White Shrimp Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Table of Contents

Summary Report 3

Description of the Problem 3

Constructing Models—General Discussion 3

Detecting Influential Points and Outliers 3

Variable Selection 4

Multicollinearity 4

Other Procedures 4

How the Final Model Was Chosen 4

Model 7

Exploring the Data 10

Listing of Data 10

Summary Information for Individual Variables 11

99% Prediction Ellipses 41

Box–Cox Analysis 52

Numerical Results 52

Plots 53

Model Choice Diagnostics 54

Untransformed Data 54

Logged Inflows 56

Logged Harvest 58

All Variables Logged 60

Regression—Untransformed Data 62

ANOVA and Parameter Estimates 62

Collinearity Diagnostics 63

Residuals Diagnostics 65

Summary Information 65

Case Values for Residuals Diagnostics 66

Graphics 67

Prediction Intervals for White Shrimp Harvest 74

Outlier and Influential Point Detection 75

Calculated Quantities 75

Graphics 78

Regression—Logged Harvest 82

ANOVA and Parameter Estimates 82

Collinearity Diagnostics 83

Residuals Diagnostics 85
Summary Information 85
Case Values for Residual Diagnostics 86
Graphics 87

Prediction Intervals for Natural Log of White Shrimp Harvest 94

Outlier and Influential Point Detection 95
Calculated Quantities 95
Graphics 98

Examining Subsets of the Data *102*

Untransformed Data: 1964 and 1967 Omitted 102
Scree Plots 104

Logged Harvest: 1959, 1966, 1967, and 1971 Omitted 107
Scree Plots 109

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1959 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of white shrimp.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect influential points. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. No transformation was suggested. At this point, there were four data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Natural log of inflow variables; harvest untransformed

3. Natural log of harvest; inflows untransformed
4. Natural log of all variables

Selecting the Points to be Omitted. Data sets 1 and 3 (with maximum R^2 of 0.45 and 0.42, respectively) seemed more promising than sets 3 and 4 (with maximum R^2 of 0.30 and 0.32), so full regressions were performed for two models, each of which contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model. Because so many points were flagged, a large number of subsets of those two data sets were analyzed. Each subset was obtained by deleting various combinations of the potentially troublesome points. In each case, one subset was chosen as optimal; those results are presented in the section on subset analysis.

The observations flagged as potentially influential are given in the summary table below. Those which were ultimately deleted in fitting the final candidate models are indicated with an asterisk. The abbreviation key and a similar summary table for points designated as potentially influential by box plots appear on the next page. A point was not considered to be a potential problem unless it garnered multiple flags.

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 1									
1961	1								1
***1964**			1				1	1	3
1966							1		1
***1967**			1				1	1	3
1973	1								1
1974	1								1
1975	1								1
1977							1		1
1979	2								2
1983	1								1
Data Set 3									
***1959**	1						1		2
1961	1								1
***1966**	1						1		2
***1967**	2	1	1				1	1	6
***1971**	2								2
1976	1								1
1983							1		1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	Variable
1959	Ln(White Shrimp Harvest)
1961	Ln(White Shrimp Harvest) January-February Inflows
1966	Ln(White Shrimp Harvest)
1967	Ln(White Shrimp Harvest) Ln(January-February Inflows)
1971	Ln(January-February Inflows) Ln(May-June Inflows)
1973	March-April Inflows
1974	September-October Inflows
1975	November-December Inflows
1976	Ln(January-February Inflows)
1979	March-April Inflows July-August Inflows
1983	July-August Inflows

Summary of points flagged by boxplots

Selecting the Final Candidate Models. After the subset analysis led us to two subsets (untransformed data, 1964 and 1967 omitted; and logged harvest, 1959, 1966, 1967, and 1971 omitted), further examination led us to consider the following two models:

1964 and 1967 Omitted:

1a. Harvest regressed on January-February, March-April, July-August, and November-December inflows

1959, 1966, 1967, and 1971 Omitted:

3a. Natural log of harvest regressed on January-February, March-April, July-August, and November-December inflows

Selecting the Final Model. To put these models on a common ground for testing, the observations corresponding to the years 1959, 1964, 1966, 1967, and 1971 were deleted. Regression was performed using each of these two models, and the deleted residuals were calculated. In the models where the prediction was for the natural log of harvest, the prediction

was transformed back to the original scale before the deleted residual was calculated. Various descriptive statistics were calculated for the square of these deleted residuals. This was repeated for the entire data set of 29 observations, and the results of both of these procedures appear below. Clearly, model 1a performs better from the point of view of prediction, and is therefore our final choice.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
1a	*24*	*1837.7451*	*2026866.2804*	*311168.890001*	*464418.298290*
3a	*24*	*4929.2933*	*2080393.8296*	*370338.440932*	*502880.360329*
1a	*29*	*22.5214*	*5727551.1302*	*713058.512080*	*1293245.463846*
3a	*29*	*469.2938*	*5847464.8998*	*815586.372789*	*1375688.585535*

Model

White Shrimp Harvest = 3212.037 – 0.691*(January-February Inflows)
+ 0.273*(March-April Inflows)
– 0.325*(July-August Inflows)
+ 0.505*(November-December Inflows)

Notes on the final model: There is no evidence of serial autocorrelation, based on the Durbin-Watson results. Neither the variance inflation factors (VIF) nor the condition index indicates problems with multicollinearity.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, July-August Inflows, March-April Inflows, January-February Inflows*[c,d]	.	*.799*	*.638*	*.572*	*584.3514*	*1.976*

a. Dependent Variable: White Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, July-August Inflows, March-April Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13253724.491	4	3313431.123	9.704	.000[b]
	Residual	7512264.385	22	341466.563		
	Total	20765988.876	26			

a. Dependent Variable: White Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, July-August Inflows, March-April Inflows, January-February Inflows

Coefficients[a]

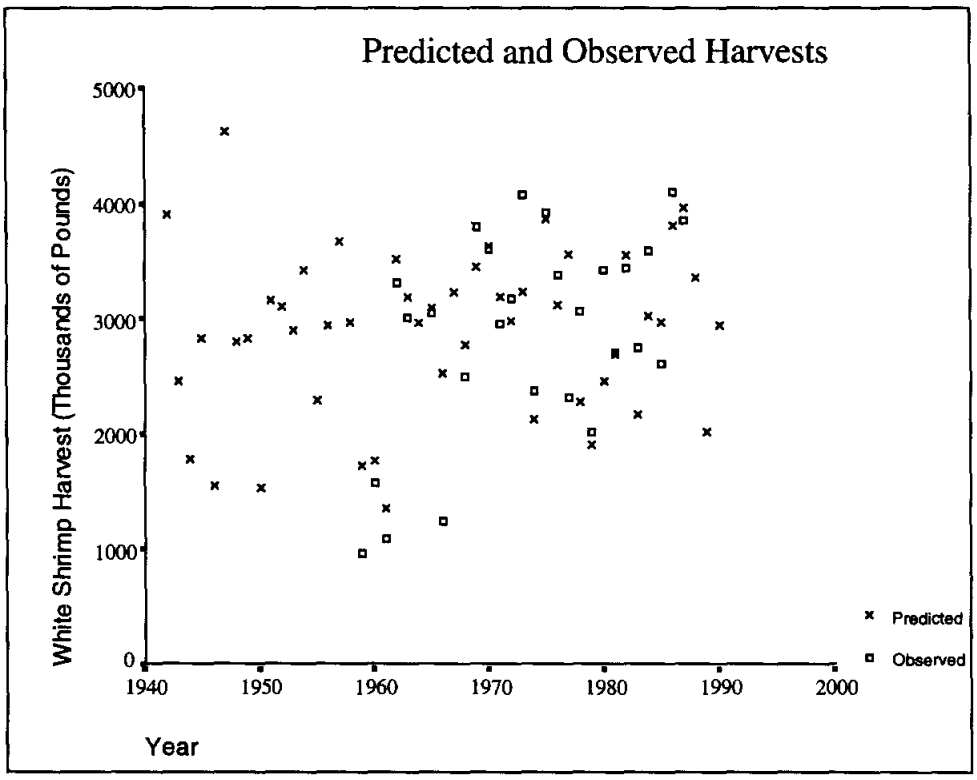
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3212.037	280.221		11.462	.000	2630.893	3793.181		
	January-February Inflows	-.691	.137	-.832	-5.041	.000	-.975	-.406	.604	1.657
	March-April Inflows	.273	.095	.415	2.890	.009	.077	.470	.797	1.255
	July-August Inflows	-.325	.162	-.285	-2.013	.057	-.661	.010	.819	1.221
	November-December Inflows	.505	.113	.697	4.484	.000	.271	.738	.680	1.470

a. Dependent Variable: White Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	January-February Inflows	March-April Inflows	July-August Inflows	November-December Inflows
1	1	4.140	1.000	.01	.01	.01	.01	.01
	2	.408	3.187	.00	.02	.21	.11	.27
	3	.224	4.295	.01	.00	.43	.81	.00
	4	.126	5.740	.98	.08	.19	.02	.13
	5	.102	6.374	.00	.90	.16	.04	.59

a. Dependent Variable: White Shrimp Harvest


Predicted and Observed Harvests
White Shrimp Harvest (Thousands of Pounds)
5000
4000
3000
2000
1000
0
1940
1950
1960
1970
1980
1990
2000
Year
Predicted
Observed

Exploring the Data

Listing of Data

YEAR	WHITE_SH	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1959	982.00	2088.38	2234.80	1954.20	2282.80	2054.00	207.00
1960	1596.40	2838.00	799.80	1831.80	1208.18	1091.60	1409.60
1961	1106.70	5180.00	1440.10	1977.30	1437.95	1154.04	3586.10
1962	3324.40	728.40	649.90	1036.80	532.90	2163.94	1621.10
1963	3027.30	1102.10	356.90	796.10	201.78	978.50	1417.60
1964	4700.70	851.95	1061.50	445.80	215.41	126.83	276.50
1965	3066.20	1466.60	1035.80	2334.80	243.99	588.62	1398.70
1966	1260.00	2126.40	1977.80	5402.30	1220.70	260.65	1288.40
1967	1038.80	257.53	583.93	749.10	383.91	529.50	336.49
1968	2516.80	2129.20	3236.90	6258.00	929.20	515.10	920.20
1969	3809.60	1663.10	4102.00	4023.50	489.22	556.89	862.74
1970	3620.60	752.30	2674.30	1624.80	402.78	395.35	702.30
1971	2962.80	134.30	306.18	273.04	448.98	1627.41	280.35
1972	3188.40	2042.19	715.60	1966.77	442.44	748.44	2250.95
1973	4077.70	2190.55	5382.71	5752.84	1597.24	565.19	1165.62
1974	2392.40	3342.00	947.02	1514.33	566.48	4222.20	2309.20
1975	3927.20	3138.98	2242.47	3911.76	1251.90	1972.37	5217.90
1976	3402.10	300.41	774.04	1891.54	958.01	568.55	451.20
1977	2336.20	2017.84	3210.59	1381.78	412.79	716.23	2019.79
1978	3075.60	2120.06	606.39	673.68	390.93	472.81	1017.47
1979	2028.70	2872.02	4744.84	3937.29	3019.84	418.13	740.91
1980	3441.60	2483.63	1718.35	2028.90	382.89	2799.02	1261.47
1981	2722.40	331.86	393.91	4583.43	1656.01	1004.49	300.79
1982	3456.40	1380.97	1586.83	3551.50	1489.26	2326.50	2674.10
1983	2762.90	2666.53	1887.04	2520.25	3116.05	339.35	2584.78
1984	3604.30	1259.48	1283.67	822.10	524.19	2011.59	1017.37
1985	2623.20	2468.30	2670.78	1760.81	626.87	2025.67	1873.57
1986	4108.30	1651.33	771.37	4515.98	841.81	1356.07	3585.61
1987	3865.50	1905.62	1955.75	3070.28	1274.76	1591.52	3886.93

WHITE_SH	White shrimp harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
White Shrimp Harvest	.113	29	.200*	.946	29	.222
Ln(White Shrimp Harvest)	.176	29	.022	.850	29	.010*
January-February Inflows	.101	29	.200*	.946	29	.230
March-April Inflows	.151	29	.091	.876	29	.010*
May-June Inflows	.198	29	.005	.916	29	.032
July-August Inflows	.194	29	.007	.826	29	.010*
September-October Inflows	.173	29	.026	.867	29	.010*
November-December Inflows	.182	29	.015	.888	29	.010*
Ln(January-February Inflows)	.188	29	.010	.870	29	.010*
Ln(March-April Inflows)	.091	29	.200*	.973	29	.667
Ln(May-June Inflows)	.107	29	.200*	.954	29	.330
Ln(July-August Inflows)	.125	29	.200*	.955	29	.353
Ln(September-October Inflows)	.116	29	.200*	.972	29	.659
Ln(November-December Inflows)	.096	29	.200*	.956	29	.359

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

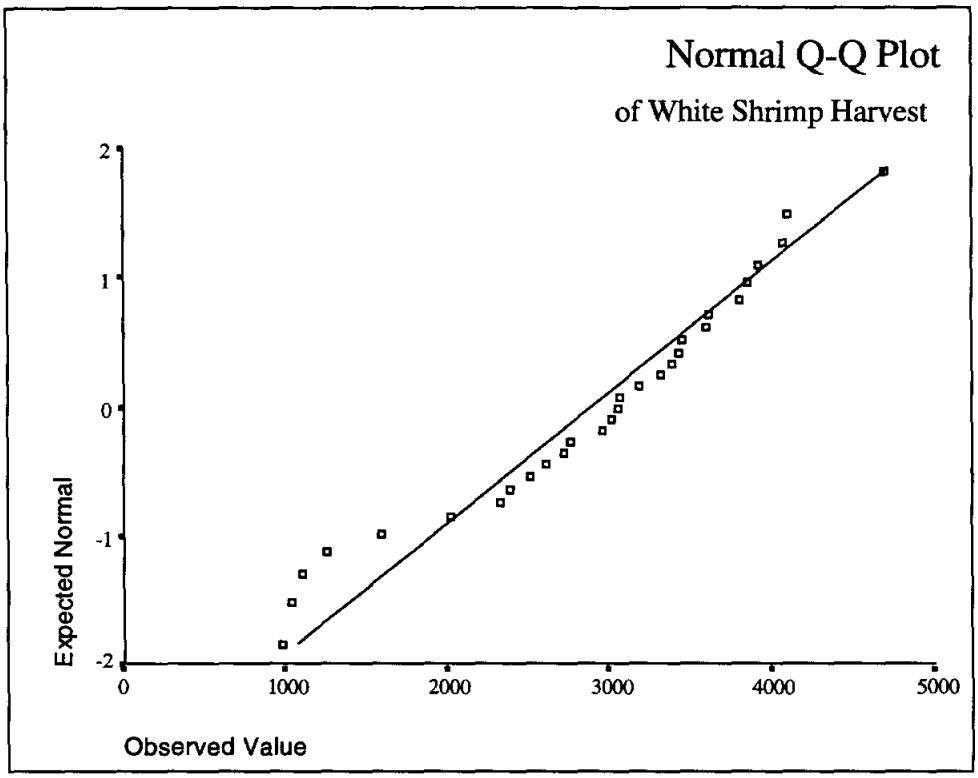
a. Lilliefors Significance Correction

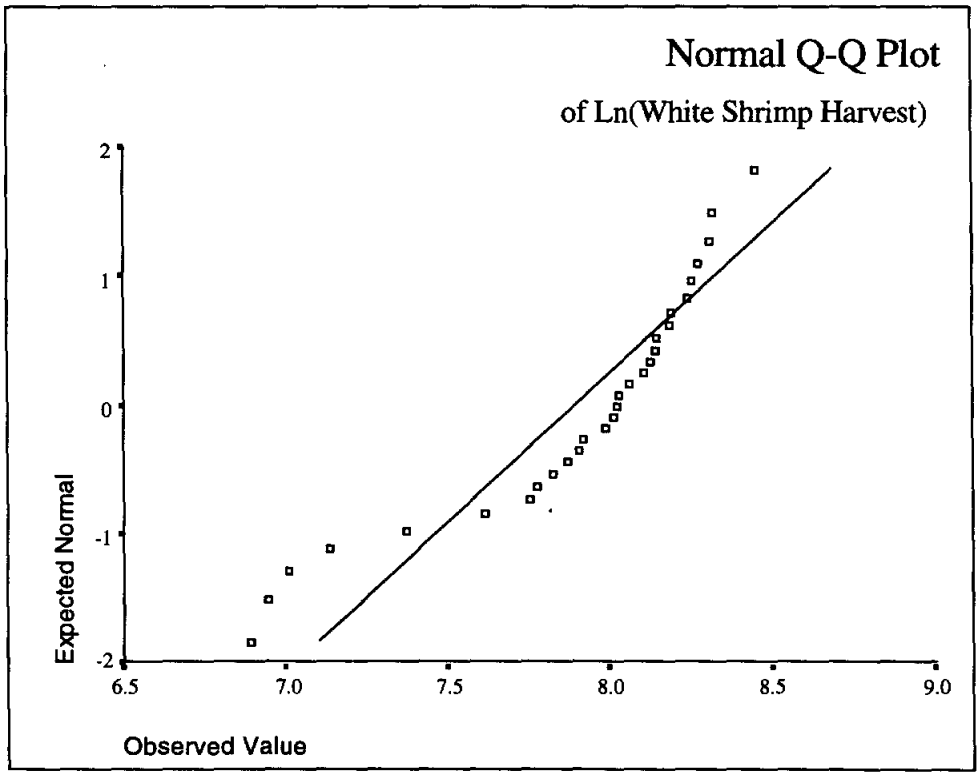
Descriptives

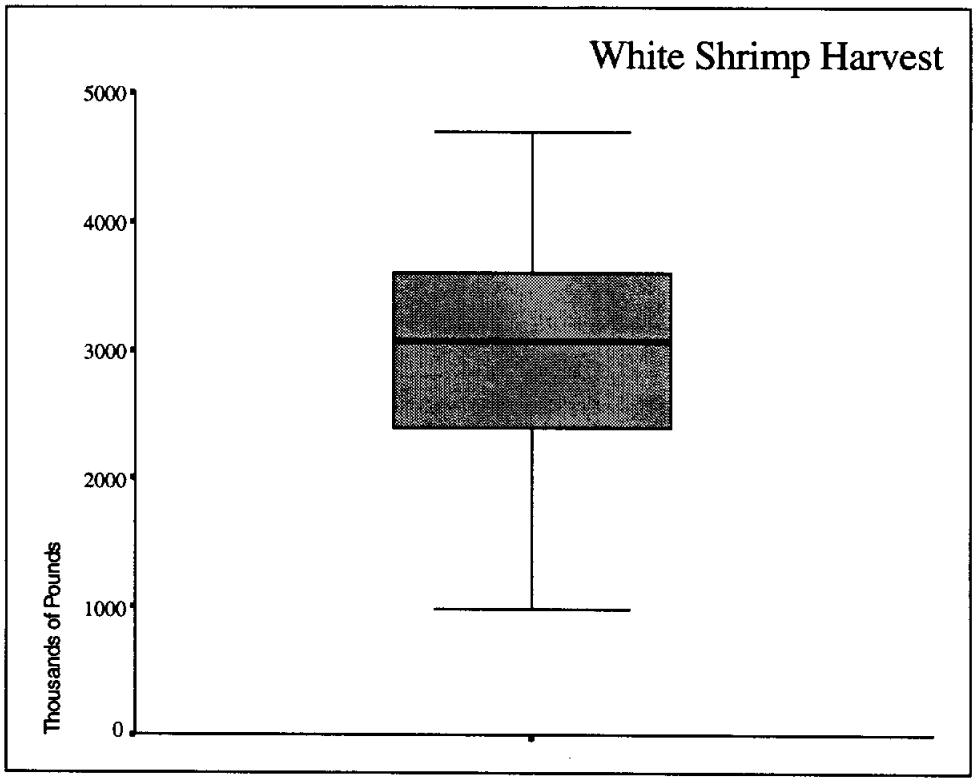
			Statistic	Std. Error
White Shrimp Harvest	Mean		*2897.4207*	*183.9375*
	95% Confidence Interval for Mean	*Lower Bound*	*2520.6419*	
		Upper Bound	*3274.1995*	
	5% Trimmed Mean		*2912.8852*	
	Median		*3066.2000*	
	Variance		*981156.766*	
	Std. Deviation		*990.5336*	
	Minimum		*982.00*	
	Maximum		*4700.70*	
	Range		*3718.70*	
	Interquartile Range		*1248.1500*	
	Skewness		*-.532*	*.434*
	Kurtosis		*-.377*	*.845*

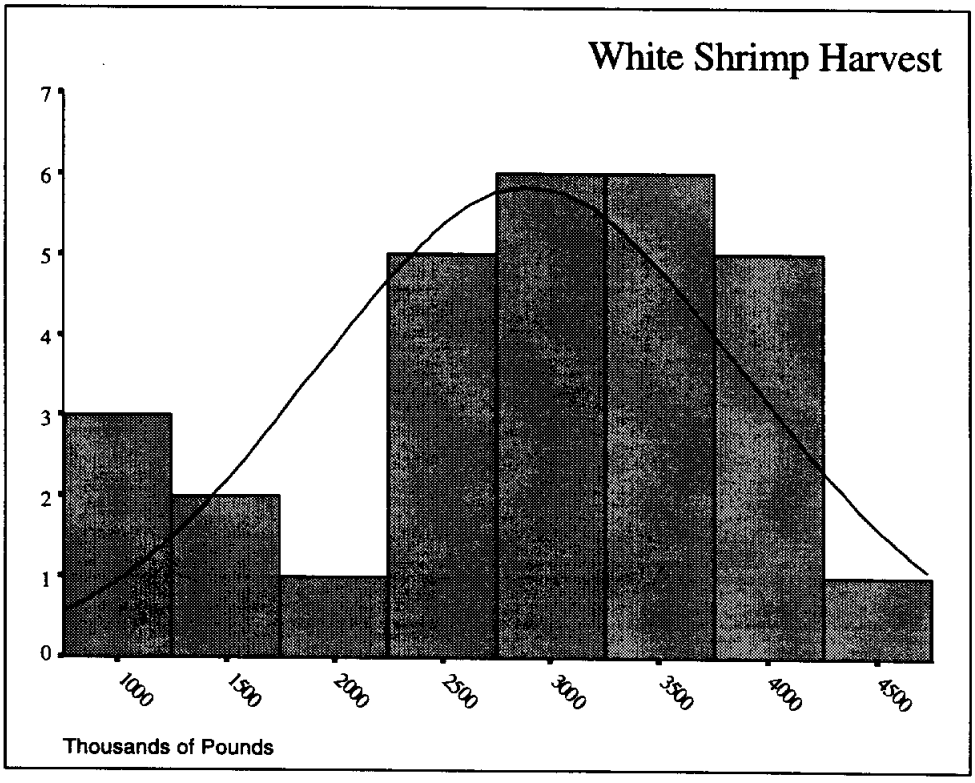
Extreme Values

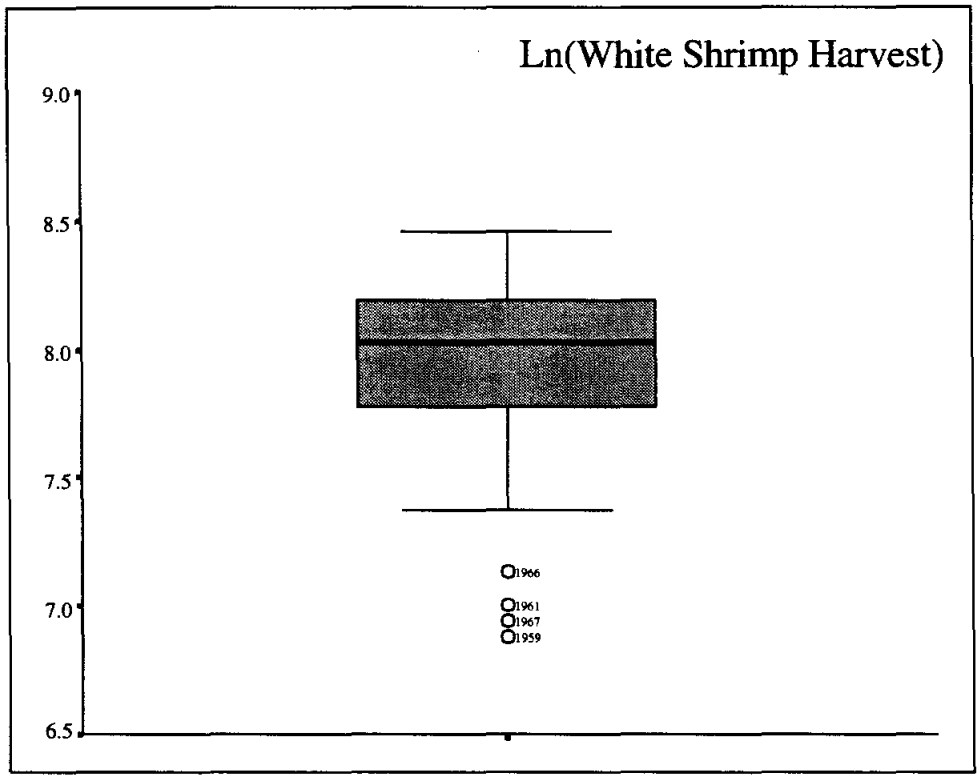
			Case Number	Year	Value
White Shrimp Harvest	Highest	1	*6*	*1964*	*4700.70*
		2	*28*	*1986*	*4108.30*
		3	*15*	*1973*	*4077.70*
		4	*17*	*1975*	*3927.20*
		5	*29*	*1987*	*3865.50*
	Lowest	1	*1*	*1959*	*982.00*
		2	*9*	*1967*	*1038.80*
		3	*3*	*1961*	*1106.70*
		4	*8*	*1966*	*1260.00*
		5	*2*	*1960*	*1596.40*


Normal Q-Q Plot
of White Shrimp Harvest
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(White Shrimp Harvest)
Expected Normal
2
1
0
-1
-2
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


White Shrimp Harvest
5000
4000
3000
2000
1000
0
Thousands of Pounds


White Shrimp Harvest
7
6
5
4
3
2
1
0
1000
1500
2000
2500
3000
3500
4000
4500
Thousands of Pounds

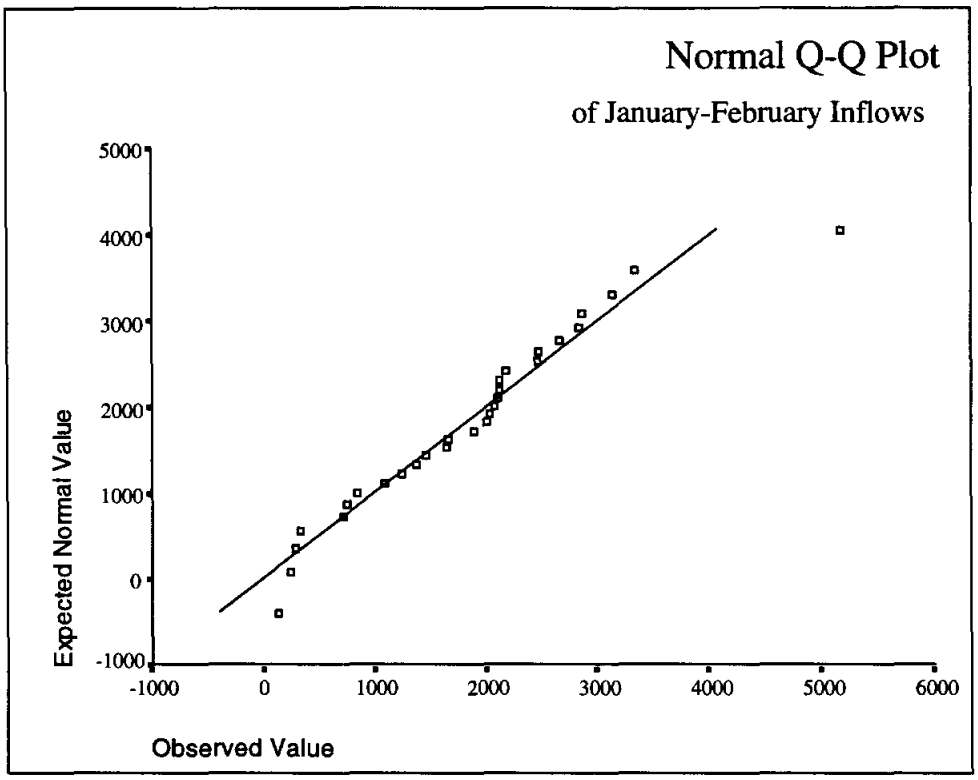

Ln(White Shrimp Harvest)
9.0
8.5
8.0
7.5
7.0
6.5
1966
1961
1967
1959

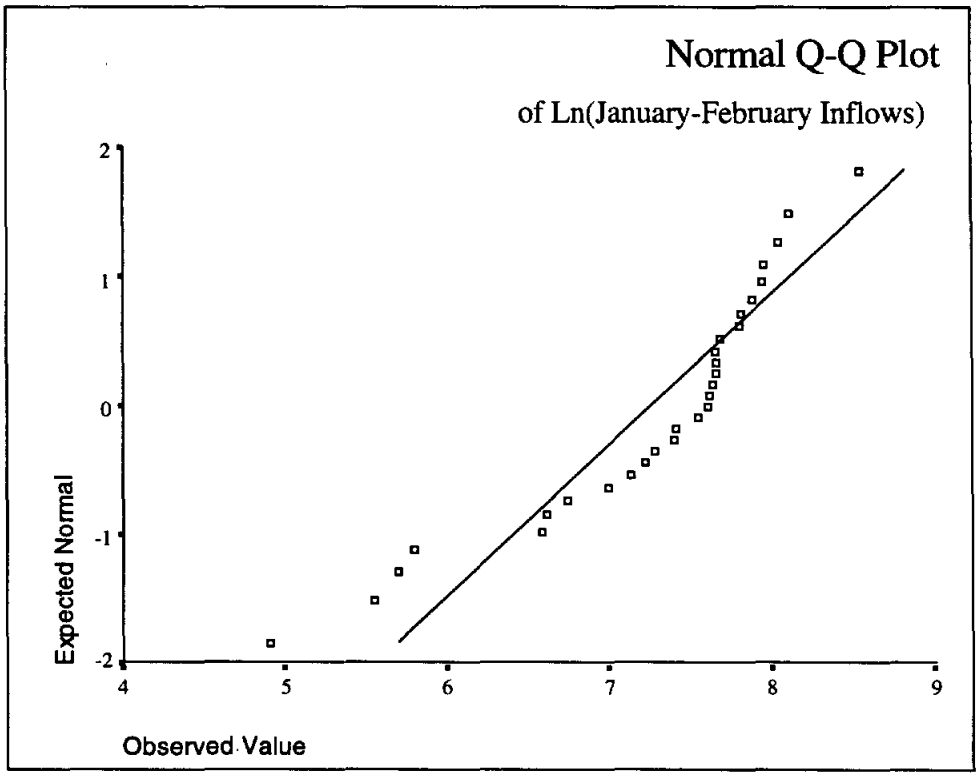
Descriptives

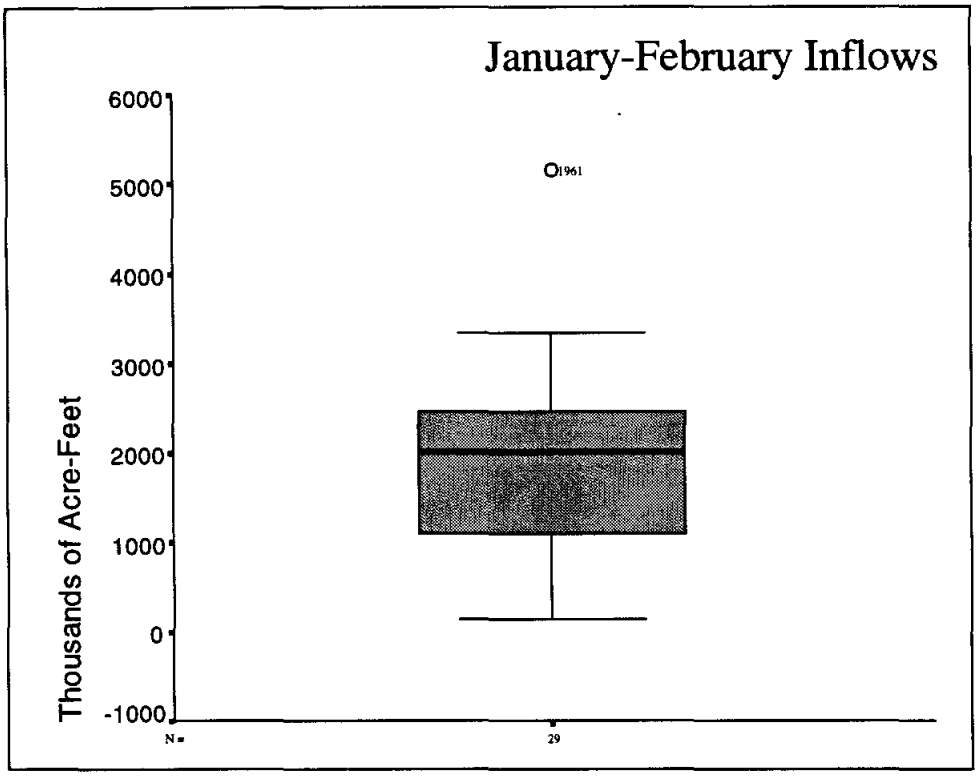
			Statistic	Std. Error
JF_INFL	Mean		1844.4838	204.3525
	95% Confidence Interval for Mean	Lower Bound	1425.8868	
		Upper Bound	2263.0808	
	5% Trimmed Mean		1783.7525	
	Median		2017.8400	
	Variance		1211038	
	Std. Deviation		1100.4717	
	Minimum		134.30	
	Maximum		5180.00	
	Range		5045.70	
	Interquartile Range		1498.9400	
	Skewness		.729	.434
	Kurtosis		1.622	.845

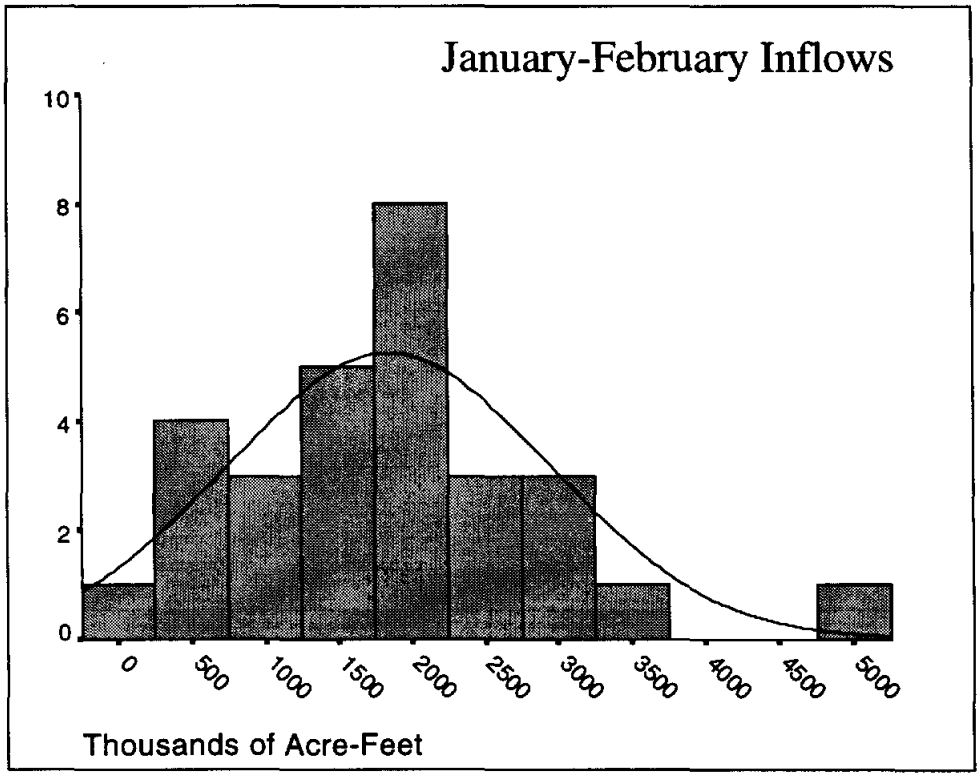
Extreme Values

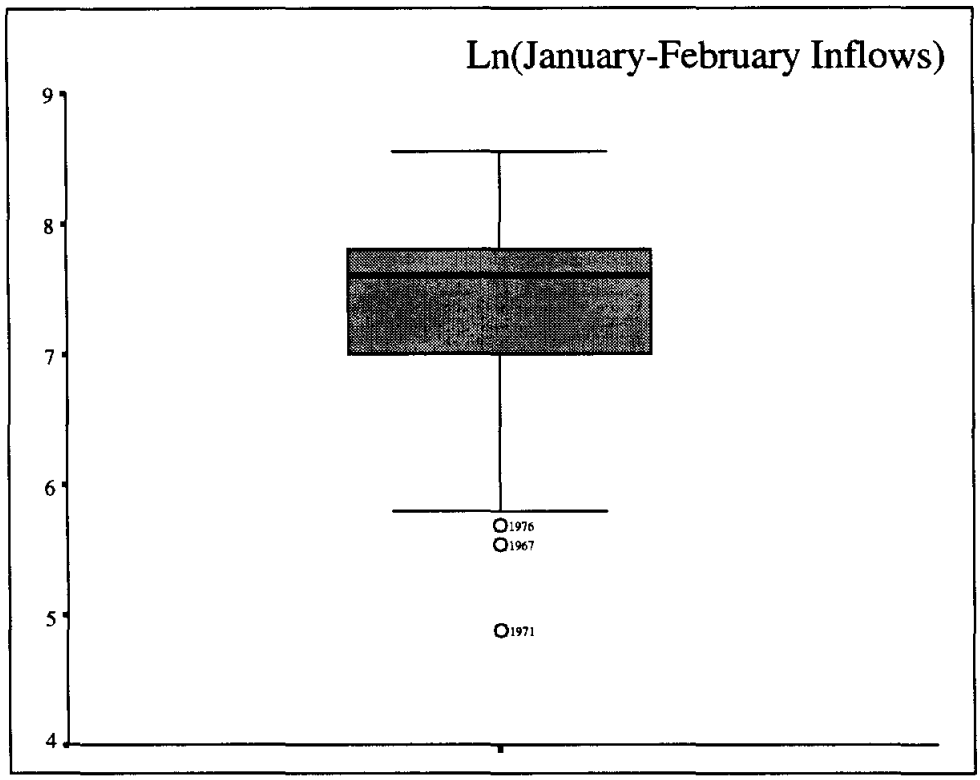
			Case Number	YEAR	Value
JF_INFL	Highest	1	3	1961	5180.00
		2	16	1974	3342.00
		3	17	1975	3138.98
		4	21	1979	2872.02
		5	2	1960	2838.00
	Lowest	1	13	1971	134.30
		2	9	1967	257.53
		3	18	1976	300.41
		4	23	1981	331.86
		5	4	1962	728.40


Normal Q-Q Plot
of January-February Inflows
Expected Normal Value
Observed Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal
Observed Value
2
1
0
-1
-2
4
5
6
7
8
9


January-February Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1961
N =
29


January-February Inflows
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet

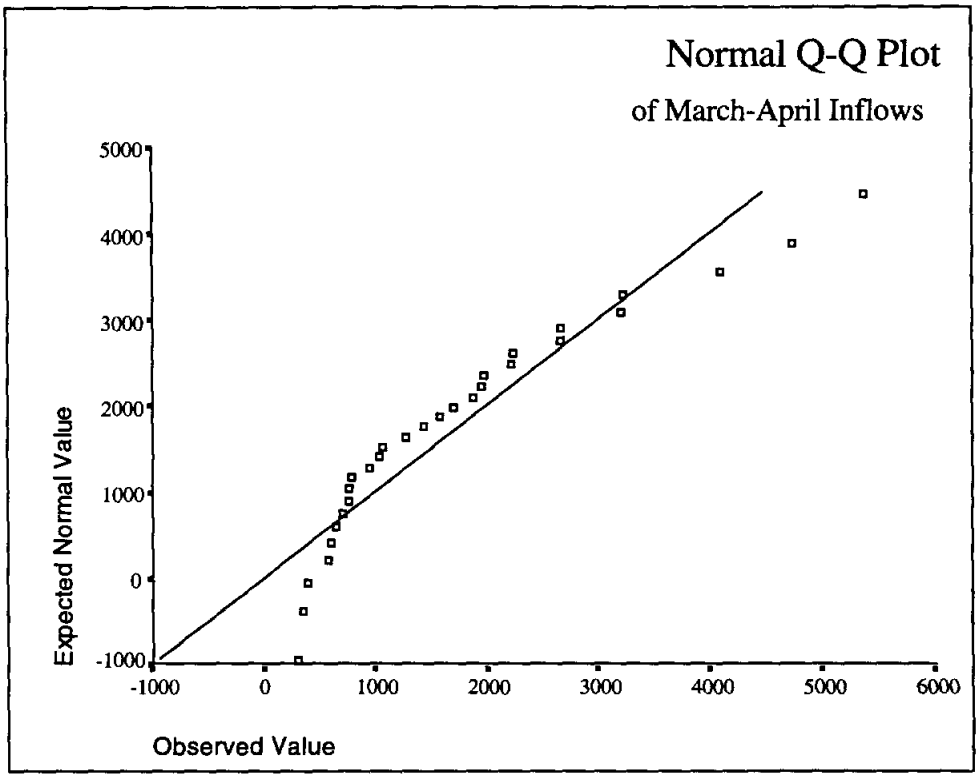

Ln(January-February Inflows)
9
8
7
6
5
4
1976
1967
1971

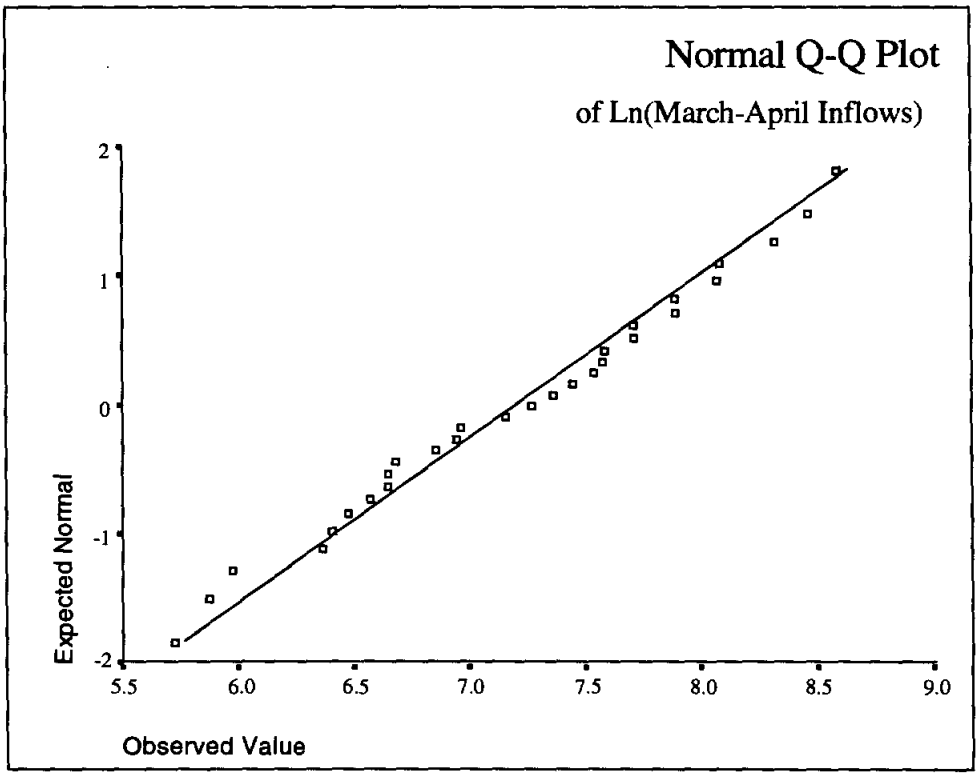
Descriptives

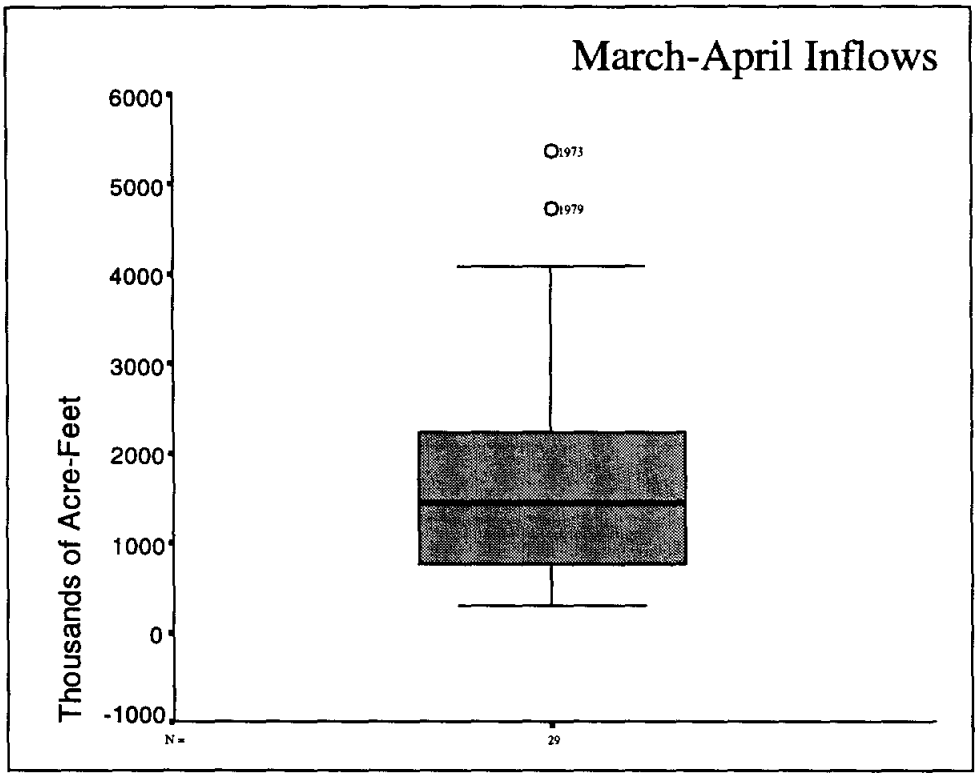
			Statistic	Std. Error
MA_INFL	Mean		1770.7334	247.9403
	95% Confidence Interval for Mean	Lower Bound	1262.8507	
		Upper Bound	2278.6162	
	5% Trimmed Mean		1661.5554	
	Median		1440.1000	
	Variance		1782758	
	Std. Deviation		1335.1995	
	Minimum		306.18	
	Maximum		5382.71	
	Range		5076.53	
	Interquartile Range		1713.1400	
	Skewness		1.211	.434
	Kurtosis		.982	.845

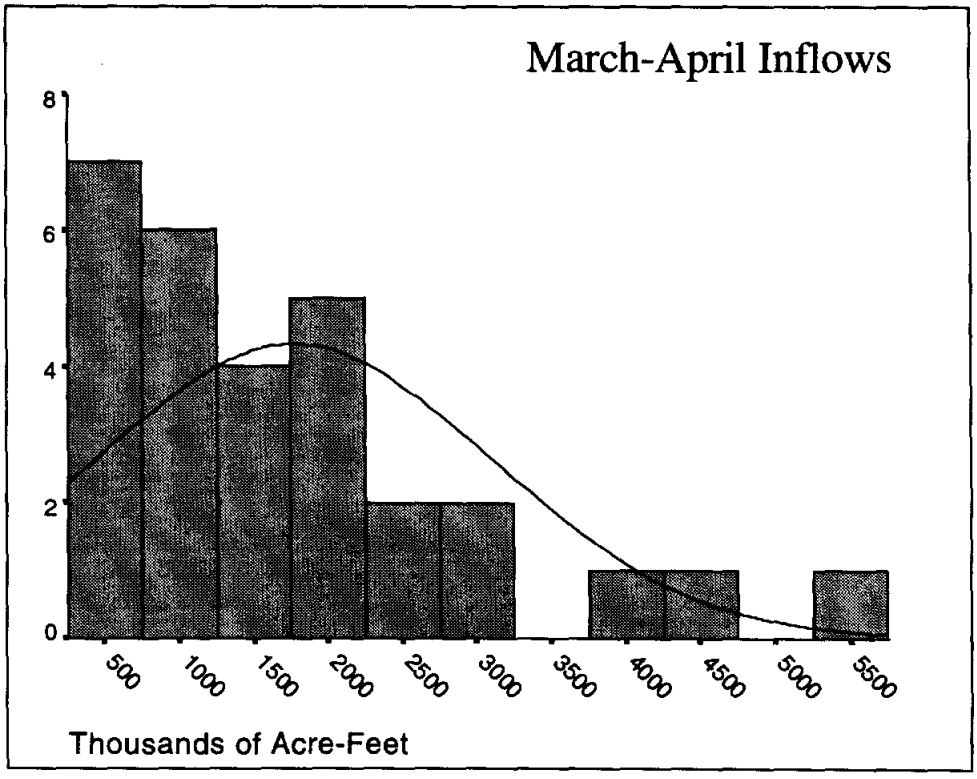
Extreme Values

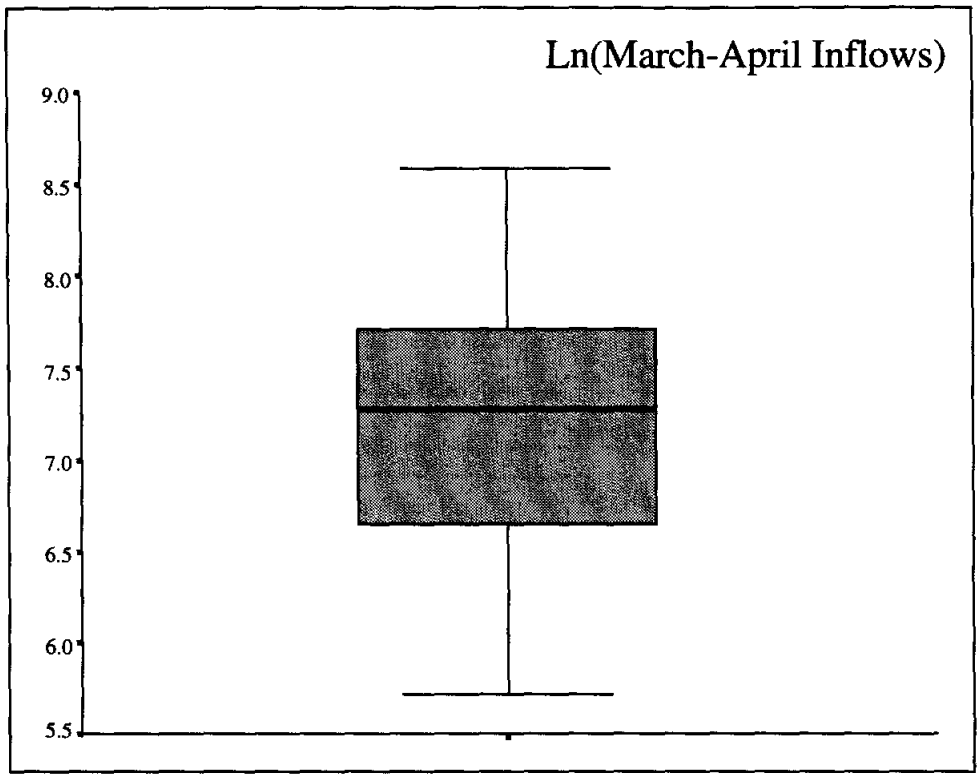
			Case Number	YEAR	Value
MA_INFL	Highest	1	15	1973	5382.71
		2	21	1979	4744.84
		3	11	1969	4102.00
		4	10	1968	3236.90
		5	19	1977	3210.59
	Lowest	1	13	1971	306.18
		2	5	1963	356.90
		3	23	1981	393.91
		4	9	1967	583.93
		5	20	1978	606.39


Normal Q-Q Plot
of March-April Inflows
Expected Normal Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(March-April Inflows)
Expected Normal
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


March-April Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1973
1979
N =
29


March-April Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
Thousands of Acre-Feet

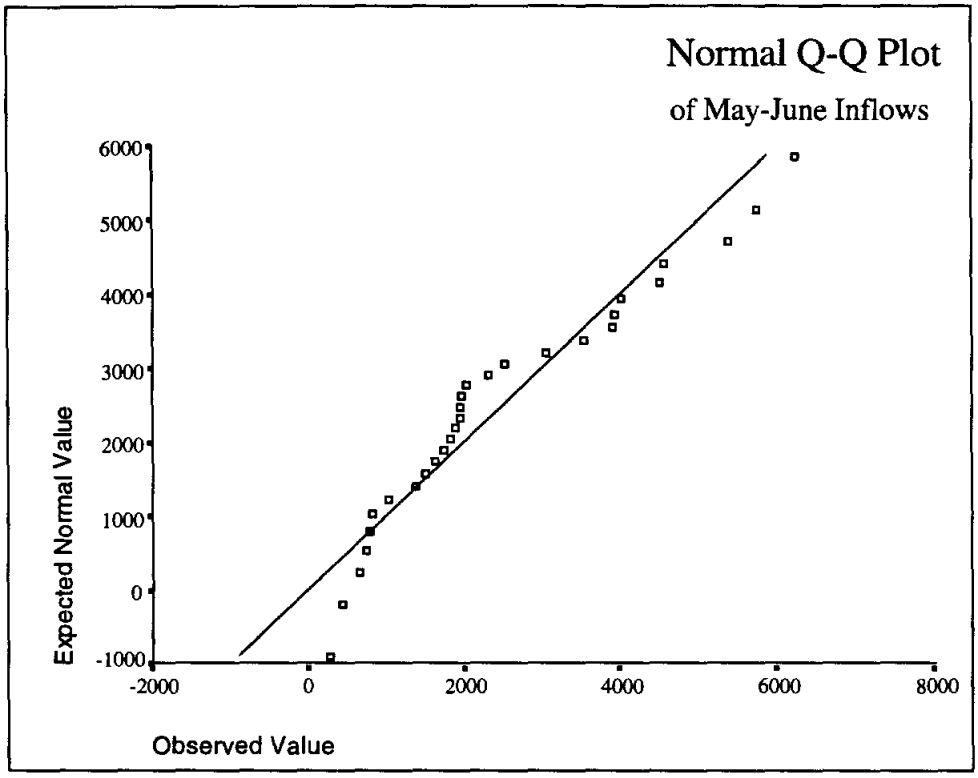

Ln(March-April Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5

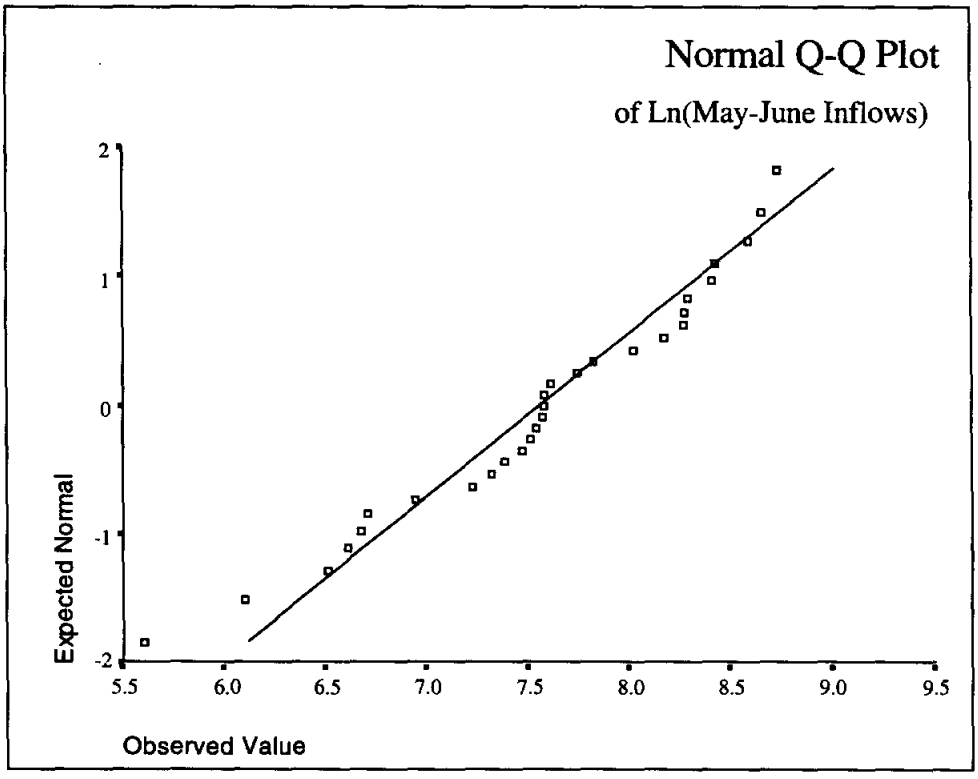
Descriptives

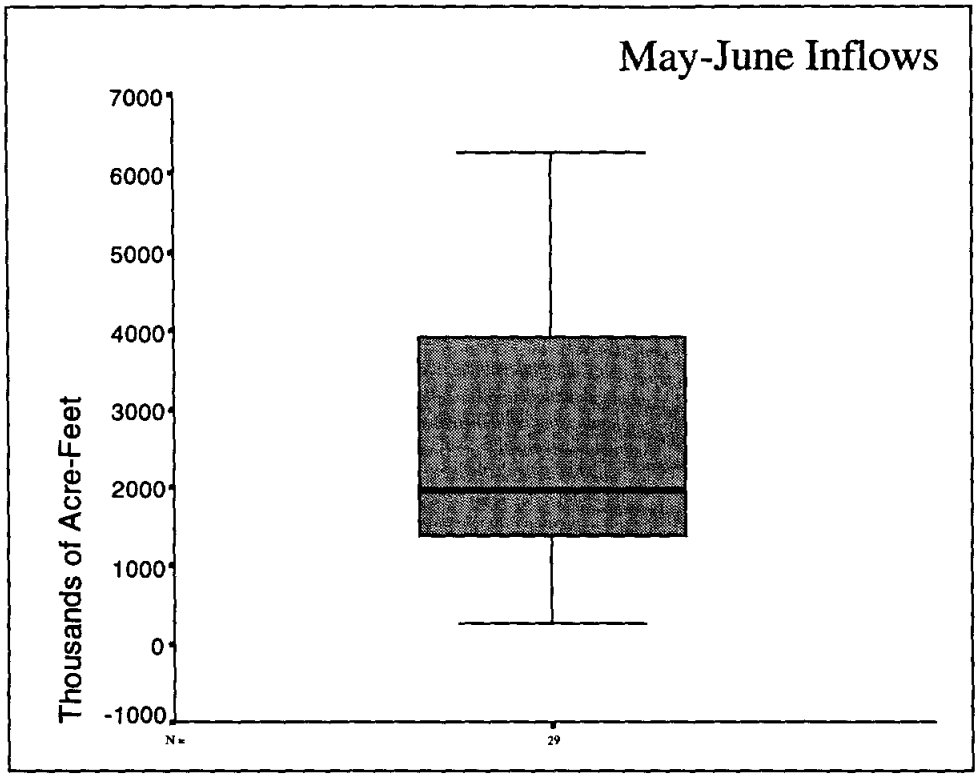
			Statistic	Std. Error
MJ_INFL	Mean		2503.1303	310.4068
	95% Confidence Interval for Mean	*Lower Bound*	1867.2908	
		Upper Bound	3138.9699	
	5% Trimmed Mean		2424.1514	
	Median		1966.7700	
	Variance		2794219	
	Std. Deviation		1671.5918	
	Minimum		273.04	
	Maximum		6258.00	
	Range		5984.96	
	Interquartile Range		2715.2350	
	Skewness		.744	.434
	Kurtosis		-.406	.845

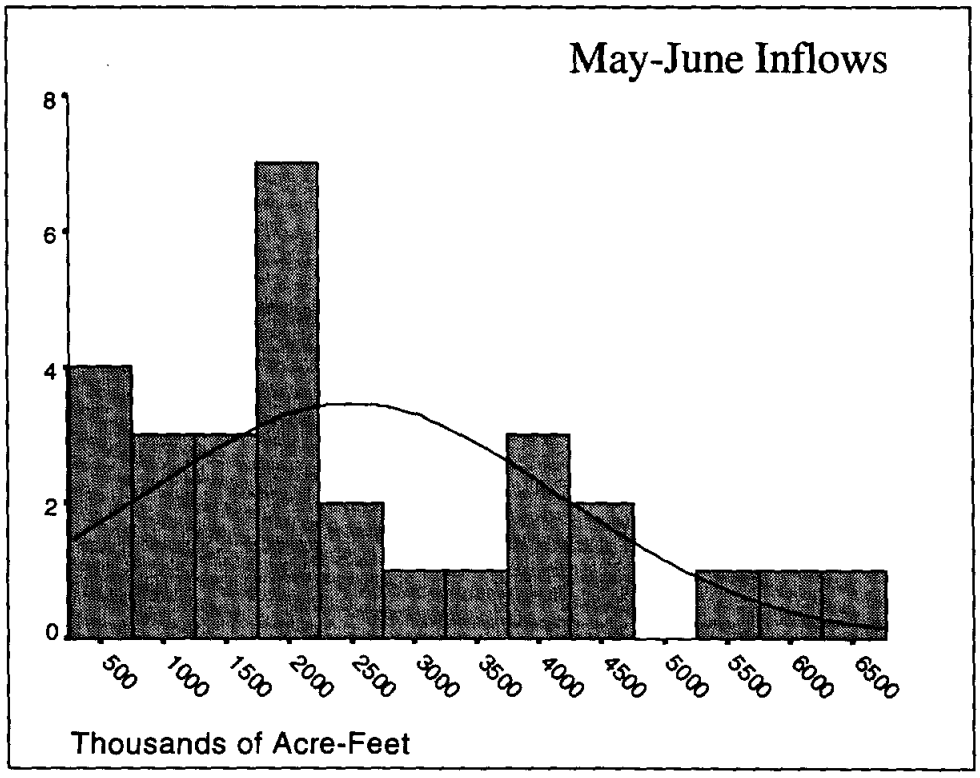
Extreme Values

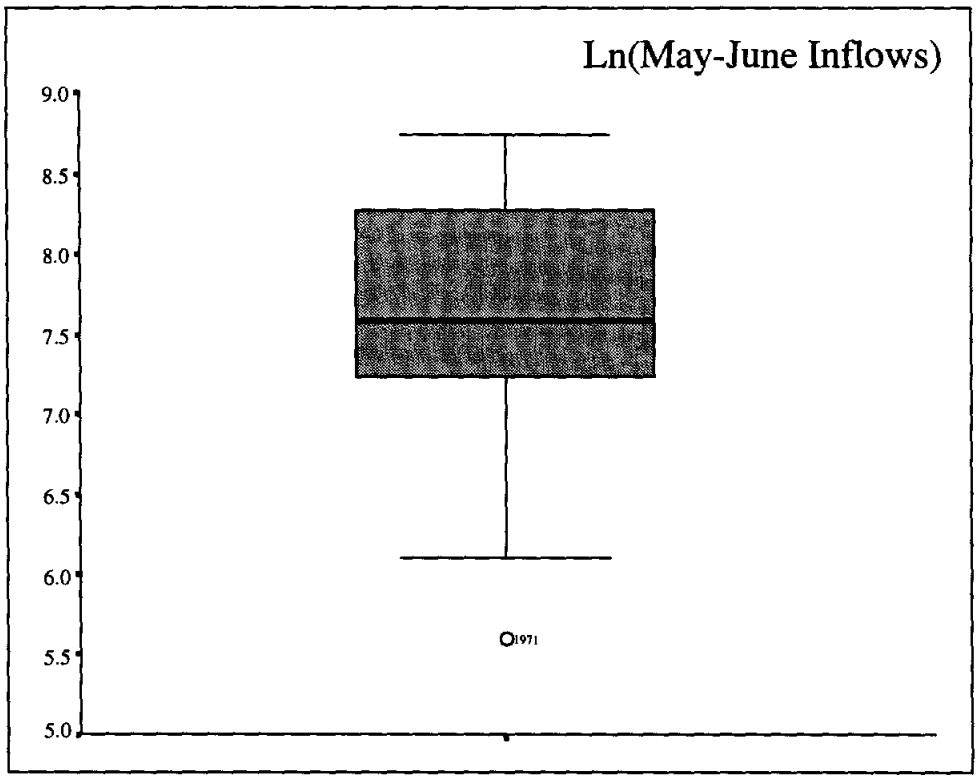
			Case Number	YEAR	Value
MJ_INFL	Highest	1	10	1968	6258.00
		2	15	1973	5752.84
		3	8	1966	5402.30
		4	23	1981	4583.43
		5	28	1986	4515.98
	Lowest	1	13	1971	273.04
		2	6	1964	445.80
		3	20	1978	673.68
		4	9	1967	749.10
		5	5	1963	796.10


Normal Q-Q Plot
of May-June Inflows
Expected Normal Value
6000
5000
4000
3000
2000
1000
0
-1000
-2000
0
2000
4000
6000
8000
Observed Value


Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
Observed Value


May-June Inflows
Thousands of Acre-Feet
7000
6000
5000
4000
3000
2000
1000
0
-1000
N =
29


May-June Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
Thousands of Acre-Feet

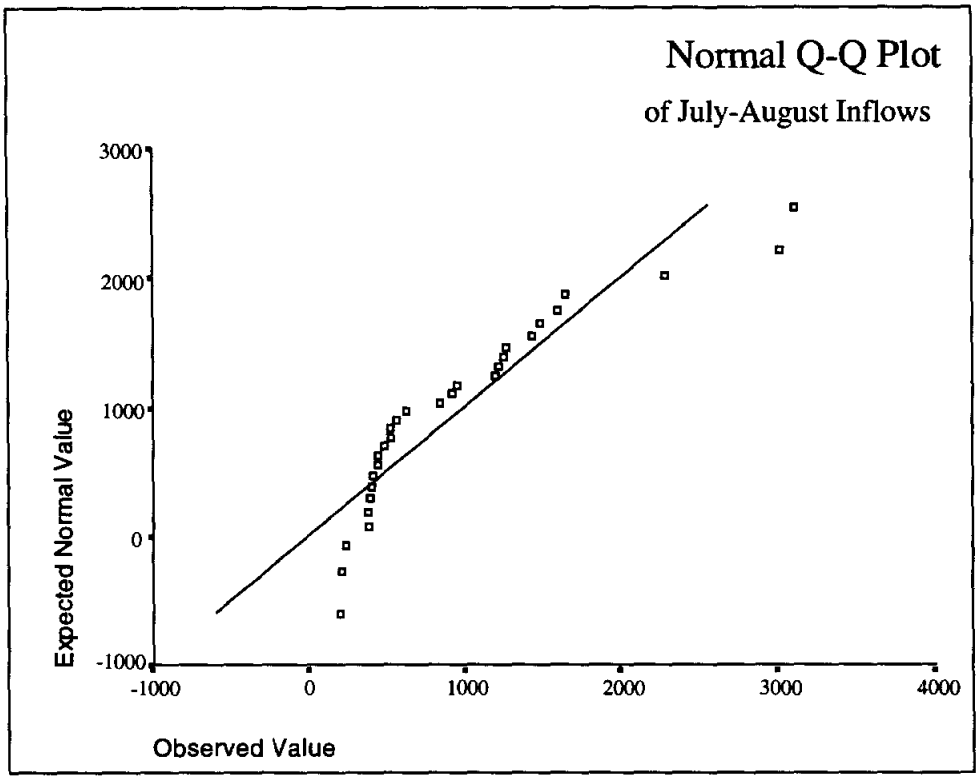

Ln(May-June Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1971

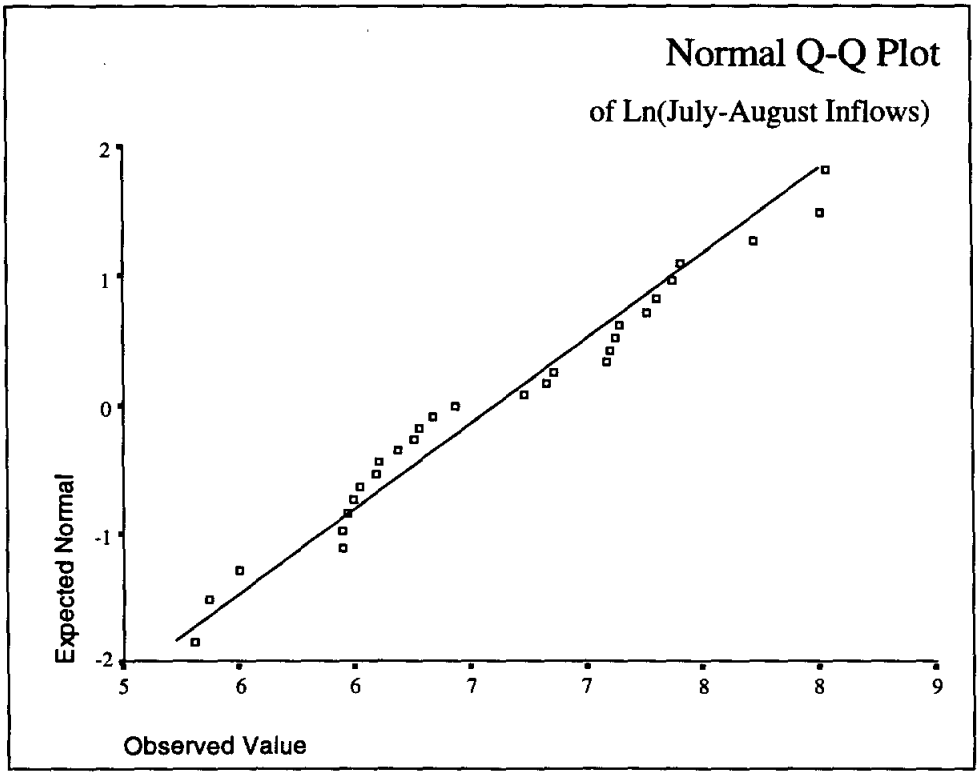
Descriptives

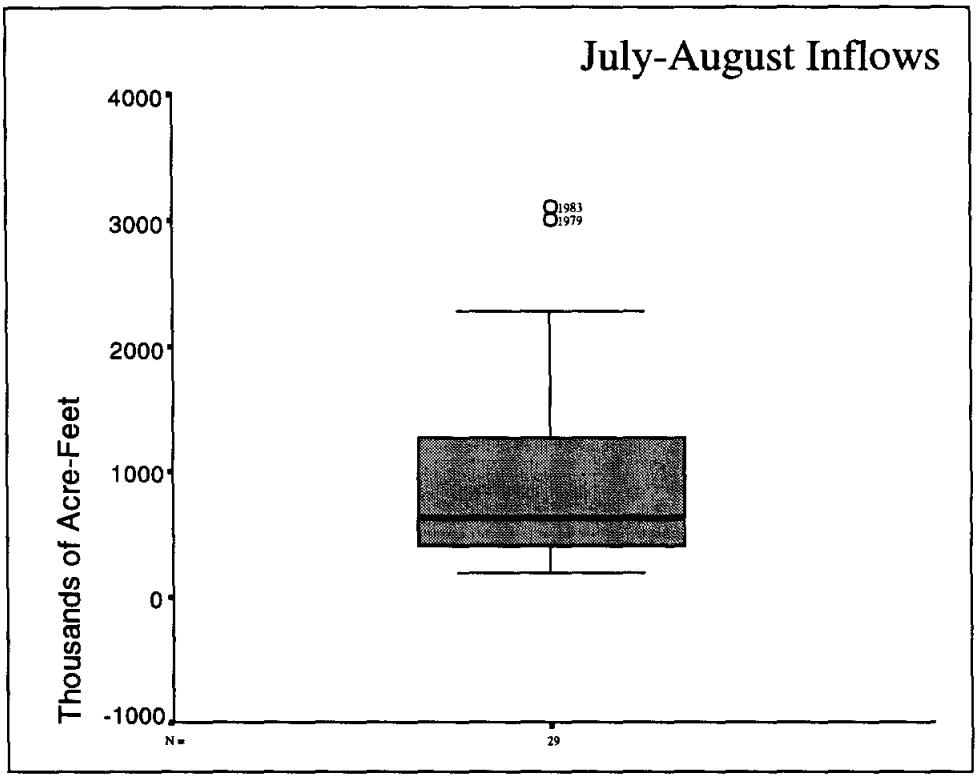
			Statistic	Std. Error
JA_INFL	Mean		984.4576	144.6129
	95% Confidence Interval for Mean	Lower Bound	688.2314	
		Upper Bound	1280.6837	
	5% Trimmed Mean		910.9417	
	Median		626.8700	
	Variance		606474.1	
	Std. Deviation		778.7645	
	Minimum		201.78	
	Maximum		3116.05	
	Range		2914.27	
	Interquartile Range		948.5700	
	Skewness		1.463	.434
	Kurtosis		1.838	.845

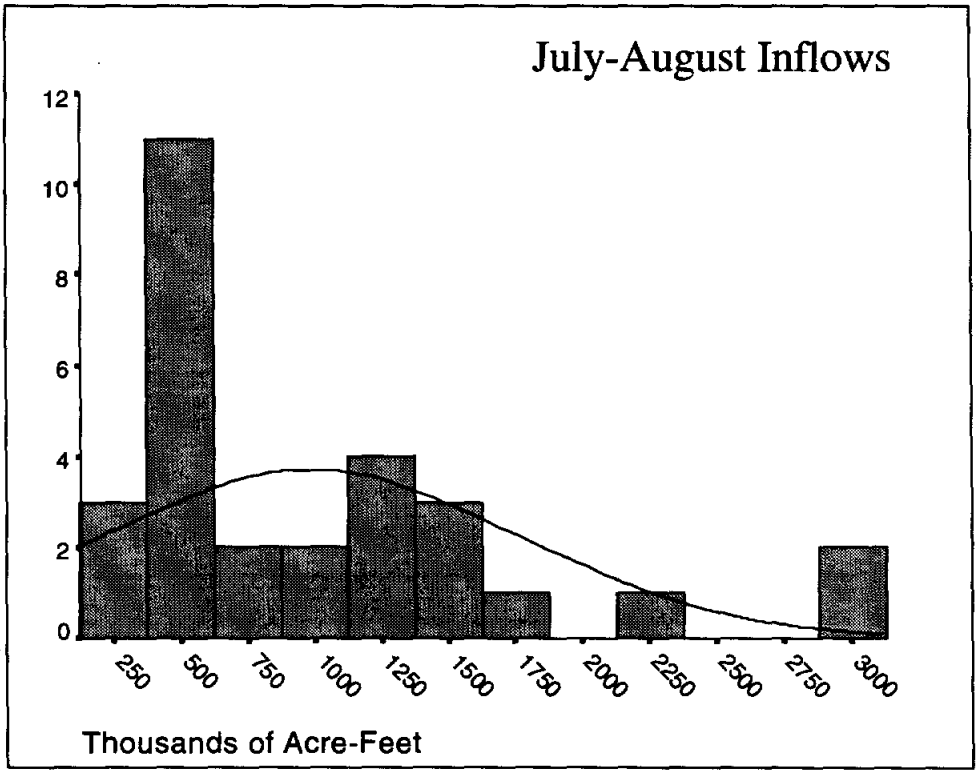
Extreme Values

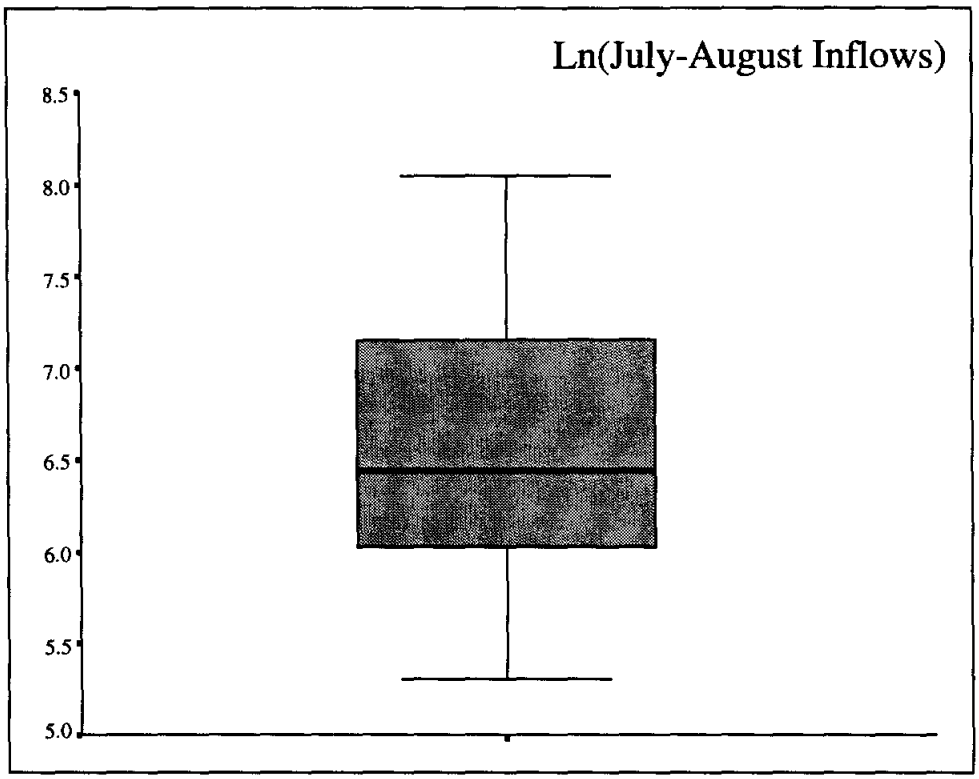
			Case Number	YEAR	Value
JA_INFL	Highest	1	25	1983	3116.05
		2	21	1979	3019.84
		3	1	1959	2282.80
		4	23	1981	1656.01
		5	15	1973	1597.24
	Lowest	1	5	1963	201.78
		2	6	1964	215.41
		3	7	1965	243.99
		4	22	1980	382.89
		5	9	1967	383.91


Normal Q-Q Plot
of July-August Inflows
Expected Normal Value
Observed Value
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000


Normal Q-Q Plot
of Ln(July-August Inflows)
Expected Normal
Observed Value
2
1
0
-1
-2
5
6
6
7
7
8
8
9


July-August Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1983
1979
N =
29


July-August Inflows
12
10
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

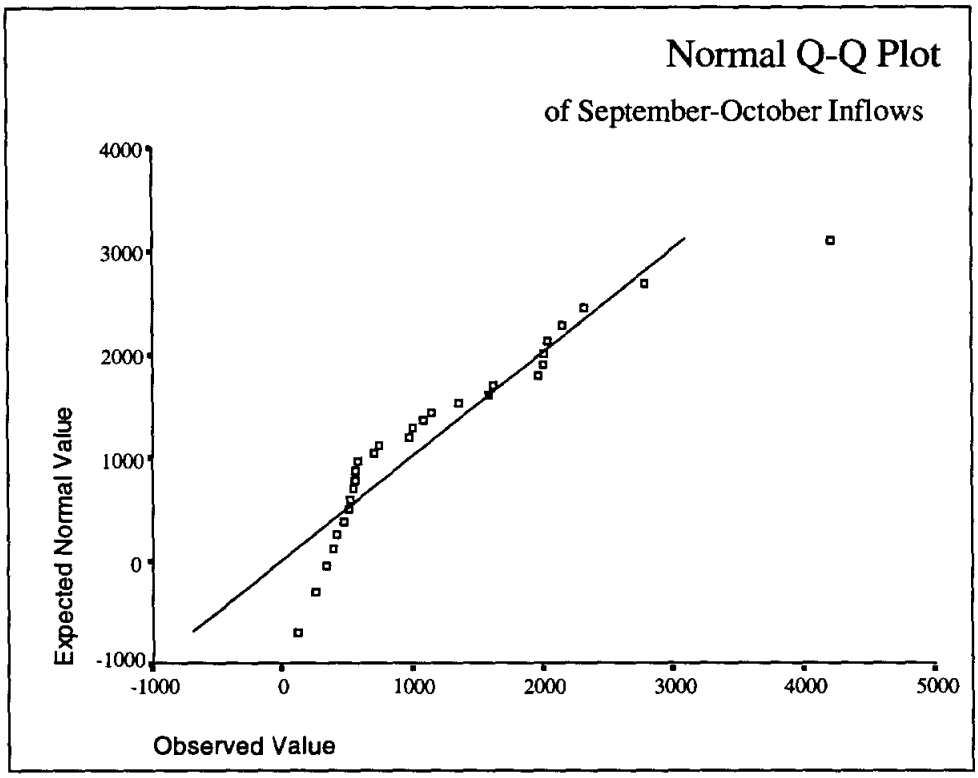

Ln(July-August Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0

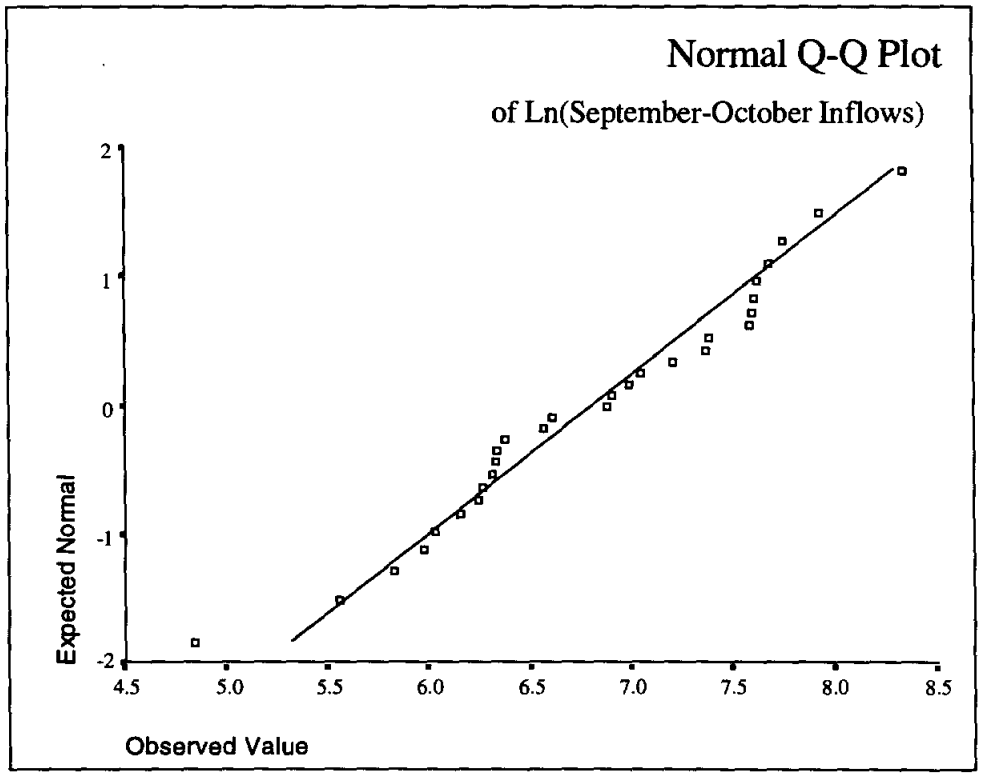
Descriptives

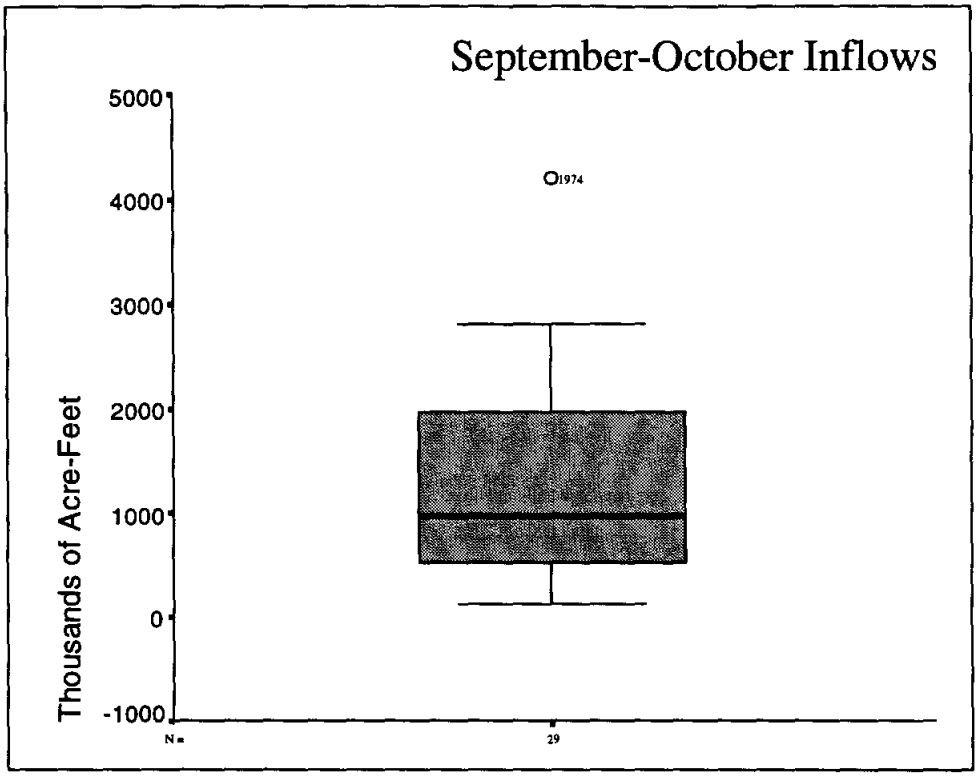
			Statistic	Std. Error
SO_INFL	Mean		*1213.1228*	*173.7714*
	95% Confidence Interval for Mean	*Lower Bound*	*857.1681*	
		Upper Bound	*1569.0774*	
	5% Trimmed Mean		*1128.5317*	
	Median		*978.5000*	
	Variance		*875698.8*	
	Std. Deviation		*935.7878*	
	Minimum		*126.83*	
	Maximum		*4222.20*	
	Range		*4095.37*	
	Interquartile Range		*1469.6800*	
	Skewness		*1.378*	*.434*
	Kurtosis		*2.282*	*.845*

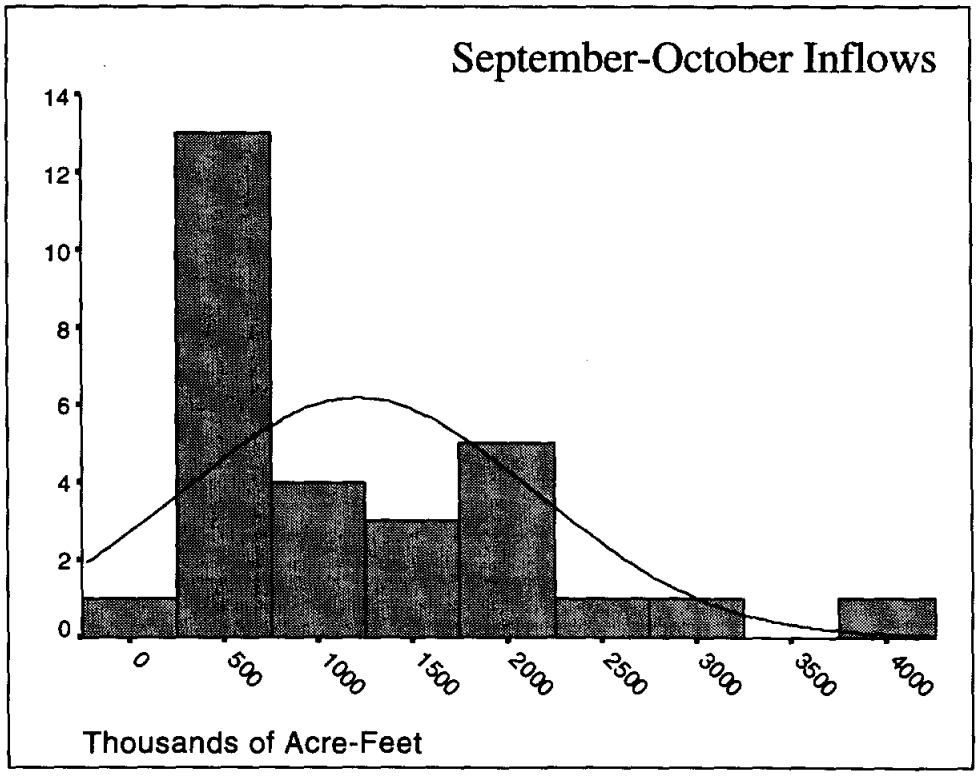
Extreme Values

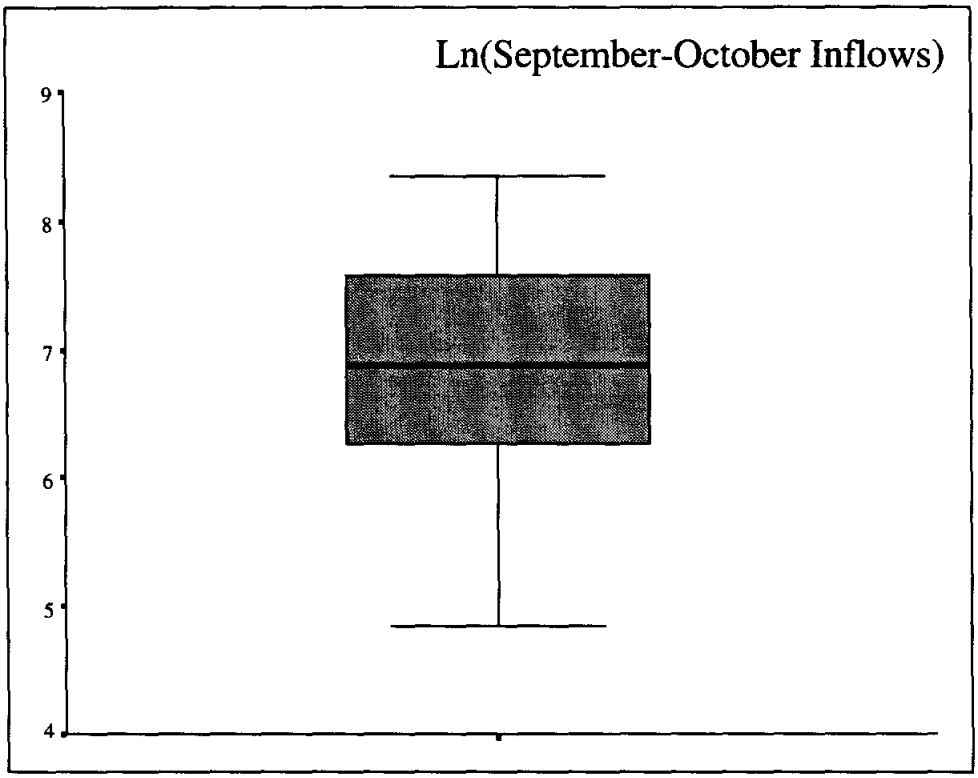
			Case Number	YEAR	Value
SO_INFL	Highest	1	*16*	*1974*	*4222.20*
		2	*22*	*1980*	*2799.02*
		3	*24*	*1982*	*2326.50*
		4	*4*	*1962*	*2163.94*
		5	*1*	*1959*	*2054.00*
	Lowest	1	*6*	*1964*	*126.83*
		2	*8*	*1966*	*260.65*
		3	*25*	*1983*	*339.35*
		4	*12*	*1970*	*395.35*
		5	*21*	*1979*	*418.13*


Normal Q-Q Plot
of September-October Inflows
Expected Normal Value
Observed Value
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal
Observed Value
2
1
0
-1
-2
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5


September-October Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
O1974
N=
29


September-October Inflows
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

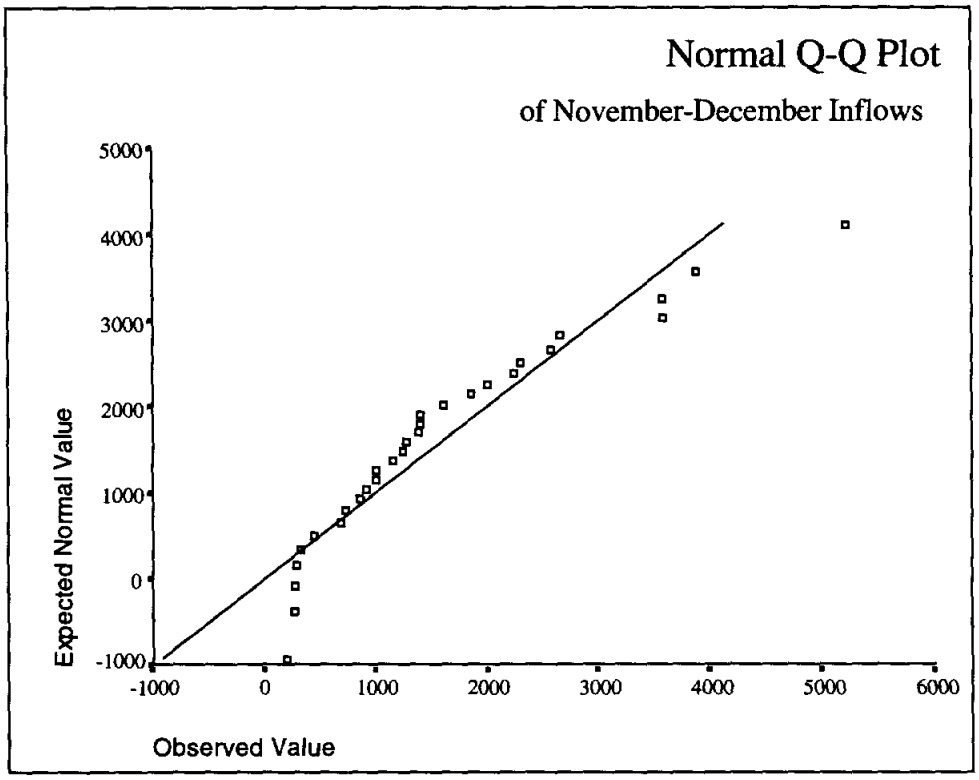

Ln(September-October Inflows)
9
8
7
6
5
4

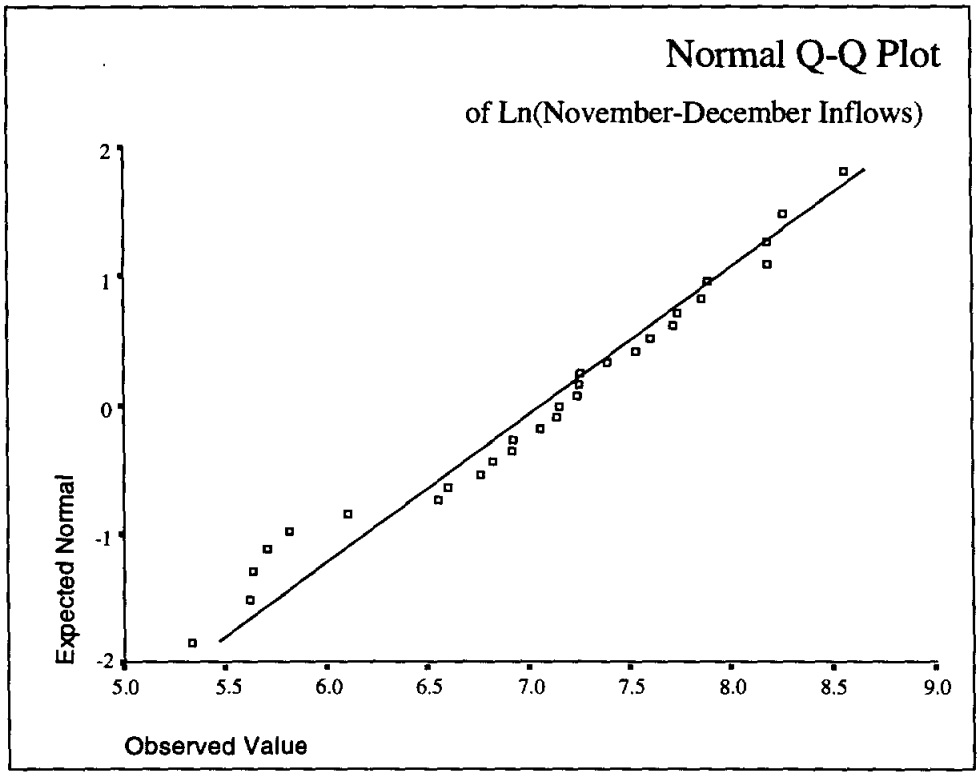
Descriptives

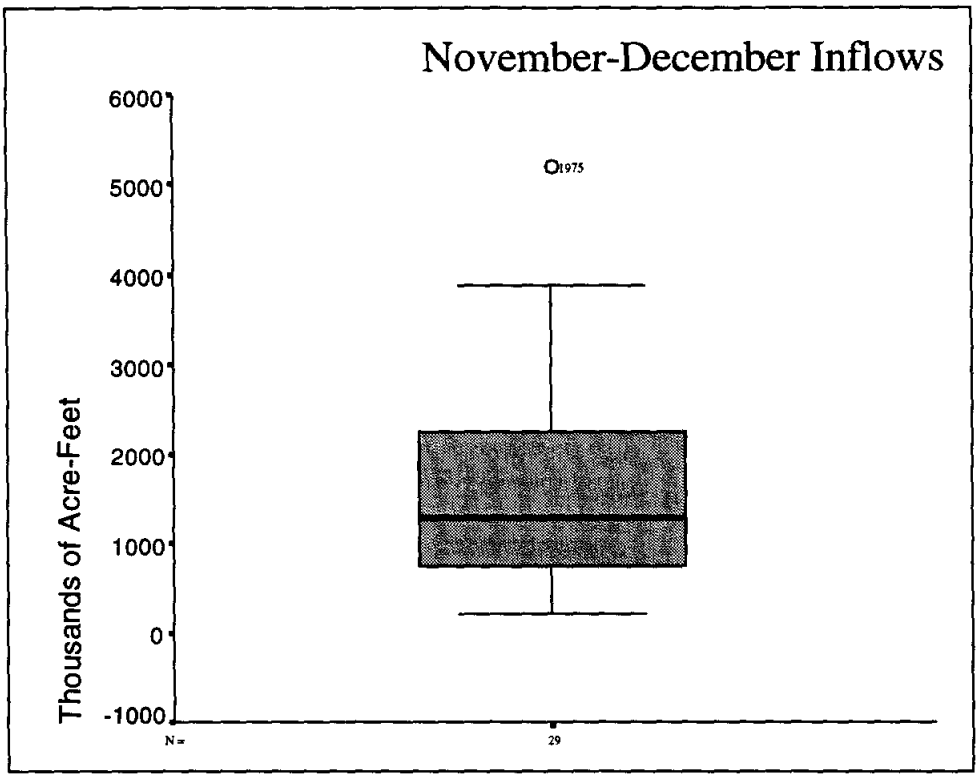
			Statistic	Std. Error
ND_INFL	Mean		1609.1290	230.8751
	95% Confidence Interval for Mean	Lower Bound	1136.2027	
		Upper Bound	2082.0552	
	5% Trimmed Mean		1508.2872	
	Median		1288.4000	
	Variance		1545796	
	Std. Deviation		1243.3005	
	Minimum		207.00	
	Maximum		5217.90	
	Range		5010.90	
	Interquartile Range		1558.4700	
	Skewness		1.218	.434
	Kurtosis		1.267	.845

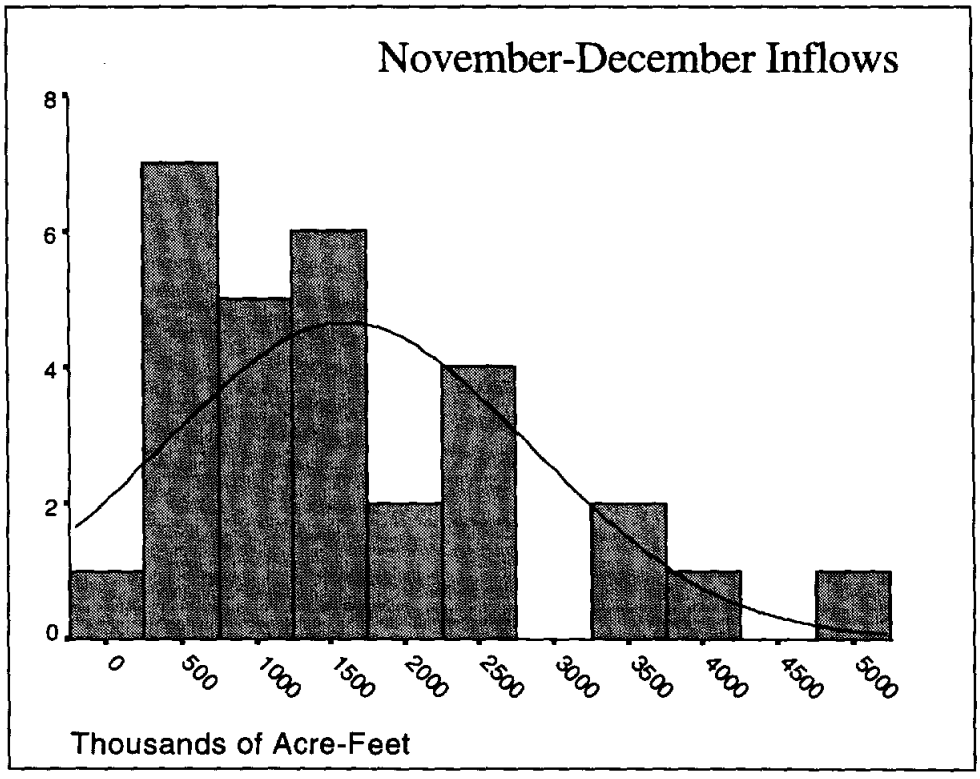
Extreme Values

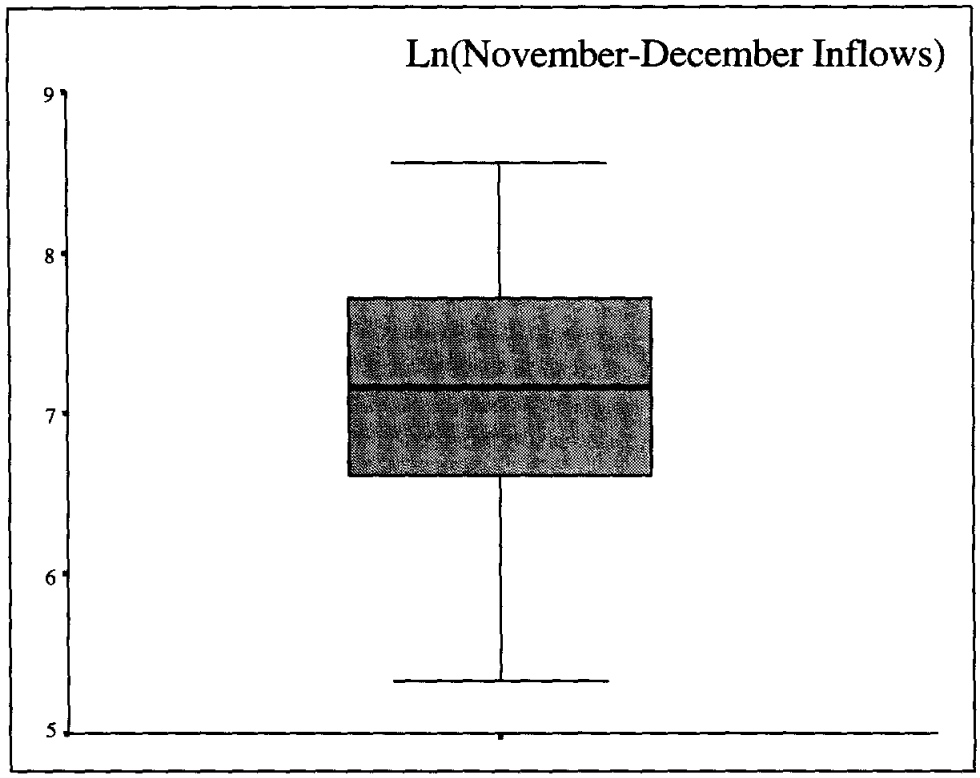
			Case Number	YEAR	Value
ND_INFL	Highest	1	17	1975	5217.90
		2	29	1987	3886.93
		3	3	1961	3586.10
		4	28	1986	3585.61
		5	24	1982	2674.10
	Lowest	1	1	1959	207.00
		2	6	1964	276.50
		3	13	1971	280.35
		4	23	1981	300.79
		5	9	1967	336.49


Normal Q-Q Plot
of November-December Inflows
Expected Normal Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal
2
1
0
-1
-2
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1975
N =
29

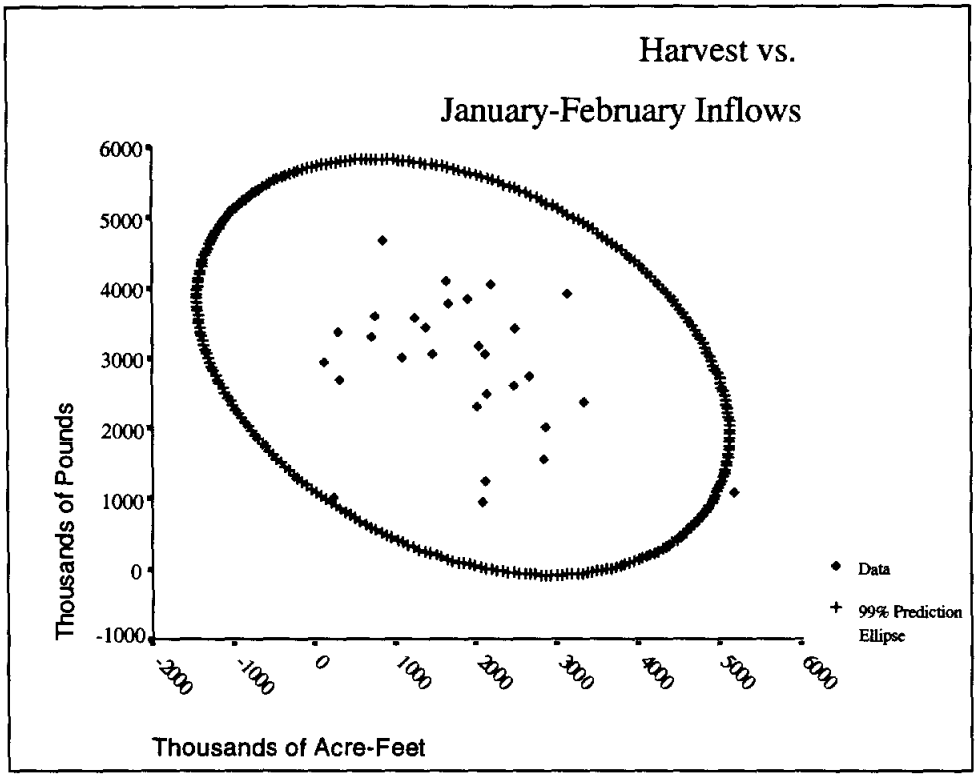

November-December Inflows
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet


Ln(November-December Inflows)
9
8
7
6
5

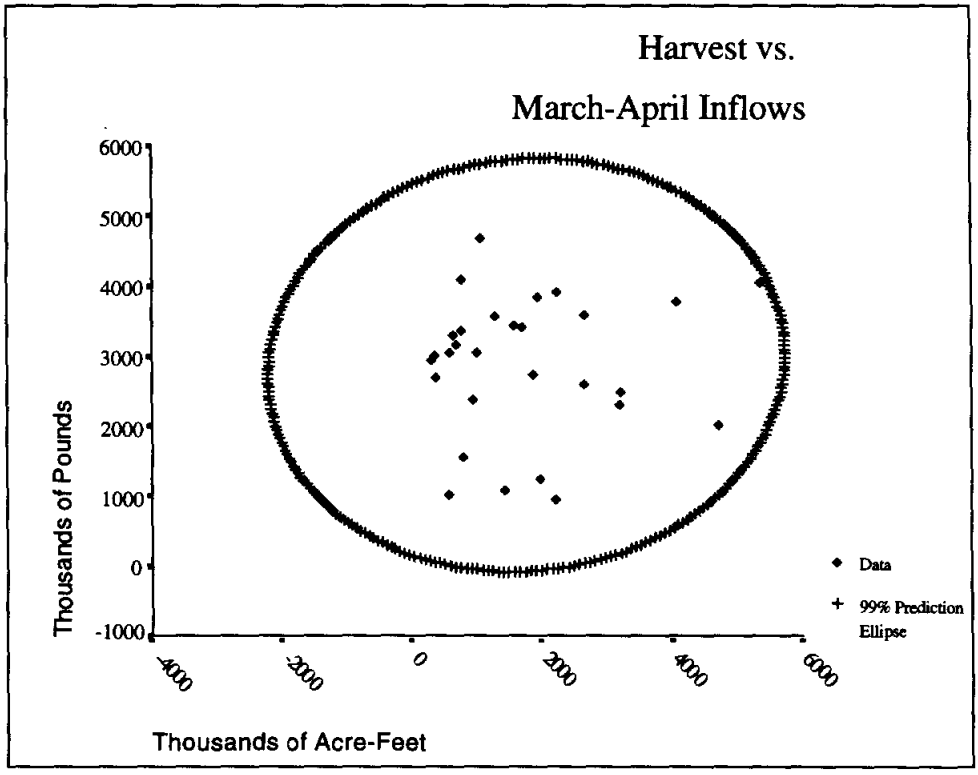
Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	White Shrimp Harvest	1010.4000	1106.7000	2364.3000	3066.2000	3612.4500	4077.7000	4404.5000
	Ln(White Shrimp Harvest)	6.917706	7.009138	7.768167	8.028194	8.192139	8.313288	8.388116
	January-February Inflows	195.9150	300.4100	977.0250	2017.8400	2475.9650	3138.9800	4261.0000
	March-April Inflows	331.5400	393.9100	743.4850	1440.1000	2456.6250	4102.0000	5063.7750
	May-June Inflows	359.4200	673.6800	1209.2900	1966.7700	3924.5250	5402.3000	6005.4200
	July-August Inflows	208.5950	243.9900	407.7850	626.8700	1356.3550	2282.8000	3067.9450
	September-October Inflows	193.7400	339.3500	522.3000	978.5000	1991.9800	2326.5000	3510.6100
	November-December Inflows	241.7500	280.3500	721.6050	1288.4000	2280.0750	3586.1000	4552.4150
	Ln(January-February Inflows)	5.2256	5.7051	6.8763	7.6098	7.8144	8.0517	8.3334
	Ln(March-April Inflows)	5.8008	5.9761	6.6106	7.2725	7.8027	8.3192	8.5279
	Ln(May-June Inflows)	5.8547	6.5128	7.0875	7.5841	8.2750	8.5946	8.6995
	Ln(July-August Inflows)	5.3399	5.4971	6.0107	6.4407	7.2107	7.7332	8.0286
	Ln(September-October Inflows)	5.2030	5.8270	6.2581	6.8860	7.5968	7.7521	8.1426
	Ln(November-December Inflows)	5.4775	5.6360	6.5811	7.1612	7.7319	8.1848	8.4126
Tukey's Hinges	White Shrimp Harvest			2392.4000	3066.2000	3604.3000		
	Ln(White Shrimp Harvest)			7.780052	8.028194	8.189883		
	January-February Inflows			1102.1000	2017.8400	2468.3000		
	March-April Inflows			771.3700	1440.1000	2242.4700		
	May-June Inflows			1381.7800	1966.7700	3911.7600		
	July-August Inflows			412.7900	626.8700	1274.7600		
	September-October Inflows			529.5000	978.5000	1972.3700		
	November-December Inflows			740.9100	1288.4000	2250.9500		
	Ln(January-February Inflows)			7.0050	7.6098	7.8113		
	Ln(March-April Inflows)			6.6482	7.2725	7.7153		
	Ln(May-June Inflows)			7.2311	7.5841	8.2717		
	Ln(July-August Inflows)			6.0229	6.4407	7.1505		
	Ln(September-October Inflows)			6.2719	6.8860	7.5870		
	Ln(November-December Inflows)			6.6079	7.1612	7.7191		

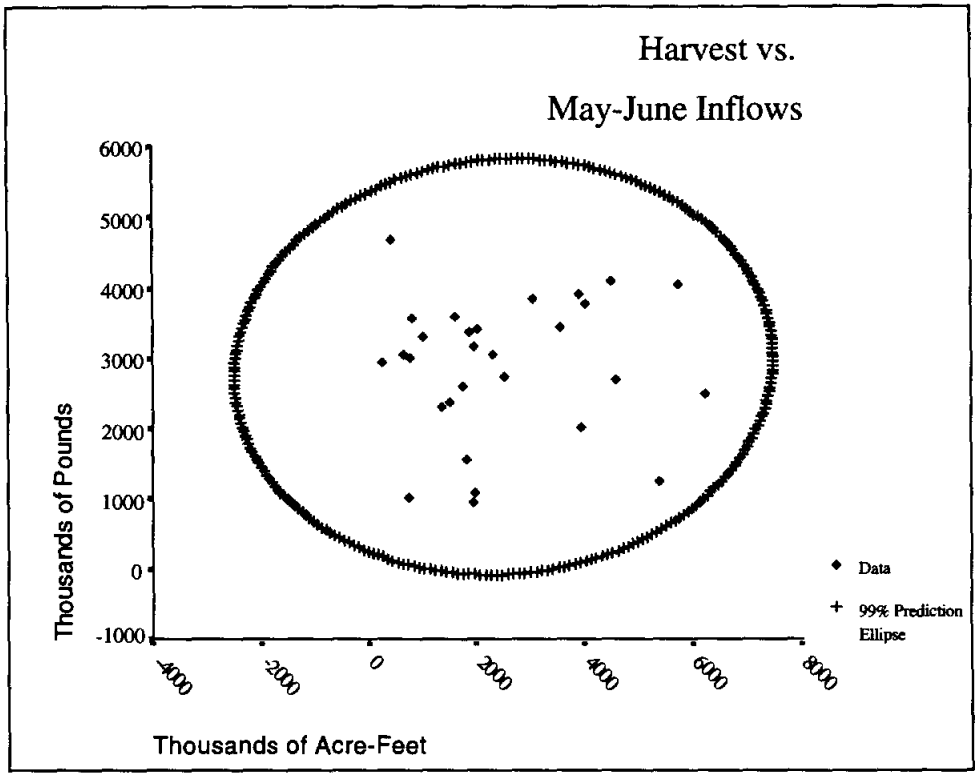
99% Prediction Ellipses

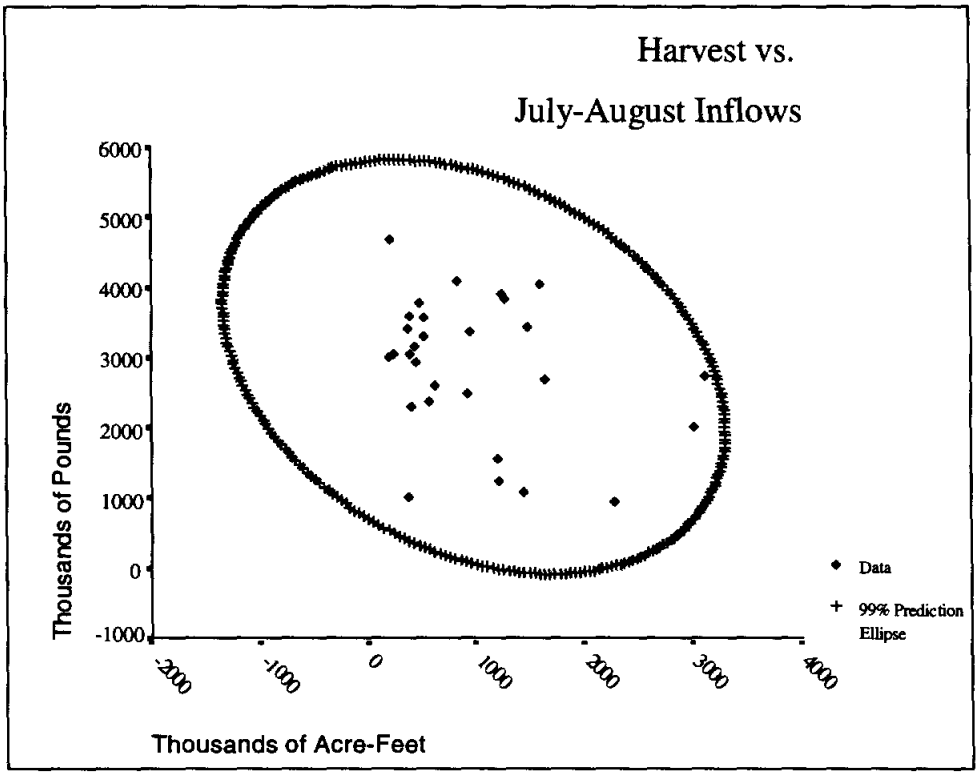


Outside ellipse: 1961. Near edge of ellipse: 1967.

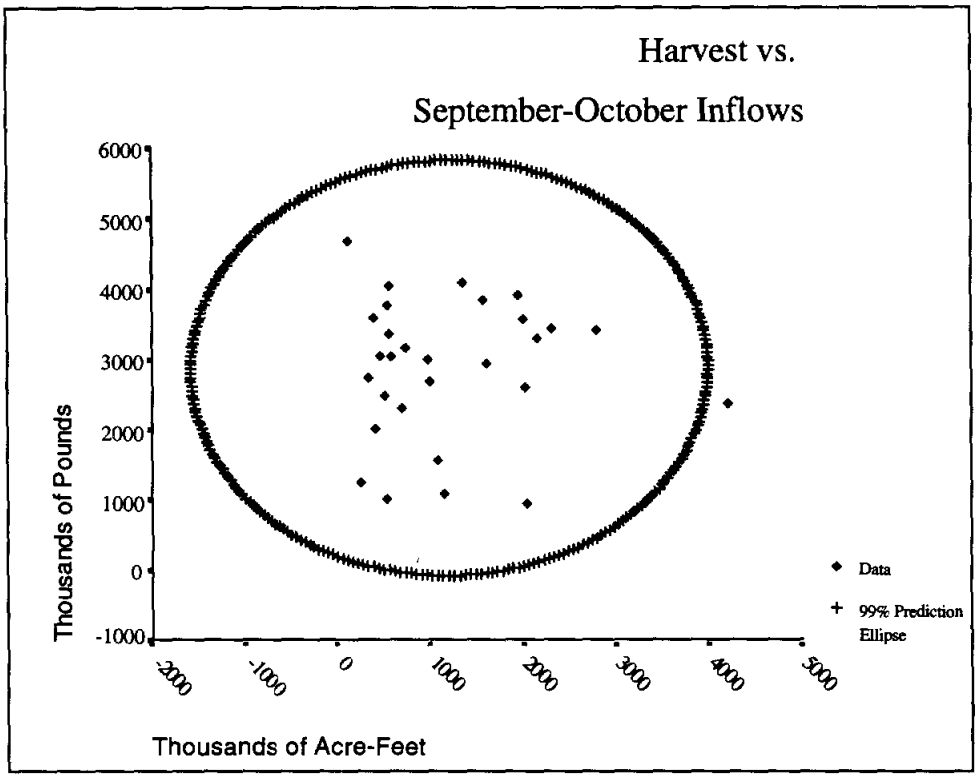


Near edge of ellipse: 1973.

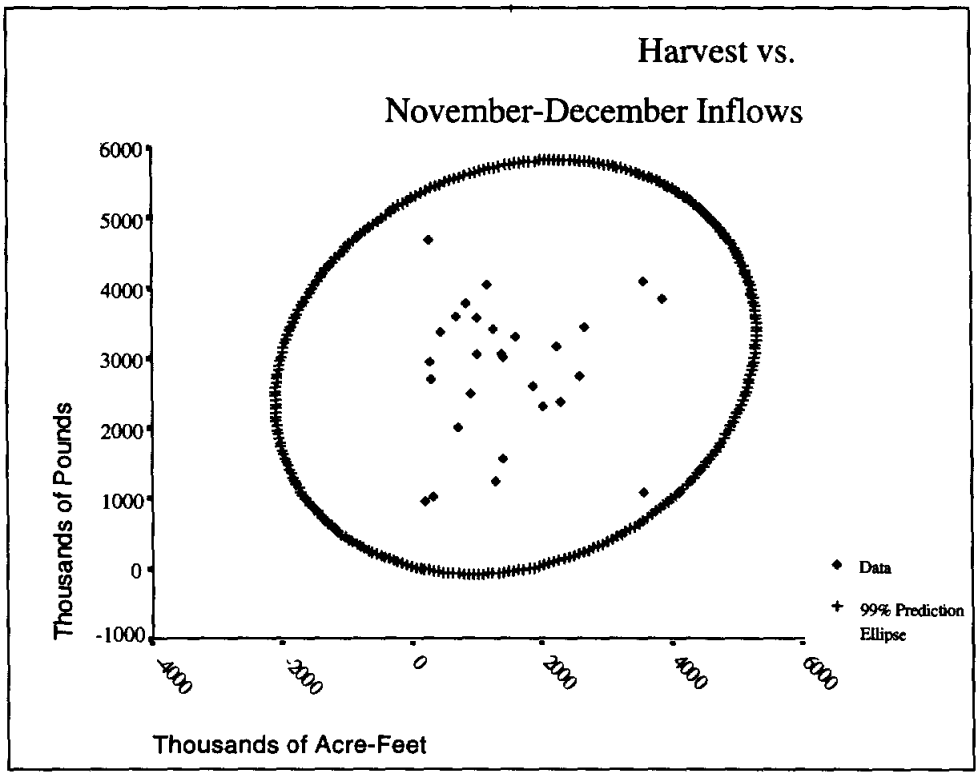


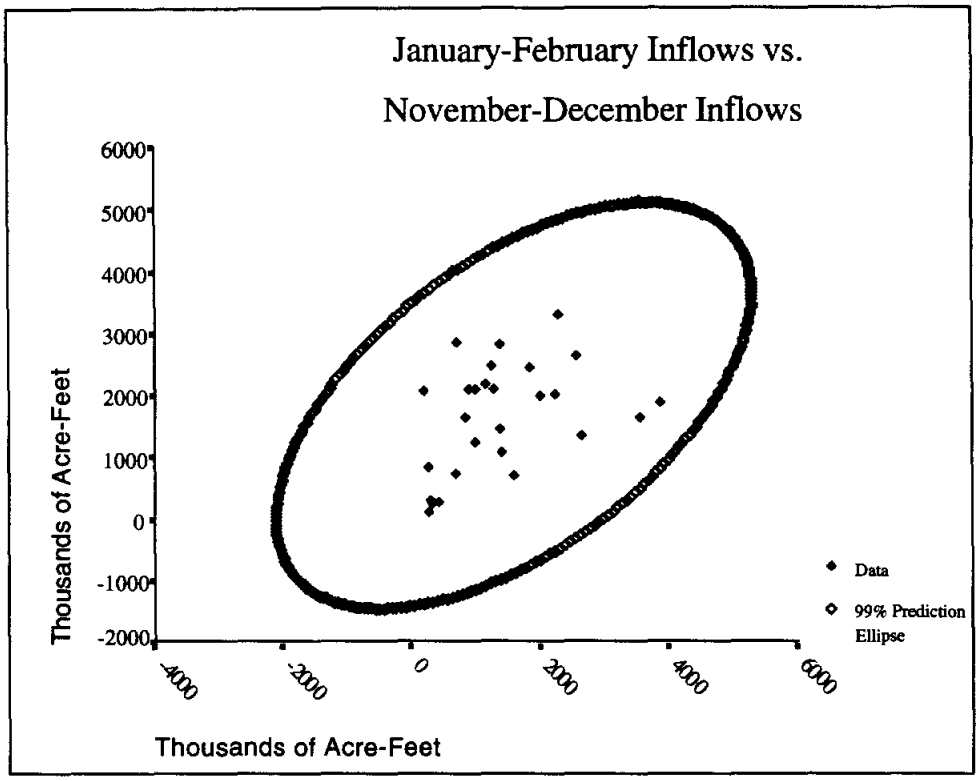


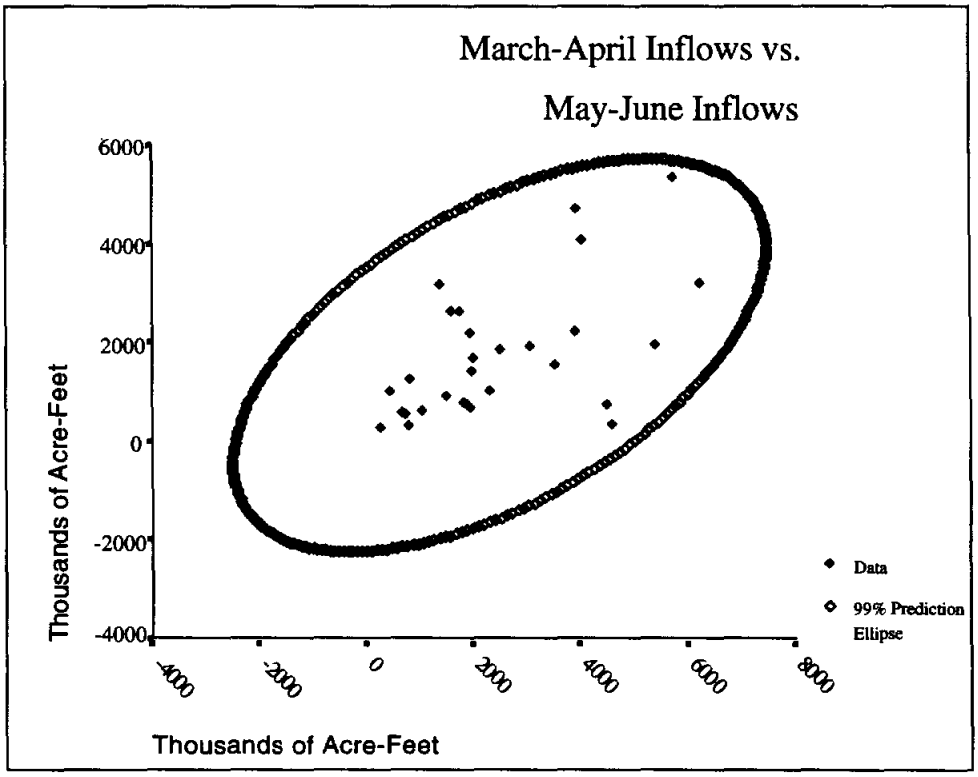
Near edge of ellipse: 1983.



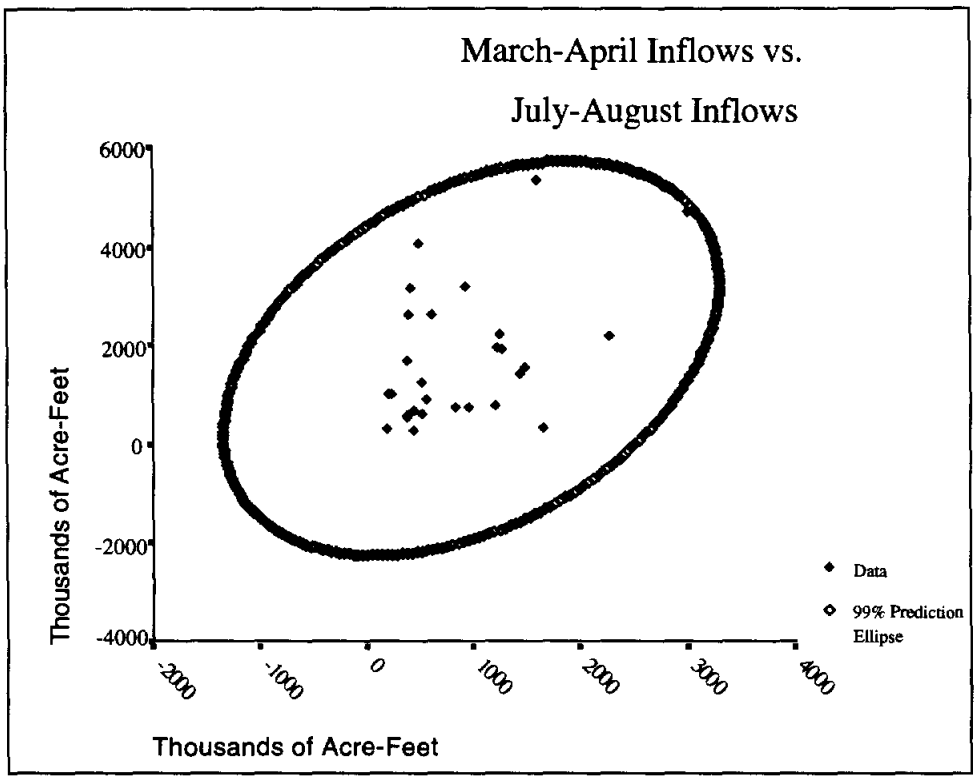
Outside ellipse: 1974.



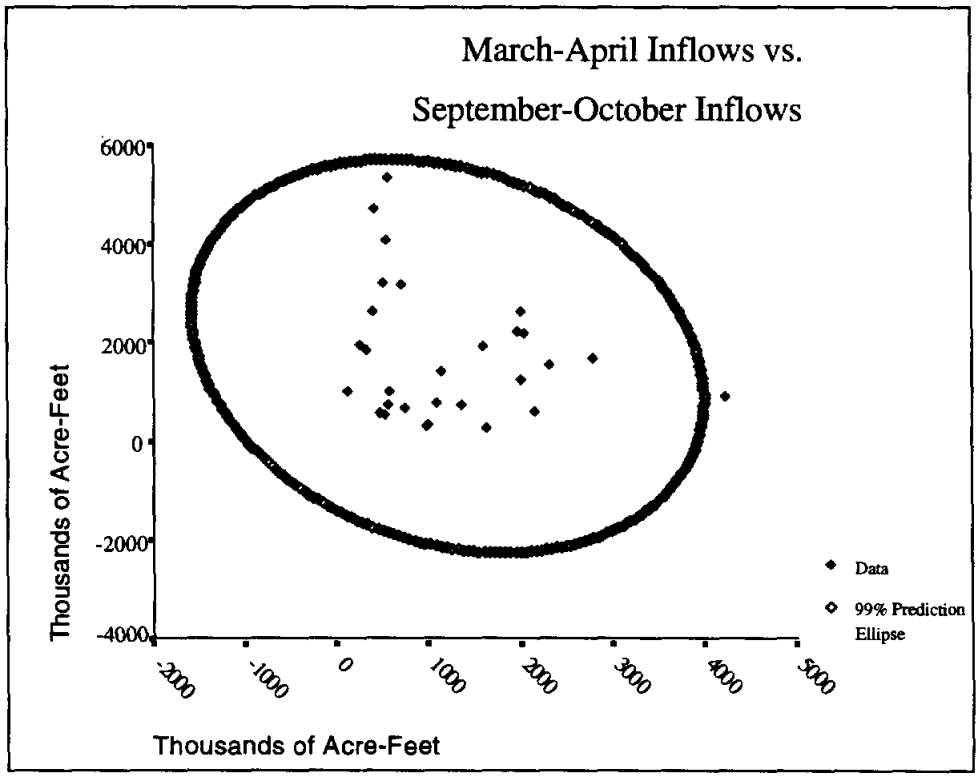




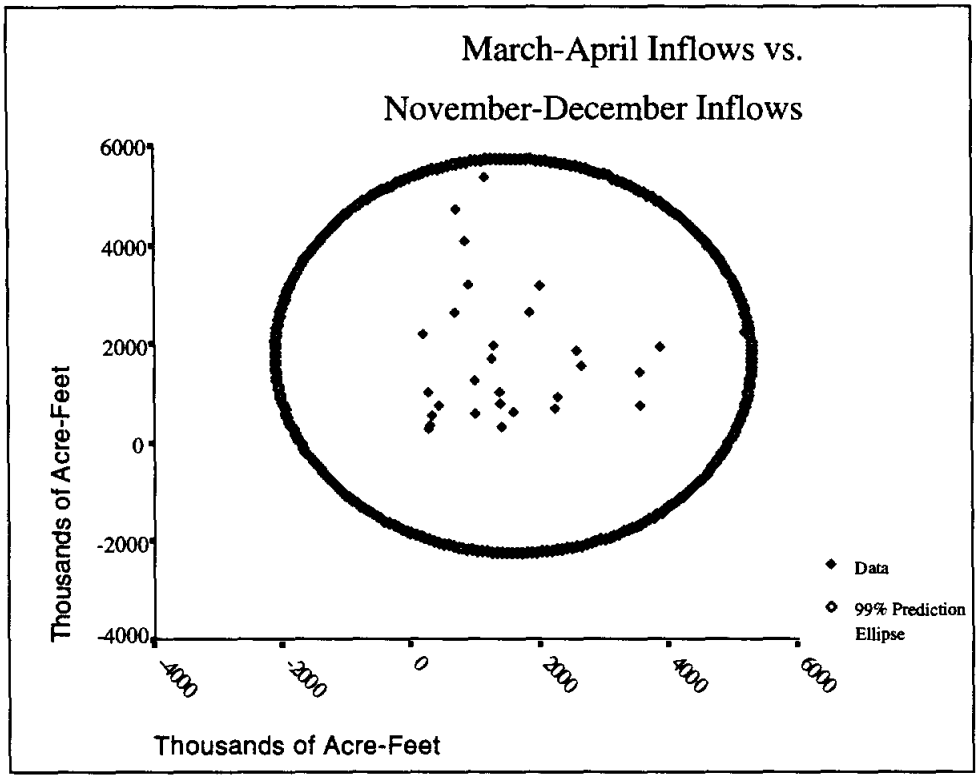
Outside ellipse: 1973.



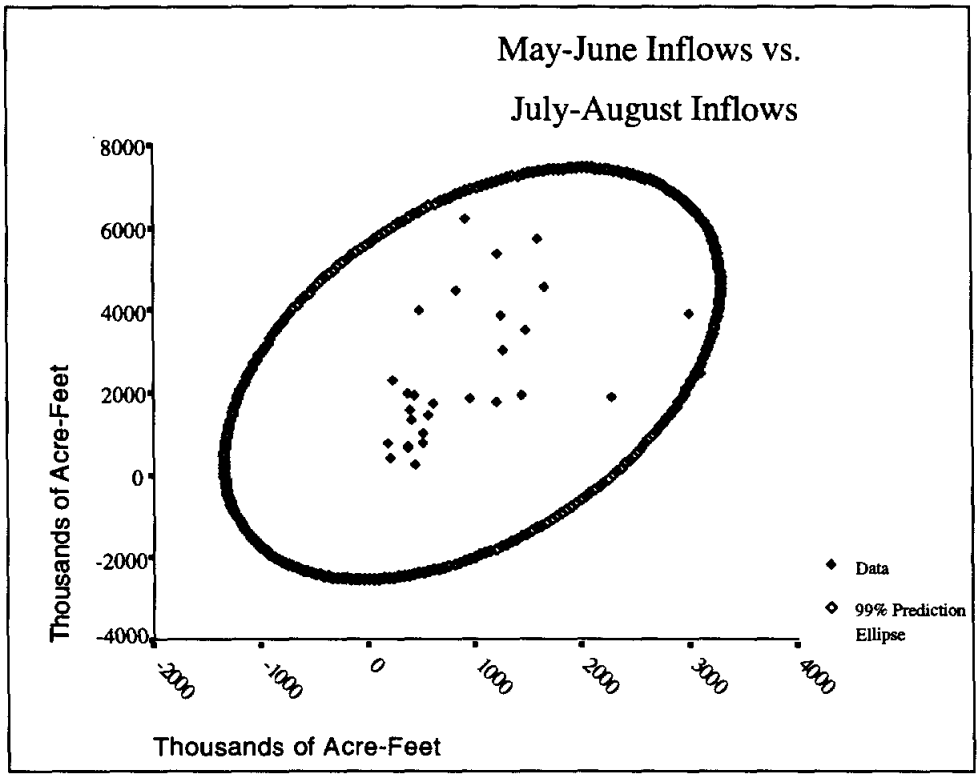
Near edge of ellipse: 1973, 1979.

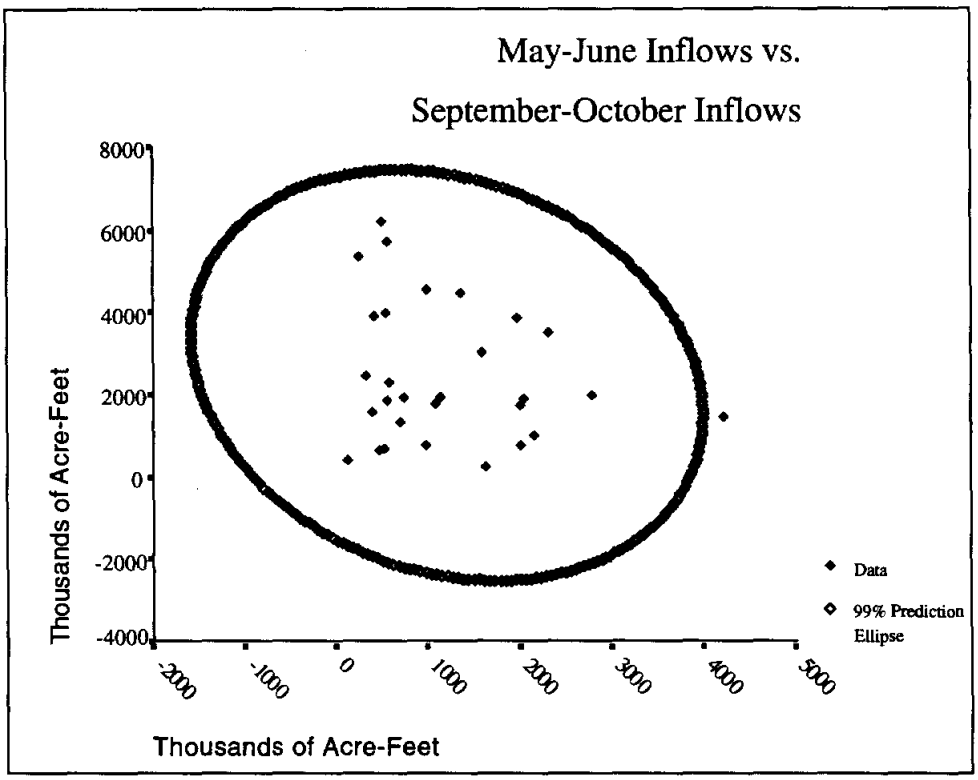


Outside ellipse: 1974.

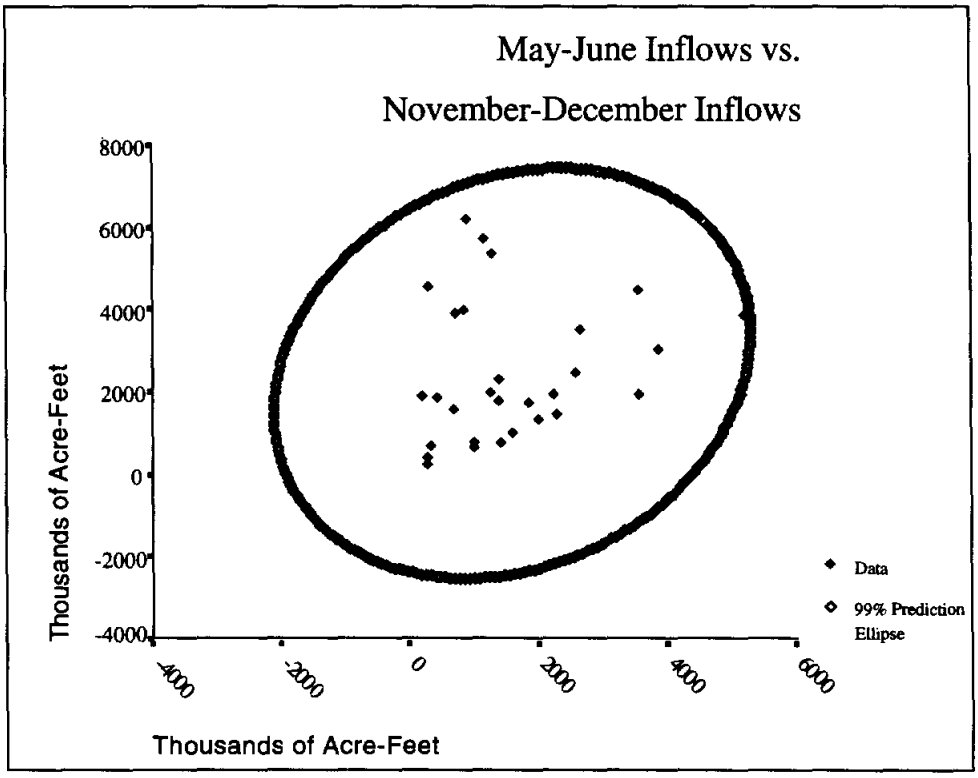


Lying on ellipse: 1975.

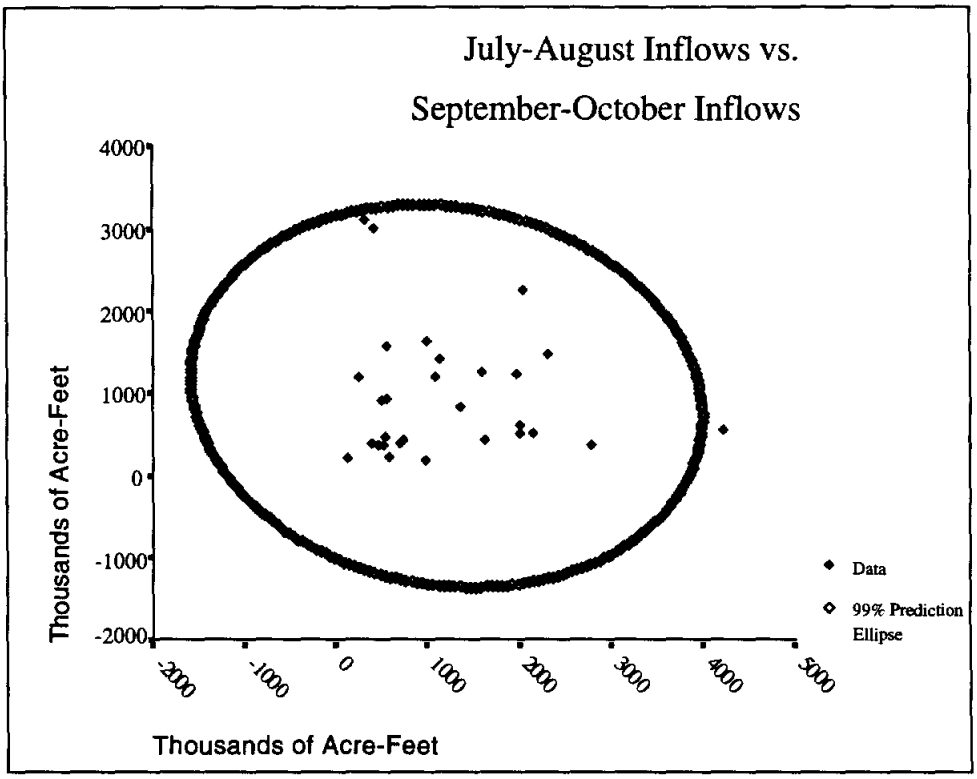




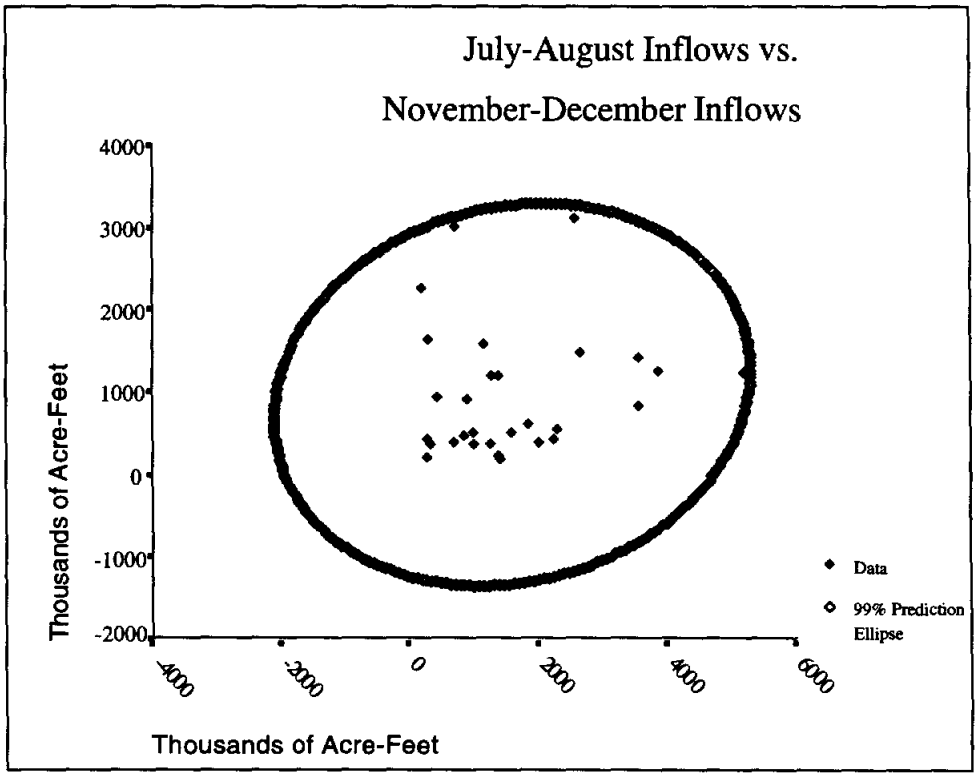
Outside ellipse: 1974.



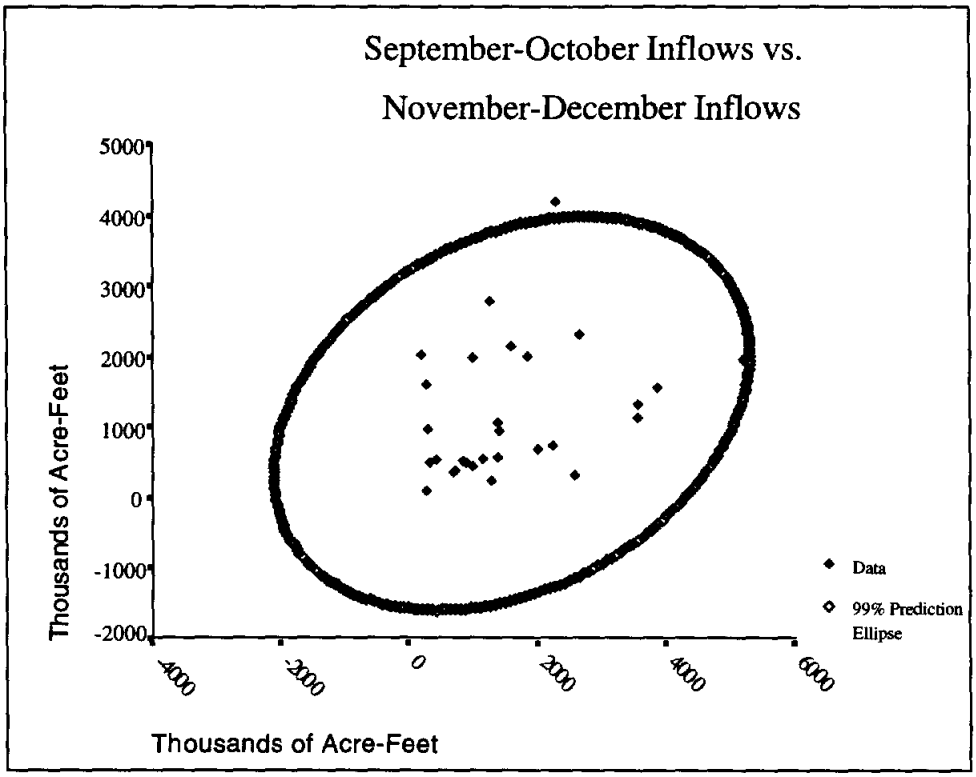
Lying on ellipse: 1975.



Outside ellipse: 1974. Near edge of ellipse: 1979, 1983.



Near edge of ellipse: 1979, 1983. Lying on ellipse: 1975.



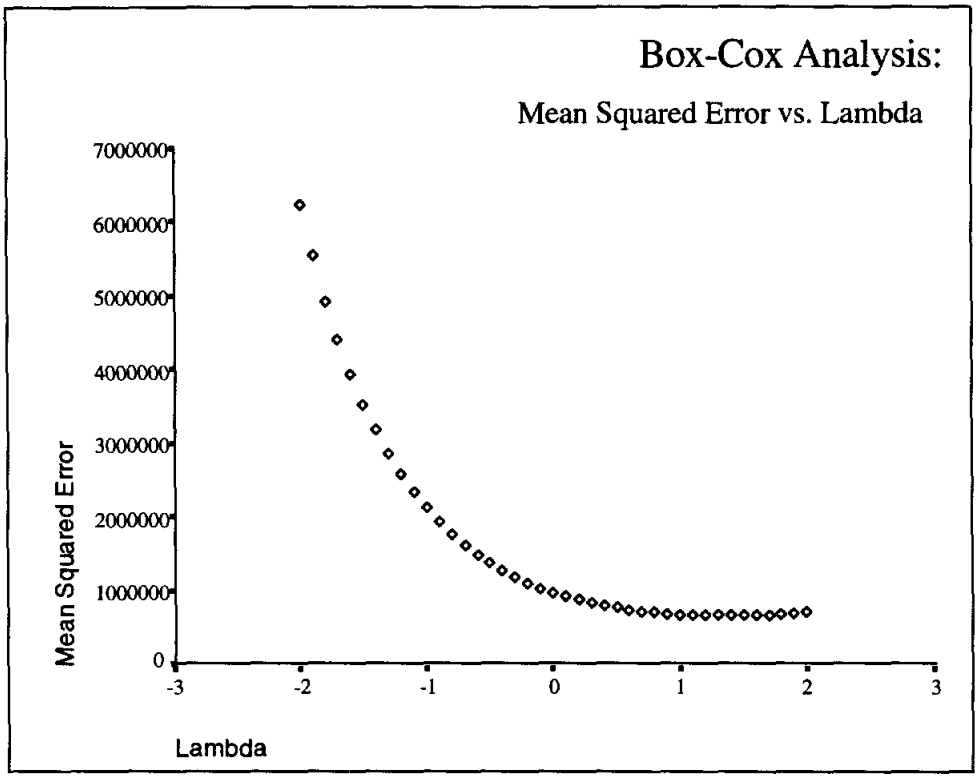
Outside ellipse: 1974. Lying on ellipse: 1975.

Box–Cox Analysis

Numerical Results

Lambda	MSE
-2.0	6254160
-1.9	5560274
-1.8	4953536
-1.7	4422453
-1.6	3957114
-1.5	3548967
-1.4	3190634
-1.3	2875716
-1.2	2598712
-1.1	2354841
-1.0	2139965
-0.9	1950499
-0.8	1783332
-0.7	1635764
-0.6	1505451
-0.5	1390354
-0.4	1288702
-0.3	1198950
-0.2	1119759
-0.1	1049958
0.0	988530
0.1	934589
0.2	887364
0.3	846185
0.4	810466
0.5	779704
0.6	753460
0.7	731355
0.8	713065
0.9	698311
1.0	686857
1.1	678504
1.2	673088
1.3	670475
1.4	670559
1.5	673260
1.6	678522
1.7	686311
1.8	696616
1.9	709445
2.0	724824

Plots


Box-Cox Analysis:
Mean Squared Error vs. Lambda
Mean Squared Error
7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
-3
-2
-1
0
1
2
3
Lambda

Model Choice Diagnostics

Untransformed Data

N = 29 Regression Models for Dependent Variable: WHSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1082	0.0752	10.67	399.8	907383	402.5	JF_INFL
1	0.0944	0.0609	11.22	400.2	921446	402.9	JA_INFL
1	0.0318	-.0041	13.73	402.1	985160	404.9	ND_INFL
1	0.0033	-.0336	14.87	403.0	1.01E6	405.7	MA_INFL
2	0.3013	0.2475	4.947	394.7	738290	398.8	JF_INFL ND_INFL
2	0.1488	0.0833	11.05	400.4	899434	404.5	JF_INFL JA_INFL
2	0.1434	0.0775	11.26	400.6	905094	404.7	JA_INFL ND_INFL
2	0.1371	0.0707	11.51	400.8	911746	404.9	JF_INFL MA_INFL
3	0.3821	0.3080	3.714	393.1	679009	398.6	JF_INFL MA_INFL ND_INFL
3	0.3274	0.2467	5.901	395.6	739084	401.0	JF_INFL JA_INFL ND_INFL
3	0.3076	0.2245	6.695	396.4	760908	401.9	JF_INFL MJ_INFL ND_INFL
3	0.3015	0.2177	6.938	396.7	767571	402.1	JF_INFL SO_INFL ND_INFL
4	0.4484	0.3565	3.061	391.8	631377	398.7	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.3924	0.2911	5.303	394.6	695519	401.5	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.3863	0.2840	5.548	394.9	702527	401.8	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.3529	0.2451	6.882	396.5	740722	403.3	JF_INFL MJ_INFL JA_INFL ND_INFL
5	0.4496	0.3299	5.015	393.8	657433	402.0	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.4490	0.3292	5.039	393.8	658162	402.0	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.3948	0.2632	7.208	396.5	722934	404.7	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.3530	0.2124	8.878	398.5	772805	406.7	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.4500	0.3000	7.000	395.7	686857	405.3	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	WHSHRIMP	952.57	3443.58	-0.29610	.
2	MODEL1	PARMS	WHSHRIMP	959.92	3282.14	.	.
3	MODEL1	PARMS	WHSHRIMP	992.55	2668.88	.	.
4	MODEL1	PARMS	WHSHRIMP	1007.05	2822.16	.	0.04251
5	MODEL1	PARMS	WHSHRIMP	859.24	3258.54	-0.56513	.
6	MODEL1	PARMS	WHSHRIMP	948.38	3583.72	-0.22532	.
7	MODEL1	PARMS	WHSHRIMP	951.36	3033.19	.	.
8	MODEL1	PARMS	WHSHRIMP	954.85	3302.23	-0.34709	0.13293
9	MODEL1	PARMS	WHSHRIMP	824.02	2985.25	-0.69621	0.22906
10	MODEL1	PARMS	WHSHRIMP	859.70	3377.84	-0.49892	.
11	MODEL1	PARMS	WHSHRIMP	872.30	3169.66	-0.57589	.
12	MODEL1	PARMS	WHSHRIMP	876.11	3271.60	-0.56413	.
13	MODEL1	PARMS	WHSHRIMP	794.59	3107.35	-0.62265	0.29345
14	MODEL1	PARMS	WHSHRIMP	833.98	3055.85	-0.71204	0.28603
15	MODEL1	PARMS	WHSHRIMP	838.17	2909.76	-0.70906	0.24375
16	MODEL1	PARMS	WHSHRIMP	860.65	3234.68	-0.49330	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	WHSHRIMP	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	27
2	.	-0.39079	.	.	-1	1	2	27
3	.	.	.	0.14203	-1	1	2	27
4	.	.	.	.	-1	1	2	27
5	.	.	.	0.42337	-1	2	3	26
6	.	-0.27497	.	.	-1	2	3	26
7	.	-0.42883	.	0.17799	-1	2	3	26
8	.	.	.	.	-1	2	3	26
9	.	.	.	0.49140	-1	3	4	25
10	.	-0.22175	.	0.40900	-1	3	4	25
11	0.04834	.	.	0.41574	-1	3	4	25
12	.	.	-0.016873	0.42683	-1	3	4	25
13	.	-0.36977	.	0.48657	-1	4	5	24
14	-0.07537	.	.	0.52022	-1	4	5	24
15	.	.	0.074885	0.48042	-1	4	5	24
16	0.10663	-0.32006	.	0.38580	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	907382.72	0.10822	0.07519	10.6688	399.759	402.494
2	921445.72	0.09440	0.06086	11.2216	400.205	402.940
3	985159.83	0.03178	-0.00408	13.7261	402.144	404.878
4	1014155.74	0.00328	-0.03363	14.8660	402.985	405.720
5	738290.25	0.30128	0.24753	4.9469	394.684	398.786
6	899433.70	0.14877	0.08329	11.0468	400.409	404.511
7	905093.97	0.14341	0.07752	11.2611	400.591	404.693
8	911745.61	0.13712	0.07074	11.5128	400.804	404.905
9	679008.77	0.38210	0.30795	3.7143	393.119	398.588
10	739083.61	0.32743	0.24672	5.9009	395.578	401.047
11	760907.95	0.30757	0.22448	6.6953	396.422	401.891
12	767570.65	0.30151	0.21769	6.9378	396.674	402.144
13	631377.05	0.44843	0.35650	3.0614	391.826	398.663
14	695518.77	0.39239	0.29112	5.3027	394.632	401.468
15	702527.40	0.38627	0.28398	5.5476	394.923	401.759
16	740722.15	0.35290	0.24505	6.8821	396.458	403.295

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	WHSHRIMP	810.82	3065.17	-0.63067	0.30025
18	MODEL1	PARMS	WHSHRIMP	811.27	3121.00	-0.62870	0.30547
19	MODEL1	PARMS	WHSHRIMP	850.26	2992.61	-0.72059	0.29271
20	MODEL1	PARMS	WHSHRIMP	879.09	3247.45	-0.49186	.
21	MODEL1	PARMS	WHSHRIMP	828.77	3079.58	-0.63502	0.30960

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	WHSHRIMP	_IN_	_P_	_EDF_
17	.	-0.36389	0.039913	0.48079	-1	5	6	23
18	-0.01843	-0.35885	.	0.49376	-1	5	6	23
19	-0.06937	.	0.057166	0.50954	-1	5	6	23
20	0.10502	-0.32134	-0.011810	0.38839	-1	5	6	23
21	-0.01511	-0.35538	0.036871	0.48713	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	657433.26	0.44959	0.32994	5.0147	393.765	401.968
18	658162.43	0.44898	0.32920	5.0391	393.797	402.001
19	722933.73	0.39476	0.26318	7.2081	396.519	404.723
20	772805.39	0.35300	0.21235	8.8781	398.453	406.657
21	686856.88	0.44996	0.29995	7.0000	395.745	405.316

Logged Inflows

N = 29 Regression Models for Dependent Variable: WHSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0954	0.0619	3.382	400.2	920377	402.9	LGJAINFL
1	0.0284	-.0076	5.487	402.2	988646	405.0	LGNDINFL
1	0.0172	-.0192	5.838	402.6	1E6	405.3	LGJFINFL
1	0.0011	-.0359	6.343	403.0	1.02E6	405.8	LGSOINFL
2	0.1463	0.0807	3.786	400.5	902023	404.6	LGMJINFL LGJAINFL
2	0.1411	0.0750	3.951	400.7	907582	404.8	LGJAINFL LGNDINFL
2	0.1312	0.0643	4.261	401.0	918037	405.1	LGJFINFL LGNDINFL
2	0.1234	0.0560	4.504	401.3	926222	405.4	LGMAINFL LGJAINFL
3	0.1952	0.0986	4.252	400.8	884391	406.3	LGJFINFL LGJAINFL LGNDINFL
3	0.1840	0.0861	4.603	401.2	896670	406.7	LGJFINFL LGMAINFL LGNDINFL
3	0.1663	0.0662	5.159	401.8	916161	407.3	LGMJINFL LGJAINFL LGNDINFL
3	0.1629	0.0624	5.267	401.9	919927	407.4	LGJFINFL LGMJINFL LGJAINFL
4	0.2902	0.1719	3.271	399.1	812484	406.0	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.2371	0.1100	4.936	401.2	873224	408.1	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.2096	0.0779	5.799	402.3	904732	409.1	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
4	0.1943	0.0600	6.280	402.8	922266	409.7	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
5	0.2977	0.1450	5.036	400.8	838873	409.0	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.2922	0.1383	5.208	401.1	845418	409.3	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2432	0.0787	6.746	403.0	903956	411.2	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2033	0.0301	7.999	404.5	951671	412.7	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
6	0.2988	0.1076	7.000	402.8	875567	412.4	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	WHSHRIMP	959.36	5568.29	.	.
2	MODEL1	PARMS	WHSHRIMP	994.31	1543.54	.	.
3	MODEL1	PARMS	WHSHRIMP	1000.01	4001.78	-152.044	.
4	MODEL1	PARMS	WHSHRIMP	1008.17	3170.21	.	.
5	MODEL1	PARMS	WHSHRIMP	949.75	4381.47	.	.
6	MODEL1	PARMS	WHSHRIMP	952.67	4094.25	.	.
7	MODEL1	PARMS	WHSHRIMP	958.14	2880.45	-493.458	.
8	MODEL1	PARMS	WHSHRIMP	962.40	4526.99	.	231.017
9	MODEL1	PARMS	WHSHRIMP	940.42	4568.40	-374.437	.
10	MODEL1	PARMS	WHSHRIMP	946.93	1419.00	-753.606	370.668
11	MODEL1	PARMS	WHSHRIMP	957.16	3624.51	.	.
12	MODEL1	PARMS	WHSHRIMP	959.13	4950.83	-168.617	.
13	MODEL1	PARMS	WHSHRIMP	901.38	3102.73	-696.253	515.471
14	MODEL1	PARMS	WHSHRIMP	934.46	4029.91	-435.703	.
15	MODEL1	PARMS	WHSHRIMP	951.17	5302.47	-404.697	.
16	MODEL1	PARMS	WHSHRIMP	960.35	1763.94	-755.981	458.837

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	WHSHRIMP	_IN_	_P_	_EDF_
1	.	-403.728	.	.	-1	1	2	27
2	.	.	.	191.647	-1	1	2	27
3	.	.	.	.	-1	1	2	27
4	.	.	-40.061	.	-1	1	2	27
5	361.113	-637.485	.	.	-1	2	3	26
6	.	-443.043	.	245.472	-1	2	3	26
7	.	.	.	509.758	-1	2	3	26
8	.	-497.802	.	.	-1	2	3	26
9	.	-349.196	.	475.454	-1	3	4	25
10	.	.	.	606.256	-1	3	4	25
11	272.934	-608.324	.	174.317	-1	3	4	25
12	442.068	-631.041	.	.	-1	3	4	25
13	.	-466.436	.	598.132	-1	4	5	24
14	357.962	-550.612	.	419.762	-1	4	5	24
15	.	-336.150	-157.299	542.057	-1	4	5	24
16	-163.955	.	.	645.655	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	920377.20	0.09545	0.06195	3.38181	400.171	402.906
2	988646.27	0.02835	-0.00763	5.48703	402.246	404.981
3	1000018.18	0.01718	-0.01922	5.83771	402.578	405.313
4	1016398.95	0.00108	-0.03592	6.34285	403.049	405.784
5	902022.96	0.14632	0.08065	3.78560	400.493	404.595
6	907581.67	0.14106	0.07499	3.95067	400.671	404.773
7	918036.58	0.13117	0.06433	4.26113	401.003	405.105
8	926221.75	0.12342	0.05599	4.50419	401.260	405.362
9	884390.60	0.19520	0.09862	4.25193	400.783	406.252
10	896669.74	0.18403	0.08611	4.60254	401.183	406.652
11	916161.21	0.16629	0.06624	5.15907	401.806	407.275
12	919926.55	0.16286	0.06241	5.26659	401.925	407.394
13	812483.86	0.29021	0.17191	3.27083	399.140	405.976
14	873224.33	0.23715	0.11001	4.93578	401.230	408.067
15	904732.46	0.20962	0.07789	5.79944	402.258	409.095
16	922265.66	0.19430	0.06002	6.28004	402.815	409.652

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	WHSHRIMP	915.90	3037.56	-684.205	450.773
18	MODEL1	PARMS	WHSHRIMP	919.47	3439.86	-695.884	496.232
19	MODEL1	PARMS	WHSHRIMP	950.77	4562.16	-450.653	.
20	MODEL1	PARMS	WHSHRIMP	975.54	2550.08	-752.857	427.118
21	MODEL1	PARMS	WHSHRIMP	935.72	3298.53	-684.535	439.356

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	WHSHRIMP	_IN_	_P_	_EDF_
17	165.608	-544.904	.	556.970	-1	5	6	23
18	.	-457.041	-60.519	619.178	-1	5	6	23
19	327.979	-525.084	-104.388	468.626	-1	5	6	23
20	-168.499	.	-126.664	690.453	-1	5	6	23
21	157.195	-533.738	-46.252	575.145	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	838873.06	0.29769	0.14502	5.03609	400.832	409.036
18	845417.55	0.29221	0.13835	5.20801	401.058	409.262
19	903955.92	0.24320	0.07868	6.74573	402.999	411.203
20	951671.35	0.20326	0.03005	7.99915	404.491	412.695
21	875567.28	0.29884	0.10762	7.00000	402.785	412.356

Logged Harvest

N = 29 Regression Models for Dependent Variable: LWHSHRMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1034	0.0702	9.172	-48.89	0.1734	-46.16	JF_INFL
1	0.0914	0.0578	9.630	-48.51	0.1757	-45.77	JA_INFL
1	0.0283	-.0076	12.03	-46.56	0.1879	-43.83	ND_INFL
1	0.0026	-.0344	13.02	-45.80	0.1929	-43.07	MA_INFL
2	0.2819	0.2266	4.371	-53.33	0.1442	-49.23	JF_INFL ND_INFL
2	0.1431	0.0771	9.662	-48.20	0.1721	-44.10	JF_INFL JA_INFL
2	0.1358	0.0694	9.937	-47.96	0.1735	-43.86	JA_INFL ND_INFL
2	0.1323	0.0655	10.07	-47.84	0.1742	-43.74	MJ_INFL JA_INFL
3	0.3551	0.2777	3.580	-54.45	0.1347	-48.98	JF_INFL MA_INFL ND_INFL
3	0.3078	0.2247	5.384	-52.39	0.1446	-46.92	JF_INFL JA_INFL ND_INFL
3	0.2880	0.2026	6.136	-51.58	0.1487	-46.11	JF_INFL MJ_INFL ND_INFL
3	0.2821	0.1959	6.363	-51.34	0.1499	-45.87	JF_INFL SO_INFL ND_INFL
4	0.4188	0.3220	3.151	-55.46	0.1264	-48.63	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.3637	0.2577	5.252	-52.84	0.1384	-46.00	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.3636	0.2575	5.257	-52.83	0.1384	-45.99	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.3329	0.2217	6.428	-51.46	0.1451	-44.63	JF_INFL MJ_INFL JA_INFL ND_INFL
5	0.4227	0.2972	5.002	-53.66	0.1310	-45.46	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.4191	0.2928	5.141	-53.48	0.1319	-45.27	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.3698	0.2328	7.020	-51.12	0.1430	-42.91	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.3333	0.1884	8.410	-49.48	0.1513	-41.28	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.4228	0.2654	7.000	-51.66	0.1370	-42.09	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	LWHSHRMP	0.41636	8.12830	-.00012620	.
2	MODEL1	PARMS	LWHSHRMP	0.41914	8.06058	.	.
3	MODEL1	PARMS	LWHSHRMP	0.43344	7.80144	.	.
4	MODEL1	PARMS	LWHSHRMP	0.43915	7.86638	.	.00001646
5	MODEL1	PARMS	LWHSHRMP	0.37973	8.05075	-.00023894	.
6	MODEL1	PARMS	LWHSHRMP	0.41481	8.18867	-.00009570	.
7	MODEL1	PARMS	LWHSHRMP	0.41655	7.95728	.	.
8	MODEL1	PARMS	LWHSHRMP	0.41741	7.96898	.	.
9	MODEL1	PARMS	LWHSHRMP	0.36697	7.93735	-.00029333	.00009504
10	MODEL1	PARMS	LWHSHRMP	0.38020	8.10250	-.00021022	.
11	MODEL1	PARMS	LWHSHRMP	0.38558	8.01236	-.00024359	.
12	MODEL1	PARMS	LWHSHRMP	0.38719	8.04507	-.00023938	.
13	MODEL1	PARMS	LWHSHRMP	0.35555	7.98953	-.00026190	.00012256
14	MODEL1	PARMS	LWHSHRMP	0.37203	7.96551	-.00029964	.00011776
15	MODEL1	PARMS	LWHSHRMP	0.37207	7.89042	-.00030132	.00010418
16	MODEL1	PARMS	LWHSHRMP	0.38094	8.04054	-.00020779	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LWHSHRMP	_IN_	_P_
1	.	.	.	.	-1	1	2
2	.	-.00016765	.	.	-1	1	2
3	.	.	.	.00005847	-1	1	2
4	.	.	.	.	-1	1	2
5	.	.	.	.00017742	-1	2	3
6	.	-.00011846	.	.	-1	2	3
7	.	-.00018344	.	.00007385	-1	2	3
8	0.000058103	-.00022235	.	.	-1	2	3
9	.	.	.	.00020565	-1	3	4
10	.	-.00009619	.	.00017119	-1	3	4
11	0.000020880	.	.	.00017413	-1	3	4
12	.	.	.000007340	.00017592	-1	3	4
13	.	-.00015800	.	.00020359	-1	4	5
14	-.000030051	.	.	.00021714	-1	4	5
15	.	.	.000046558	.00019882	-1	4	5
16	0.000046144	-.00013873	.	.00016115	-1	4	5

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	27	0.17335	0.10344	0.07024	9.1718	-48.8928	-46.1582
2	27	0.17568	0.09143	0.05778	9.6297	-48.5067	-45.7722
3	27	0.18787	0.02834	-0.00764	12.0342	-46.5600	-43.8254
4	27	0.19285	0.00259	-0.03435	13.0158	-45.8014	-43.0668
5	26	0.14419	0.28187	0.22663	4.3713	-53.3281	-49.2262
6	26	0.17207	0.14305	0.07713	9.6622	-48.2030	-44.1012
7	26	0.17351	0.13584	0.06936	9.9371	-47.9600	-43.8581
8	26	0.17423	0.13229	0.06555	10.0722	-47.8413	-43.7394
9	25	0.13467	0.35509	0.27770	3.5803	-54.4470	-48.9778
10	25	0.14455	0.30776	0.22469	5.3844	-52.3930	-46.9238
11	25	0.14867	0.28804	0.20261	6.1358	-51.5786	-46.1094
12	25	0.14991	0.28210	0.19595	6.3626	-51.3373	-45.8681
13	24	0.12642	0.41882	0.32196	3.1512	-55.4645	-48.6280
14	24	0.13841	0.36371	0.25766	5.2521	-52.8368	-46.0004
15	24	0.13844	0.36358	0.25750	5.2570	-52.8309	-45.9945
16	24	0.14512	0.33286	0.22167	6.4276	-51.4641	-44.6277

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	LWHSHRMP	0.36198	7.95590	-.00026829	.00012799
18	MODEL1	PARMS	LWHSHRMP	0.36312	7.99360	-.00026370	.00012615
19	MODEL1	PARMS	LWHSHRMP	0.37821	7.92131	-.00030562	.00012243
20	MODEL1	PARMS	LWHSHRMP	0.38900	8.02876	-.00020912	.
21	MODEL1	PARMS	LWHSHRMP	0.37009	7.95846	-.00026906	.00012965

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LWHSHRMP	_IN_	_P_
17	.	-.00015332	.000031823	.00019898	-1	5	6
18	-.000005497	-.00015475	.	.00020573	-1	5	6
19	-.000025864	.	.000039952	.00020968	-1	5	6
20	0.000047622	-.00013755	.000010897	.00015876	-1	5	6
21	-.000002686	-.00015180	.000031282	.00020011	-1	6	7

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	23	0.13103	0.42273	0.29724	5.0023	-53.6601	-45.4563
18	23	0.13186	0.41909	0.29280	5.1413	-53.4775	-45.2737
19	23	0.14305	0.36978	0.23278	7.0204	-51.1152	-42.9114
20	23	0.15132	0.33332	0.18839	8.4102	-49.4841	-41.2803
21	22	0.13697	0.42279	0.26537	7.0000	-51.6632	-42.0921

All Variables Logged

N = 29 Regression Models for Dependent Variable: LWHSHRMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0959	0.0624	4.157	-48.65	0.1748	-45.91	LGJAINFL
1	0.0434	0.0080	5.851	-47.01	0.1850	-44.28	LGNDINFL
1	0.0153	-.0212	6.757	-46.17	0.1904	-43.44	LGJFINFL
1	0.0001	-.0370	7.247	-45.73	0.1933	-42.99	LGMAINFL
2	0.1627	0.0983	4.002	-48.88	0.1681	-44.78	LGJFINFL LGNDINFL
2	0.1604	0.0958	4.077	-48.80	0.1686	-44.69	LGJAINFL LGNDINFL
2	0.1525	0.0873	4.331	-48.53	0.1702	-44.42	LGMJINFL LGJAINFL
2	0.1163	0.0483	5.500	-47.31	0.1774	-43.21	LGMAINFL LGJAINFL
3	0.2263	0.1334	3.952	-49.17	0.1616	-43.70	LGJFINFL LGJAINFL LGNDINFL
3	0.2062	0.1109	4.601	-48.42	0.1658	-42.95	LGJFINFL LGMAINFL LGNDINFL
3	0.1849	0.0870	5.288	-47.65	0.1702	-42.18	LGMJINFL LGJAINFL LGNDINFL
3	0.1762	0.0774	5.566	-47.35	0.1720	-41.88	LGJFINFL LGSOINFL LGNDINFL
4	0.3079	0.1925	3.321	-50.40	0.1506	-43.56	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.2691	0.1473	4.572	-48.82	0.1590	-41.98	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.2356	0.1082	5.650	-47.52	0.1663	-40.68	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
4	0.2138	0.0827	6.356	-46.70	0.1710	-39.86	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
5	0.3176	0.1693	5.006	-48.81	0.1549	-40.61	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.3086	0.1582	5.299	-48.43	0.1569	-40.22	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2719	0.1137	6.480	-46.93	0.1653	-38.73	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2194	0.0497	8.174	-44.91	0.1772	-36.71	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
6	0.3178	0.1318	7.000	-46.82	0.1619	-37.25	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LWHSHRMP	0.41811	9.06250	.	.
2	MODEL1	PARMS	LWHSHRMP	0.43008	7.16547	.	.
3	MODEL1	PARMS	LWHSHRMP	0.43635	8.34938	-0.06248	.
4	MODEL1	PARMS	LWHSHRMP	0.43970	7.86093	.	0.00480
5	MODEL1	PARMS	LWHSHRMP	0.41002	7.79340	-0.23177	.
6	MODEL1	PARMS	LWHSHRMP	0.41059	8.29838	.	.
7	MODEL1	PARMS	LWHSHRMP	0.41251	8.51658	.	.
8	MODEL1	PARMS	LWHSHRMP	0.42124	8.67506	.	0.08595
9	MODEL1	PARMS	LWHSHRMP	0.40196	8.52642	-0.18008	.
10	MODEL1	PARMS	LWHSHRMP	0.40715	7.21603	-0.33454	0.14644
11	MODEL1	PARMS	LWHSHRMP	0.41257	8.09668	.	.
12	MODEL1	PARMS	LWHSHRMP	0.41475	8.12862	-0.24262	.
13	MODEL1	PARMS	LWHSHRMP	0.38802	7.93439	-0.31007	0.20821
14	MODEL1	PARMS	LWHSHRMP	0.39874	8.28933	-0.20705	.
15	MODEL1	PARMS	LWHSHRMP	0.40776	8.78415	-0.19070	.
16	MODEL1	PARMS	LWHSHRMP	0.41355	7.34542	-0.33543	0.17951

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LWHSHRMP	_IN_	_P_	_EDF_
1	.	-0.17640	.	.	-1	1	2	27
2	.	.	.	0.10334	-1	1	2	27
3	.	.	.	.	-1	1	2	27
4	.	.	.	.	-1	1	2	27
5	.	.	.	0.25275	-1	2	3	26
6	.	-0.19678	.	0.12725	-1	2	3	26
7	0.16611	-0.28392	.	.	-1	2	3	26
8	.	-0.21140	.	.	-1	2	3	26
9	.	-0.15164	.	0.23785	-1	3	4	25
10	.	.	.	0.29087	-1	3	4	25
11	0.11719	-0.26775	.	0.09670	-1	3	4	25
12	.	.	-0.066150	0.28022	-1	3	4	25
13	.	-0.19900	.	0.28741	-1	4	5	24
14	0.15760	-0.24032	.	0.21334	-1	4	5	24
15	.	-0.14706	-0.055229	0.26124	-1	4	5	24
16	-0.06150	.	.	0.30565	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.17481	0.09589	0.06240	4.15743	-48.6494	-45.9148
2	0.18496	0.04338	0.00795	5.85064	-47.0124	-44.2778
3	0.19040	0.01527	-0.02121	6.75744	-46.1723	-43.4377
4	0.19334	0.00008	-0.03696	7.24735	-45.7283	-42.9937
5	0.16811	0.16274	0.09833	4.00158	-48.8770	-44.7751
6	0.16859	0.16039	0.09580	4.07734	-48.7958	-44.6939
7	0.17016	0.15253	0.08734	4.33069	-48.5257	-44.4238
8	0.17745	0.11626	0.04828	5.50029	-47.3105	-43.2086
9	0.16157	0.22629	0.13344	3.95213	-49.1662	-43.6970
10	0.16577	0.20615	0.11089	4.60147	-48.4211	-42.9520
11	0.17022	0.18486	0.08705	5.28795	-47.6538	-42.1846
12	0.17202	0.17624	0.07739	5.56606	-47.3486	-41.8794
13	0.15056	0.30786	0.19251	3.32131	-50.3973	-43.5608
14	0.15899	0.26907	0.14725	4.57225	-48.8159	-41.9795
15	0.16627	0.23564	0.10825	5.65043	-47.5189	-40.6825
16	0.17102	0.21376	0.08272	6.35606	-46.7005	-39.8640

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LWHSHRMP	0.39355	7.90192	-0.30407	0.17598
18	MODEL1	PARMS	LWHSHRMP	0.39616	8.02122	-0.30998	0.20326
19	MODEL1	PARMS	LWHSHRMP	0.40652	8.44868	-0.21153	.
20	MODEL1	PARMS	LWHSHRMP	0.42093	7.61730	-0.33435	0.16854
21	MODEL1	PARMS	LWHSHRMP	0.40234	7.94838	-0.30413	0.17395

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LWHSHRMP	_IN_	_P_	_EDF_
17	0.08250	-0.23809	.	0.26690	-1	5	6	23
18	.	-0.19658	-0.015587	0.29283	-1	5	6	23
19	0.14862	-0.23268	-0.031252	0.22796	-1	5	6	23
20	-0.06307	.	-0.043806	0.32115	-1	5	6	23
21	0.08101	-0.23610	-0.008235	0.27014	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.15488	0.31763	0.16929	5.00619	-48.8096	-40.6058
18	0.15694	0.30856	0.15825	5.29877	-48.4266	-40.2228
19	0.16526	0.27193	0.11365	6.48012	-46.9295	-38.7257
20	0.17718	0.21940	0.04970	8.17434	-44.9090	-36.7053
21	0.16188	0.31782	0.13178	7.00000	-46.8177	-37.2467

Regression—Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.671*	*.450*	*.300*	*828.7683*	*1.700*

a. Dependent Variable: White Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*12361537.983*	*6*	*2060256.331*	*3.000*	*.027*[b]
	Residual	*15110851.464*	*22*	*686856.885*		
	Total	*27472389.448*	*28*			

a. Dependent Variable: White Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3079.584	421.836		7.300	.000	2204.749	3954.419
	January-February Inflows	-.635	.199	-.705	-3.189	.004	-1.048	-.222
	March-April Inflows	.310	.157	.417	1.969	.062	-.016	.636
	May-June Inflows	-1.511E-02	.125	-.026	-.121	.905	-.273	.243
	July-August Inflows	-.355	.239	-.279	-1.486	.151	-.851	.141
	September-October Inflows	3.687E-02	.186	.035	.198	.845	-.350	.423
	November-December Inflows	.487	.168	.611	2.906	.008	.140	.835

a. Dependent Variable: White Shrimp Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.511	1.957
	March-April Inflows	.557	1.796
	May-June Inflows	.566	1.767
	July-August Inflows	.707	1.414
	September-October Inflows	.807	1.240
	November-December Inflows	.565	1.770

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	5.541	1.000	.00	.00	.00
	2	.608	3.019	.00	.00	.07
	3	.266	4.562	.04	.03	.07
	4	.230	4.904	.00	.00	.12
	5	.171	5.698	.01	.26	.23
	6	.106	7.244	.89	.01	.13
	7	7.785E-02	8.437	.05	.69	.38

a. Dependent Variable: White Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.01	.01	.01
	2	.03	.05	.20	.05
	3	.00	.02	.33	.35
	4	.06	.80	.03	.05
	5	.42	.01	.01	.02
	6	.05	.03	.43	.02
	7	.43	.09	.00	.50

a. Dependent Variable: White Shrimp Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*1484.5918*	*3927.6738*	*2897.4207*	*664.4422*	*29*
Std. Predicted Value	*-2.126*	*1.551*	*.000*	*1.000*	*29*
Standard Error of Predicted Value	*266.9057*	*576.4986*	*396.3361*	*94.9831*	*29*
Adjusted Predicted Value	*1565.7291*	*4034.1616*	*2891.3560*	*685.6245*	*29*
Residual	*-2093.7151*	*1777.4014*	*5.488E-13*	*734.6246*	*29*
Std. Residual	*-2.526*	*2.145*	*.000*	*.886*	*29*
Stud. Residual	*-2.733*	*2.361*	*.003*	*.999*	*29*
Deleted Residual	*-2450.0974*	*2154.2524*	*6.0647*	*940.1981*	*29*
Stud. Deleted Residual	*-3.285*	*2.670*	*-.011*	*1.094*	*29*
Mahal. Distance	*1.939*	*12.583*	*5.793*	*3.236*	*29*
Cook's Distance	*.000*	*.182*	*.040*	*.058*	*29*
Centered Leverage Value	*.069*	*.449*	*.207*	*.116*	*29*

a. Dependent Variable: White Shrimp Harvest

Case Values for Residuals Diagnostics

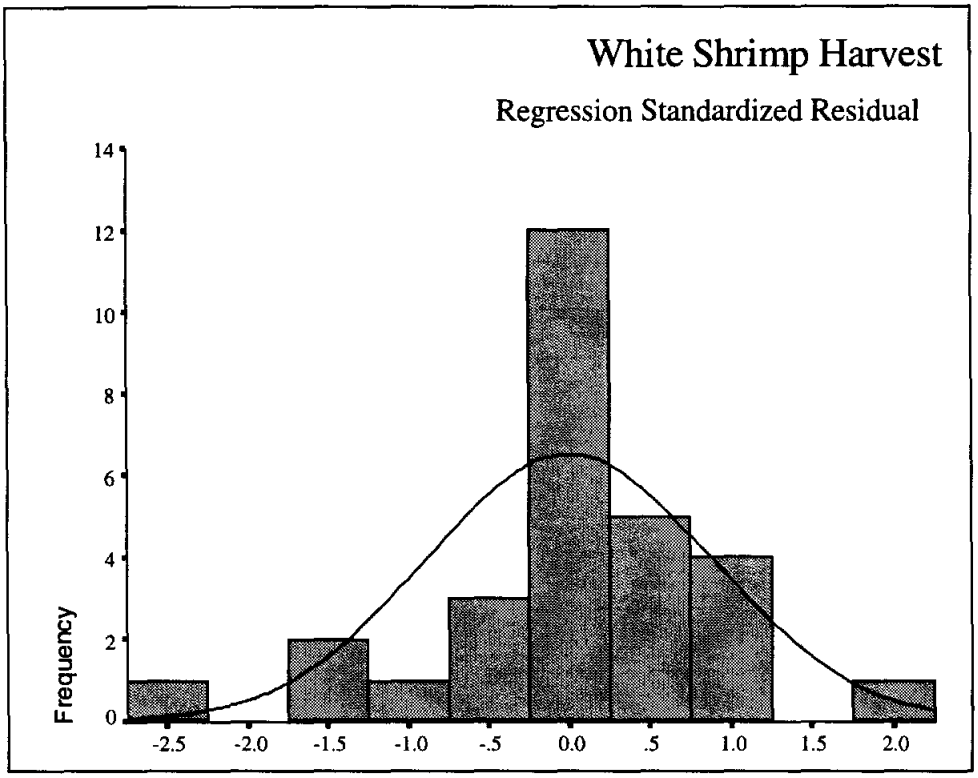
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	1781.09536	-799.09536	-1157.40312	2139.40312	-1.68009	-.96420	-1.16040	-1.17010
1960	1794.88297	-198.48297	-236.16541	1832.56541	-1.65934	-.23949	-.26124	-.25563
1961	1484.59175	-377.89175	-732.16632	1838.86632	-2.12634	-.45597	-.63468	-.62584
1962	3482.66698	-158.26698	-185.22946	3509.62946	.88081	-.19097	-.20659	-.20204
1963	3133.12011	-105.82011	-118.45241	3145.75241	.35473	-.12768	-.13509	-.13204
1964	2923.29860	1777.40140	2154.25242	2546.44758	.03895	2.14463	2.36106	*2.66968
1965	3050.00766	16.19234	18.06610	3048.13390	.22965	.01954	.02064	.02016
1966	2463.38379	-1203.38379	-1596.74751	2856.74751	-.65323	-1.45201	-1.67258	-1.74911
1967	3132.51513	-2093.71513	-2450.09743	3488.89743	.35382	-2.52630	-2.73286	*-3.28528
1968	2772.10491	-255.30491	-380.15049	2896.95049	-.18860	-.30805	-.37590	-.36844
1969	3499.59831	310.00169	402.17603	3407.42397	.90629	.37405	.42605	.41798
1970	3618.81443	1.78557	2.15354	3618.44646	1.08571	.00215	.00237	.00231
1971	3121.98088	-159.18088	-193.55801	3156.35801	.33797	-.19207	-.21180	-.20714
1972	2941.44900	246.95100	279.15835	2909.24165	.06626	.29797	.31681	.31023
1973	3289.11074	788.58926	1165.89782	2911.80218	.58950	.95152	1.15697	1.16641
1974	2306.90844	85.49156	161.48396	2230.91604	-.88873	.10315	.14177	.13858
1975	3891.04057	36.15943	56.67604	3870.52396	1.49542	.04363	.05462	.05337
1976	3000.17371	401.92629	462.58174	2939.51826	.15465	.48497	.52028	.51147
1977	3634.94279	-1298.74279	-1697.96169	4034.16169	1.10999	-1.56708	-1.79181	-1.89429
1978	2285.00990	790.59010	966.88407	2108.71593	-.92169	.95393	1.05494	1.05779
1979	1968.44450	60.25550	100.96461	1927.73539	-1.39813	.07270	.09411	.09197
1980	2585.40542	856.19458	1093.45191	2348.14809	-.46959	1.03309	1.16749	1.17771
1981	2516.58465	205.81535	336.87811	2385.52189	-.57317	.24834	.31772	.31113
1982	3499.41318	-43.01318	-54.02081	3510.42081	.90601	-.05190	-.05816	-.05683
1983	2096.68202	666.21798	1197.17083	1565.72917	-1.20513	.80387	1.07759	1.08175
1984	3048.26526	556.03474	623.02454	2981.27546	.22702	.67092	.71018	.70195
1985	3077.01390	-453.81390	-522.08054	3145.28054	.27029	-.54758	-.58732	-.57837
1986	3699.02121	409.27879	560.24050	3548.05950	1.20643	.49384	.57778	.56883
1987	3927.67382	-62.17382	-81.15071	3946.65071	1.55055	-.07502	-.08571	-.08375

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

[1]Values greater than 3 are flagged.

[2]This is flagged if it exceeds $t_{n-p-2,a} = t_{21,0.01} = 2.518$.

Graphics


White Shrimp Harvest
Regression Standardized Residual
Frequency
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12
10
8
6
4
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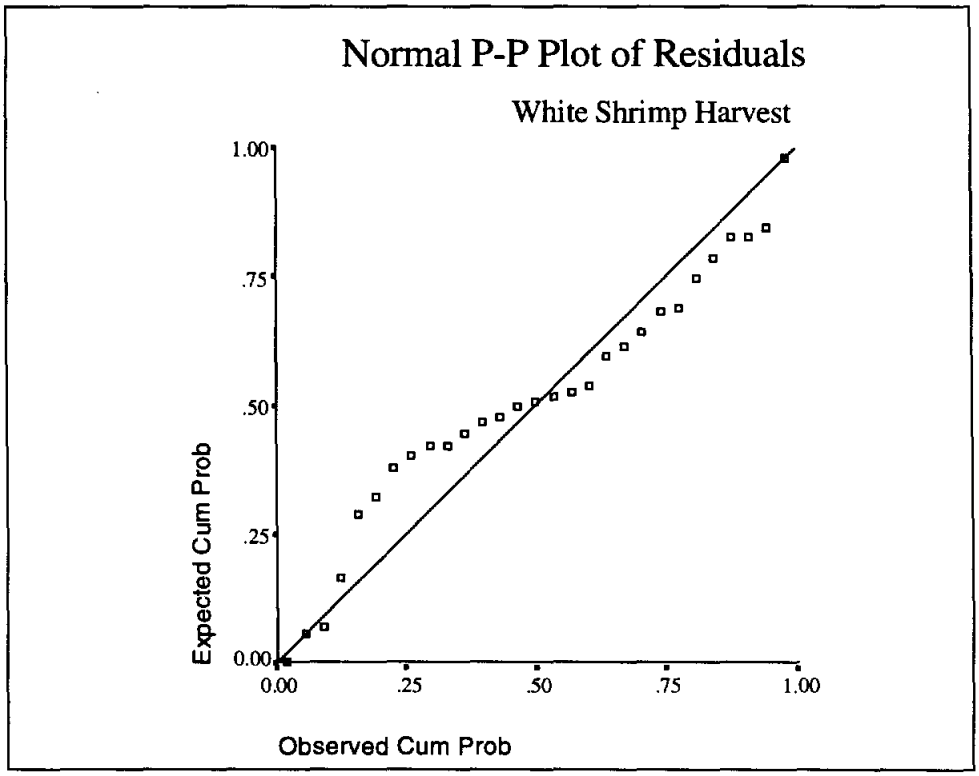
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0


Normal P-P Plot of Residuals
White Shrimp Harvest
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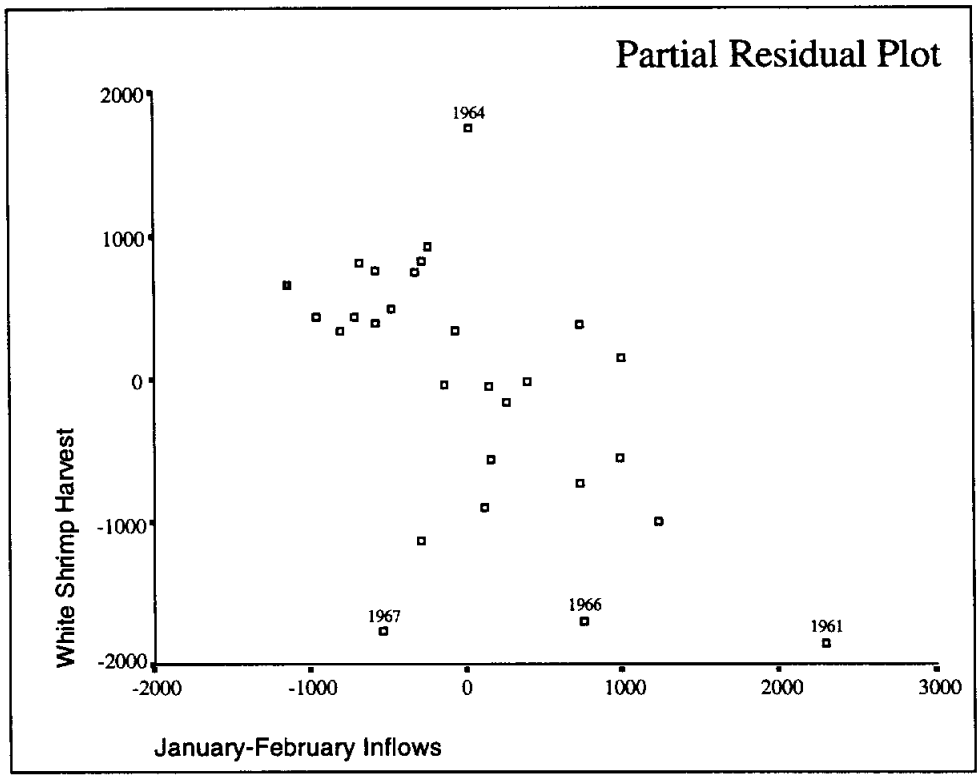
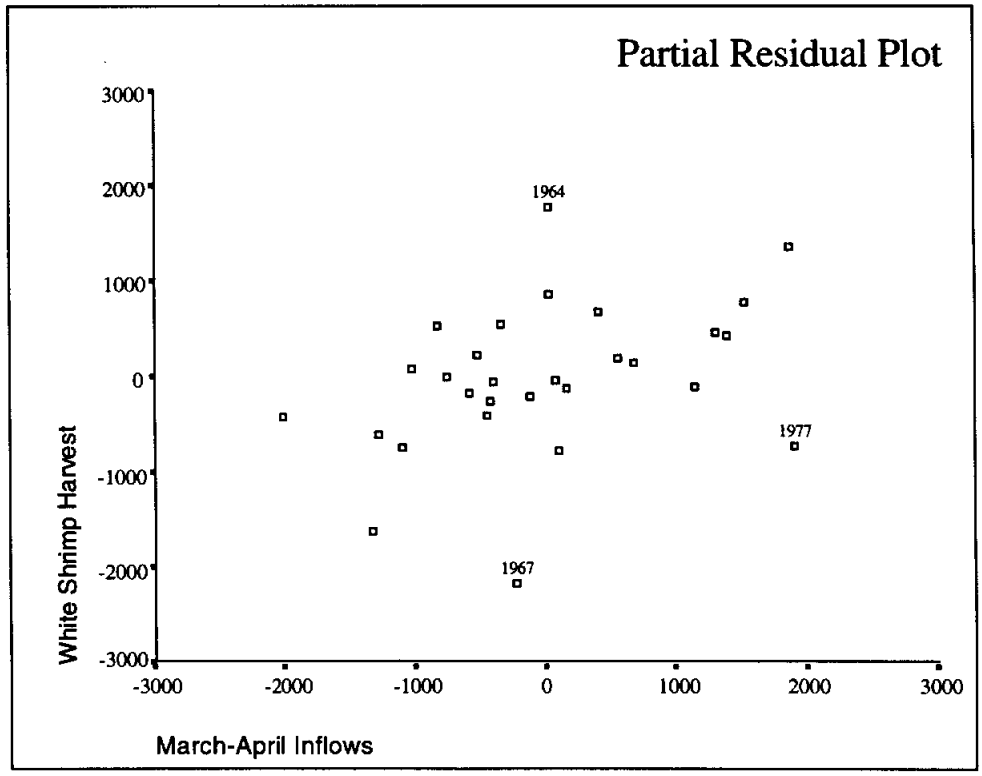
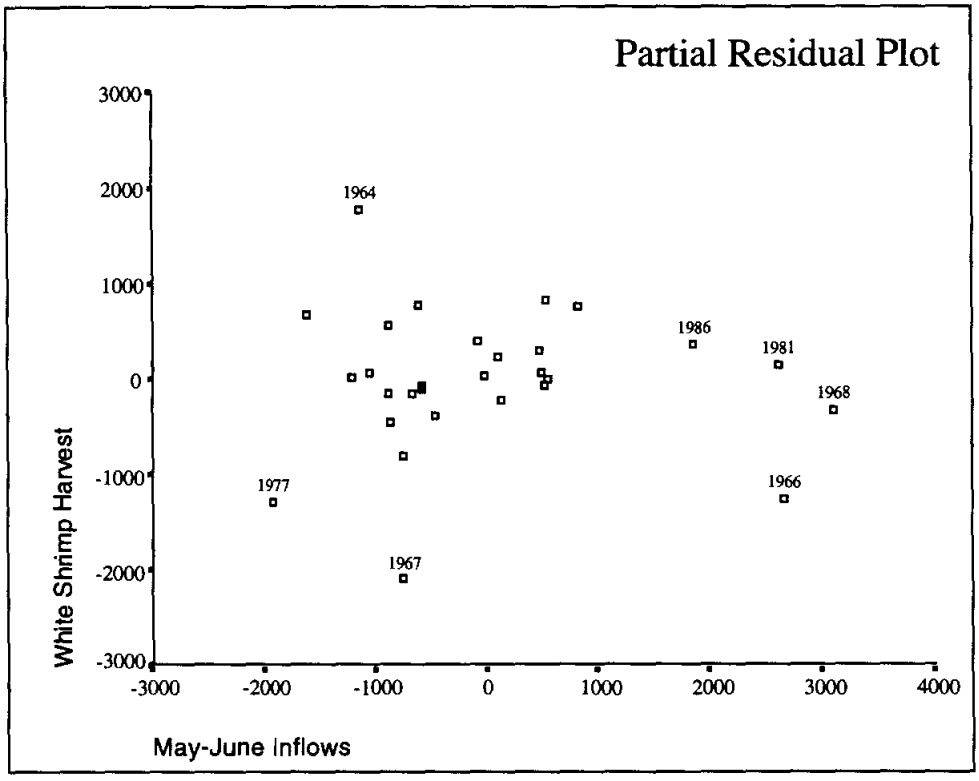
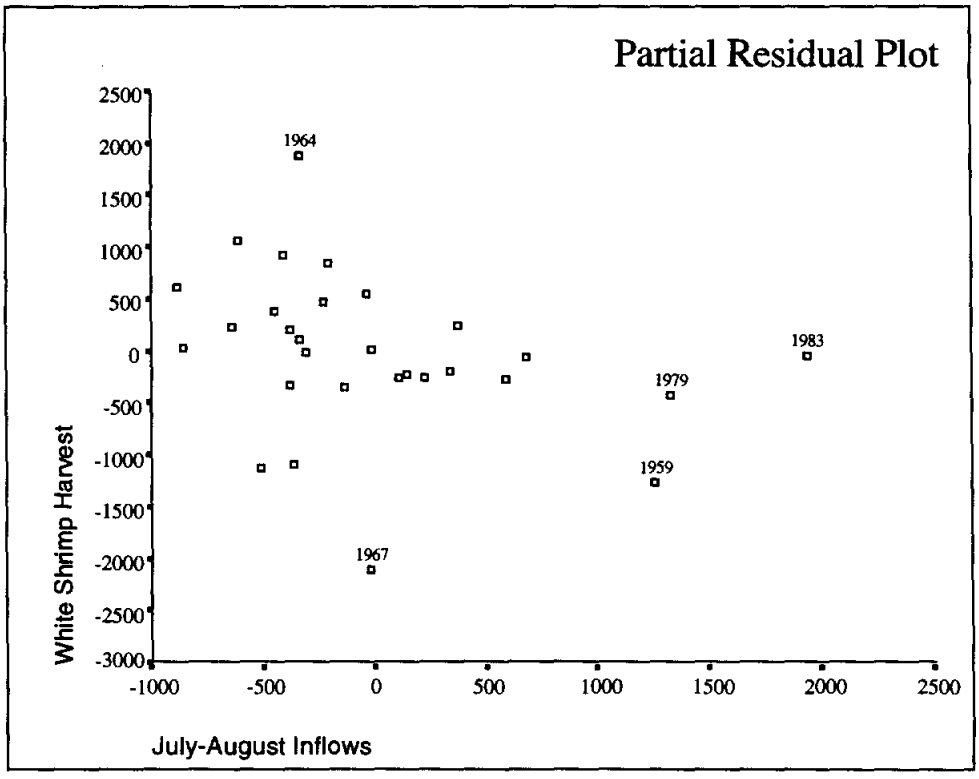
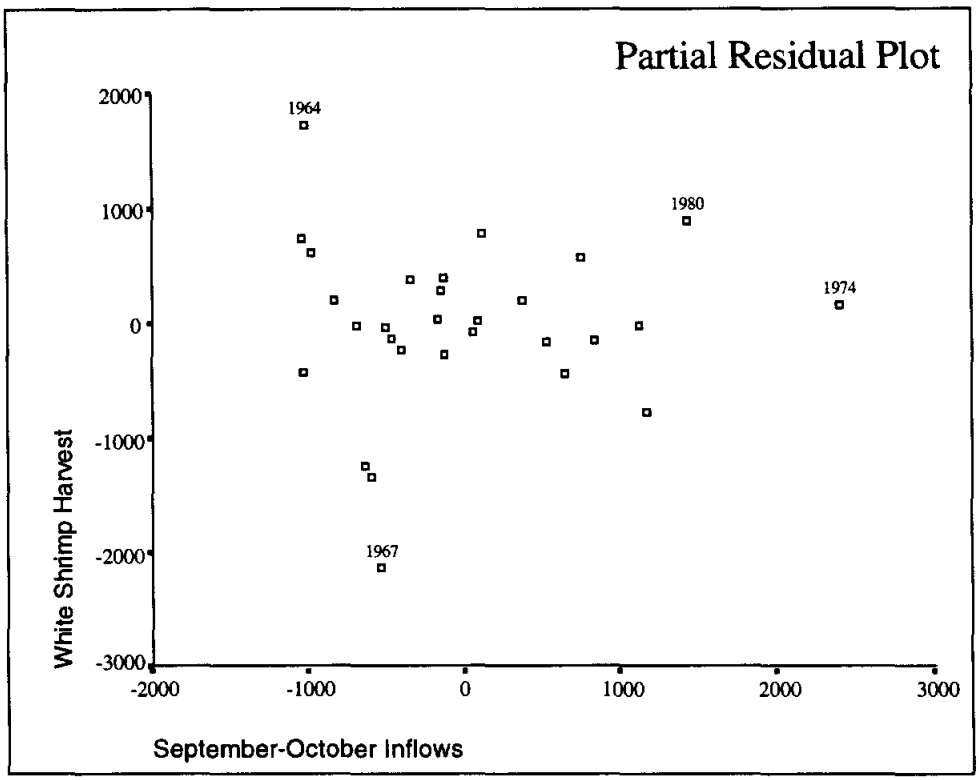
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

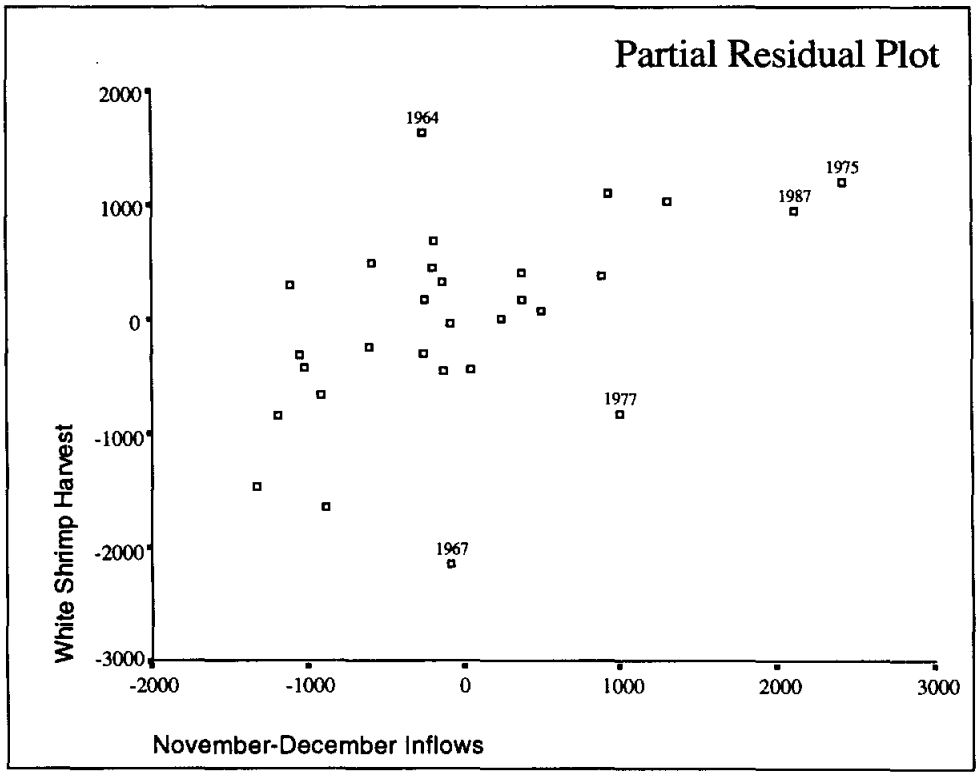

Partial Residual Plot
White Shrimp Harvest
January-February Inflows
2000
1000
0
-1000
-2000
-2000
-1000
0
1000
2000
3000
1964
1967
1966
1961

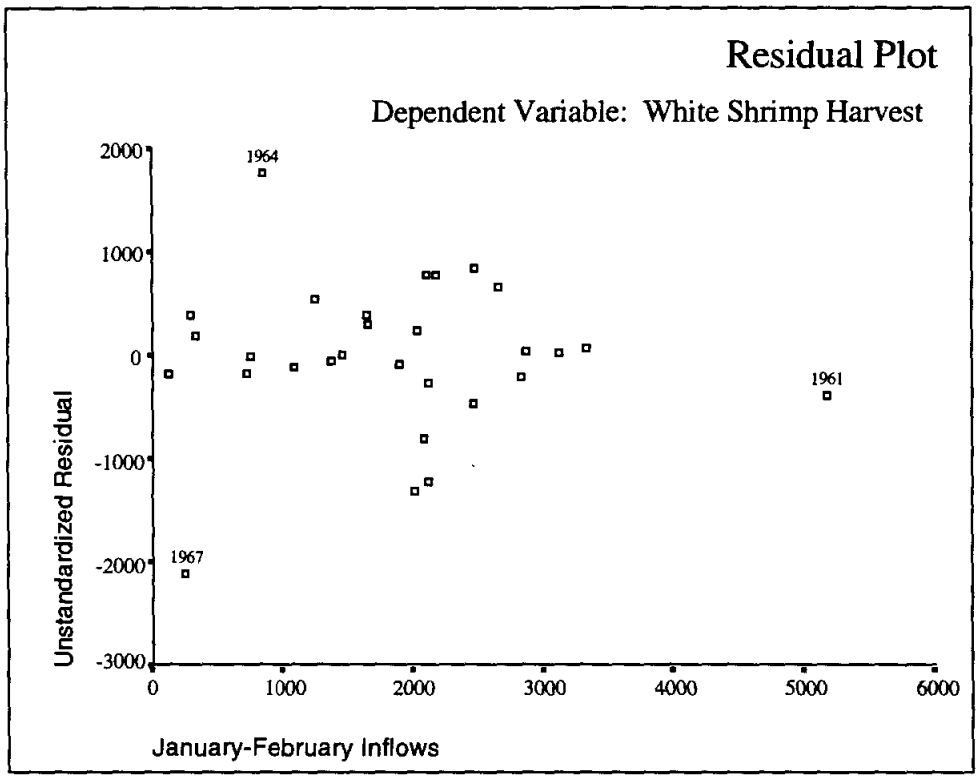

Partial Residual Plot
White Shrimp Harvest
March-April Inflows
3000
2000
1000
0
-1000
-2000
-3000
-3000
-2000
-1000
0
1000
2000
3000
1964
1977
1967


Partial Residual Plot
White Shrimp Harvest
May-June Inflows
3000
2000
1000
0
-1000
-2000
-3000
-3000
-2000
-1000
0
1000
2000
3000
4000
1964
1986
1981
1968
1977
1966
1967


Partial Residual Plot
White Shrimp Harvest
July-August Inflows
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-3000
-1000
-500
0
500
1000
1500
2000
2500
1964
1983
1979
1959
1967


Partial Residual Plot
2000
1000
0
-1000
-2000
-3000
1964
1980
1974
1967
White Shrimp Harvest
-2000
-1000
0
1000
2000
3000
September-October Inflows


Partial Residual Plot
2000
1000
0
-1000
-2000
-3000
1964
1975
1987
1977
1967
White Shrimp Harvest
-2000
-1000
0
1000
2000
3000
November-December Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
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1000
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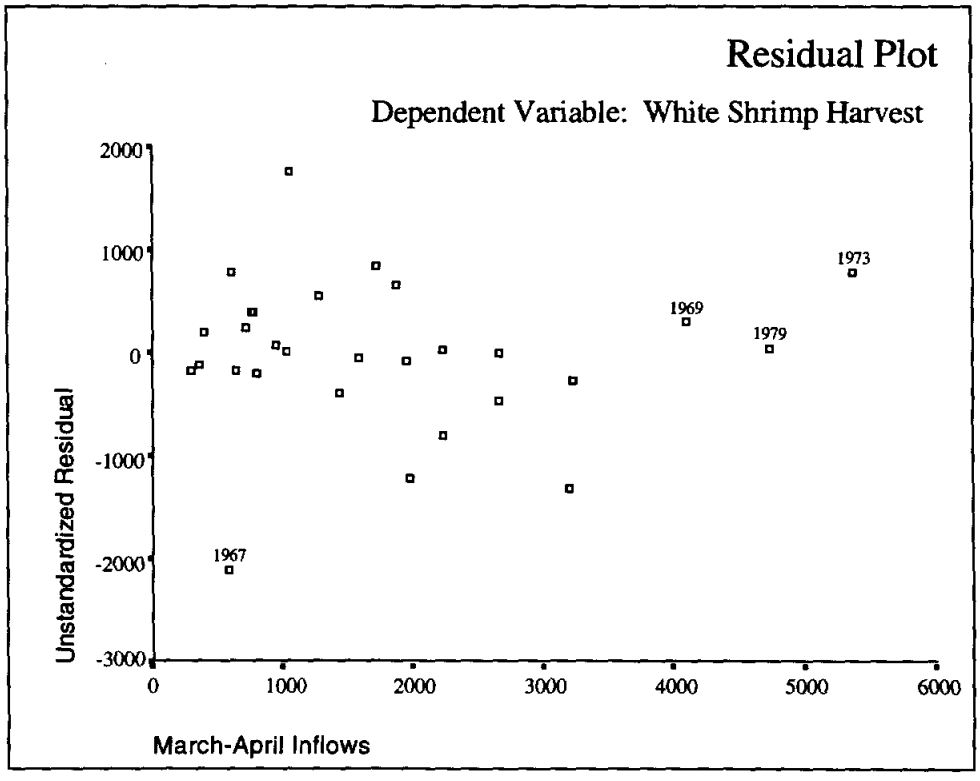
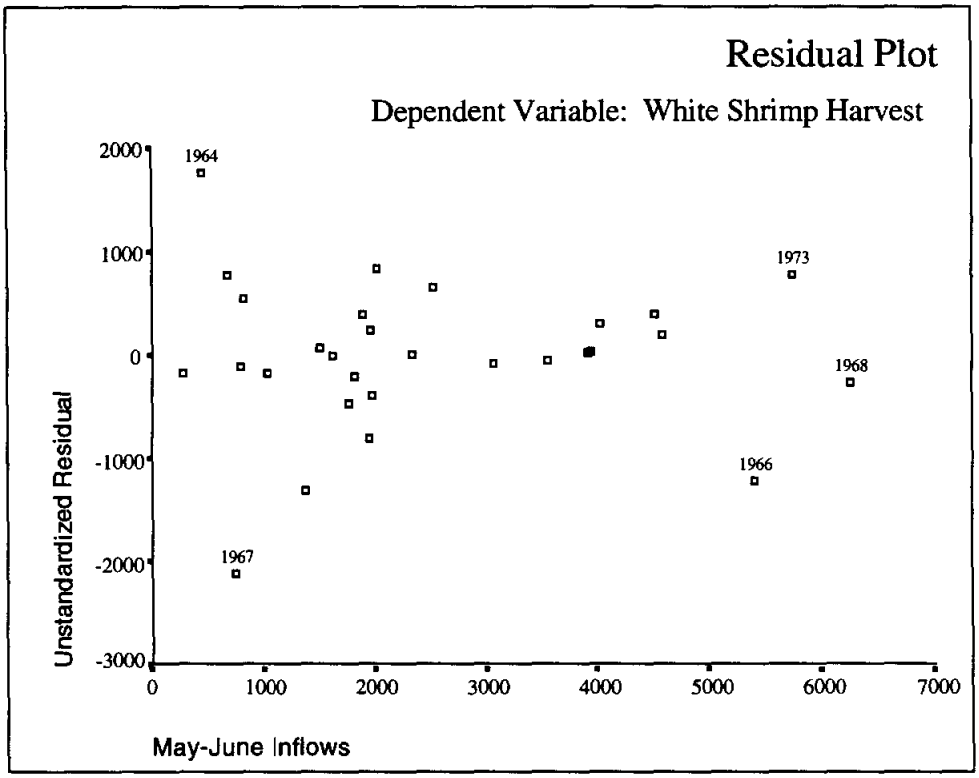
-1000
-2000
-3000
1964
1961
1967
0
1000
2000
3000
4000
5000
6000
January-February Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1973
1969
1979
1967
0
1000
2000
3000
4000
5000
6000
March-April Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
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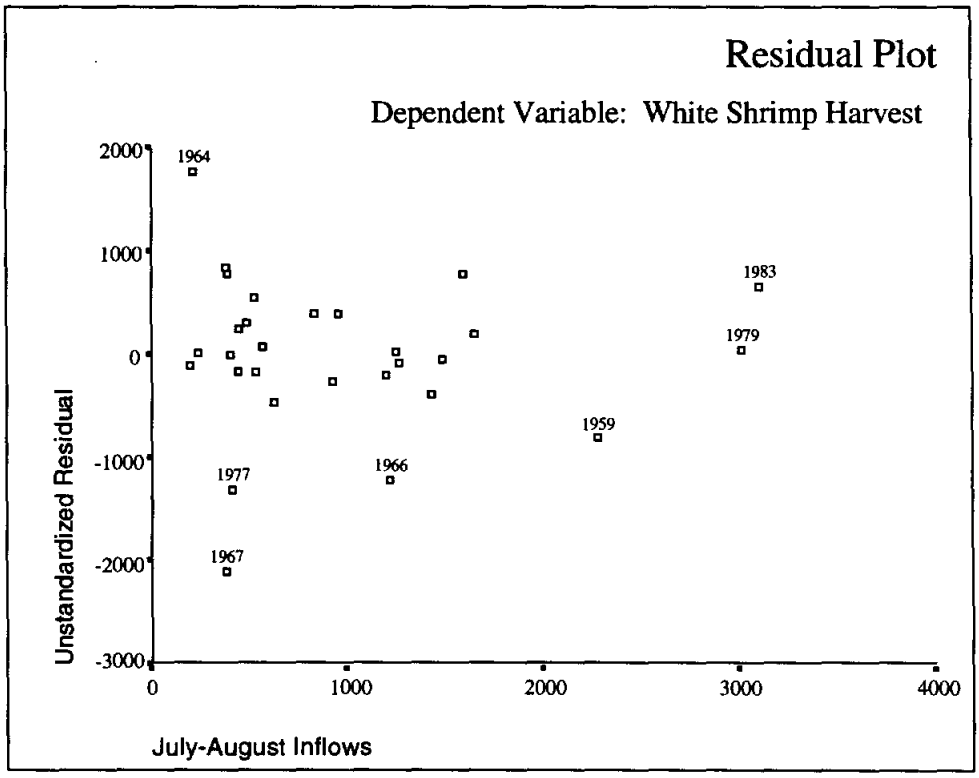
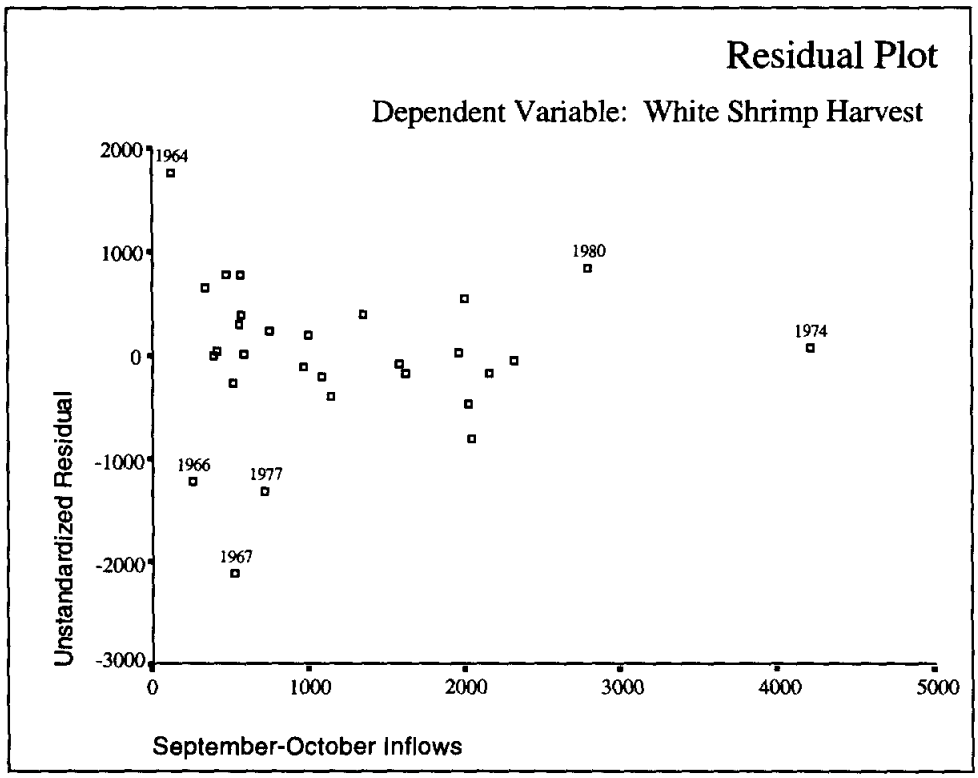
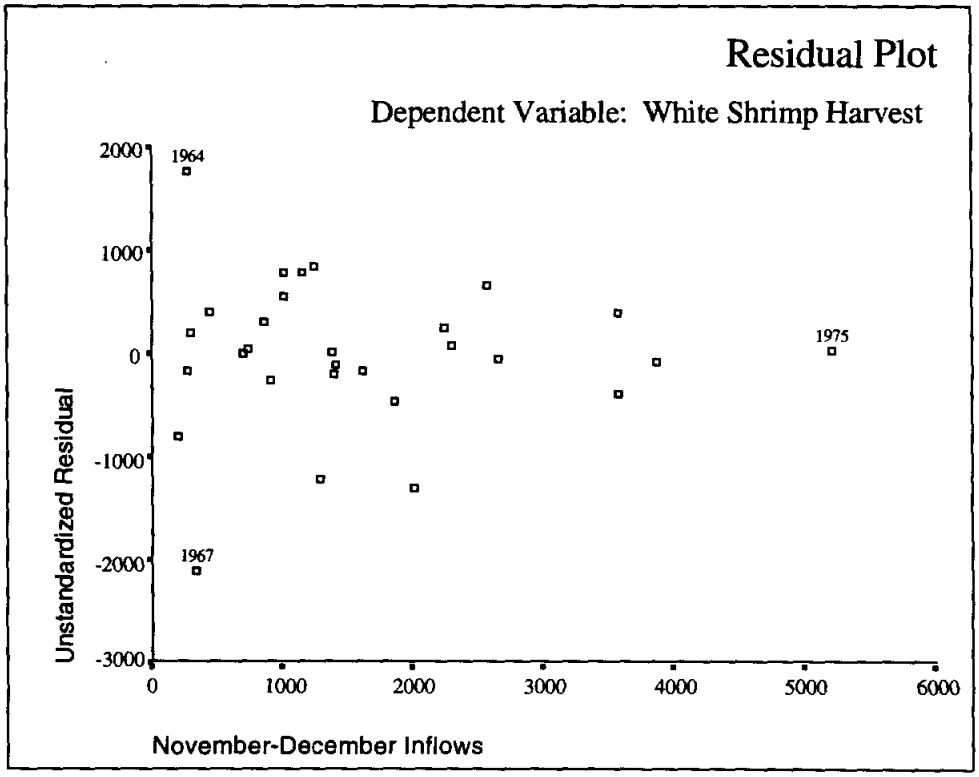
-1000
-2000
-3000
1964
1973
1968
1966
1967
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1964
1983
1979
1959
1977
1966
1967
0
1000
2000
3000
4000
July-August Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1964
1980
1974
1966
1977
1967
0
1000
2000
3000
4000
5000
September-October Inflows


Residual Plot
Dependent Variable: White Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
-3000
1964
1975
1967
0
1000
2000
3000
4000
5000
6000
November-December Inflows

Prediction Intervals for White Shrimp Harvest

YEAR	WHSHRIMP	LICI_1	UICI_1
1959	982.00	-892.25870	4454.44942
1960	1596.40	-720.69130	4310.45725
1961	1106.70	-1361.10619	4330.28968
1962	3324.40	982.32141	5983.01254
1963	3027.30	675.61356	5590.62667
1964	4700.70	391.10287	5455.49434
1965	3066.20	595.75390	5504.26143
1966	1260.00	-144.63774	5071.40532
1967	1038.80	632.28549	5632.74476
1968	2516.80	79.59791	5464.61191
1969	3809.60	909.59712	6089.59950
1970	3620.60	1091.00112	6146.62774
1971	2962.80	586.90662	5657.05514
1972	3188.40	474.26982	5408.62818
1973	4077.70	601.46279	5976.75870
1974	2392.40	-526.02334	5139.84021
1975	3927.20	1164.70791	6617.37323
1976	3402.10	515.63549	5484.71193
1977	2336.20	1038.70424	6231.18133
1978	3075.60	-255.14590	4825.16570
1979	2028.70	-798.82012	4735.70913
1980	3441.60	8.29894	5162.51191
1981	2722.40	-236.69112	5269.86041
1982	3456.40	936.33568	6062.49069
1983	2762.90	-710.04366	4903.40769
1984	3604.30	589.78286	5506.74767
1985	2623.20	592.87650	5561.15130
1986	4108.30	1066.93616	6331.10625
1987	3865.50	1332.76944	6522.57821

WHSHRIMP	White shrimp harvest
LICI_1	Lower limit for 99% prediction interval for white shrimp harvest
UICI_1	Upper limit for 99% prediction interval for white shrimp harvest

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	-.78352	.08897	-.04264	-.02848
1960	-.11138	-.02855	-.08251	.06756
1961	-.60597	.05567	-.48122	.18138
1962	-.08339	-.02788	.04985	-.00693
1963	-.04562	-.03951	.00437	.01113
1964	*1.22928	*1.14666	.02362	.02052
1965	.00686	.00468	.00135	-.00234
1966	*-1.00003	-.05529	-.36746	.50692
1967	*-1.35541	*-1.30076	.45782	.14810
1968	-.25765	.03098	-.07888	.03803
1969	.22792	.01149	-.00722	.13893
1970	.00105	.00061	-.00043	.00067
1971	-.09626	-.06331	.04358	.00469
1972	.11204	.06208	.03168	-.04675
1973	.80682	-.23798	-.08112	.50586
1974	.13065	-.04666	.04530	-.01409
1975	.04020	-.01361	-.00925	.00719
1976	.19869	.15355	-.08945	-.05341
1977	*-1.05024	-.27323	.14909	-.78498
1978	.49951	.34335	.28083	-.18234
1979	.07559	-.01519	.00427	.02974
1980	.61996	-.11048	.23474	.01028
1981	.24828	.04169	-.04518	-.15166
1982	-.02875	.00704	.01733	-.00100
1983	.96571	.04344	-.09572	-.09107
1984	.24365	.08719	-.05663	.05965
1985	-.22432	.02437	-.02377	-.13545
1986	.34547	-.00565	-.09176	-.12910
1987	-.04627	.00480	.02644	-.01254

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for January-February inflows
SDFBETA_2 Standardized dfbeta for March-April inflows

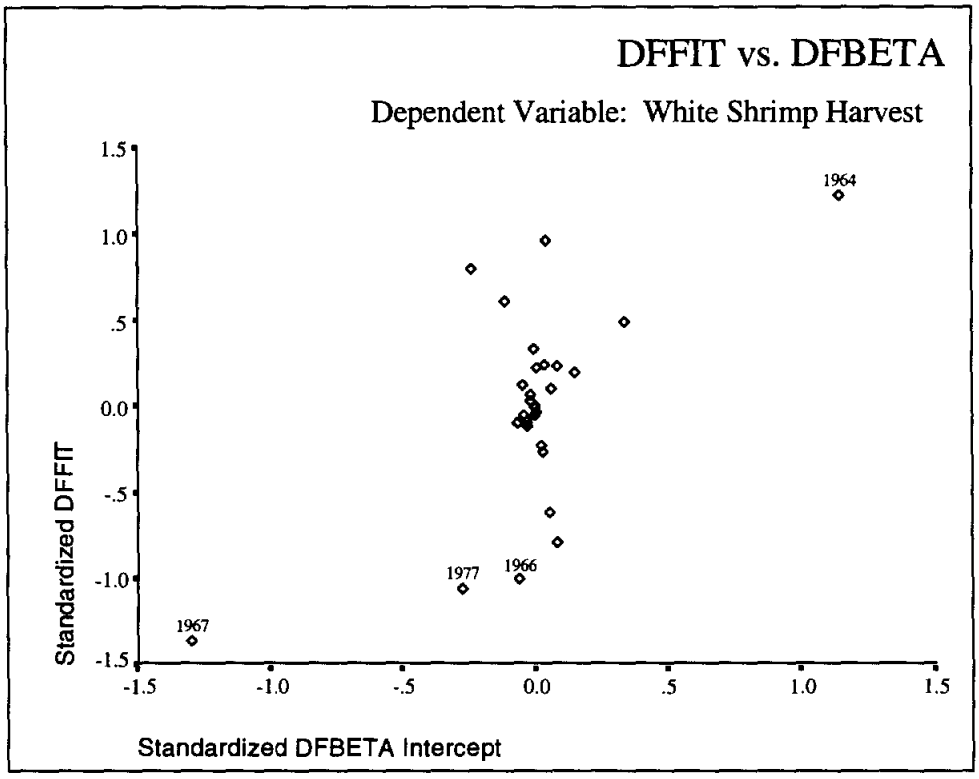
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

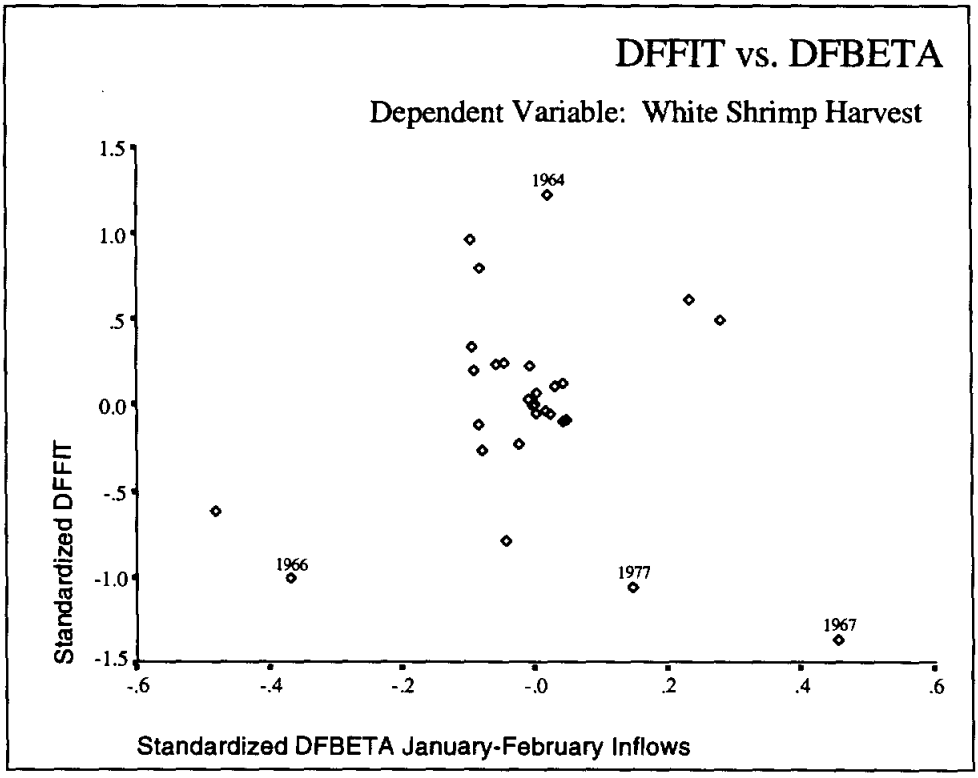
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	0.15654	-.51241	-.37237	.37761
1960	-0.00620	-.00914	.02533	.05164
1961	0.06001	.03328	.20137	.02143
1962	0.02146	-.00942	-.04130	-.02225
1963	0.01202	.01216	.01439	-.00701
1964	-0.49954	-.27845	-.66961	-.15358
1965	0.00178	-.00392	-.00330	-.00037
1966	-0.80592	.20859	.28867	.35753
1967	0.39643	.01385	.42332	.05648
1968	-0.21008	.11029	.01280	.10786
1969	0.03479	-.12076	-.01499	-.02333
1970	-0.00046	-.00024	-.00029	.00019
1971	0.03000	-.01491	-.02731	.01187
1972	0.00573	-.04223	-.06166	.02490
1973	0.17606	-.08321	.04031	-.05383
1974	0.01427	-.02047	.10305	-.03898
1975	-0.00022	-.00021	.00140	.03280
1976	-0.00566	.05958	-.04203	-.01533
1977	0.62236	.32069	.28927	-.43671
1978	-0.10494	-.13666	-.27140	-.13916
1979	-0.01881	.04560	-.00433	-.01457
1980	0.10913	-.23503	.42912	-.29710
1981	0.15702	.07916	.03419	-.08423
1982	-0.00500	-.01095	-.01608	-.01151
1983	-0.34944	.81061	-.31797	.27285
1984	-0.09826	-.00671	.12636	-.02860
1985	0.08068	.06698	-.09185	-.00639
1986	0.18559	-.04286	-.01851	.17598
1987	0.00822	-.00954	-.00123	-.04086

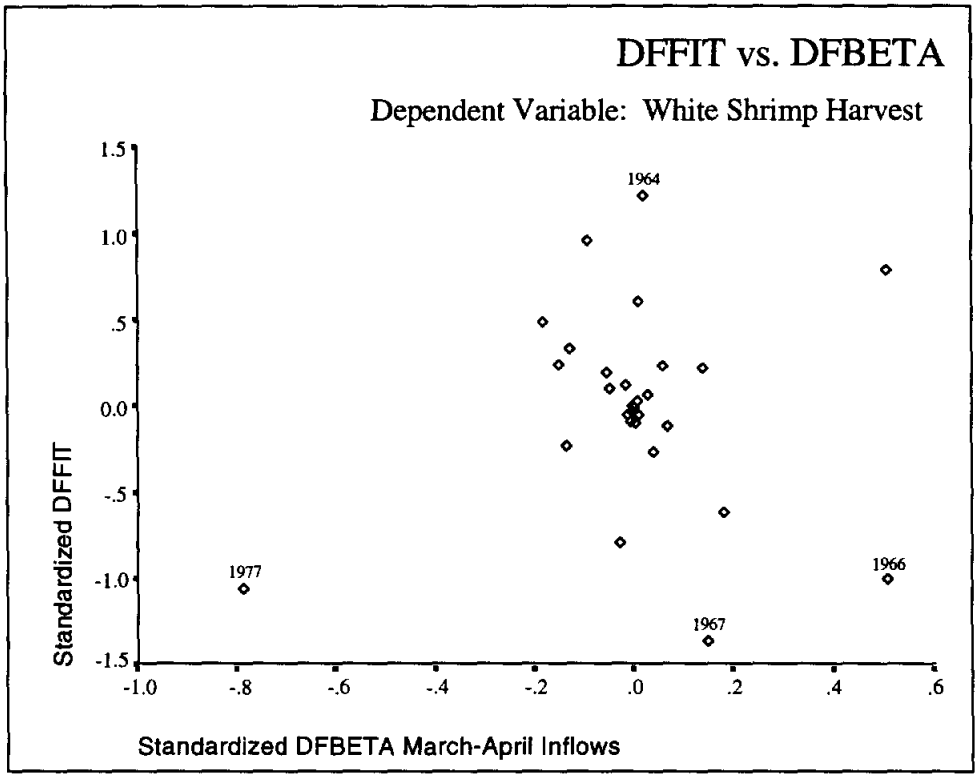
SDFBETA_3 Standardized dfbeta for May-June inflows
SDFBETA_4 Standardized dfbeta for July-August inflows
SDFBETA_5 Standardized dfbeta for September-October inflows
SDFBETA_6 Standardized dfbeta for November-December inflows

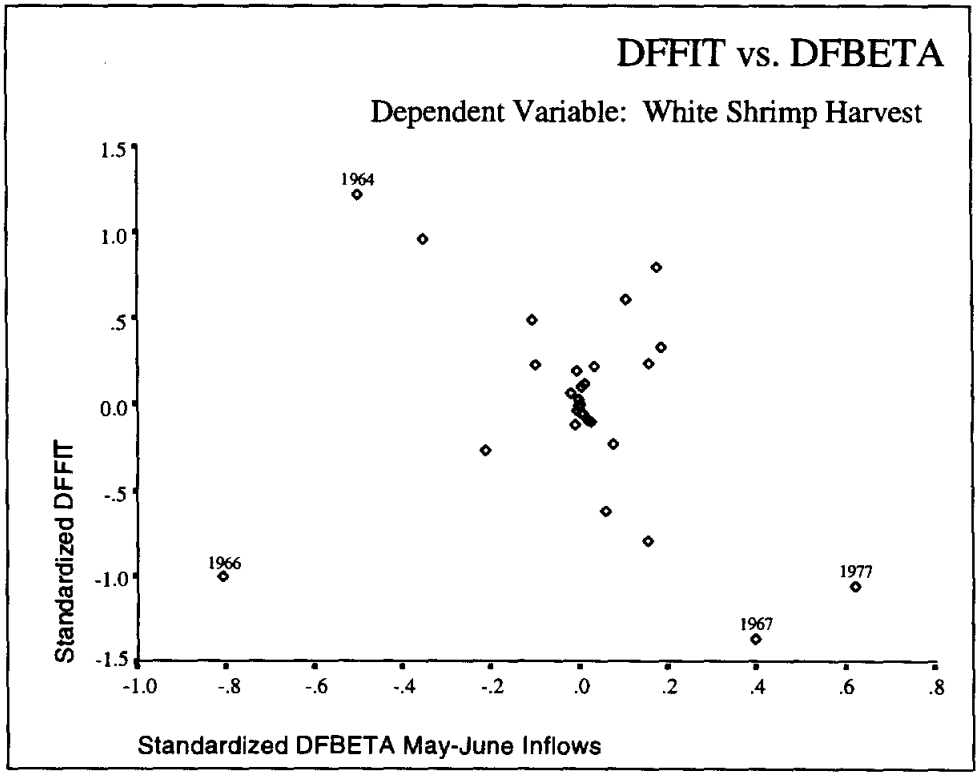
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

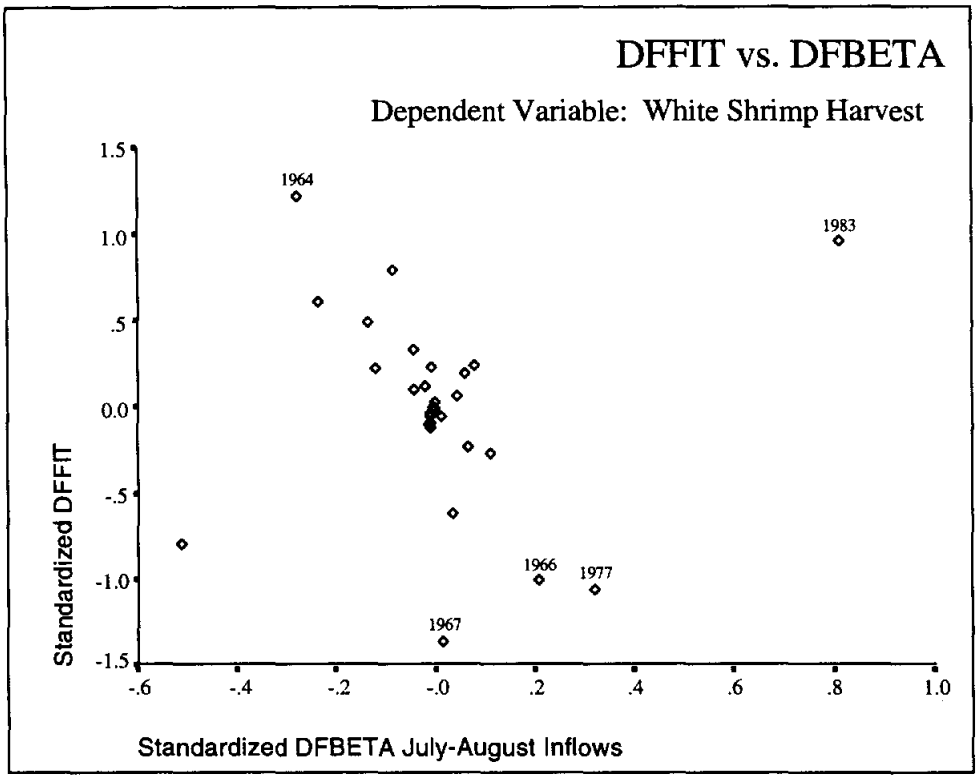
Graphics

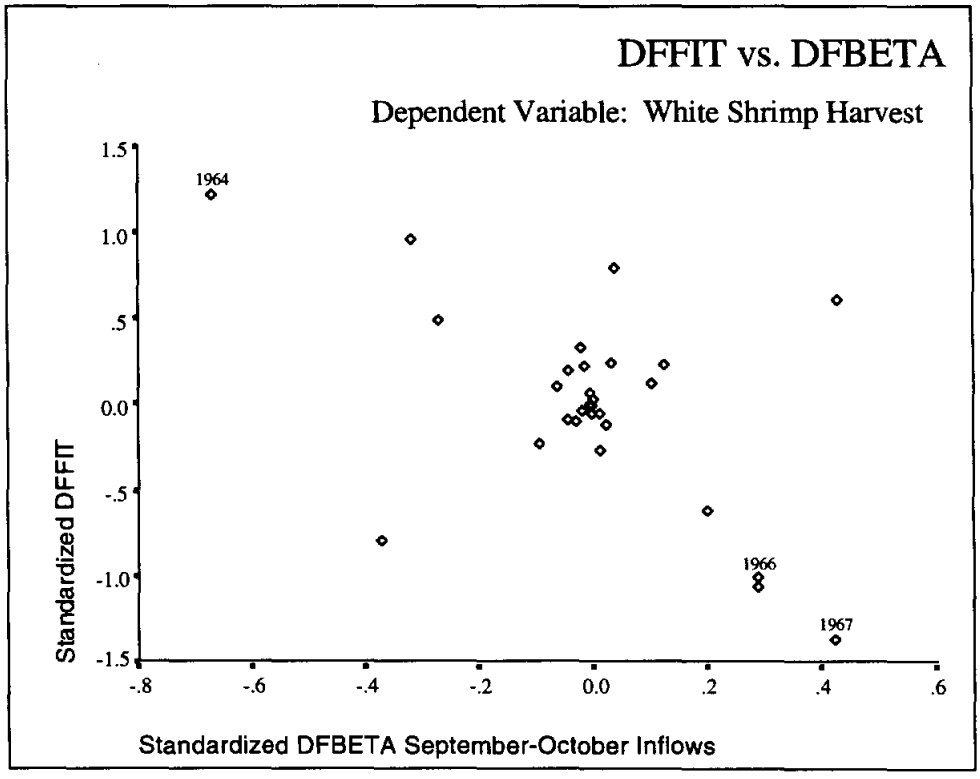

DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
Standardized DFBETA Intercept
1964
1977
1966
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5

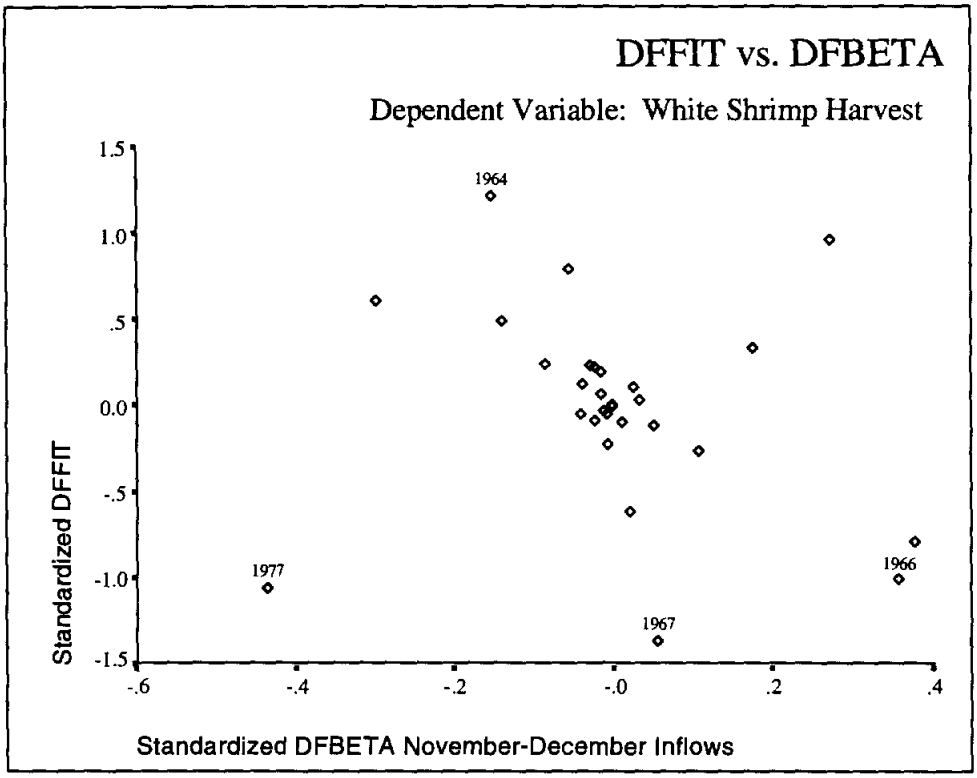

DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
Standardized DFBETA January-February Inflows
1964
1966
1977
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1977
1966
1967
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1966
1977
1967
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
.8
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1983
1966
1977
1967
-.6
-.4
-.2
-.0
.2
.4
.6
.8
1.0
Standardized DFBETA July-August Inflows


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1966
1967
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA September-October Inflows


DFFIT vs. DFBETA
Dependent Variable: White Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1977
1966
1967
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA November-December Inflows

Regression—Logged Harvest

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.650*	*.423*	*.265*	*.370089*	*1.462*

a. Dependent Variable: Ln(White Shrimp Harvest)

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2.207*	*6*	*.368*	*2.686*	*.041*[b]
	Residual	*3.013*	*22*	*.137*		
	Total	*5.220*	*28*			

a. Dependent Variable: Ln(White Shrimp Harvest)

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	*7.958*	*.188*		*42.249*	*.000*	*7.568*	*8.349*		
	January-February Inflows	*-2.691E-04*	*.000*	*-.686*	*-3.026*	*.006*	*.000*	*.000*	*.511*	*1.957*
	March-April Inflows	*1.296E-04*	*.000*	*.401*	*1.847*	*.078*	*.000*	*.000*	*.557*	*1.796*
	May-June Inflows	*-2.688E-06*	*.000*	*-.010*	*-.048*	*.962*	*.000*	*.000*	*.566*	*1.767*
	July-August Inflows	*-1.518E-04*	*.000*	*-.274*	*-1.421*	*.169*	*.000*	*.000*	*.707*	*1.414*
	September-October Inflows	*3.127E-05*	*.000*	*.068*	*.376*	*.711*	*.000*	*.000*	*.807*	*1.240*
	November-December Inflows	*2.001E-04*	*.000*	*.576*	*2.674*	*.014*	*.000*	*.000*	*.565*	*1.770*

a. Dependent Variable: Ln(White Shrimp Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	*.511*	*1.957*
	March-April Inflows	*.557*	*1.796*
	May-June Inflows	*.566*	*1.767*
	July-August Inflows	*.707*	*1.414*
	September-October Inflows	*.807*	*1.240*
	November-December Inflows	*.565*	*1.770*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	5.541	1.000	.00	.00	.00
	2	.608	3.019	.00	.00	.07
	3	.266	4.562	.04	.03	.07
	4	.230	4.904	.00	.00	.12
	5	.171	5.698	.01	.26	.23
	6	.106	7.244	.89	.01	.13
	7	7.785E-02	8.437	.05	.69	.38

a. Dependent Variable: Ln(White Shrimp Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.01	.01	.01
	2	.03	.05	.20	.05
	3	.00	.02	.33	.35
	4	.06	.80	.03	.05
	5	.42	.01	.01	.02
	6	.05	.03	.43	.02
	7	.43	.09	.00	.50

a. Dependent Variable: Ln(White Shrimp Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	7.281519	8.325120	7.895521	.280766	29
Std. Predicted Value	-2.187	1.530	.000	1.000	29
Standard Error of Predicted Value	.119187	.257437	.176985	4.24150E-02	29
Adjusted Predicted Value	7.222637	8.345042	7.892987	.297031	29
Residual	-1.042662	.563215	1.89886E-15	.328048	29
Std. Residual	-2.817	1.522	.000	.886	29
Stud. Residual	-3.048	1.675	.003	1.011	29
Deleted Residual	-1.220140	.701399	2.53426E-03	.431375	29
Stud. Deleted Residual	-3.917	1.753	-.033	1.131	29
Mahal. Distance	1.939	12.583	5.793	3.236	29
Cook's Distance	.000	.228	.046	.072	29
Centered Leverage Value	.069	.449	.207	.116	29

a. Dependent Variable: Ln(White Shrimp Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	7.44016	-.55057	-.79745	7.68704	-1.62184	-1.48768	-1.79041	-1.89255
1960	7.42644	-.05093	-.06060	7.43611	-1.67073	-.13762	-.15012	-.14674
1961	7.28152	-.27238	-.52774	7.53688	-2.18689	-.73599	-1.02445	-1.02566
1962	8.15514	-.04609	-.05394	8.16299	.92466	-.12454	-.13473	-.13169
1963	7.98971	.02572	.02879	7.98664	.33547	.06948	.07351	.07183
1964	7.89225	.56321	.68263	7.77284	-.01164	1.52184	1.67542	1.75252
1965	7.95313	.07506	.08375	7.94445	.20519	.20282	.21424	.20953
1966	7.70889	-.57002	-.75635	7.89522	-.66473	-1.54023	-1.77419	-1.87253
1967	7.98848	-1.04266	-1.22014	8.16596	.33110	-2.81733	*-3.04769	*-3.91725
1968	7.84759	-.01685	-.02509	7.85583	-.17071	-.04553	-.05555	-.05428
1969	8.14776	.09752	.12652	8.11876	.89840	.26350	.30013	.29383
1970	8.19015	.00425	.00512	8.18927	1.04937	.01148	.01260	.01231
1971	8.00014	-.00625	-.00760	8.00149	.37261	-.01688	-.01862	-.01819
1972	7.90316	.16412	.18552	7.88175	.02719	.44346	.47149	.46299
1973	8.05990	.25339	.37462	7.93867	.58548	.68466	.83249	.82648
1974	7.68611	.09395	.17745	7.60260	-.74587	.25385	.34888	.34181
1975	8.30990	-.03421	-.05363	8.32931	1.47588	-.09245	-.11574	-.11312
1976	7.93555	.19660	.22626	7.90588	.14258	.53121	.56989	.56094
1977	8.19197	-.43569	-.56962	8.32590	1.05587	-1.17726	-1.34610	-1.37290
1978	7.62388	.40737	.49821	7.53304	-.96749	1.10074	1.21730	1.23151
1979	7.49319	.12196	.20436	7.41079	-1.43298	.32954	.42658	.41851
1980	7.78937	.35432	.45250	7.69119	-.37806	.95739	1.08193	1.08636
1981	7.74815	.16111	.26371	7.64556	-.52487	.43534	.55696	.54804
1982	8.16489	-.01690	-.02123	8.16921	.95940	-.04568	-.05119	-.05002
1983	7.53371	.39032	.70140	7.22264	-1.28865	1.05468	1.41380	1.44868
1984	7.97072	.21916	.24557	7.94432	.26784	.59219	.62684	.61798
1985	7.97896	-.10681	-.12288	7.99503	.29719	-.28861	-.30956	-.30310
1986	8.23417	.08660	.11854	8.20223	1.20615	.23399	.27376	.26792
1987	8.32512	-.06527	-.08520	8.34504	1.53010	-.17637	-.20150	-.19705

PRE_1 Predicted value of the natural log of harvest

RES_1 Ordinary residual; observed log harvest minus predicted log harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of the log of harvest

ZRE_1 Z-score of the residual

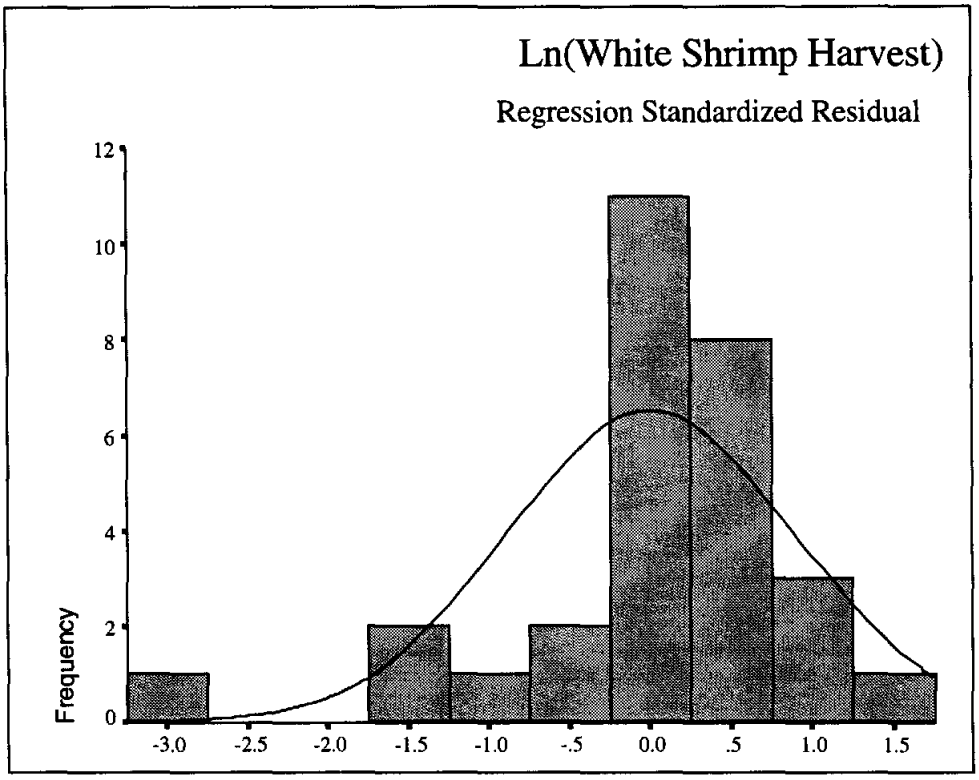
SRE_1 Studentized residual

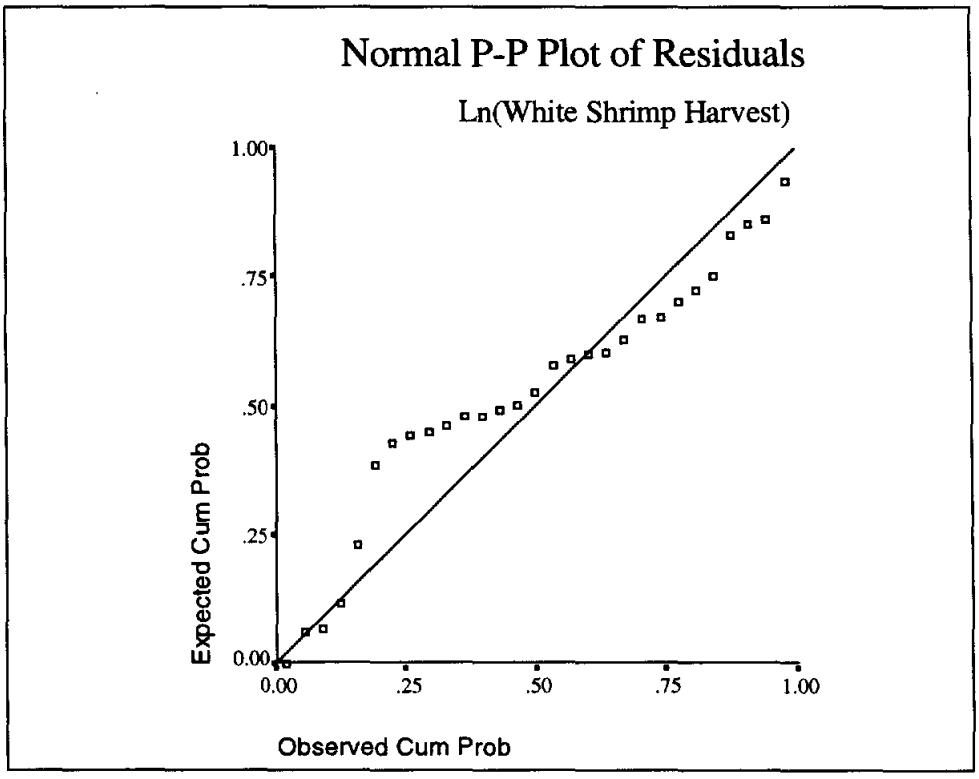
SDR_1 Studentized deleted residuals

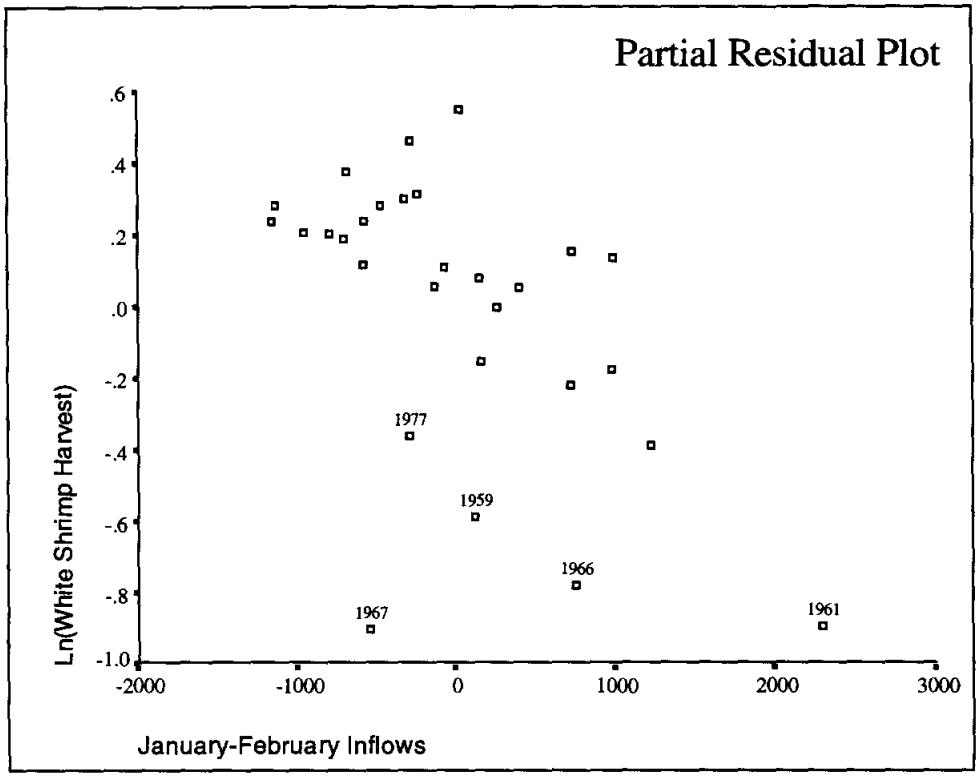
[1]Values greater than 3 are flagged.

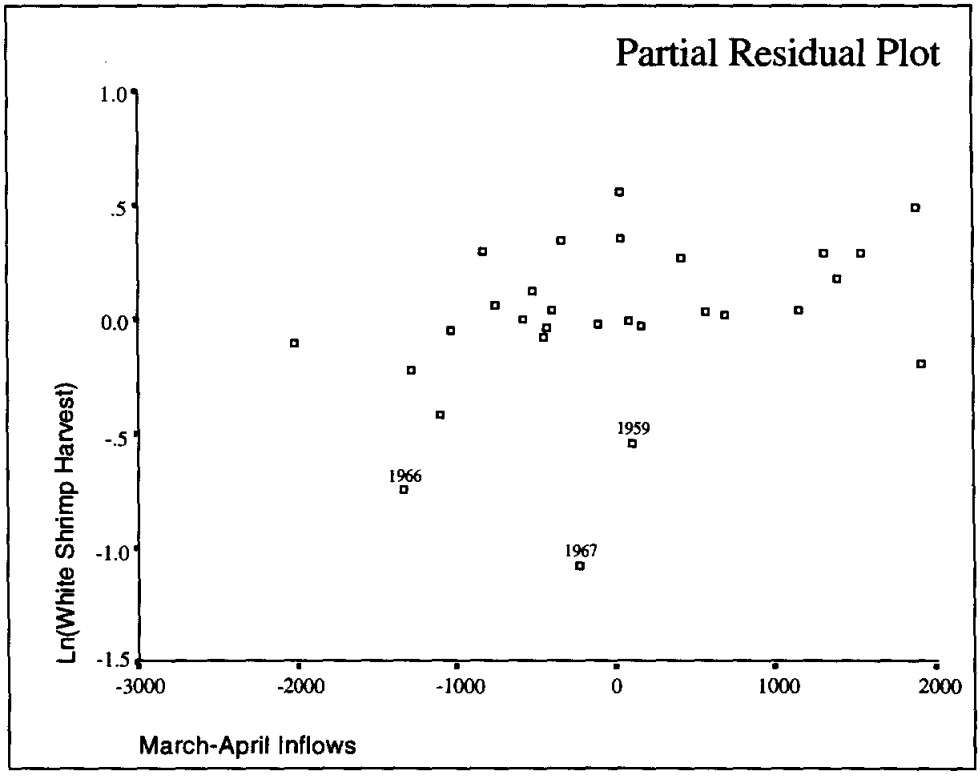
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{21,0.01} = 2.518$.

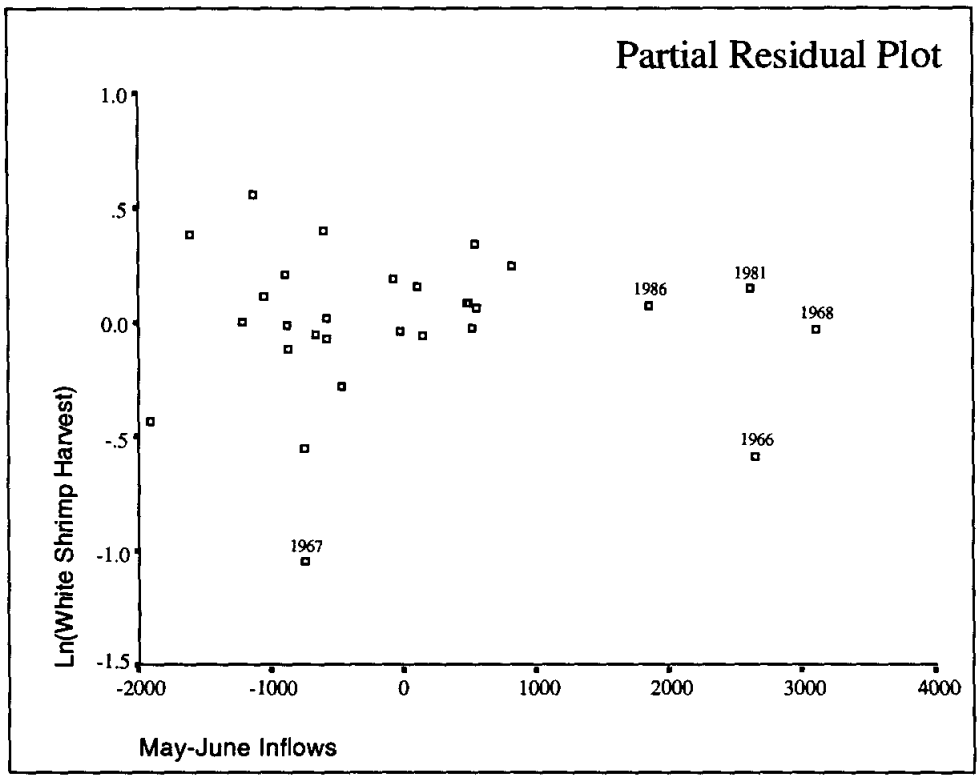
Graphics

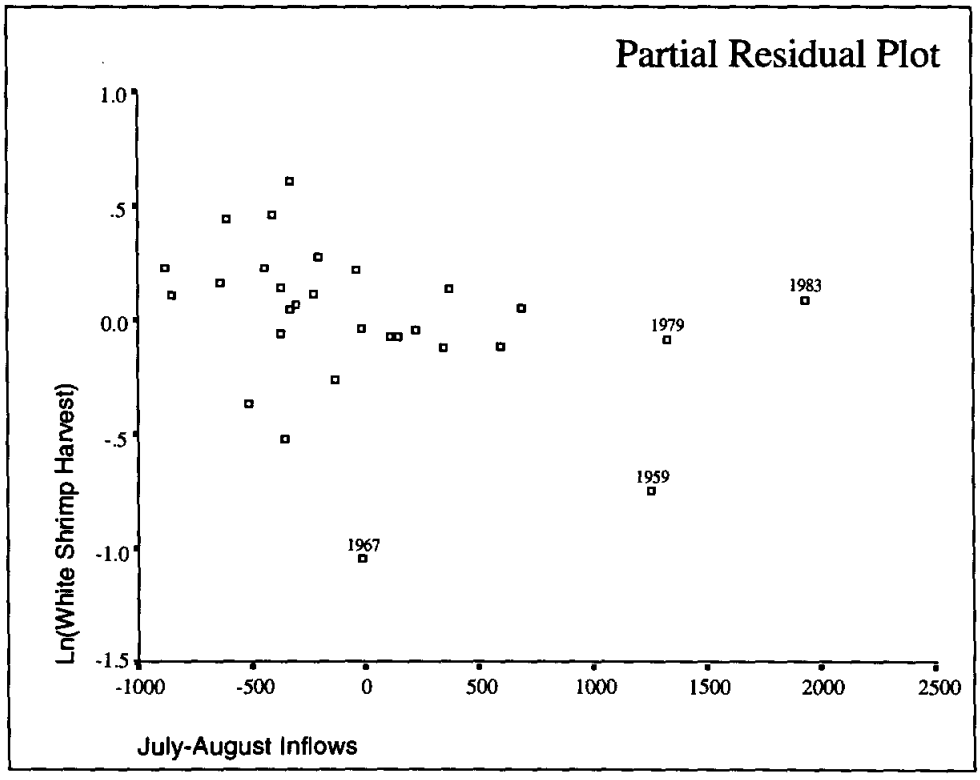

Ln(White Shrimp Harvest)
Regression Standardized Residual
Frequency
12
10
8
6
4
2
0
-3.0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

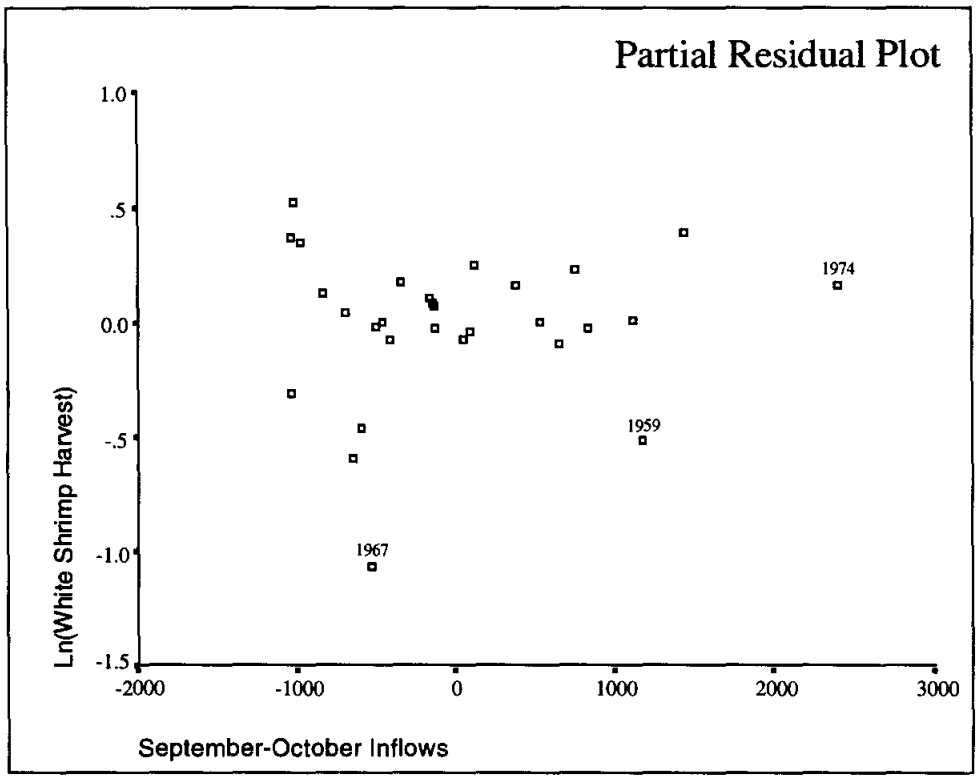

Normal P-P Plot of Residuals
Ln(White Shrimp Harvest)
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

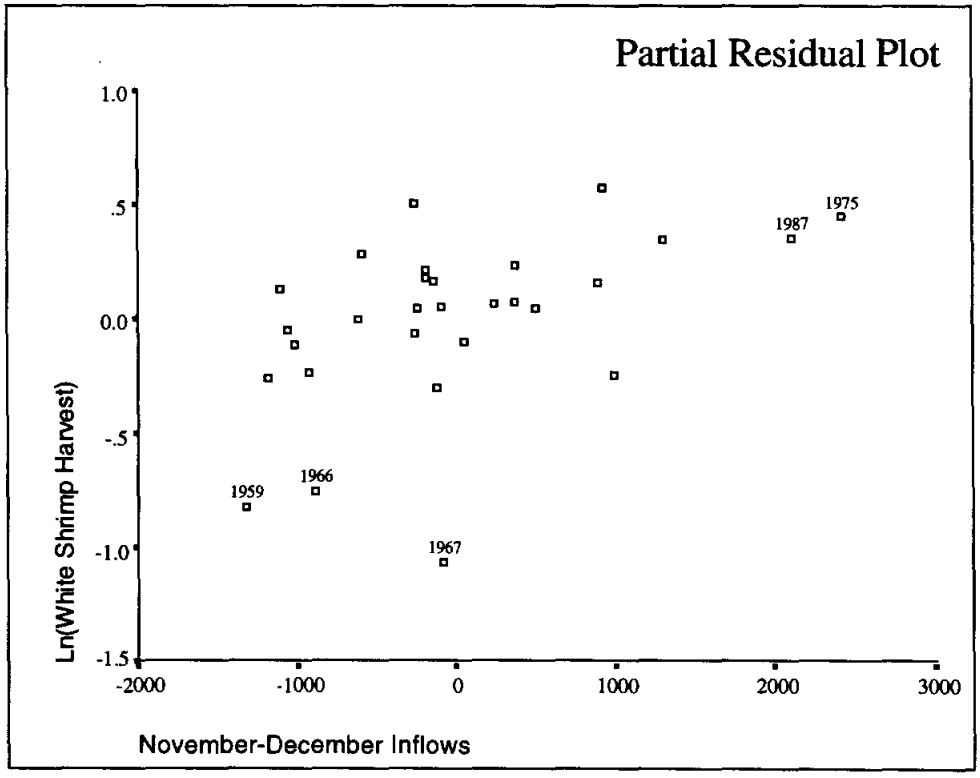

Partial Residual Plot
Ln(White Shrimp Harvest)
.6
.4
.2
.0
-.2
-.4
-.6
-.8
-1.0
1977
1959
1966
1967
1961
-2000
-1000
0
1000
2000
3000
January-February Inflows

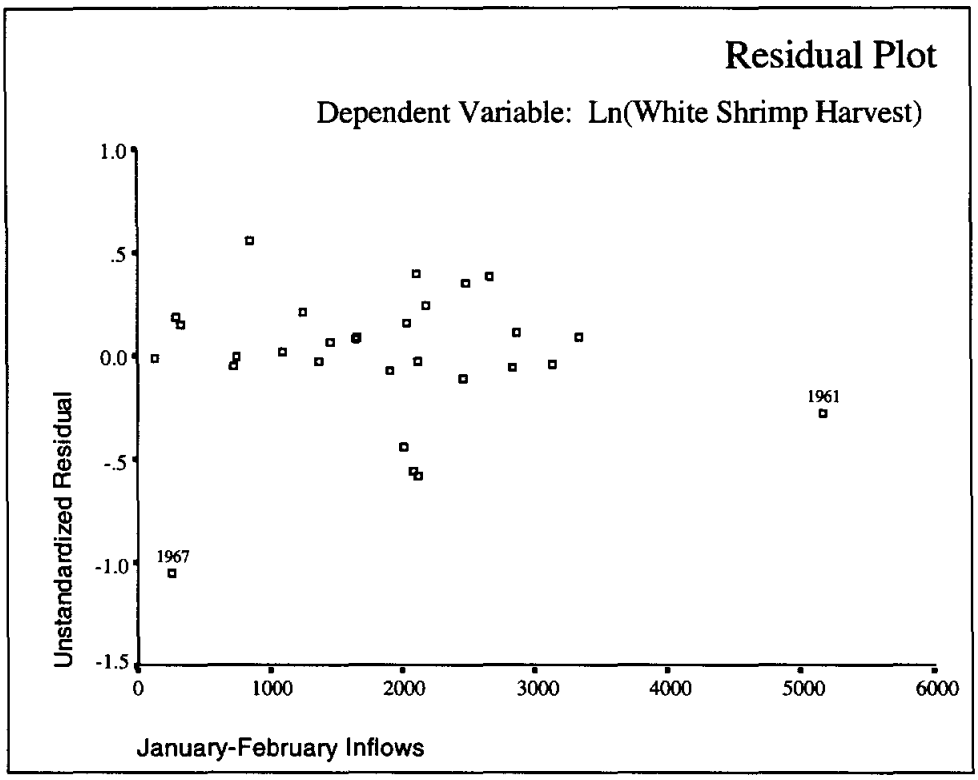

Partial Residual Plot
Ln(White Shrimp Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
1959
1966
1967
-3000
-2000
-1000
0
1000
2000
March-April Inflows

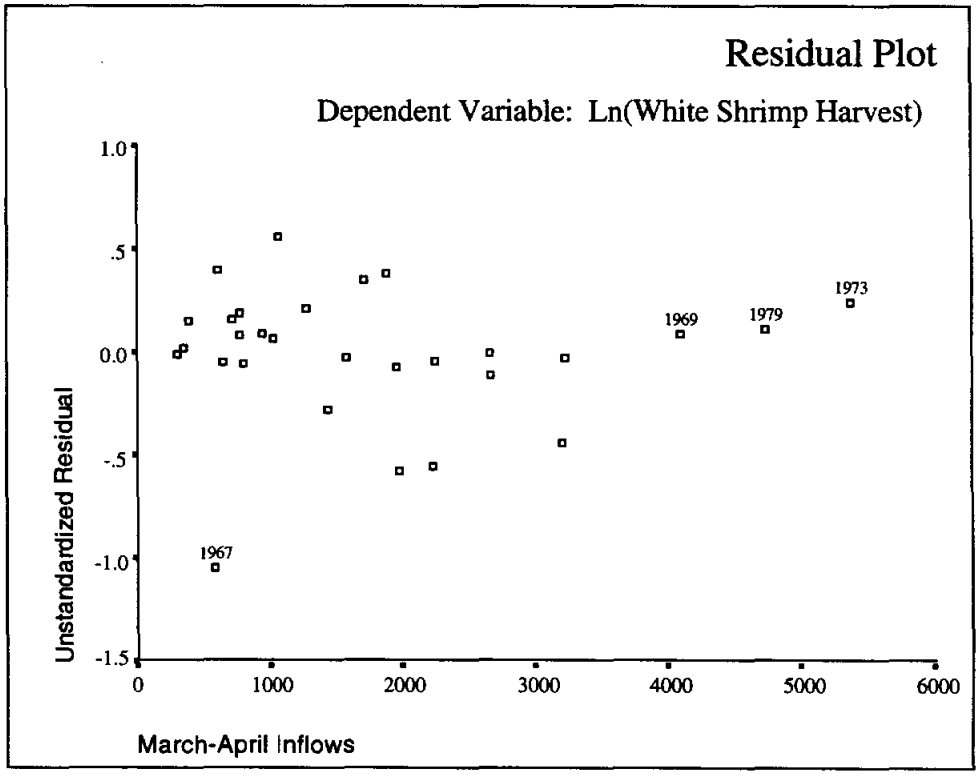

Partial Residual Plot
Ln(White Shrimp Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2000
-1000
0
1000
2000
3000
4000
1986
1981
1968
1966
1967
May-June Inflows

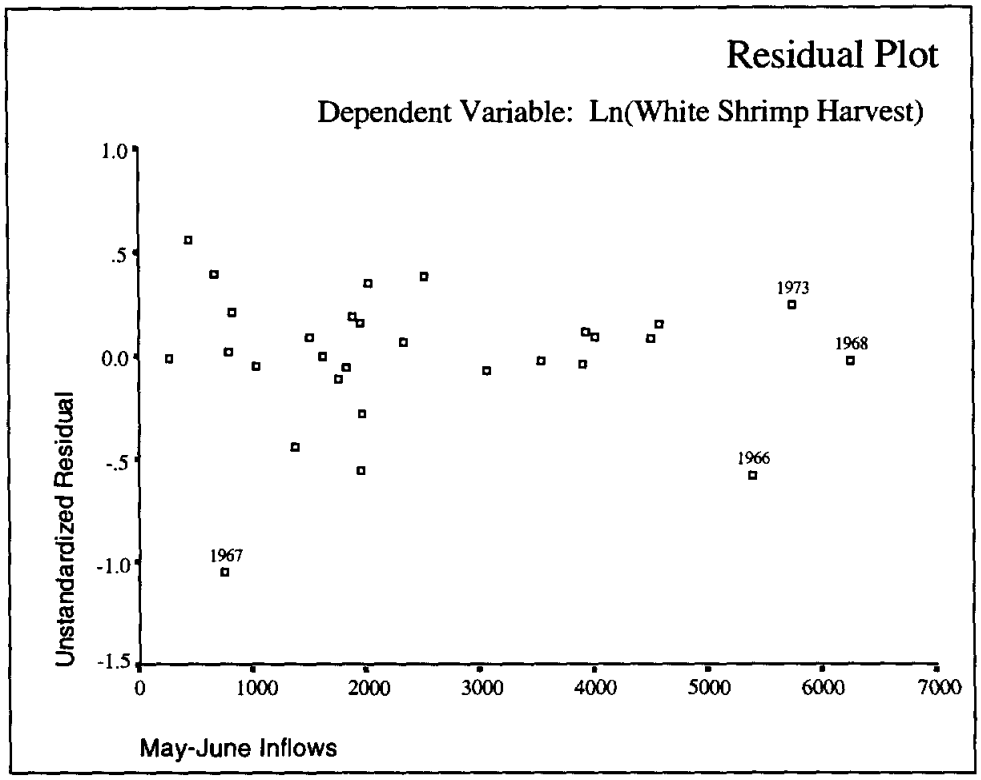

Partial Residual Plot
Ln(White Shrimp Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-1000
-500
0
500
1000
1500
2000
2500
1983
1979
1959
1967
July-August Inflows

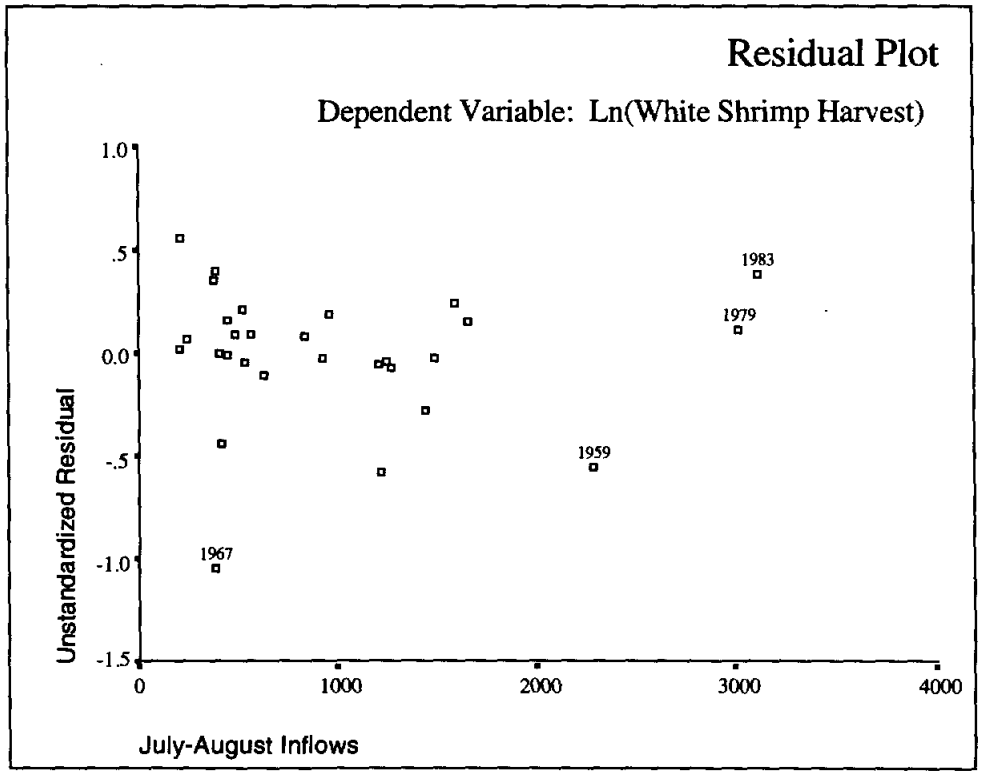

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
1974
1959
1967
-2000
-1000
0
1000
2000
3000
September-October Inflows

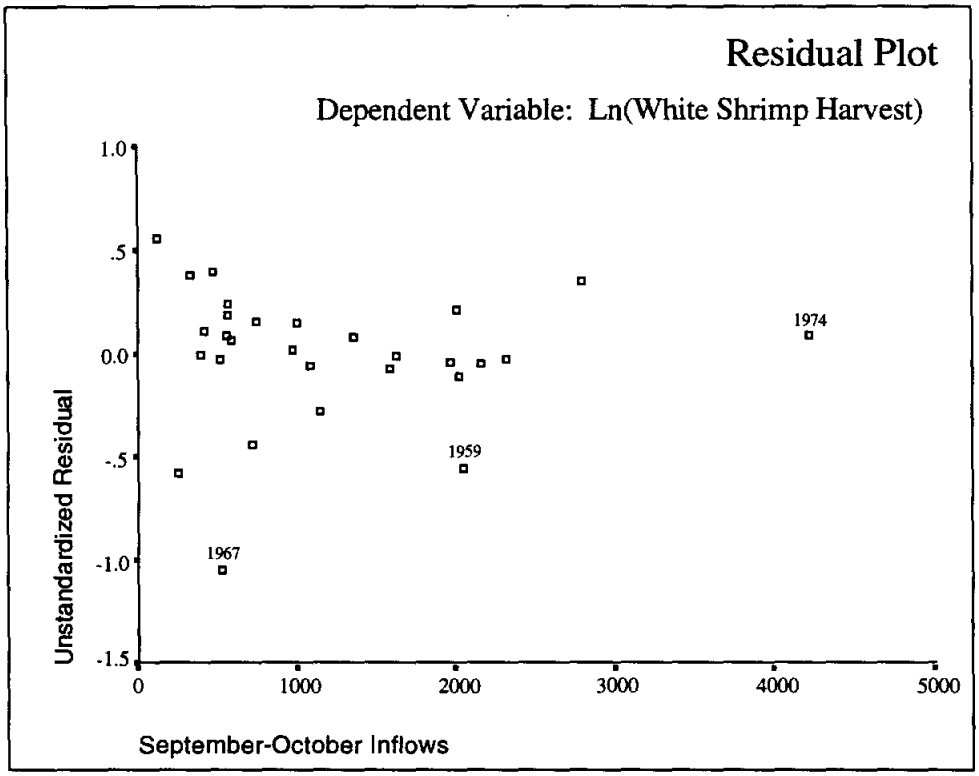

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
Ln(White Shrimp Harvest)
1975
1987
1966
1959
1967
-2000
-1000
0
1000
2000
3000
November-December Inflows

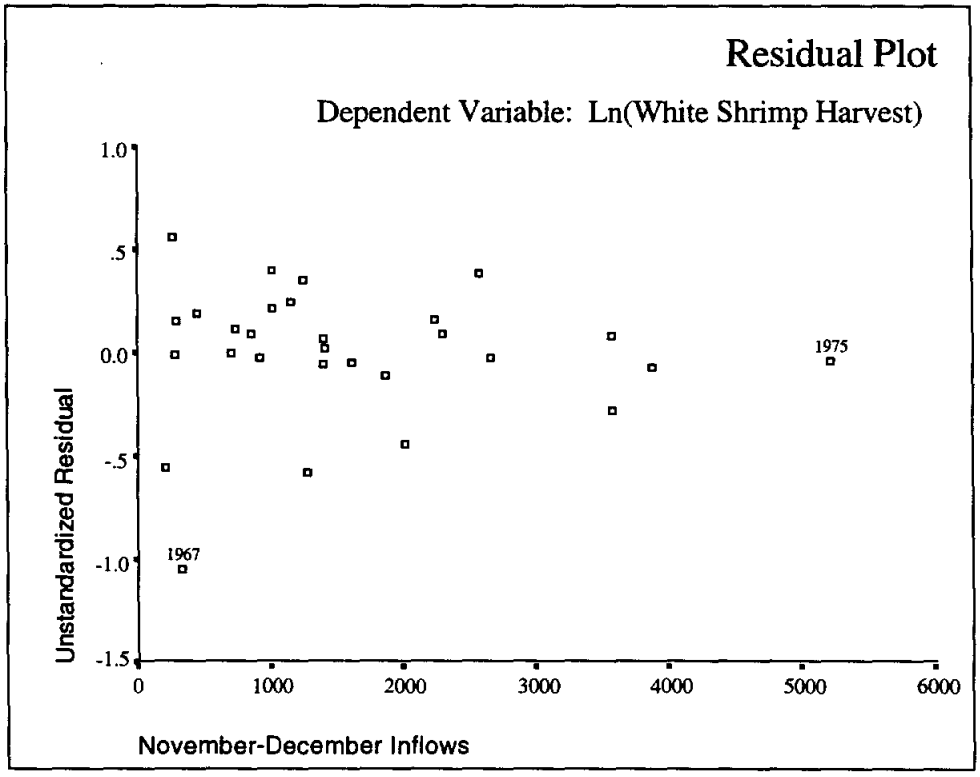

Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1961
1967
0
1000
2000
3000
4000
5000
6000
January-February Inflows


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1973
1969
1979
1967
0
1000
2000
3000
4000
5000
6000
March-April Inflows


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1973
1968
1966
1967
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1983
1979
1959
1967
0
1000
2000
3000
4000
July-August Inflows


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1974
1959
1967
0
1000
2000
3000
4000
5000
September-October Inflows


Residual Plot
Dependent Variable: Ln(White Shrimp Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
1975
1967
0
1000
2000
3000
4000
5000
6000
November-December Inflows

Prediction Intervals for the Natural Log of White Shrimp Harvest

YEAR	LWSHRIMP	LICI_1	UICI_1
1959	6.8896	6.24637	8.63396
1960	7.3755	6.30310	8.54977
1961	7.0091	6.01077	8.55227
1962	8.1090	7.03860	9.27167
1963	8.0154	6.89231	9.08712
1964	8.4555	6.76149	9.02301
1965	8.0282	6.85718	9.04908
1966	7.1389	6.54427	8.87351
1967	6.9458	6.87200	9.10497
1968	7.8307	6.64525	9.04994
1969	8.2453	6.99119	9.30433
1970	8.1944	7.06135	9.31895
1971	7.9939	6.86809	9.13218
1972	8.0673	6.80143	9.00488
1973	8.3133	6.85973	9.26008
1974	7.7801	6.42105	8.95116
1975	8.2757	7.09245	9.52735
1976	8.1321	6.82608	9.04503
1977	7.7563	7.03262	9.35133
1978	8.0313	6.48957	8.75820
1979	7.6152	6.25746	8.72892
1980	8.1437	6.63856	8.94019
1981	7.9093	6.51867	8.97764
1982	8.1480	7.02034	9.30944
1983	7.9240	6.28036	8.78706
1984	8.1899	6.87288	9.06856
1985	7.8722	6.86966	9.08826
1986	8.3208	7.05880	9.40953
1987	8.2598	7.16636	9.48388

LWSHRIMP Natural log of white shrimp harvest

LICI_1 Lower limit for 99% prediction interval for the natural log of white shrimp harvest

UICI_1 Upper limit for 99% prediction interval for the natural log of white shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	7.70270	.20534	.27510	.3595	.0193
1960	3.50215	.00061	.12508	.8350	.0000
1961	12.58289	.14056	.44939	.0829	.0063
1962	3.11024	.00044	.11108	.8746	.0000
1963	2.02053	.00009	.07216	.9587	.0000
1964	3.93262	.08502	.14045	.7875	.0013
1965	1.93856	.00076	.06923	.9632	.0000
1966	5.93237	.14699	.21187	.5477	.0073
1967	3.10726	.22586	.11097	.8749	.0252
1968	8.22999	.00022	.29393	.3128	.0000
1969	5.45178	.00383	.19471	.6050	.0000
1970	3.81885	.00000	.13639	.8004	.0000
1971	4.00746	.00001	.14312	.7789	.0000
1972	2.26493	.00414	.08089	.9437	.0000
1973	8.09586	.04737	.28914	.3242	.0002
1974	12.21094	.01546	.43611	.0938	.0000
1975	9.17043	.00109	.32752	.2407	.0000
1976	2.70595	.00700	.09664	.9108	.0000
1977	5.61775	.07957	.20063	.5850	.0011
1978	4.13978	.04720	.14785	.7635	.0002
1979	10.32413	.01756	.36872	.1709	.0000
1980	5.10993	.04634	.18250	.6466	.0002
1981	9.92791	.02822	.35457	.1927	.0000
1982	4.73994	.00010	.16928	.6917	.0000
1983	11.45266	.22757	.40902	.1201	.0257
1984	2.04514	.00676	.07304	.9573	.0000
1985	2.69573	.00206	.09628	.9117	.0000
1986	6.57933	.00395	.23498	.4740	.0000
1987	5.58221	.00177	.19936	.5893	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	*-1.26729	.14391	-.06897	-.04607
1960	-.06394	-.01639	-.04736	.03878
1961	-.99310	.09123	-.78864	.29726
1962	-.05435	-.01817	.03249	-.00452
1963	.02482	.02150	-.00238	-.00606
1964	.80696	.75273	.01550	.01347
1965	.07128	.04864	.01406	-.02430
1966	*-1.07059	-.05919	-.39339	.54269
1967	*-1.61614	*-1.55097	.54588	.17659
1968	-.03796	.00456	-.01162	.00560
1969	.16022	.00808	-.00508	.09767
1970	.00559	.00323	-.00228	.00358
1971	-.00845	-.00556	.00383	.00041
1972	.16720	.09265	.04728	-.06977
1973	.57168	-.16862	-.05748	.35843
1974	.32226	-.11509	.11173	-.03476
1975	-.08521	.02885	.01960	-.01524
1976	.21791	.16841	-.09810	-.05857
1977	-.76117	-.19802	.10805	-.56892
1978	.58154	.39974	.32695	-.21229
1979	.34399	-.06913	.01943	.13532
1980	.57187	-.10191	.21653	.00949
1981	.43733	.07343	-.07957	-.26714
1982	-.02530	.00619	.01525	-.00088
1983	*1.29328	.05817	-.12818	-.12196
1984	.21450	.07676	-.04985	.05251
1985	-.11756	.01277	-.01246	-.07099
1986	.16272	-.00266	-.04322	-.06081
1987	-.10886	.01130	.06221	-.02949

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

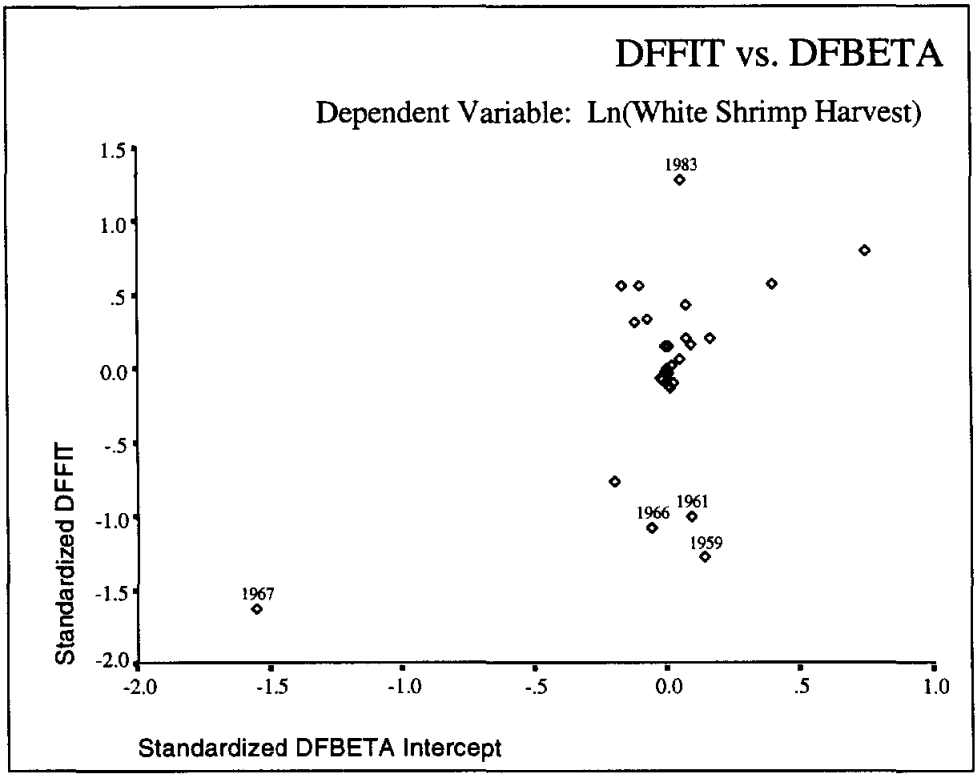
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

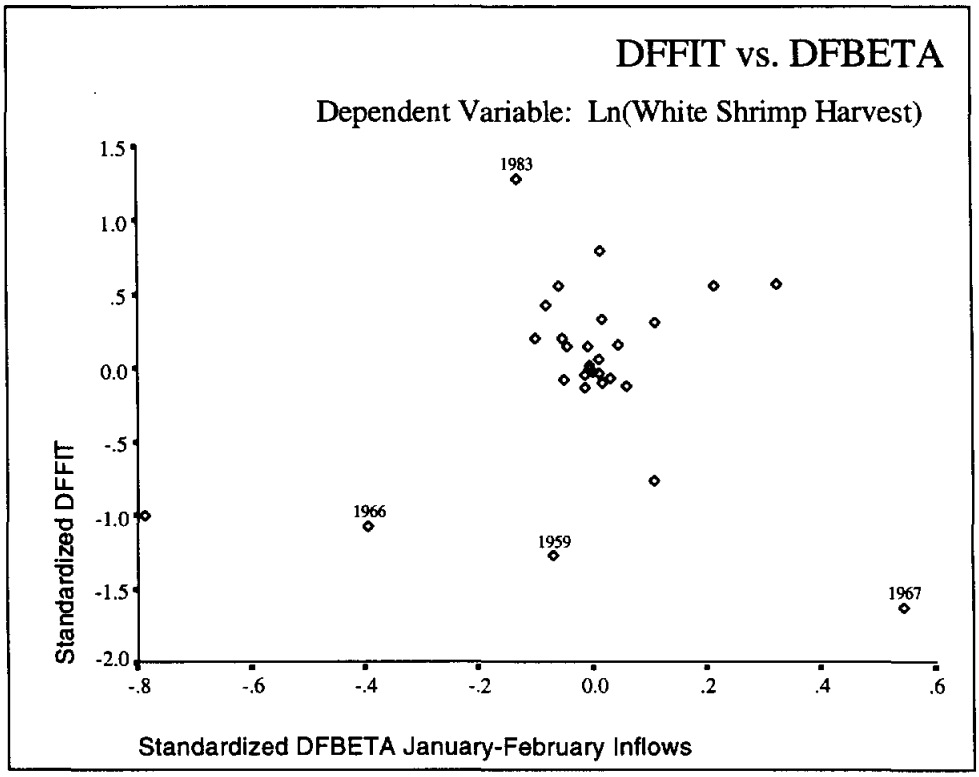
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.25319	-.82879	-.60228	.61076
1960	-.00356	-.00525	.01454	.02965
1961	.09834	.05455	.33001	.03513
1962	.01399	-.00614	-.02692	-.01450
1963	-.00654	-.00661	-.00783	.00381
1964	-.32792	-.18279	-.43956	-.10082
1965	.01852	-.04073	-.03429	-.00380
1966	-.86279	.22331	.30904	.38275
1967	.47269	.01652	.50475	.06735
1968	-.03095	.01625	.00189	.01589
1969	.02446	-.08489	-.01054	-.01640
1970	-.00245	-.00129	-.00152	.00103
1971	.00263	-.00131	-.00240	.00104
1972	.00855	-.06302	-.09201	.03716
1973	.12475	-.05896	.02856	-.03814
1974	.03521	-.05049	.25418	-.09615
1975	.00046	.00044	-.00296	-.06952
1976	-.00621	.06534	-.04610	-.01682
1977	.45106	.23242	.20965	-.31651
1978	-.12217	-.15910	-.31596	-.16201
1979	-.08561	.20753	-.01972	-.06629
1980	.10066	-.21679	.39583	-.27406
1981	.27659	.13943	.06023	-.14837
1982	-.00440	-.00964	-.01415	-.01013
1983	-.46796	1.08556	-.42583	.36540
1984	-.08651	-.00591	.11125	-.02518
1985	.04228	.03510	-.04814	-.00335
1986	.08741	-.02019	-.00872	.08289
1987	.01935	-.02244	-.00290	-.09612

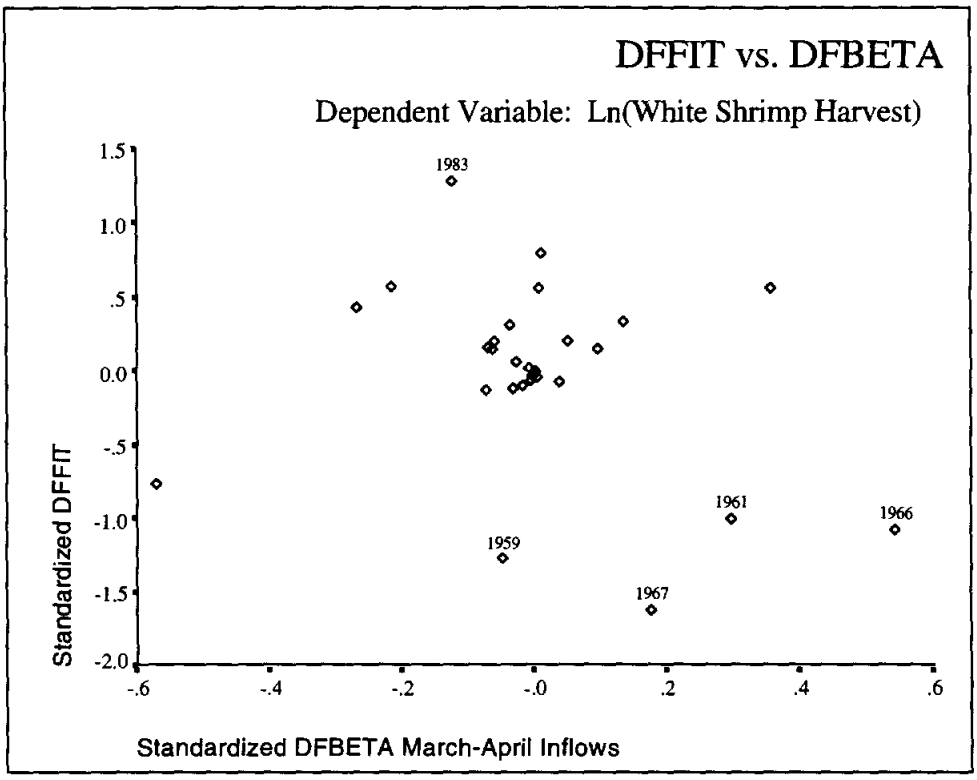
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

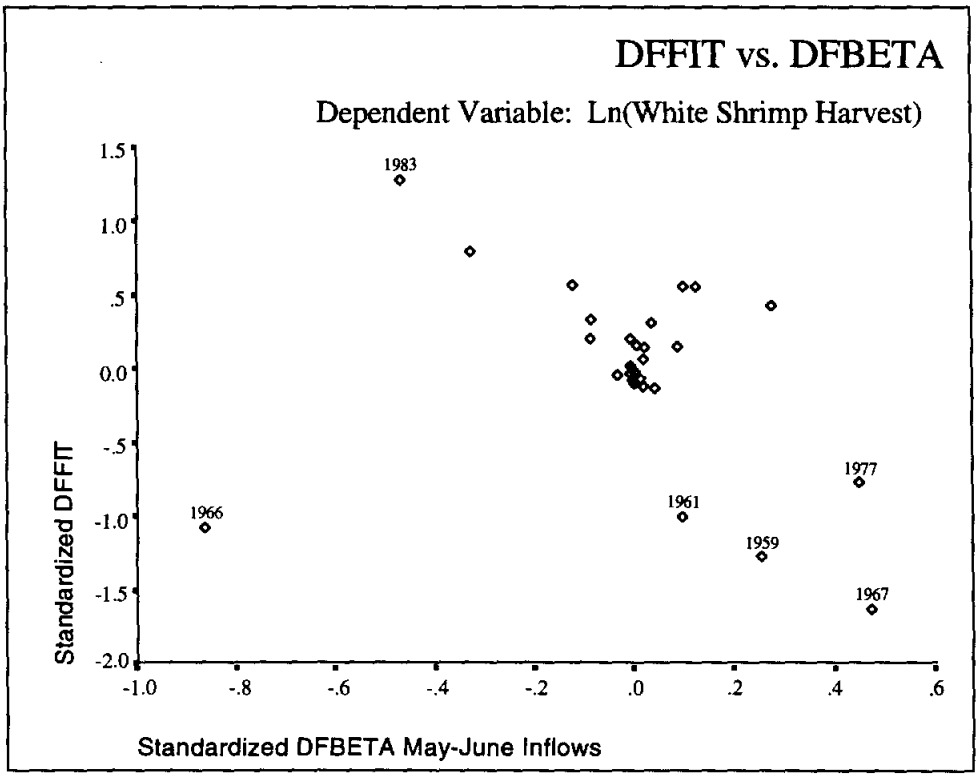
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

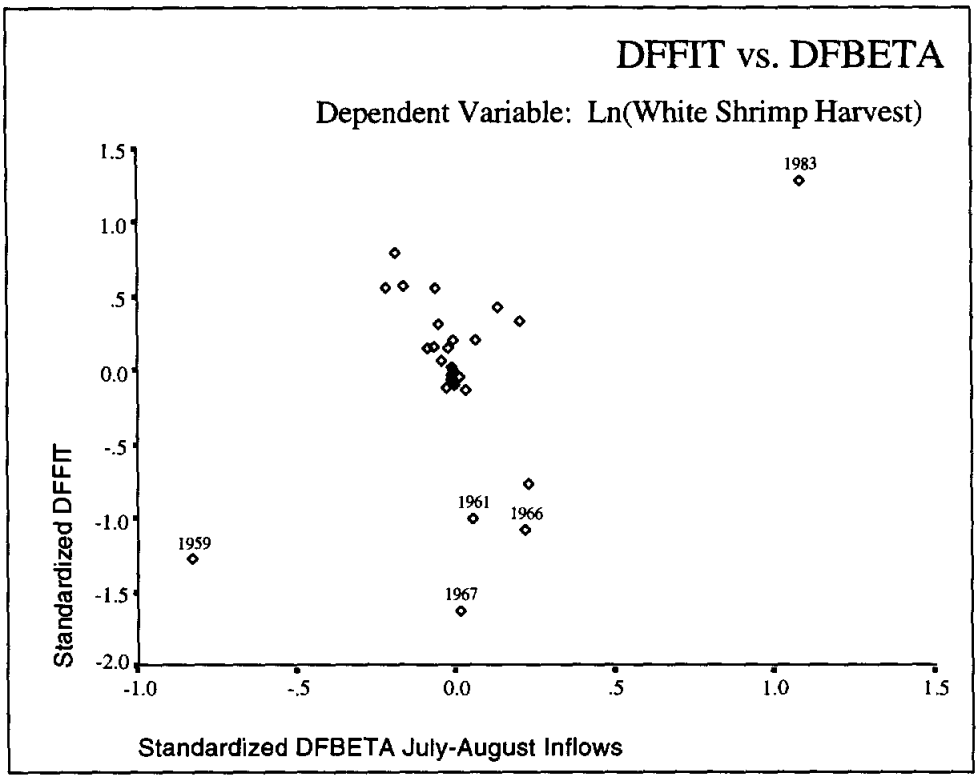
Graphics

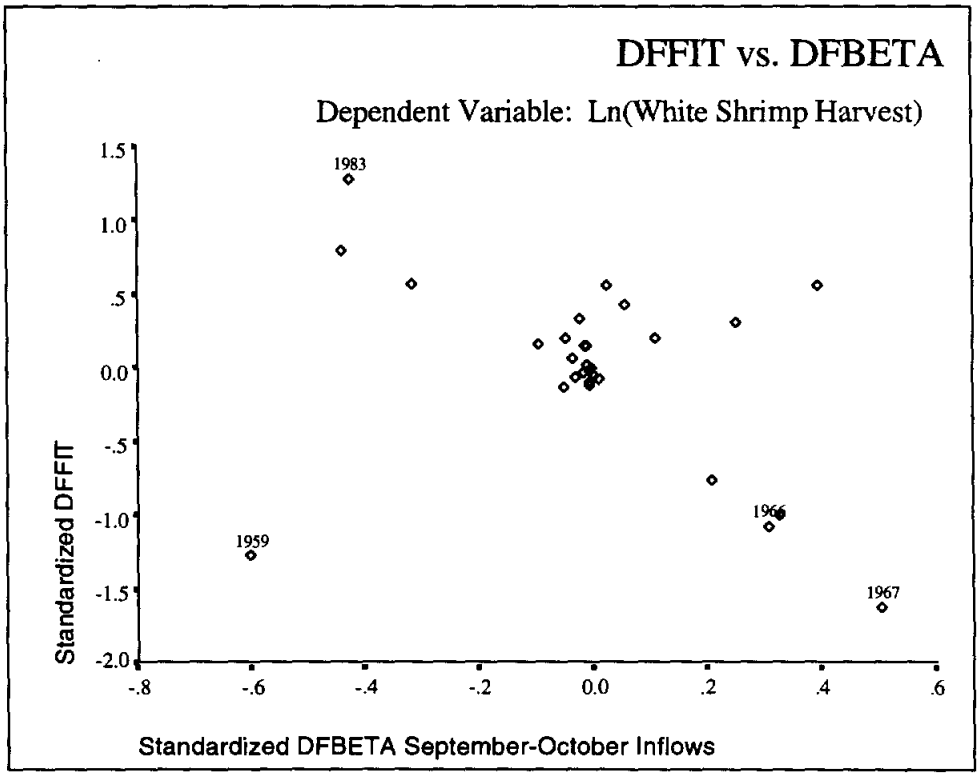

DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
Standardized DFBETA Intercept
1983
1961
1966
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

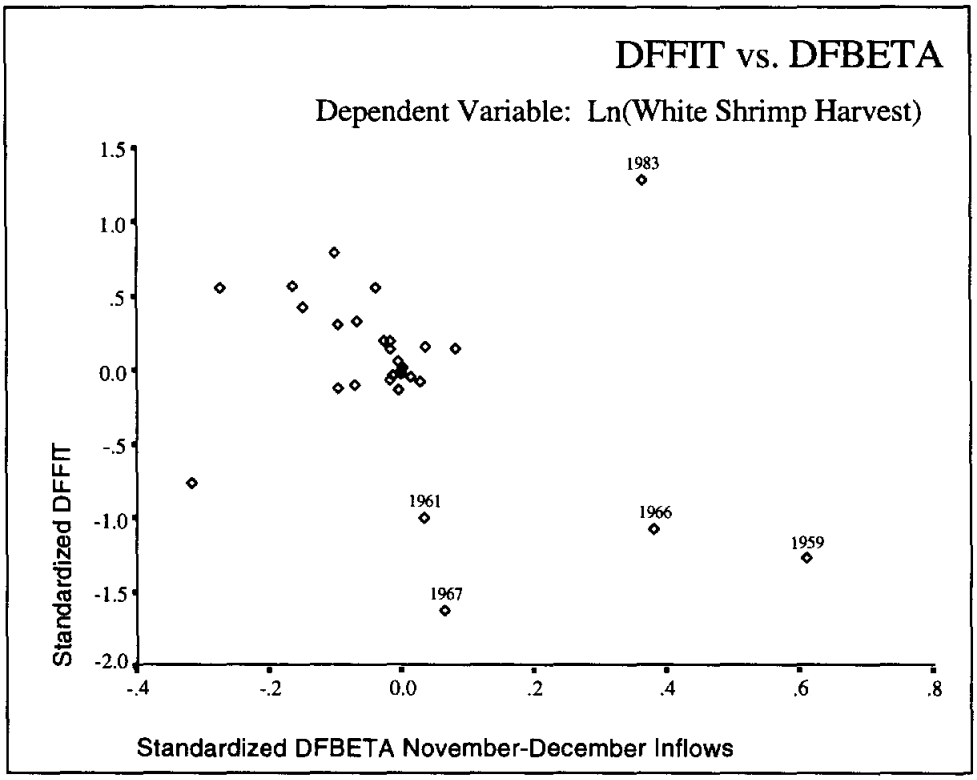

DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
Standardized DFBETA January-February Inflows
1983
1966
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
Standardized DFBETA March-April Inflows
1983
1961
1966
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
Standardized DFBETA May-June Inflows
1983
1977
1966
1961
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
Standardized DFBETA July-August Inflows
1983
1961
1966
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.5
0.0
.5
1.0
1.5


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
Standardized DFBETA September-October Inflows
1983
1966
1959
1967
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: Ln(White Shrimp Harvest)
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1983
1961
1966
1959
1967
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFBETA November-December Inflows

Examining Subsets of the Data

Untransformed Data: 1964 and 1967 Omitted

N = 27 Regression Models for Dependent Variable: WHSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.2005	0.1685	21.80	363.9	664102	366.5	JF_INFL
1	0.1224	0.0873	26.17	366.4	728994	369.0	JA_INFL
1	0.0464	0.0083	30.43	368.6	792100	371.2	ND_INFL
1	0.0052	-.0346	32.74	369.8	826332	372.4	MJ_INFL
2	0.4753	0.4315	8.401	354.5	454024	358.4	JF_INFL ND_INFL
2	0.2491	0.1865	21.07	364.2	649706	368.1	JF_INFL JA_INFL
2	0.2275	0.1632	22.28	365.0	668363	368.8	JF_INFL MA_INFL
2	0.2171	0.1519	22.86	365.3	677378	369.2	JF_INFL MJ_INFL
3	0.5716	0.5157	5.003	351.0	386784	356.2	JF_INFL MA_INFL ND_INFL
3	0.5009	0.4358	8.962	355.2	450583	360.3	JF_INFL JA_INFL ND_INFL
3	0.4844	0.4172	9.887	356.0	465489	361.2	JF_INFL MJ_INFL ND_INFL
3	0.4753	0.4069	10.40	356.5	473698	361.7	JF_INFL SO_INFL ND_INFL
4	0.6382	0.5725	3.269	348.5	341467	355.0	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.5834	0.5076	6.343	352.3	393242	358.8	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.5805	0.5042	6.505	352.5	395970	359.0	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.5301	0.4447	9.327	355.5	443524	362.0	JF_INFL MJ_INFL JA_INFL ND_INFL
5	0.6430	0.5580	5.004	350.1	353037	357.9	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.6387	0.5527	5.244	350.4	357287	358.2	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.5885	0.4905	8.057	354.0	406922	361.7	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.5306	0.4188	11.30	357.5	464170	365.3	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.6430	0.5360	7.000	352.1	370623	361.2	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	WHSHRIMP	814.924	3620.29	-0.37155	.
2	MODEL1	PARMS	WHSHRIMP	853.812	3312.54	.	.
3	MODEL1	PARMS	WHSHRIMP	890.000	2633.54	.	.
4	MODEL1	PARMS	WHSHRIMP	909.028	2796.04	.	.
5	MODEL1	PARMS	WHSHRIMP	673.813	3375.84	-0.63590	.
6	MODEL1	PARMS	WHSHRIMP	806.044	3777.23	-0.31111	.
7	MODEL1	PARMS	WHSHRIMP	817.535	3487.27	-0.40973	0.11249
8	MODEL1	PARMS	WHSHRIMP	823.030	3459.73	-0.38503	.
9	MODEL1	PARMS	WHSHRIMP	621.919	3077.32	-0.75232	0.21973
10	MODEL1	PARMS	WHSHRIMP	671.255	3499.49	-0.58215	.
11	MODEL1	PARMS	WHSHRIMP	682.268	3259.27	-0.64284	.
12	MODEL1	PARMS	WHSHRIMP	688.257	3368.09	-0.63614	.
13	MODEL1	PARMS	WHSHRIMP	584.351	3212.04	-0.69051	0.27338
14	MODEL1	PARMS	WHSHRIMP	627.090	2940.63	-0.76858	0.24438
15	MODEL1	PARMS	WHSHRIMP	629.262	3154.60	-0.76799	0.26487
16	MODEL1	PARMS	WHSHRIMP	665.976	3329.19	-0.57160	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	WHSHRIMP	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	25
2	.	-0.39903	.	.	-1	1	2	25
3	.	.	.	0.15591	-1	1	2	25
4	0.03912	.	.	.	-1	1	2	25
5	.	.	.	0.44400	-1	2	3	24
6	.	-0.26488	.	.	-1	2	3	24
7	.	.	.	.	-1	2	3	24
8	0.07061	.	.	.	-1	2	3	24
9	.	.	.	0.51428	-1	3	4	23
10	.	-0.19382	.	0.42800	-1	3	4	23
11	0.05252	.	.	0.43881	-1	3	4	23
12	.	.	0.00846	0.44247	-1	3	4	23
13	.	-0.32543	.	0.50458	-1	4	5	22
14	.	.	0.11268	0.50183	-1	4	5	22
15	-0.06245	.	.	0.53488	-1	4	5	22
16	0.10157	-0.28027	.	0.41084	-1	4	5	22

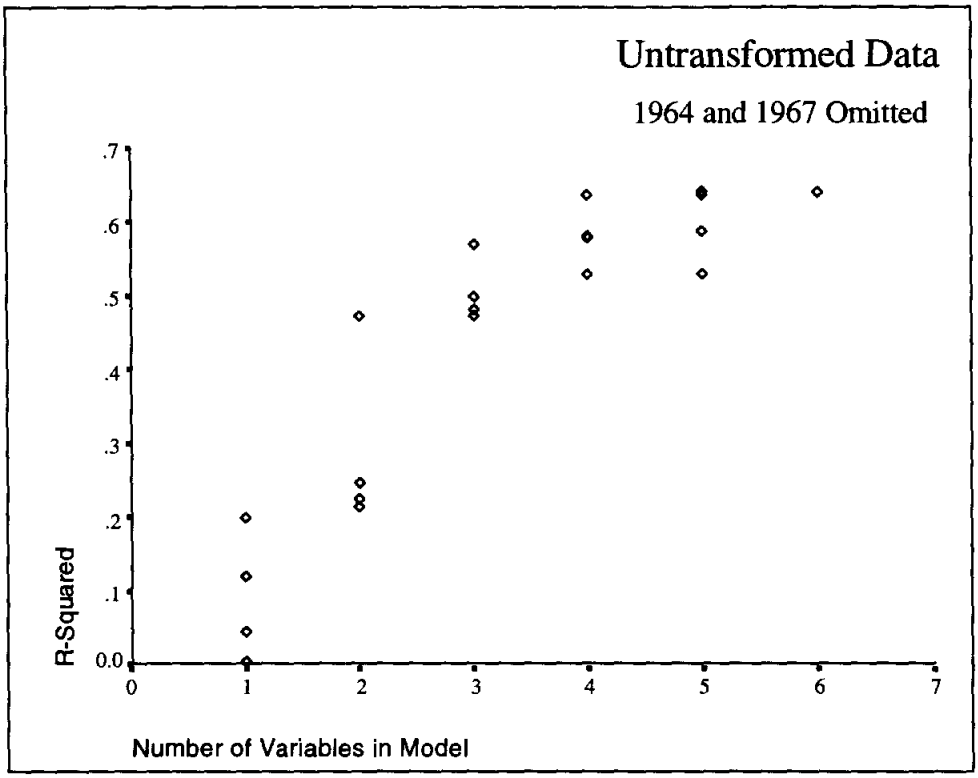
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	664101.68	0.20049	0.16851	21.7963	363.889	366.481
2	728994.25	0.12237	0.08726	26.1735	366.406	368.998
3	792100.12	0.04640	0.00825	30.4303	368.648	371.240
4	826331.50	0.00519	-0.03461	32.7393	369.790	372.382
5	454024.22	0.47527	0.43154	8.4007	354.519	358.407
6	649706.46	0.24911	0.18654	21.0722	364.195	368.083
7	668363.42	0.22755	0.16318	22.2804	364.960	368.847
8	677378.20	0.21713	0.15189	22.8641	365.321	369.209
9	386783.56	0.57161	0.51573	5.0029	351.043	356.226
10	450583.09	0.50094	0.43585	8.9621	355.165	360.348
11	465489.45	0.48443	0.41719	9.8872	356.044	361.227
12	473698.30	0.47534	0.40691	10.3966	356.516	361.699
13	341466.56	0.63824	0.57247	3.2693	348.478	354.957
14	393241.80	0.58339	0.50764	6.3426	352.289	358.769
15	395970.23	0.58050	0.50423	6.5046	352.476	358.955
16	443523.50	0.53012	0.44469	9.3273	355.538	362.017

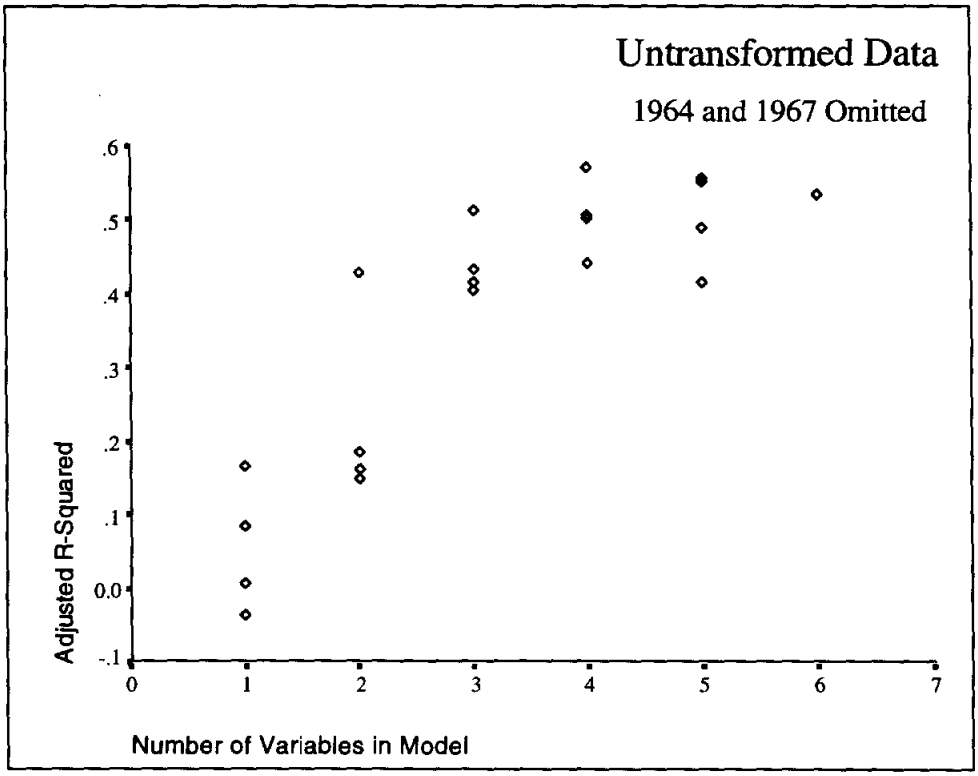
OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	WHSHRIMP	594.169	3118.51	-0.70357	0.28694
18	MODEL1	PARMS	WHSHRIMP	597.735	3226.79	-0.69568	0.28261
19	MODEL1	PARMS	WHSHRIMP	637.905	3021.82	-0.77826	0.27569
20	MODEL1	PARMS	WHSHRIMP	681.300	3297.08	-0.57365	.
21	MODEL1	PARMS	WHSHRIMP	608.788	3126.28	-0.70525	0.29017

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	WHSHRIMP	_IN_	_P_	_EDF_
17	.	-0.31163	0.07238	0.49700	-1	5	6	21
18	-0.01458	-0.31746	.	0.50963	-1	5	6	21
19	-0.04858	.	0.09531	0.51978	-1	5	6	21
20	0.10555	-0.27712	0.02323	0.40652	-1	5	6	21
21	-0.00558	-0.30889	0.07074	0.49910	-1	6	7	20

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	353036.72	0.64298	0.55798	5.0035	350.121	357.896
18	357286.71	0.63869	0.55266	5.2443	350.444	358.219
19	406922.40	0.58849	0.49051	8.0568	353.957	361.732
20	464170.34	0.53060	0.41884	11.3005	357.511	365.286
21	370623.32	0.64305	0.53596	7.0000	352.117	361.187

Scree Plots


Untransformed Data
1964 and 1967 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
Adjusted R-Squared
.6
.5
.4
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.2
.1
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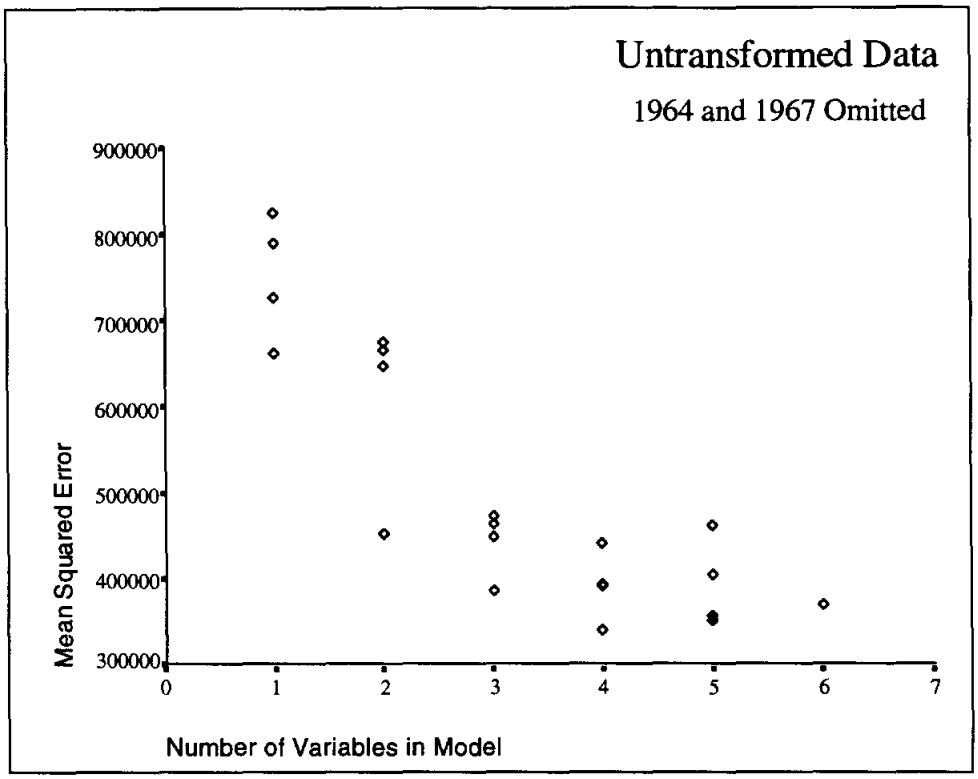
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
900000
800000
700000
600000
500000
400000
300000
Mean Squared Error
0
1
2
3
4
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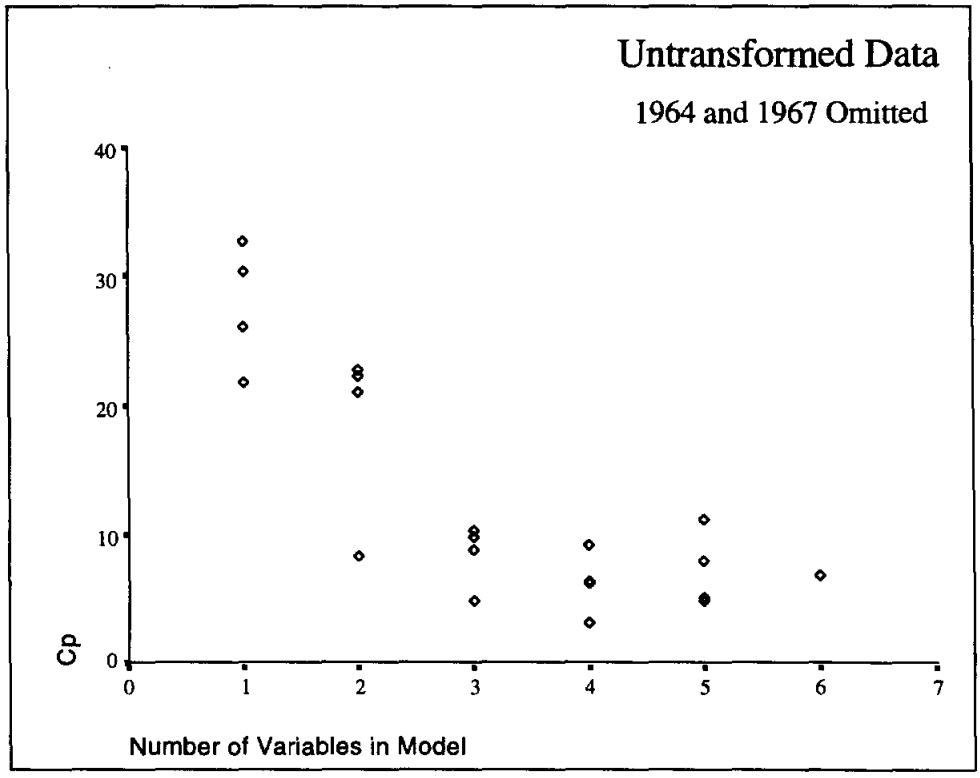
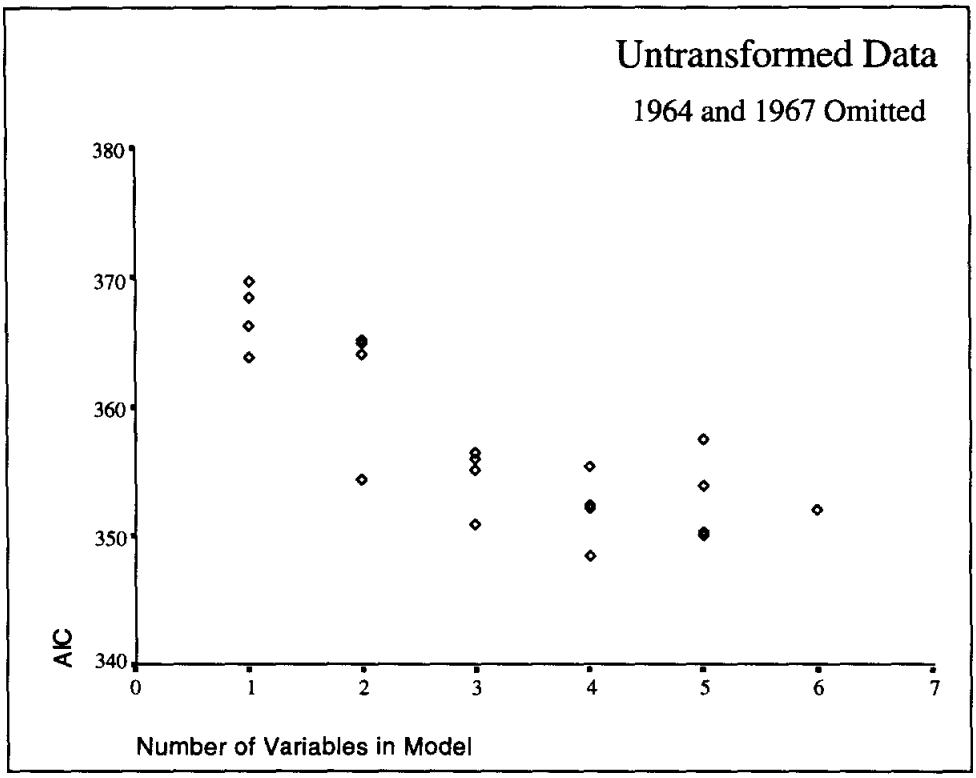
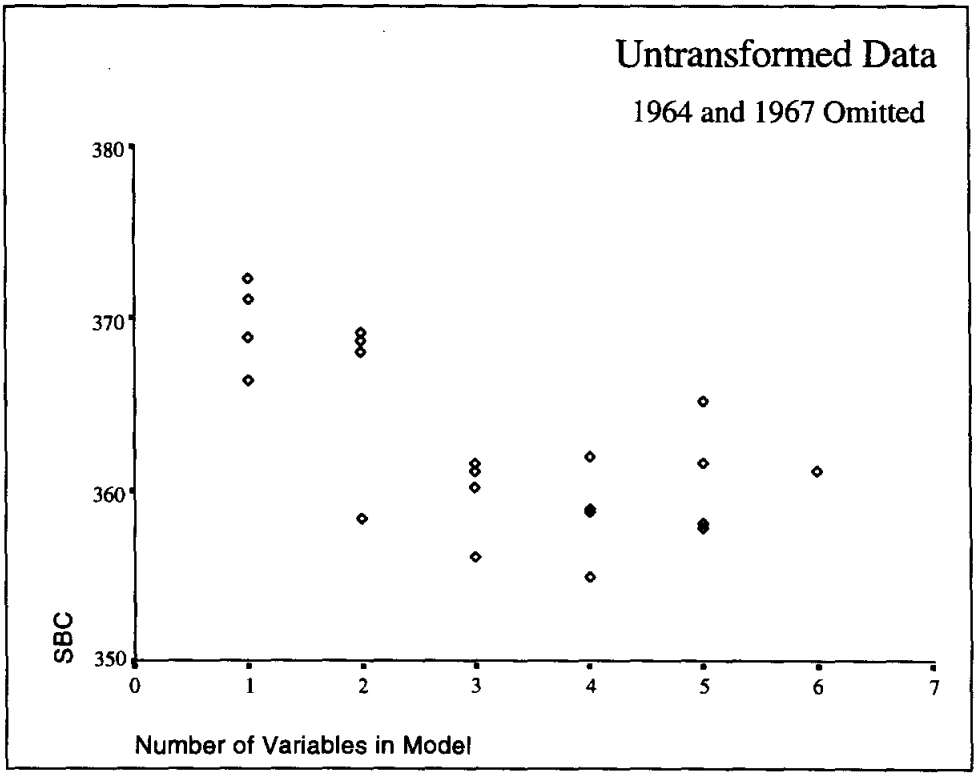
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
40
30
20
10
0
Cp
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
380
370
360
350
340
AIC
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1964 and 1967 Omitted
380
370
360
350
SBC
0
1
2
3
4
5
6
7
Number of Variables in Model

Logged Harvest: 1959, 1966, 1967, and 1971 Omitted

N = 25 Regression Models for Dependent Variable: LWHSHRMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.4324	0.4077	9.519	-68.21	0.0605	-65.78	JF_INFL
1	0.0945	0.0551	27.68	-56.54	0.0965	-54.10	JA_INFL
1	0.0069	-.0363	32.40	-54.23	0.1058	-51.79	MJ_INFL
1	0.0047	-.0386	32.51	-54.17	0.1061	-51.74	ND_INFL
2	0.5441	0.5026	5.514	-71.69	0.0508	-68.04	JF_INFL ND_INFL
2	0.4646	0.4159	9.786	-67.68	0.0597	-64.02	JF_INFL MA_INFL
2	0.4520	0.4021	10.47	-67.09	0.0611	-63.44	JF_INFL SO_INFL
2	0.4516	0.4017	10.49	-67.07	0.0611	-63.42	JF_INFL MJ_INFL
3	0.6190	0.5646	3.484	-74.18	0.0445	-69.31	JF_INFL MA_INFL ND_INFL
3	0.5550	0.4914	6.927	-70.30	0.0519	-65.42	JF_INFL MJ_INFL ND_INFL
3	0.5546	0.4910	6.946	-70.28	0.0520	-65.40	JF_INFL JA_INFL ND_INFL
3	0.5460	0.4811	7.410	-69.80	0.0530	-64.92	JF_INFL SO_INFL ND_INFL
4	0.6588	0.5906	3.343	-74.94	0.0418	-68.85	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.6342	0.5610	4.670	-73.20	0.0448	-67.10	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.6241	0.5489	5.210	-72.52	0.0461	-66.42	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.5840	0.5007	7.369	-69.98	0.0510	-63.89	JF_INFL MJ_INFL JA_INFL ND_INFL
5	0.6652	0.5771	5.000	-73.41	0.0432	-66.10	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.6588	0.5691	5.343	-72.94	0.0440	-65.63	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.6381	0.5428	6.459	-71.47	0.0467	-64.15	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.5849	0.4757	9.317	-68.04	0.0535	-60.73	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.6652	0.5536	7.000	-71.41	0.0456	-62.88	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	LWHSHRMP	0.24596	8.38036	-.00019448	.
2	MODEL1	PARMS	LWHSHRMP	0.31065	8.12214	.	.
3	MODEL1	PARMS	LWHSHRMP	0.32534	7.95758	.	.
4	MODEL1	PARMS	LWHSHRMP	0.32569	8.03144	.	.
5	MODEL1	PARMS	LWHSHRMP	0.22539	8.32129	-.00025689	.
6	MODEL1	PARMS	LWHSHRMP	0.24424	8.32600	-.00020699	.000042605
7	MODEL1	PARMS	LWHSHRMP	0.24711	8.34182	-.00020486	.
8	MODEL1	PARMS	LWHSHRMP	0.24720	8.31575	-.00019794	.
9	MODEL1	PARMS	LWHSHRMP	0.21088	8.22282	-.00029009	.000067181
10	MODEL1	PARMS	LWHSHRMP	0.22792	8.27424	-.00025748	.
11	MODEL1	PARMS	LWHSHRMP	0.22801	8.34403	-.00024665	.
12	MODEL1	PARMS	LWHSHRMP	0.23021	8.31102	-.00025779	.
13	MODEL1	PARMS	LWHSHRMP	0.20448	8.24545	-.00027720	.000083503
14	MODEL1	PARMS	LWHSHRMP	0.21175	8.18042	-.00029690	.000075719
15	MODEL1	PARMS	LWHSHRMP	0.21464	8.24387	-.00029595	.000080047
16	MODEL1	PARMS	LWHSHRMP	0.22581	8.27679	-.00023885	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LWHSHRMP	_IN_	_P_
1	.	.	.	.	-1	1	2
2	.	-.00012603	.	.	-1	1	2
3	0.000016547	.	.	.	-1	1	2
4	.	.	.	-.00001760	-1	1	2
5	.	.	.	0.00010162	-1	2	3
6	.	.	.	.	-1	2	3
7	.	.	.000047892	.	-1	2	3
8	0.000027788	.	.	.	-1	2	3
9	.	.	.	0.00012357	-1	3	4
10	0.000021063	.	.	0.00009831	-1	3	4
11	.	-.00004451	.	0.00010182	-1	3	4
12	.	.	.000015726	0.00009753	-1	3	4
13	.	-.00009111	.	0.00012929	-1	4	5
14	.	.	.000045763	0.00011443	-1	4	5
15	-.000017864	.	.	0.00013058	-1	4	5
16	0.000038938	-.00008313	.	0.00009586	-1	4	5

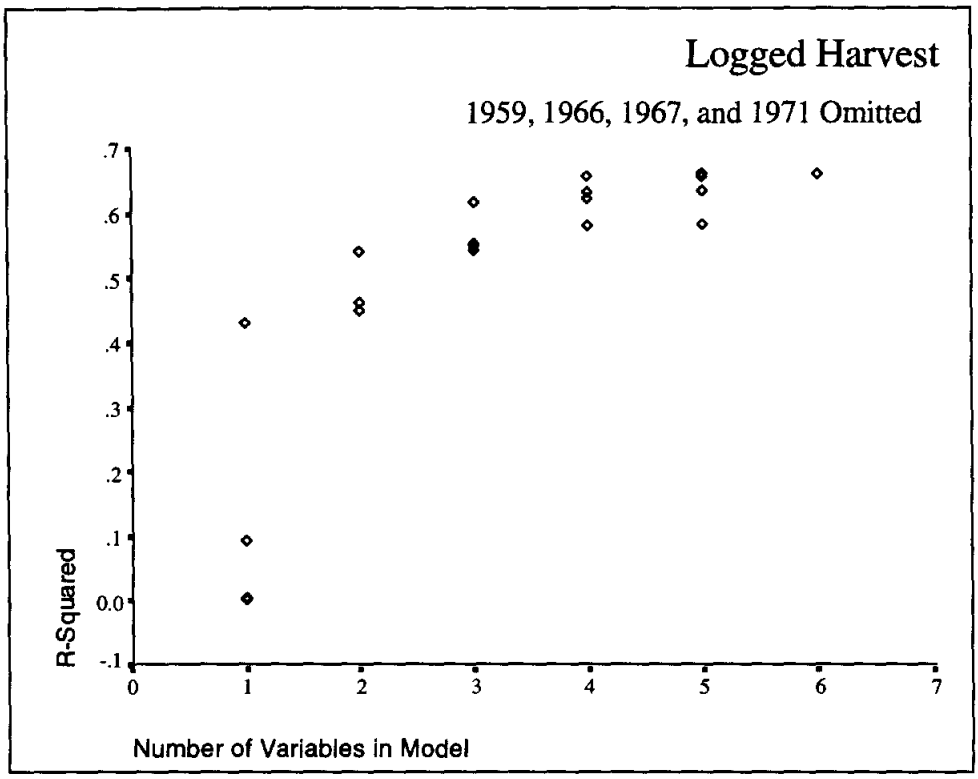
OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	23	0.06050	0.43235	0.40767	9.5191	-68.2138	-65.7761
2	23	0.09650	0.09451	0.05514	27.6831	-56.5394	-54.1016
3	23	0.10584	0.00686	-0.03632	32.3957	-54.2294	-51.7916
4	23	0.10607	0.00468	-0.03859	32.5125	-54.1748	-51.7370
5	22	0.05080	0.54405	0.50260	5.5136	-71.6919	-68.0353
6	22	0.05965	0.46459	0.41592	9.7858	-67.6756	-64.0189
7	22	0.06106	0.45195	0.40213	10.4654	-67.0922	-63.4356
8	22	0.06111	0.45155	0.40169	10.4870	-67.0739	-63.4173
9	21	0.04447	0.61901	0.56458	3.4839	-74.1817	-69.3062
10	21	0.05195	0.55497	0.49139	6.9270	-70.2975	-65.4220
11	21	0.05199	0.55462	0.49099	6.9458	-70.2778	-65.4023
12	21	0.05299	0.54599	0.48113	7.4098	-69.7981	-64.9226
13	20	0.04181	0.65883	0.59060	3.3427	-74.9419	-68.8475
14	20	0.04484	0.63415	0.56098	4.6696	-73.1958	-67.1014
15	20	0.04607	0.62411	0.54893	5.2097	-72.5185	-66.4242
16	20	0.05099	0.58395	0.50074	7.3686	-69.9812	-63.8869

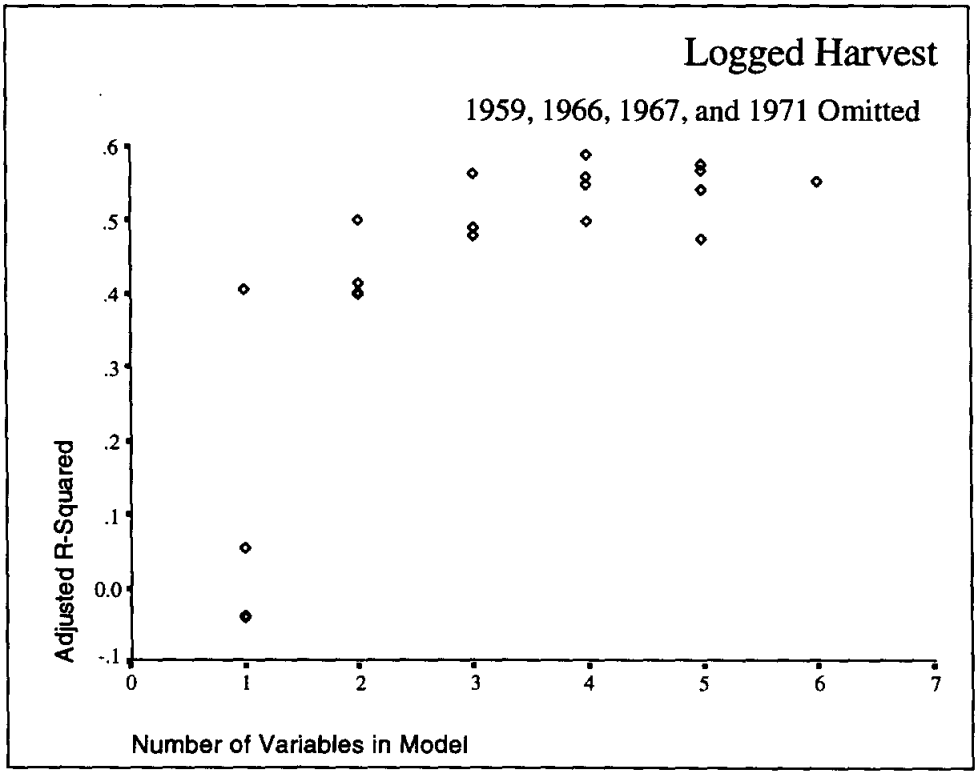
OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	LWHSHRMP	0.20783	8.21510	-.00028294	.000087667
18	MODEL1	PARMS	LWHSHRMP	0.20980	8.24537	-.00027716	.000083455
19	MODEL1	PARMS	LWHSHRMP	0.21608	8.20050	-.00030181	.000086720
20	MODEL1	PARMS	LWHSHRMP	0.23141	8.26584	-.00024033	.
21	MODEL1	PARMS	LWHSHRMP	0.21352	8.21523	-.00028299	.000087748

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LWHSHRMP	_IN_	_P_
17	.	-.00008261	.000030481	0.00012267	-1	5	6
18	0.000000080	-.00009116	.	0.00012926	-1	5	6
19	-.000015713	.	.000044068	0.00012093	-1	5	6
20	0.000039624	-.00007966	.000011696	0.00009269	-1	5	6
21	-.000000133	-.00008252	.000030483	0.00012272	-1	6	7

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	19	0.04319	0.66521	0.57710	5.0000	-73.4133	-66.1001
18	19	0.04401	0.65883	0.56905	5.3426	-72.9419	-65.6287
19	19	0.04669	0.63808	0.54283	6.4586	-71.4655	-64.1522
20	19	0.05355	0.58492	0.47569	9.3165	-68.0394	-60.7262
21	18	0.04559	0.66521	0.55361	7.0000	-71.4134	-62.8812

Scree Plots


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
Adjusted R-Squared
.6
.5
.4
.3
.2
.1
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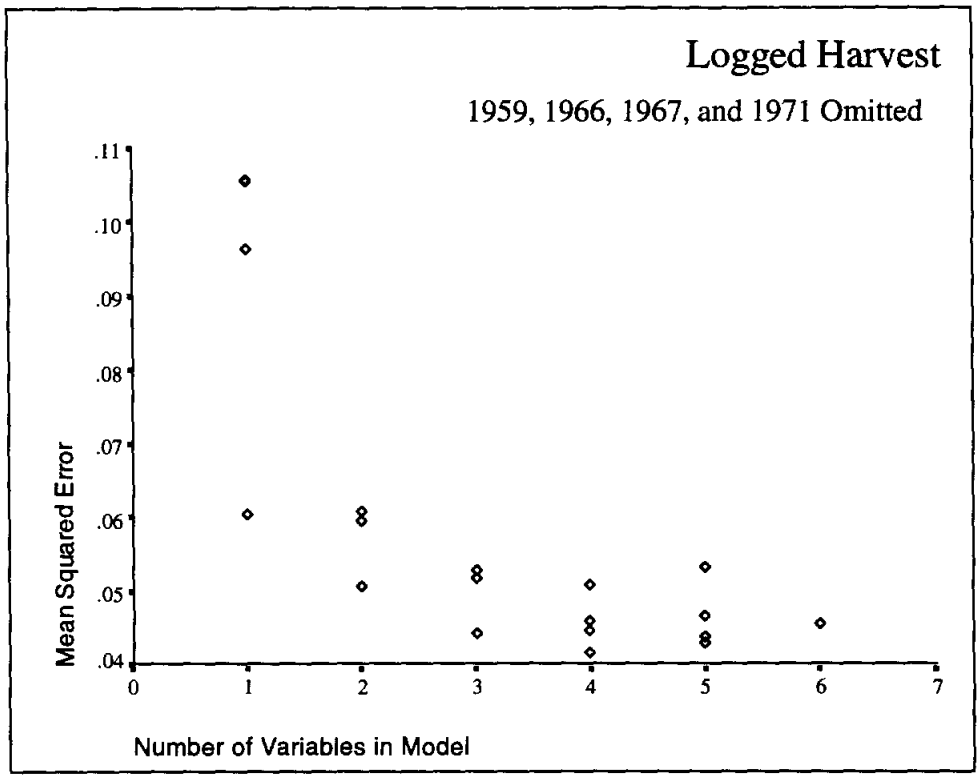
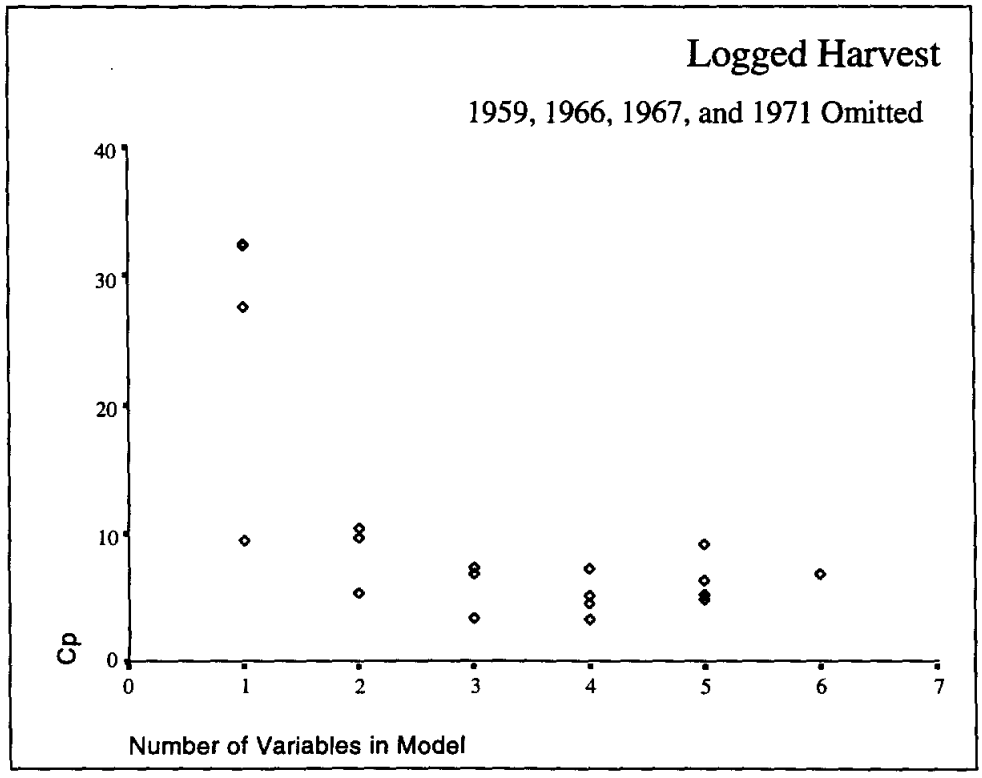
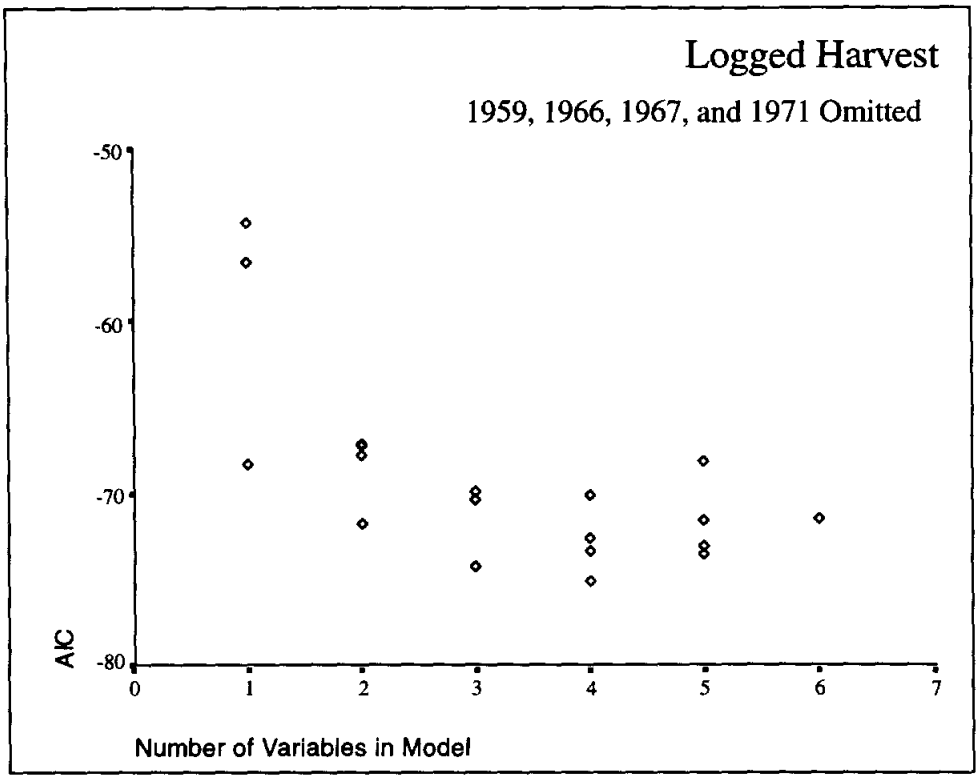
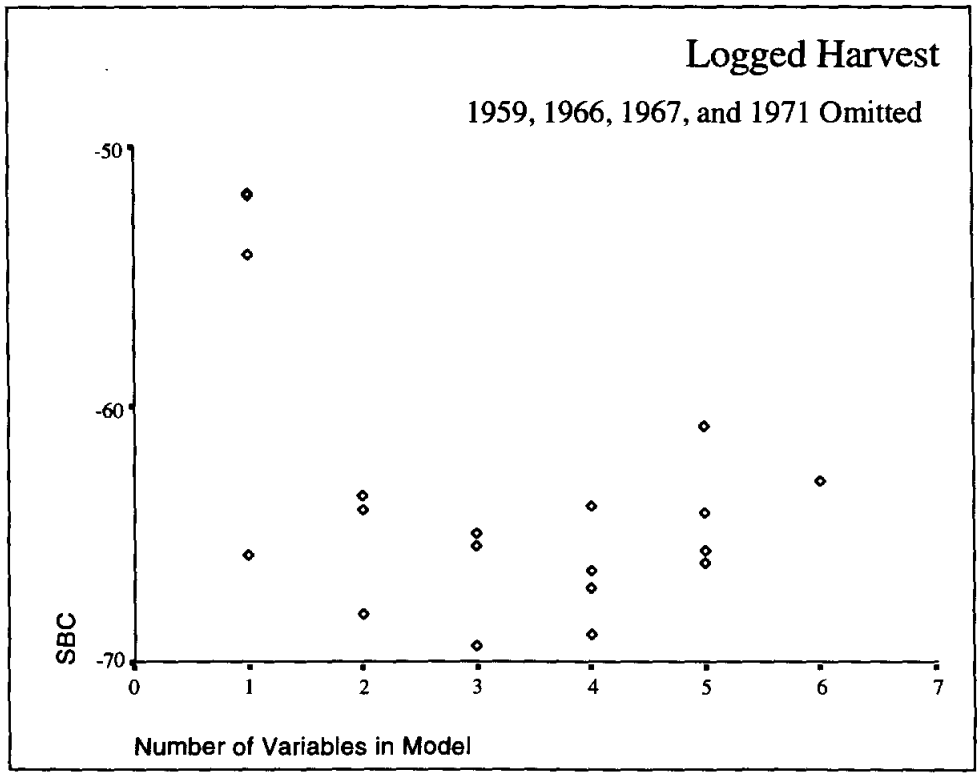
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
Mean Squared Error
.11
.10
.09
.08
.07
.06
.05
.04
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
Cp
40
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
AIC
-50
-60
-70
-80
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Harvest
1959, 1966, 1967, and 1971 Omitted
SBC
-50
-60
-70
0
1
2
3
4
5
6
7
Number of Variables in Model

Brown Shrimp Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Jacqueline Kiffe

Department of Statistics
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Table of Contents

Summary Report 3

Description of the Problem 3

Constructing Models—General Discussion 3

Detecting Influential Points and Outliers 3

Variable Selection 4

Multicollinearity 4

Other Procedures 4

How the Final Model Was Chosen 4

Model 8

Exploring the Data 10

Listing of Data 10

Summary Information for Individual Variables 11

99% Prediction Ellipses 41

Box–Cox Analysis 52

Numerical Results 52

Plots 53

Model Choice Diagnostics 54

Untransformed Data 54

Square Root of Harvest (Box–Cox Transformation) 56

Logged Inflows 58

Logged Harvest 60

All Variables Logged 62

Regression—Untransformed Data 64

ANOVA and Parameter Estimates 64

Collinearity Diagnostics 65

Residuals Diagnostics 67

Summary Information 67

Case Values for Residuals Diagnostics 68

Graphics 69

Prediction Intervals for Brown Shrimp Harvest 76

Outlier and Influential Point Detection 77

Calculated Quantities 77

Graphics 80

Regression—Square Root of Harvest (Box–Cox Transformation) 84

ANOVA and Parameter Estimates 84

Collinearity Diagnostics 85

Residuals Diagnostics 87
Summary Information 87
Case Values for Residuals Diagnostics 88
Graphics 89

Prediction Intervals for the Square Root of Brown Shrimp Harvest 96

Outlier and Influential Point Detection 97
Calculated Quantities 97
Graphics 100

Regression—All Variables Logged *104*

ANOVA and Parameter Estimates 104

Collinearity Diagnostics 105

Residuals Diagnostics 107
Summary Information 107
Case Values for Residuals Diagnostics 108
Graphics 109

Prediction Intervals for the Natural Log of Brown Shrimp Harvest 116

Outlier and Influential Point Detection 117
Calculated Quantities 117
Graphics 120

Examining Subsets of the Data *124*

Untransformed Data: 1959 and 1975 Omitted 124
Scree Plots 126

Square Root of Harvest (Box–Cox Transformation): 1959, 1975, and 1979 Omitted 129
Scree Plots 131

All Variables Logged: 1960 Omitted 134

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1959 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of brown shrimp.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The recommended transformation was the square root of harvest. At this point, there were five data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Square root of harvest; remaining variables untransformed
3. Natural log of inflow variables; harvest untransformed
4. Natural log of harvest; inflows untransformed
5. Natural log of all variables

Selecting the Points to be Omitted. Data sets 1, 2, and 5 (maximum R^2 = 0.43, 0.42, and 0.43 respectively) showed somewhat more promise than sets 3 and 4 (maximum R^2 = 0.39 and 0.37 respectively), so full regressions were performed for three models, each of which contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model. Because so many points were flagged, a large number of subsets of those three data sets were analyzed. Each subset was obtained by deleting various combinations of the potentially troublesome points. In each case, one subset was chosen as optimal; those results are presented in the section on subset analysis.

The observations flagged as potentially influential are given in the summary table on the next page. Those which were ultimately deleted in fitting the model are indicated with an asterisk. The abbreviation key and a similar summary table for points designated as potentially influential by box plots also appear on the following pages. A point was not considered to be a potential problem unless it garnered multiple flags.

The results from this part of the analysis point out an unfortunate truth in the search for influential points: The various measures of an observation's influence are only general rules of thumb. The only way actually to ascertain the effect an observation has on the model is to remove it and refit the model without it. Unfortunately, this itself is inadequate; many points have a profound influence on the fit of the model *only* in the presence of another particular point. Only by removing both points is the true effect discovered. Unfortunately, there are no tests for detecting such relationships, only graphical procedures and experience.

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 1									
***1959**			1				1	1	3
1961	1								1
1973	1								1
1974	1								1
***1975**	1						1		2
1976								1	1
1979	2								2
1980							1		1
1983	1								1
Data Set 2									
***1959**			1				1	3	5
1961	1								1
1973	1								1
1974	1								1
***1975**	1						1	1	3
***1979**	2								2
1983	1						1		2
Data Set 5									
1959	1			1	1		1	1	5
***1960**	1	1	1				1	2	6
1961	1								1
1967	1								1
1971	2								2
1976	1								1
1981							1		1
1983							1		1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX Box plot
SRE Studentized residual
SDR Studentized deleted residual
LEV Leverage value
MAH Mahalanobis distance
COO Cook's distance
SDF Standardized Dffits value
SDB Standardized Dfbeta value

Year	Variable
1959	Ln(Brown Shrimp Harvest)
1960	Ln(Brown Shrimp Harvest)
1961	Ln(Brown Shrimp Harvest) January-February Inflows
1967	Ln(January-February Inflows)
1971	Ln(January-February Inflows) Ln(May-June Inflows)
1973	March-April Inflows
1974	September-October Inflows
1975	November-December Inflows
1976	Ln(January-February Inflows)
1979	March-April Inflows July-August Inflows
1983	July-August Inflows

Summary of points flagged by boxplots

Selecting the Final Candidate Models. After the subset analysis led us to three subsets (untransformed data, 1959 and 1975 omitted; square root of harvest, 1959, 1975, and 1979 omitted; all variables logged, 1960 omitted), further examination led us to consider the following two models:

1959 and 1975 Omitted:

1a. Harvest regressed on January-February, July-August, September-October, and November-December inflows

1959, 1975, and 1979 Omitted:

2a. Square root of harvest regressed on January-February, July-August, September-October, and November-December inflows

Selecting the Final Model. To put these models on a common ground for testing, the observations corresponding to the years 1959, 1975, and 1979 were deleted. Regression was performed using each of these two models, and the deleted residuals were calculated. In the models where the prediction was for the square root of harvest, the prediction was transformed back to the original scale before the residual was calculated. Various descriptive statistics were calculated for the square of these deleted residuals. This was repeated for the entire data set of 29 observations, and the results of both of these procedures appear on the next page. Clearly, model 1a performs better from the point of view of prediction, and is therefore our final choice.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
1a	*26*	*1478.5364*	*2817860.1621*	*436334.715067*	*678819.215235*
2a	*26*	*2.4352*	*3805727.4392*	*517870.251210*	*867047.913709*
1a	*29*	*33.6001*	*3476037.4098*	*642356.264167*	*992028.977915*
2a	*29*	*1104.4258*	*3288921.8390*	*727235.407397*	*1026733.316183*

Model

Brown Shrimp Harvest = 1019.833 – 0.578*(January-February Inflows)
+ 0.419*(July-August Inflows)
+ 0.406*(September-October Inflows)
+ 0.353*(November-December Inflows)

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, July-August Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.756*	*.571*	*.493*	*582.7584*	*1.125*

a. Dependent Variable: Brown Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, July-August Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*9954495.256*	*4*	*2488623.814*	*7.328*	*.001*[b]
	Residual	*7471362.011*	*22*	*339607.364*		
	Total	*17425857.267*	*26*			

a. Dependent Variable: Brown Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, July-August Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

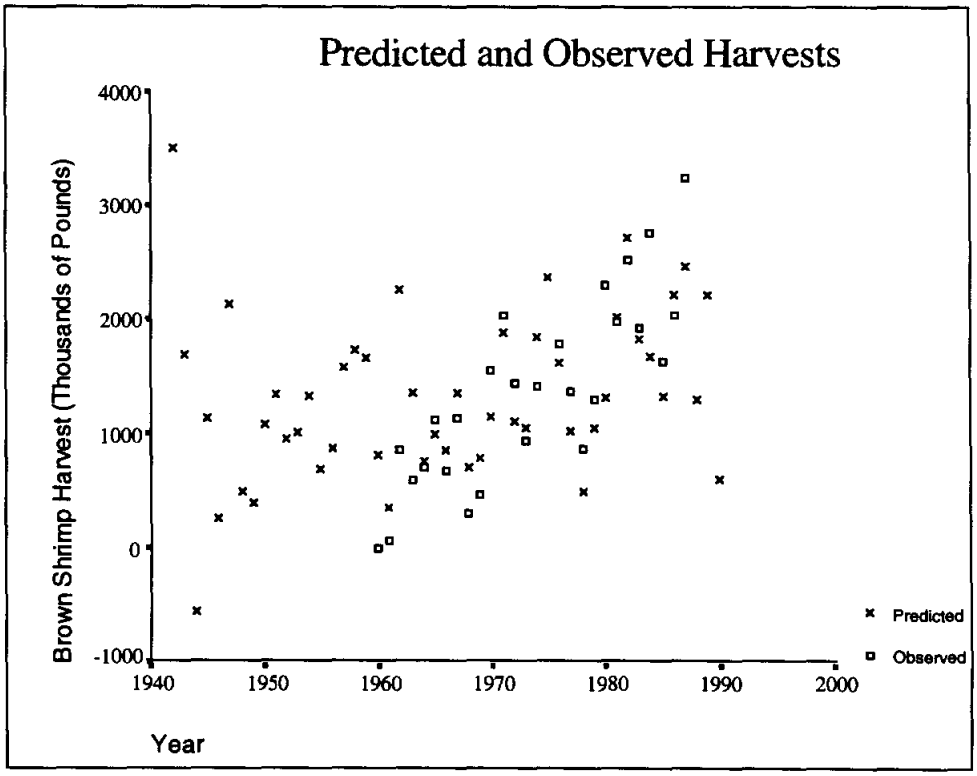
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	1019.833	268.170		3.803	.001	463.682	1575.985		
	January-February Inflows	-.578	.132	-.784	-4.386	.000	-.851	-.305	.610	1.640
	July-August Inflows	.419	.168	.391	2.493	.021	.071	.768	.794	1.260
	September-October Inflows	.406	.134	.468	3.022	.006	.127	.685	.813	1.230
	November-December Inflows	.353	.140	.449	2.529	.019	.064	.643	.619	1.616

a. Dependent Variable: Brown Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	January-February Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	4.068	1.000	.01	.01	.01	.01	.01
	2	.475	2.928	.00	.00	.32	.33	.00
	3	.208	4.420	.09	.14	.23	.25	.36
	4	.134	5.508	.76	.05	.43	.33	.09
	5	.115	5.957	.14	.80	.00	.08	.54

a. Dependent Variable: Brown Shrimp Harvest



Exploring the Data

Listing of Data

YEAR	BRSHRIMP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1959	23.30	2088.38	2234.80	1954.20	2282.80	2054.00	207.00
1960	8.60	2838.00	799.80	1831.80	1208.18	1091.60	1409.60
1961	82.90	5180.00	1440.10	1977.30	1437.95	1154.04	3586.10
1962	868.50	728.40	649.90	1036.80	532.90	2163.94	1621.10
1963	600.80	1102.10	356.90	796.10	201.78	978.50	1417.60
1964	717.10	851.95	1061.50	445.80	215.41	126.83	276.50
1965	1132.20	1466.60	1035.80	2334.80	243.99	588.62	1398.70
1966	681.10	2126.40	1977.80	5402.30	1220.70	260.65	1288.40
1967	1148.50	257.53	583.93	749.10	383.91	529.50	336.49
1968	307.80	2129.20	3236.90	6258.00	929.20	515.10	920.20
1969	475.50	1663.10	4102.00	4023.50	489.22	556.89	862.74
1970	1556.00	752.30	2674.30	1624.80	402.78	395.35	702.30
1971	2050.10	134.30	306.18	273.04	448.98	1627.41	280.35
1972	1453.00	2042.19	715.60	1966.77	442.44	748.44	2250.95
1973	955.40	2190.55	5382.71	5752.84	1597.24	565.19	1165.62
1974	1422.70	3342.00	947.02	1514.33	566.48	4222.20	2309.20
1975	828.40	3138.98	2242.47	3911.76	1251.90	1972.37	5217.90
1976	1798.00	300.41	774.04	1891.54	958.01	568.55	451.20
1977	1381.50	2017.84	3210.59	1381.78	412.79	716.23	2019.79
1978	883.20	2120.06	606.39	673.68	390.93	472.81	1017.47
1979	1315.00	2872.02	4744.84	3937.29	3019.84	418.13	740.91
1980	2314.50	2483.63	1718.35	2028.90	382.89	2799.02	1261.47
1981	1991.90	331.86	393.91	4583.43	1656.01	1004.49	300.79
1982	2535.30	1380.97	1586.83	3551.50	1489.26	2326.50	2674.10
1983	1940.80	2666.53	1887.04	2520.25	3116.05	339.35	2584.78
1984	2771.00	1259.48	1283.67	822.10	524.19	2011.59	1017.37
1985	1651.00	2468.30	2670.78	1760.81	626.87	2025.67	1873.57
1986	2047.40	1651.33	771.37	4515.98	841.81	1356.07	3585.61
1987	3261.40	1905.62	1955.75	3070.28	1274.76	1591.52	3886.93

BRSHRIMP	Brown shrimp harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Brown Shrimp Harvest	.082	29	.200*	.974	29	.703
Square Root of Brown Shrimp Harvest	.090	29	.200*	.957	29	.372
Ln(Brown Shrimp Harvest)	.229	29	.000	.738	29	.010*
January-February Inflows	.101	29	.200*	.946	29	.230
March-April Inflows	.151	29	.091	.876	29	.010*
May-June Inflows	.198	29	.005	.916	29	.032
July-August Inflows	.194	29	.007	.826	29	.010*
September-October Inflows	.173	29	.026	.867	29	.010*
November-December Inflows	.182	29	.015	.888	29	.010*
Ln(January-February Inflows)	.188	29	.010	.870	29	.010*
Ln(March-April Inflows)	.091	29	.200*	.973	29	.667
Ln(May-June Inflows)	.107	29	.200*	.954	29	.330
Ln(July-August Inflows)	.125	29	.200*	.955	29	.353
Ln(September-October Inflows)	.116	29	.200*	.972	29	.659
Ln(November-December Inflows)	.096	29	.200*	.956	29	.359

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

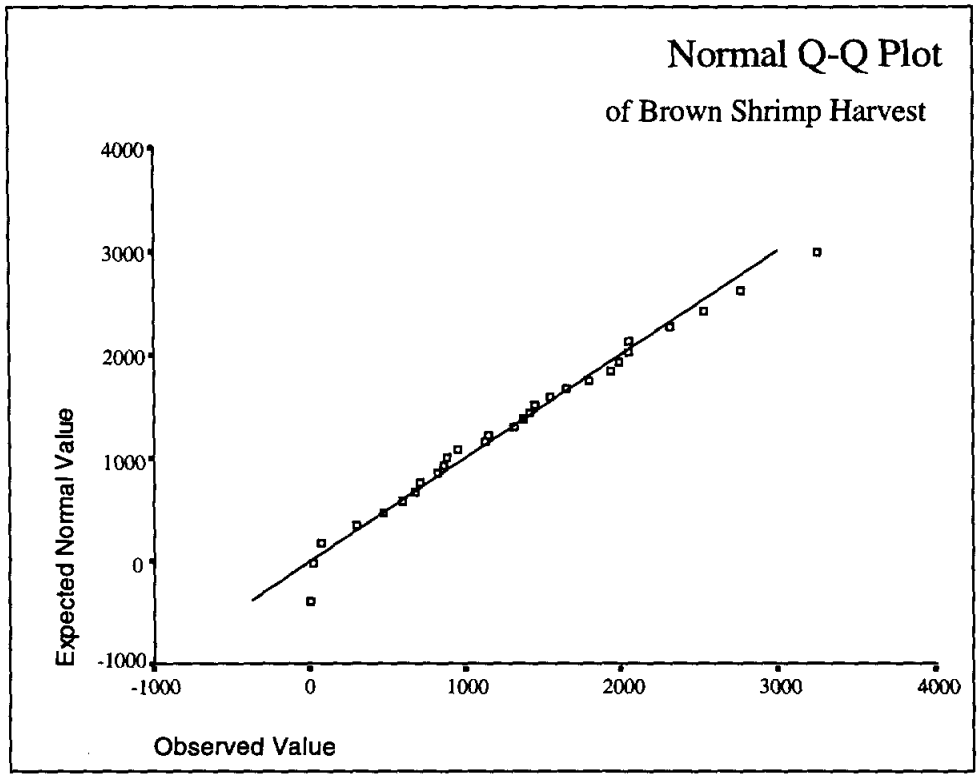
a. Lilliefors Significance Correction

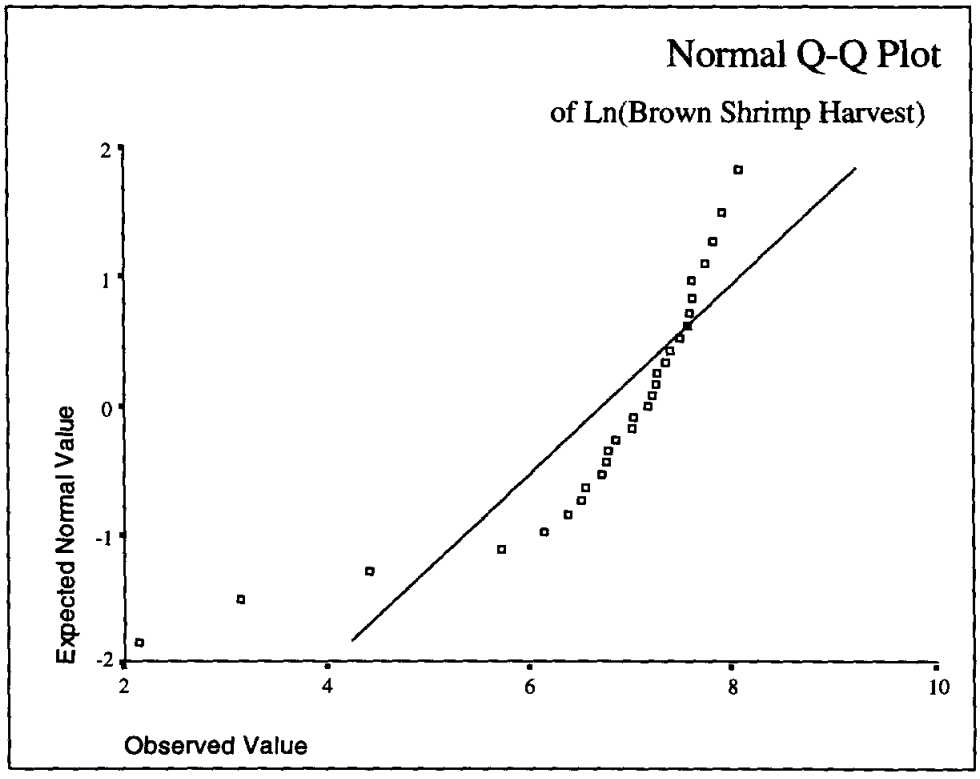
Descriptives

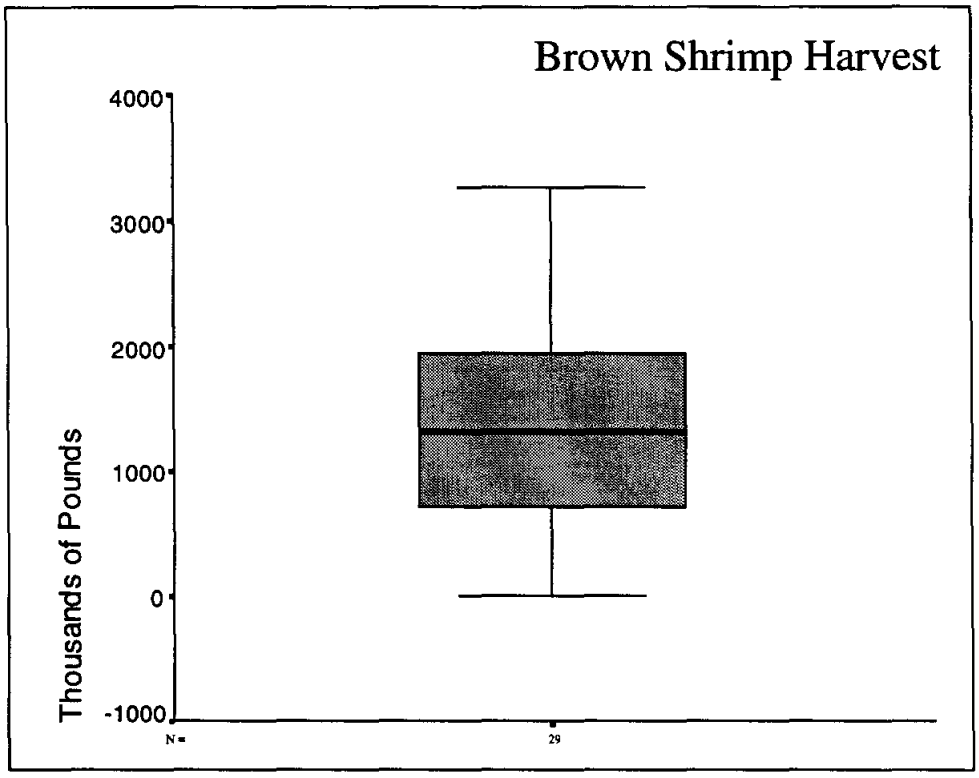
			Statistic	Std. Error
BROWN_SH	Mean		1317.3414	154.7969
	95% Confidence Interval for Mean	Lower Bound	1000.2543	
		Upper Bound	1634.4284	
	5% Trimmed Mean		1290.2477	
	Median		1315.0000	
	Variance		694900.2	
	Std. Deviation		833.6067	
	Minimum		8.60	
	Maximum		3261.40	
	Range		3252.80	
	Interquartile Range		1267.2500	
	Skewness		.372	.434
	Kurtosis		-.303	.845

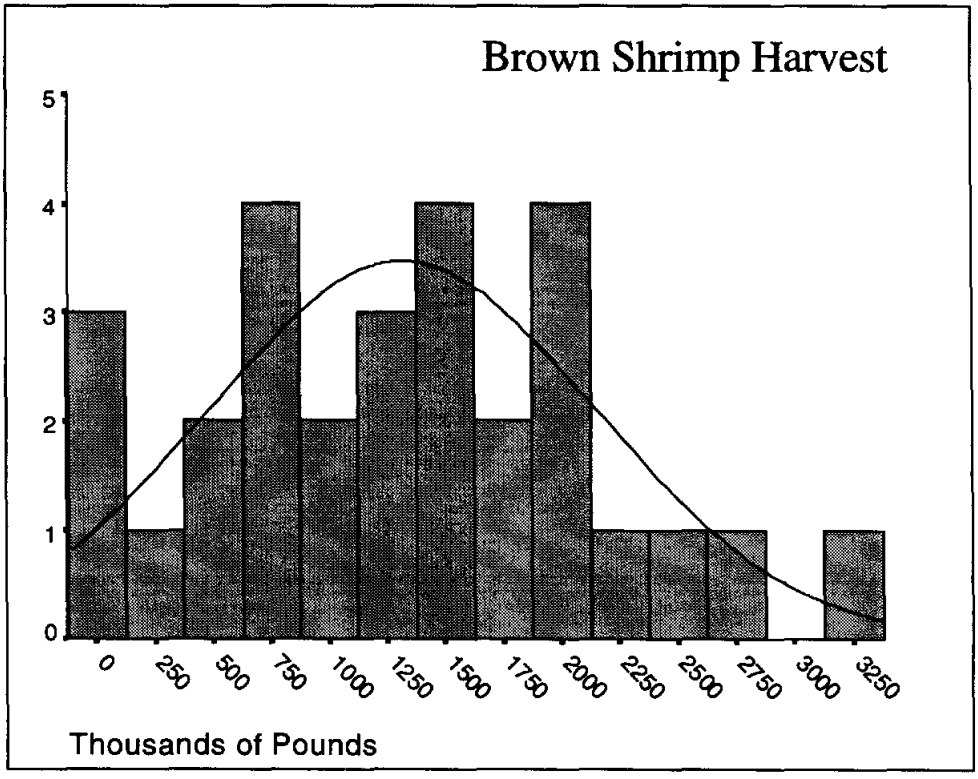
Extreme Values

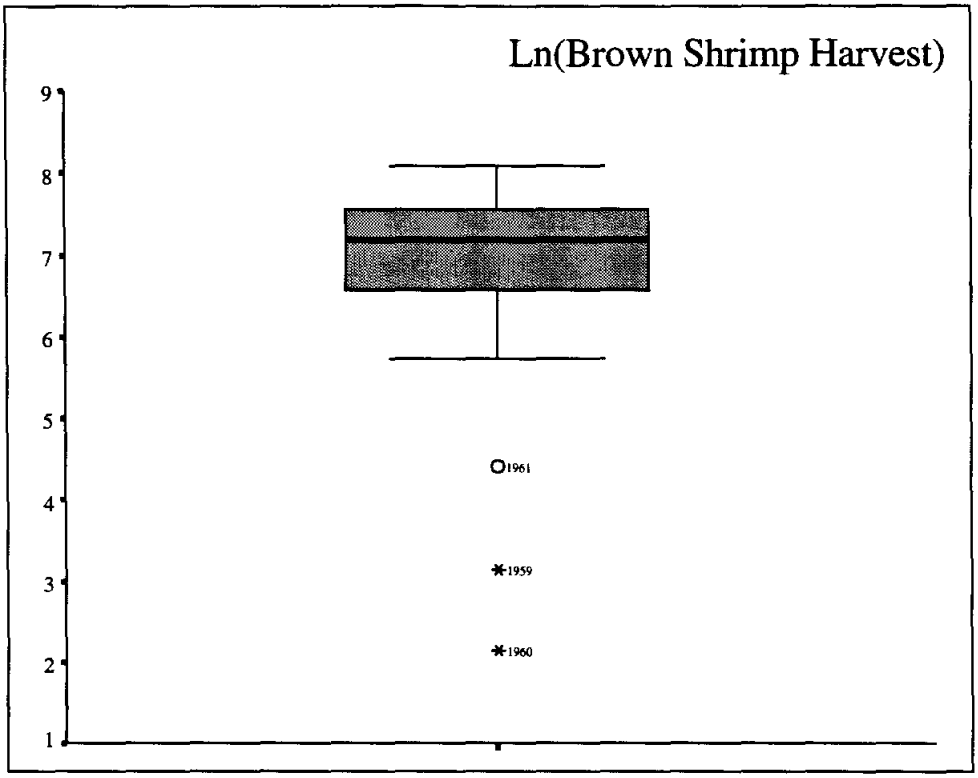
			Case Number	YEAR	Value
BROWN_SH	Highest	1	29	1987	3261.40
		2	26	1984	2771.00
		3	24	1982	2535.30
		4	22	1980	2314.50
		5	13	1971	2050.10
	Lowest	1	2	1960	8.60
		2	1	1959	23.30
		3	3	1961	82.90
		4	10	1968	307.80
		5	11	1969	475.50

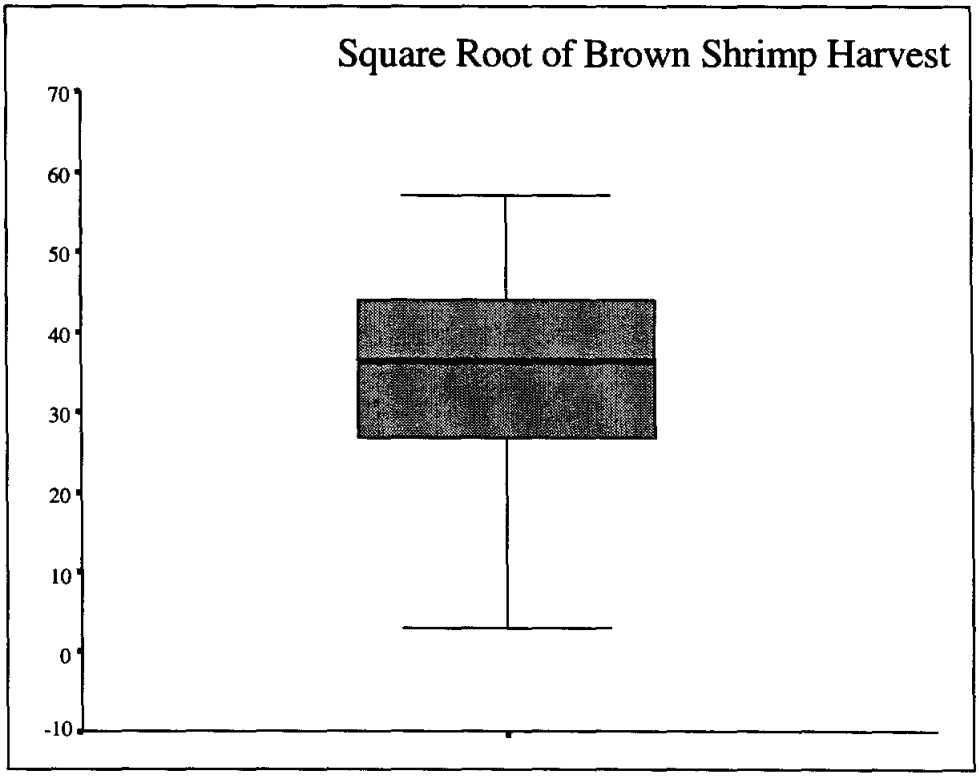

Normal Q-Q Plot
of Brown Shrimp Harvest
Expected Normal Value
Observed Value
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000


Normal Q-Q Plot
of Ln(Brown Shrimp Harvest)
Expected Normal Value
Observed Value
2
1
0
-1
-2
2
4
6
8
10


Brown Shrimp Harvest
4000
3000
2000
1000
0
-1000
Thousands of Pounds
N=
29


Brown Shrimp Harvest
5
4
3
2
1
0
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Pounds


Ln(Brown Shrimp Harvest)
9
8
7
6
5
4
3
2
1
1961
1959
1960

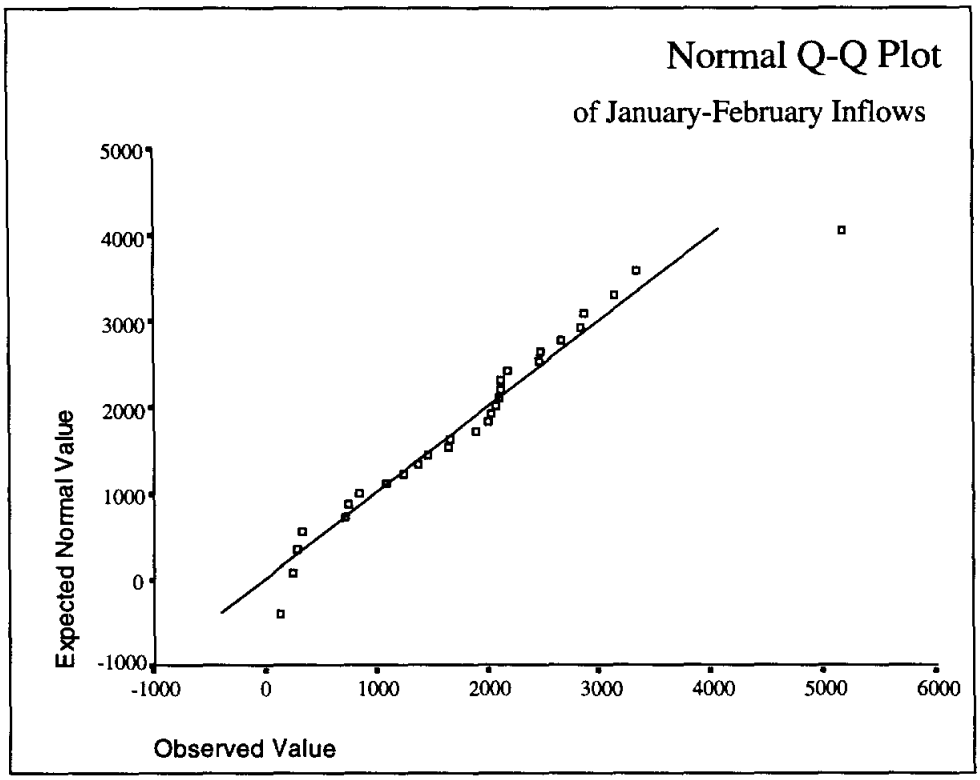

Square Root of Brown Shrimp Harvest
70
60
50
40
30
20
10
0
-10

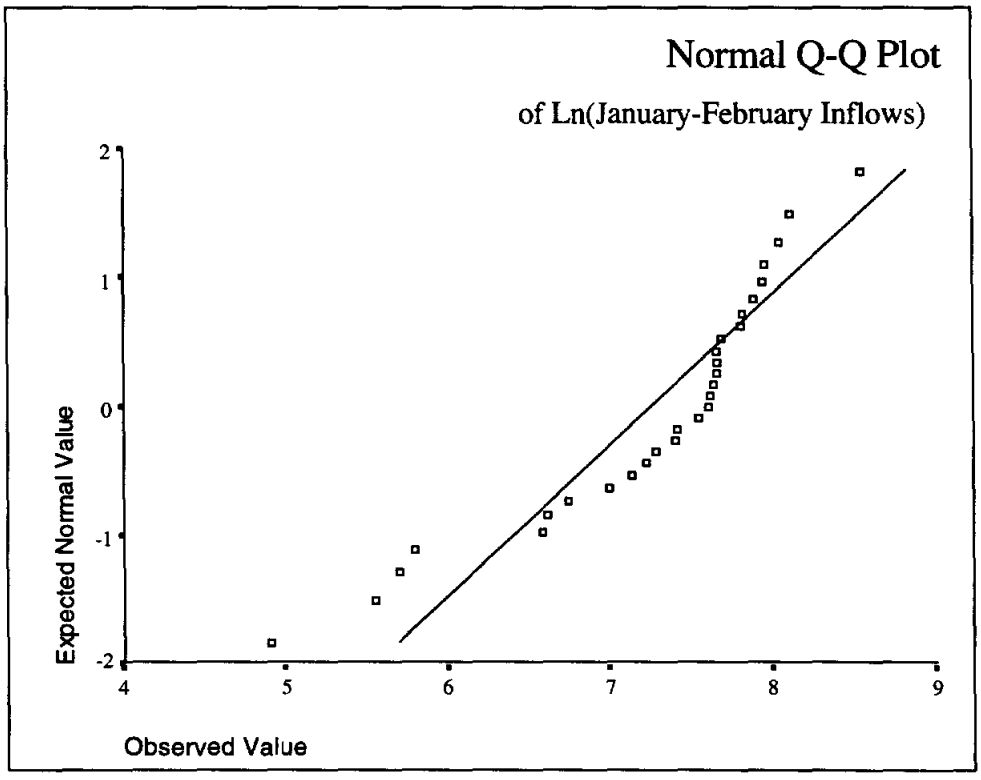
Descriptives

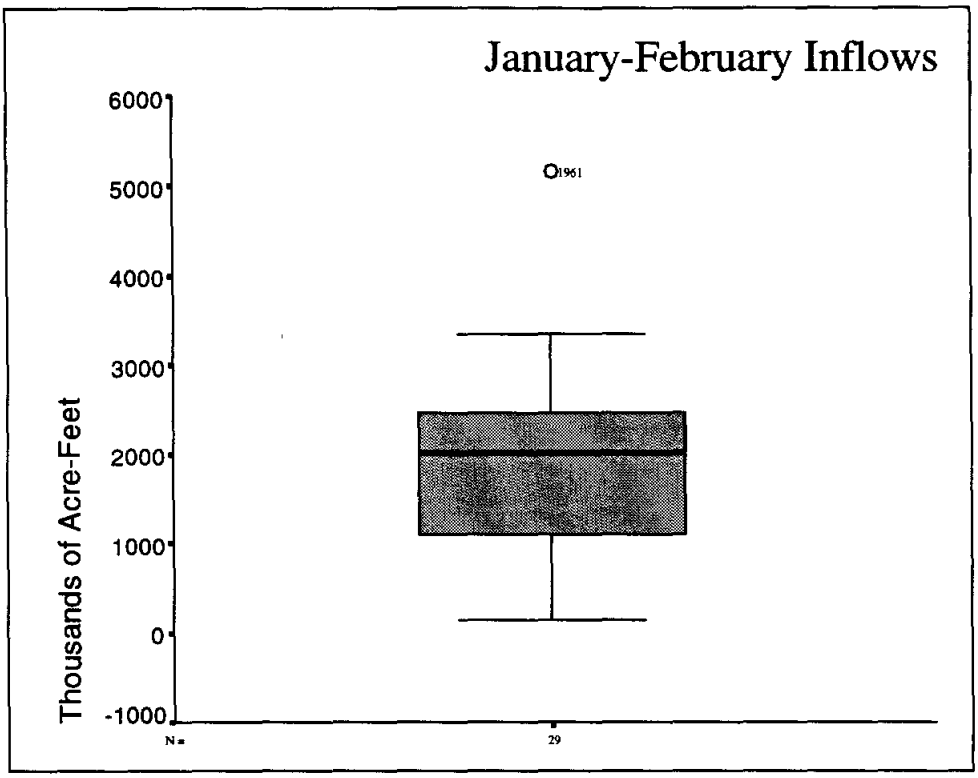
			Statistic	Std. Error
JF_INFL	Mean		1844.4838	204.3525
	95% Confidence Interval for Mean	*Lower Bound*	1425.8868	
		Upper Bound	2263.0808	
	5% Trimmed Mean		1783.7525	
	Median		2017.8400	
	Variance		1211038	
	Std. Deviation		1100.4717	
	Minimum		134.30	
	Maximum		5180.00	
	Range		5045.70	
	Interquartile Range		1498.9400	
	Skewness		.729	.434
	Kurtosis		1.622	.845

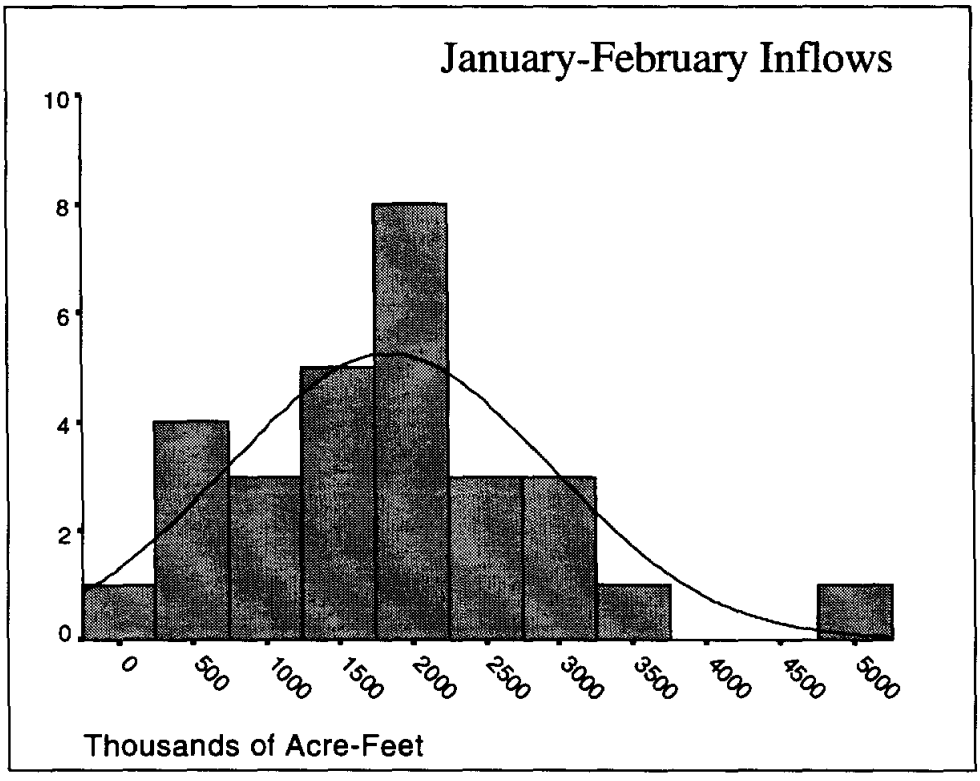
Extreme Values

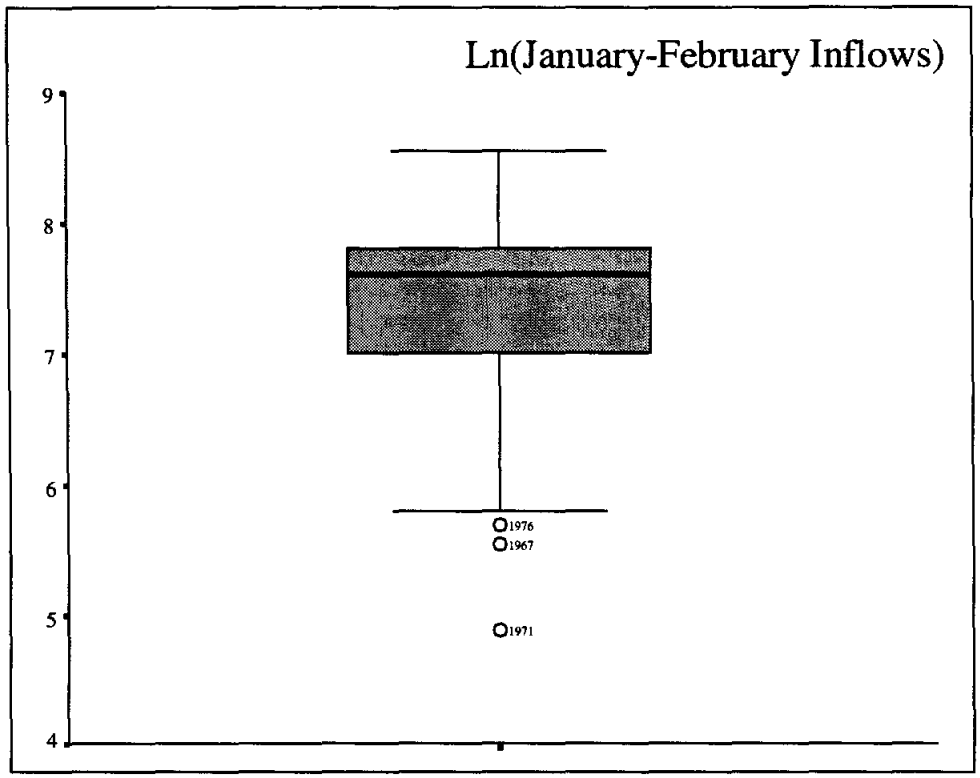
			Case Number	YEAR	Value
JF_INFL	Highest	1	3	1961	5180.00
		2	16	1974	3342.00
		3	17	1975	3138.98
		4	21	1979	2872.02
		5	2	1960	2838.00
	Lowest	1	13	1971	134.30
		2	9	1967	257.53
		3	18	1976	300.41
		4	23	1981	331.86
		5	4	1962	728.40


Normal Q-Q Plot
of January-February Inflows
Expected Normal Value
Observed Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal Value
Observed Value
2
1
0
-1
-2
4
5
6
7
8
9


January-February Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1961
N =
29


January-February Inflows
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet

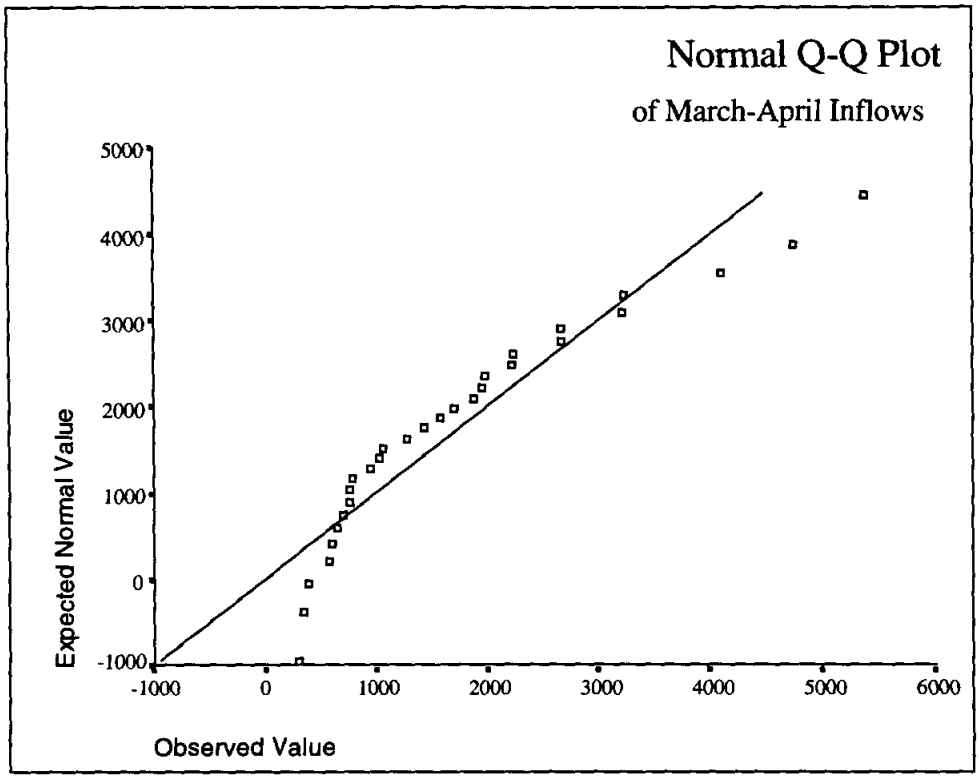

Ln(January-February Inflows)
9
8
7
6
5
4
1976
1967
1971

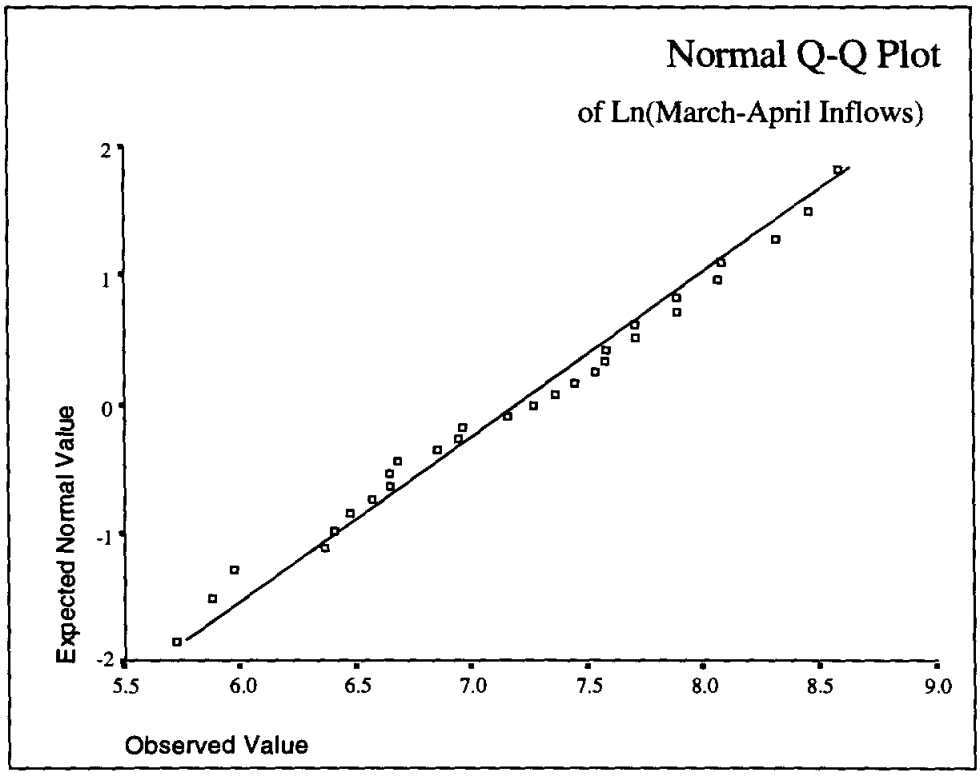
Descriptives

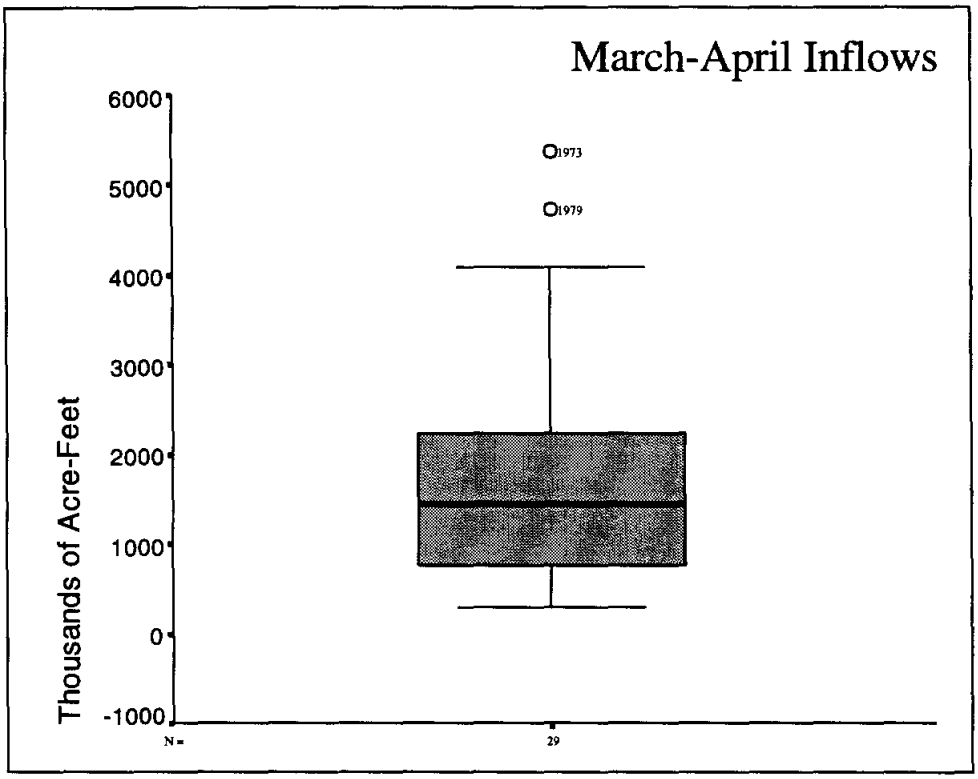
			Statistic	Std. Error
MA_INFL	Mean		1770.7334	247.9403
	95% Confidence Interval for Mean	Lower Bound	1262.8507	
		Upper Bound	2278.6162	
	5% Trimmed Mean		1661.5554	
	Median		1440.1000	
	Variance		1782758	
	Std. Deviation		1335.1995	
	Minimum		306.18	
	Maximum		5382.71	
	Range		5076.53	
	Interquartile Range		1713.1400	
	Skewness		1.211	.434
	Kurtosis		.982	.845

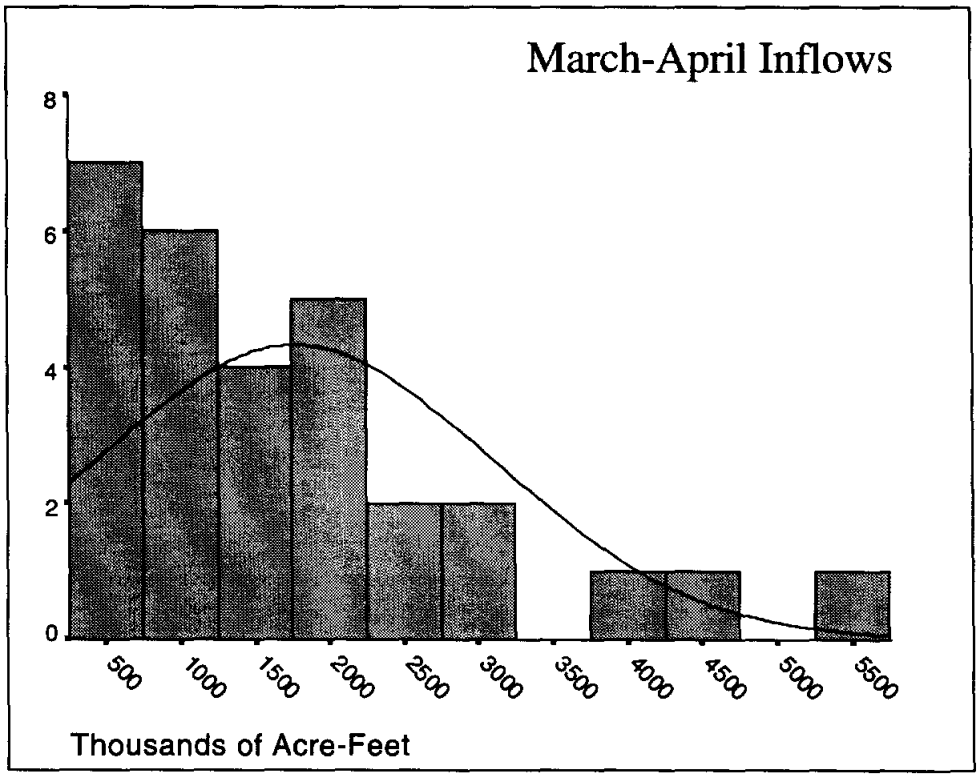
Extreme Values

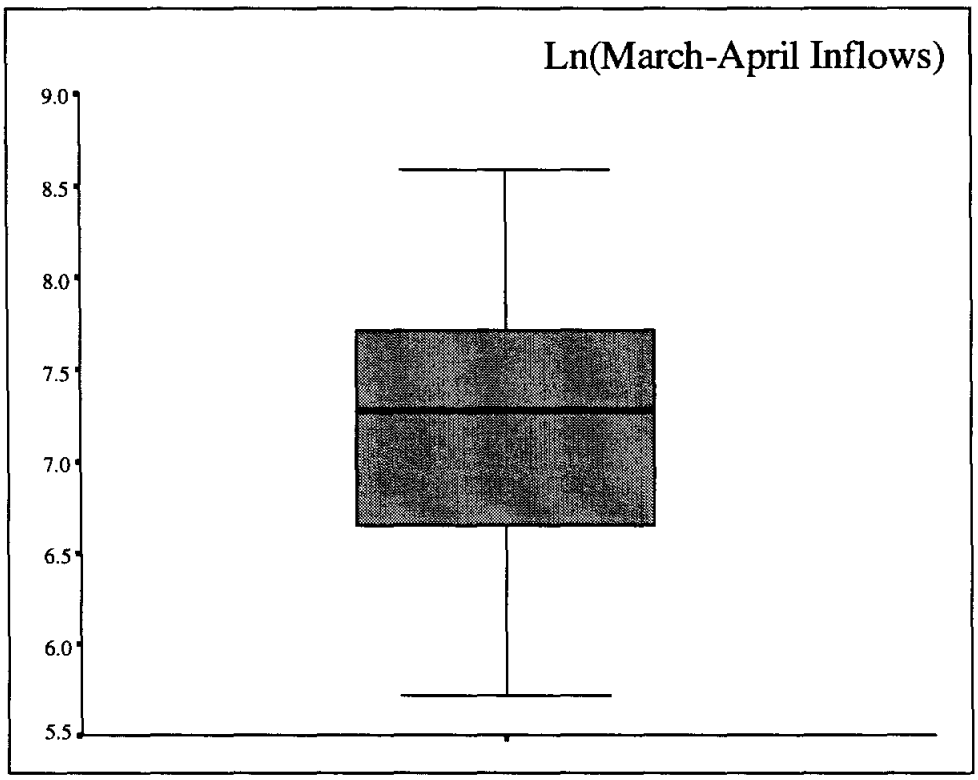
			Case Number	YEAR	Value
MA_INFL	Highest	1	15	1973	5382.71
		2	21	1979	4744.84
		3	11	1969	4102.00
		4	10	1968	3236.90
		5	19	1977	3210.59
	Lowest	1	13	1971	306.18
		2	5	1963	356.90
		3	23	1981	393.91
		4	9	1967	583.93
		5	20	1978	606.39


Normal Q-Q Plot
of March-April Inflows
Expected Normal Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Observed Value


Normal Q-Q Plot
of Ln(March-April Inflows)
Expected Normal Value
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


March-April Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1973
1979
N =
29


March-April Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
Thousands of Acre-Feet

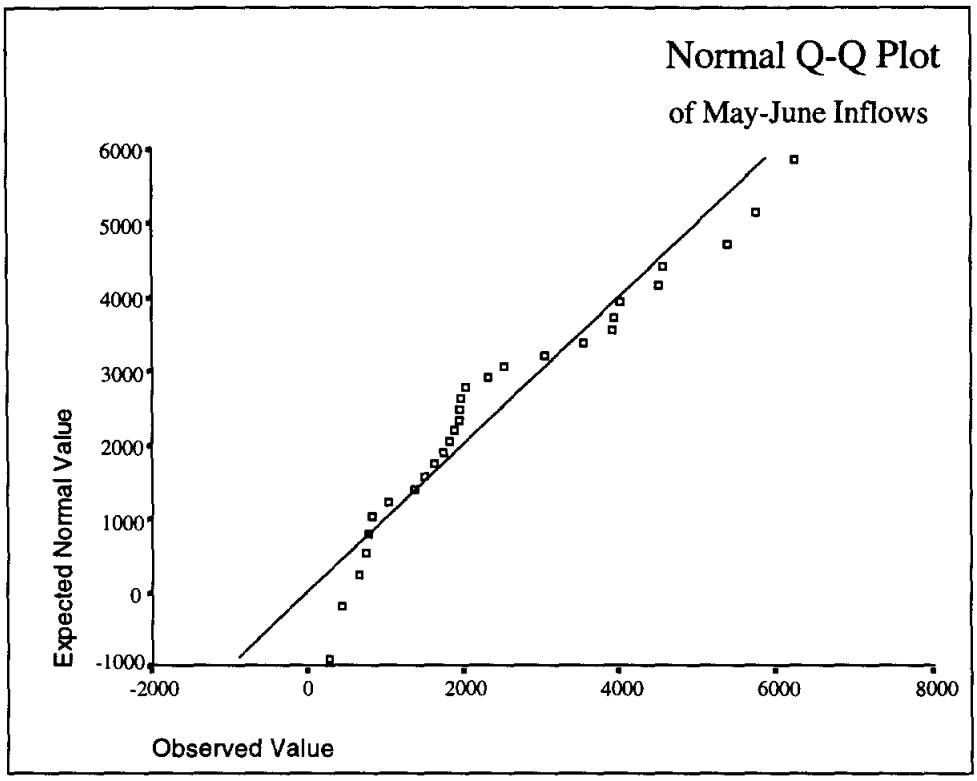

Ln(March-April Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5

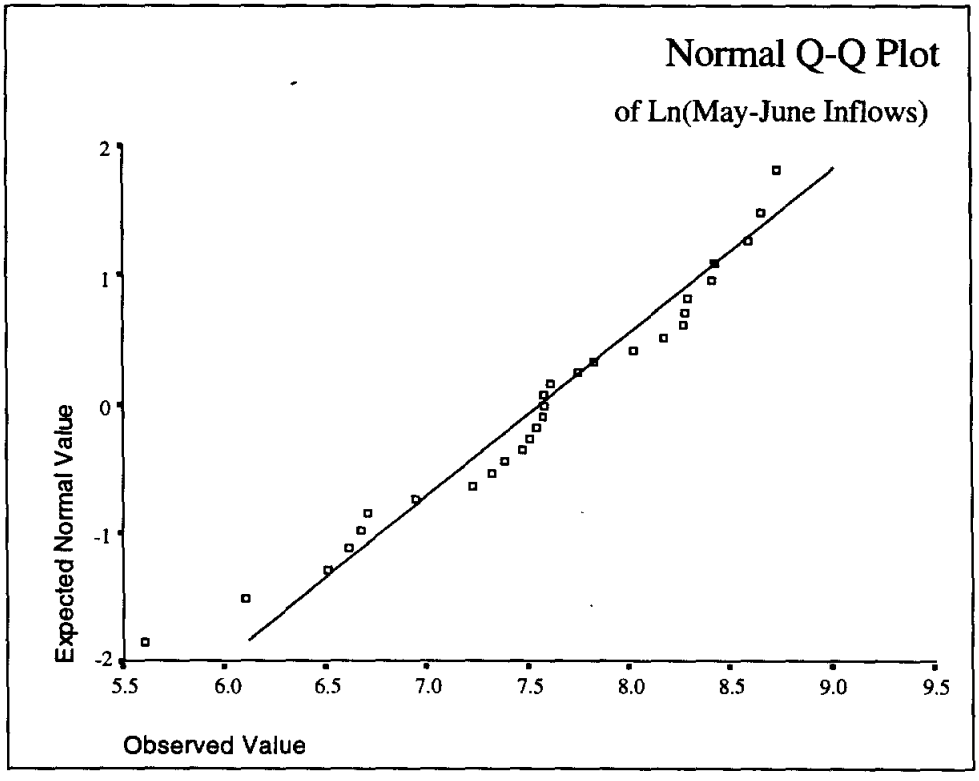
Descriptives

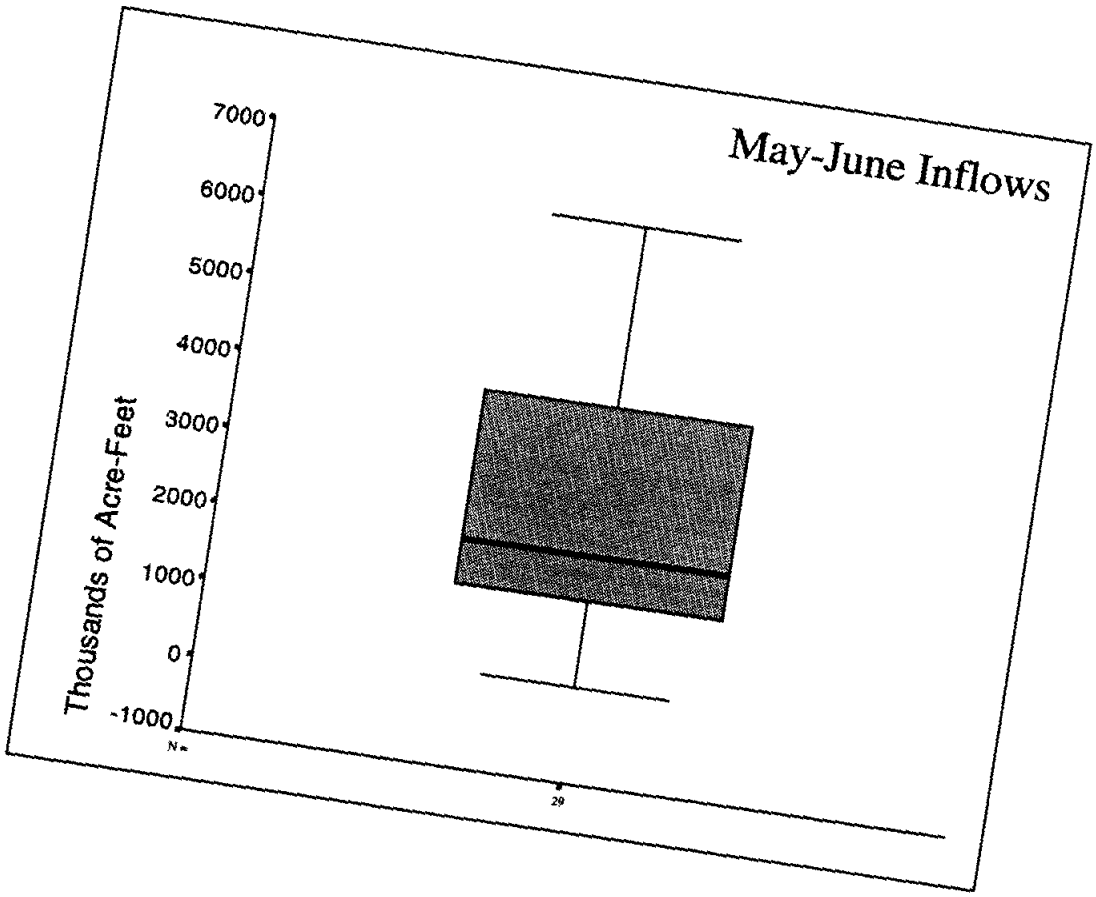
			Statistic	Std. Error
MJ_INFL	Mean		2503.1303	310.4068
	95% Confidence Interval for Mean	Lower Bound	1867.2908	
		Upper Bound	3138.9699	
	5% Trimmed Mean		2424.1514	
	Median		1966.7700	
	Variance		2794219	
	Std. Deviation		1671.5918	
	Minimum		273.04	
	Maximum		6258.00	
	Range		5984.96	
	Interquartile Range		2715.2350	
	Skewness		.744	.434
	Kurtosis		-.406	.845

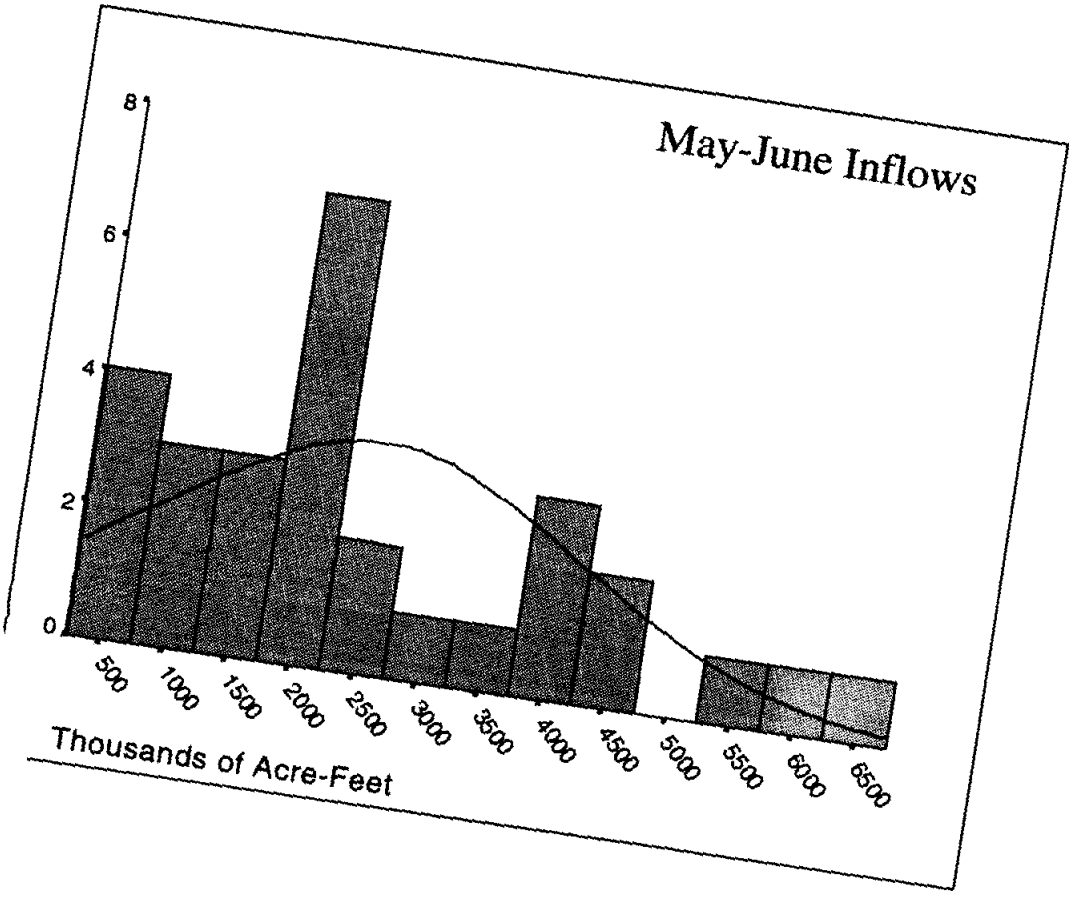
Extreme Values

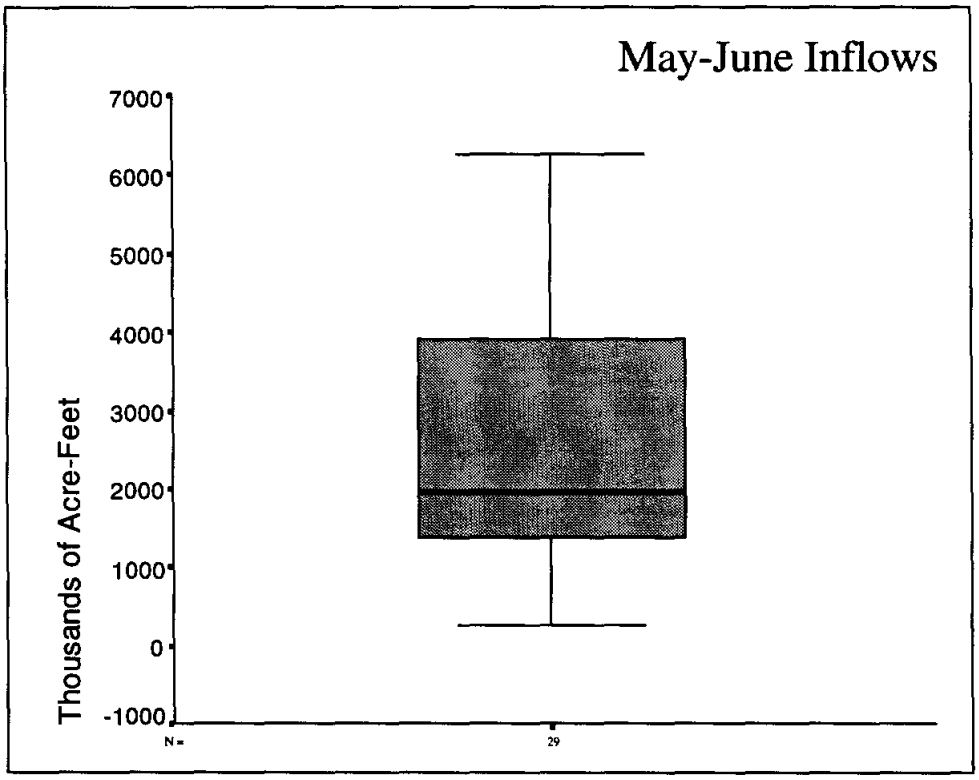
			Case Number	YEAR	Value
MJ_INFL	Highest	1	10	1968	6258.00
		2	15	1973	5752.84
		3	8	1966	5402.30
		4	23	1981	4583.43
		5	28	1986	4515.98
	Lowest	1	13	1971	273.04
		2	6	1964	445.80
		3	20	1978	673.68
		4	9	1967	749.10
		5	5	1963	796.10

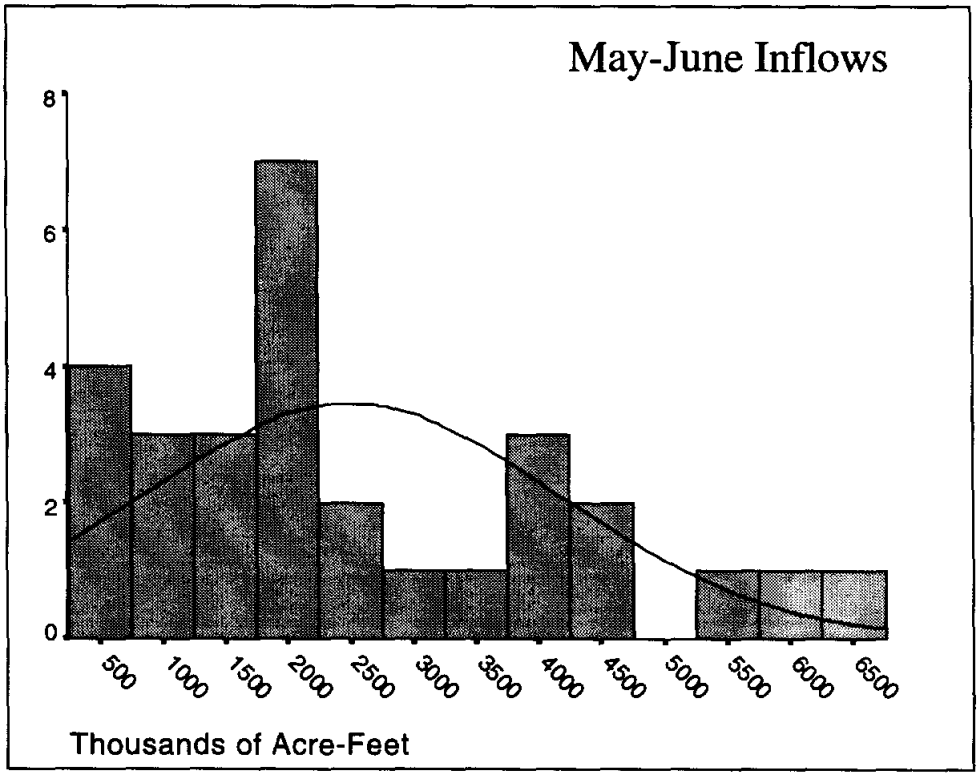

Normal Q-Q Plot
of May-June Inflows
Expected Normal Value
6000
5000
4000
3000
2000
1000
0
-1000
-2000
0
2000
4000
6000
8000
Observed Value

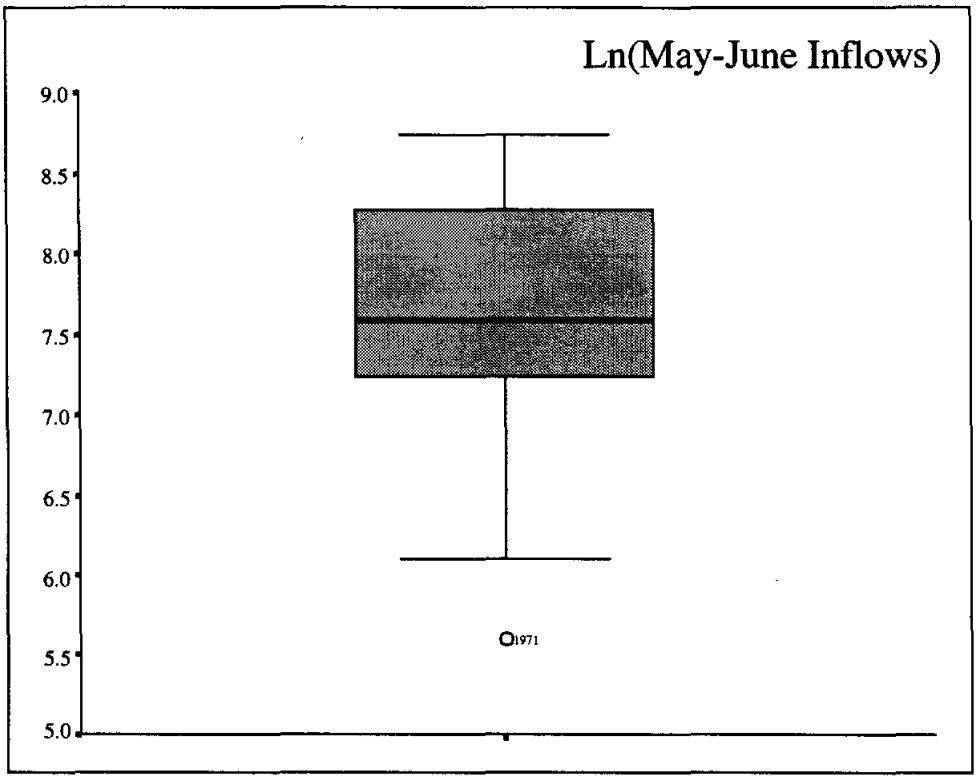

Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal Value
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
Observed Value


May-June Inflows
Thousands of Acre-Feet
7000
6000
5000
4000
3000
2000
1000
0
-1000
N=
29


May-June Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
Thousands of Acre-Feet


May-June Inflows
Thousands of Acre-Feet
7000
6000
5000
4000
3000
2000
1000
0
-1000
N=
29


May-June Inflows
8
6
4
2
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
Thousands of Acre-Feet

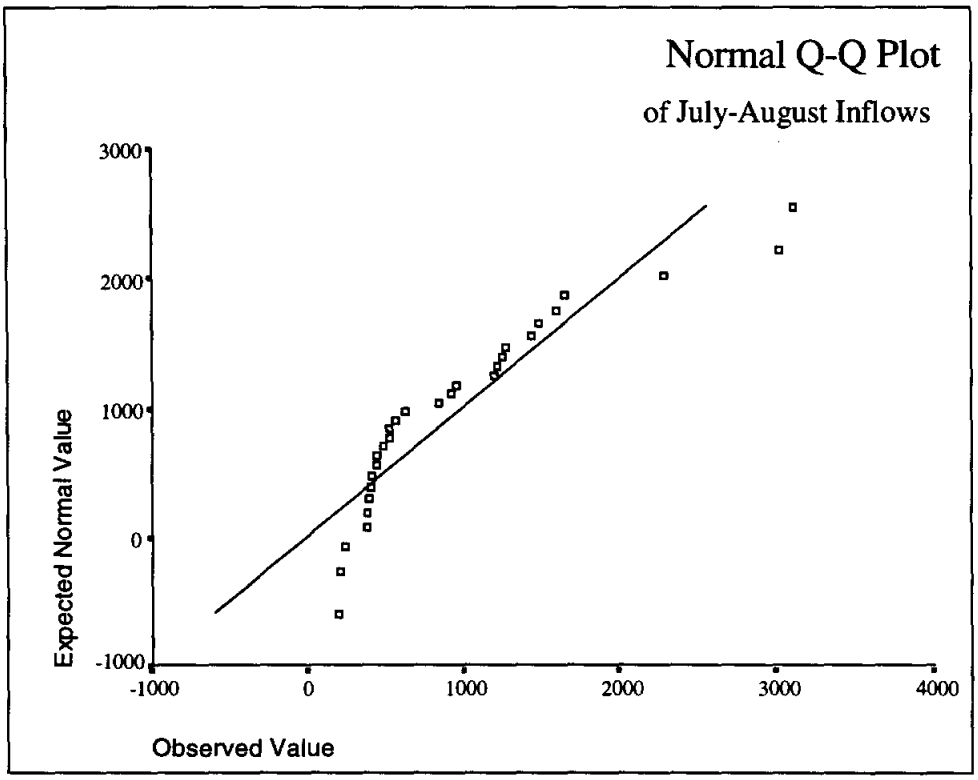

Ln(May-June Inflows)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1971

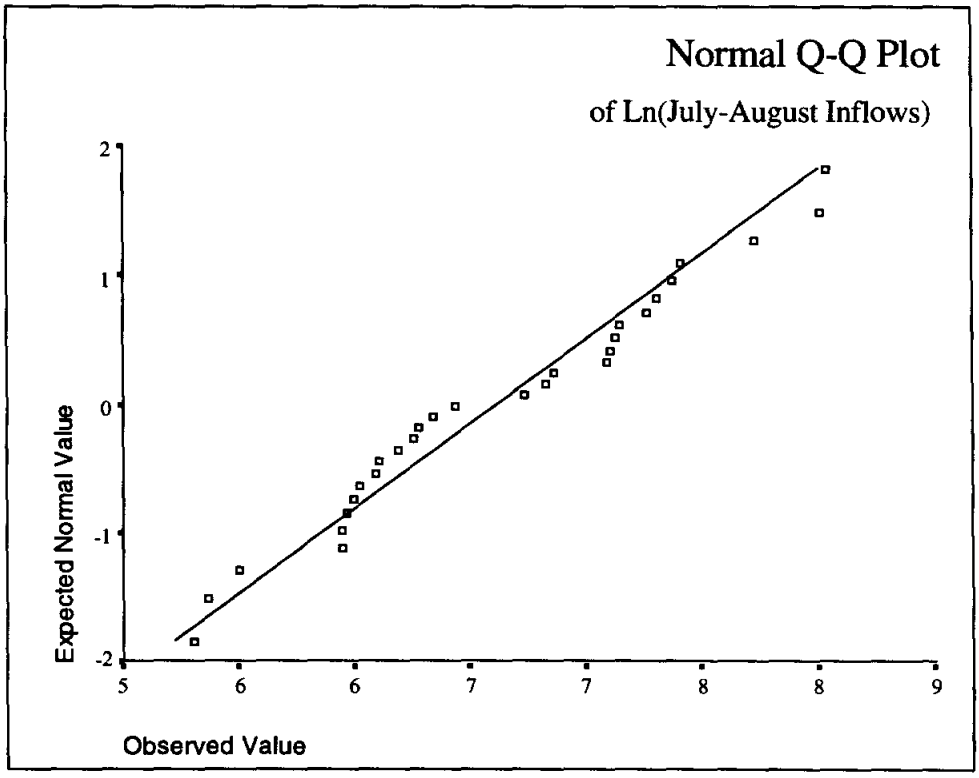
Descriptives

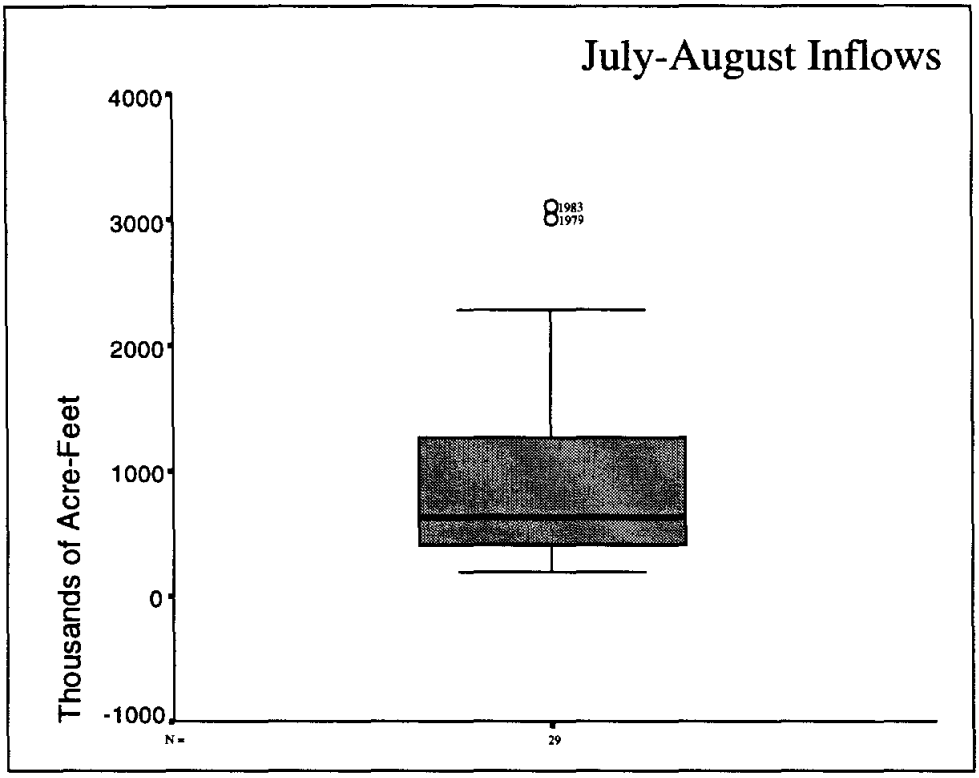
			Statistic	Std. Error
JA_INFL	Mean		984.4576	144.6129
	95% Confidence Interval for Mean	Lower Bound	688.2314	
		Upper Bound	1280.6837	
	5% Trimmed Mean		910.9417	
	Median		626.8700	
	Variance		606474.1	
	Std. Deviation		778.7645	
	Minimum		201.78	
	Maximum		3116.05	
	Range		2914.27	
	Interquartile Range		948.5700	
	Skewness		1.463	.434
	Kurtosis		1.838	.845

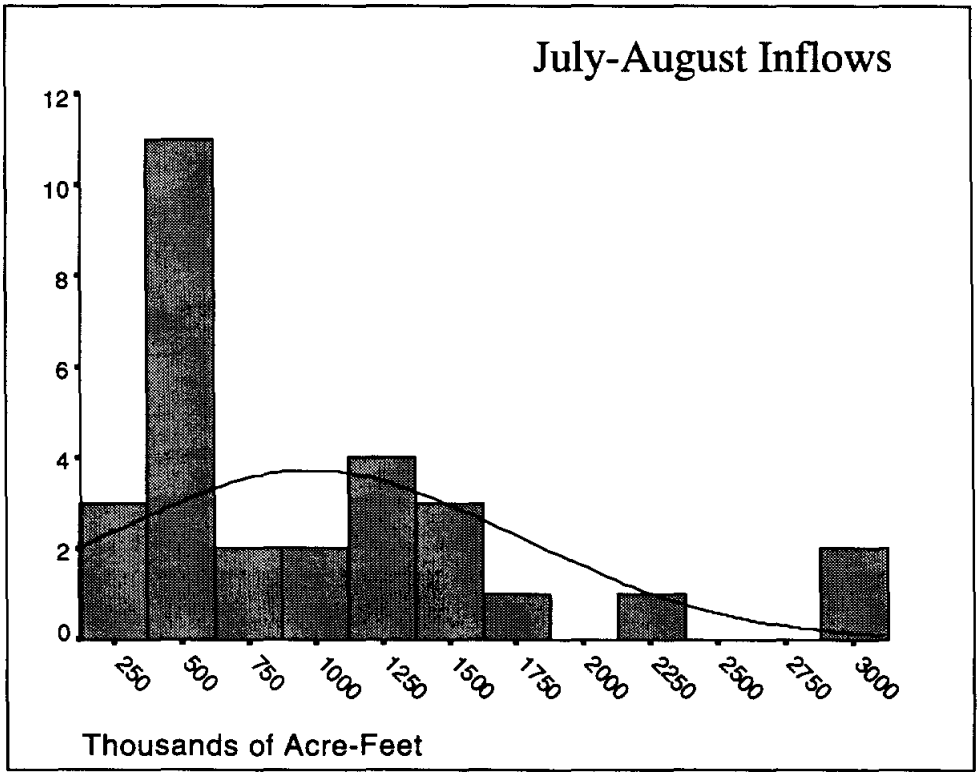
Extreme Values

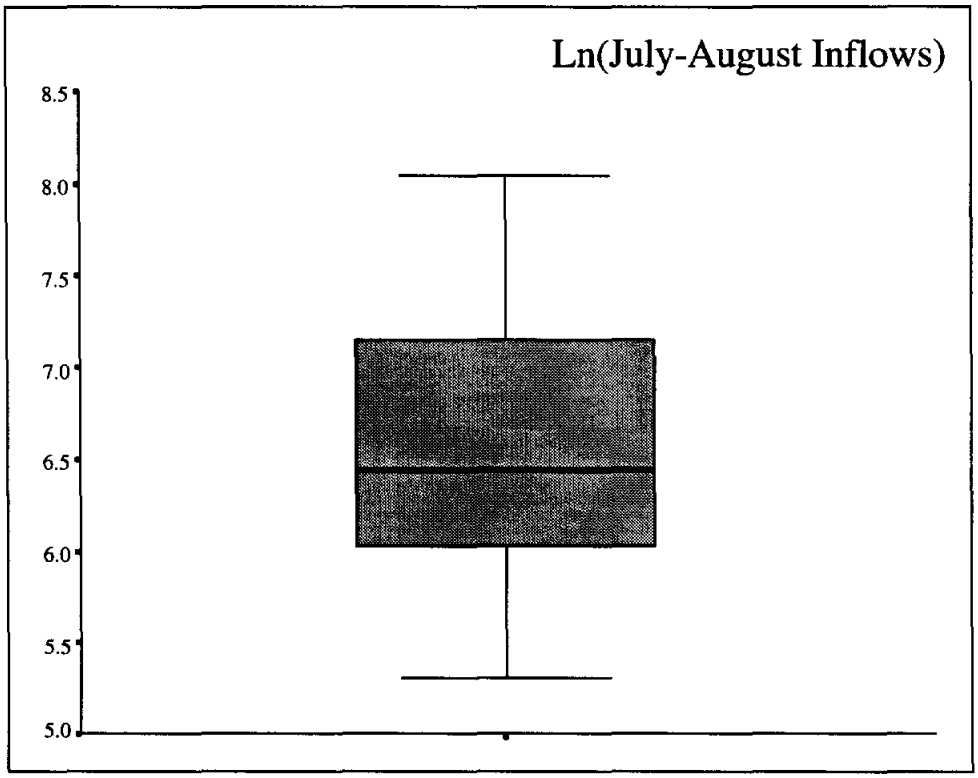
			Case Number	YEAR	Value
JA_INFL	Highest	1	25	1983	3116.05
		2	21	1979	3019.84
		3	1	1959	2282.80
		4	23	1981	1656.01
		5	15	1973	1597.24
	Lowest	1	5	1963	201.78
		2	6	1964	215.41
		3	7	1965	243.99
		4	22	1980	382.89
		5	9	1967	383.91


Normal Q-Q Plot
of July-August Inflows
Expected Normal Value
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(July-August Inflows)
Expected Normal Value
2
1
0
-1
-2
5
6
6
7
7
8
8
9
Observed Value


July-August Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
8
1983
1979
N =
29


July-August Inflows
12
10
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

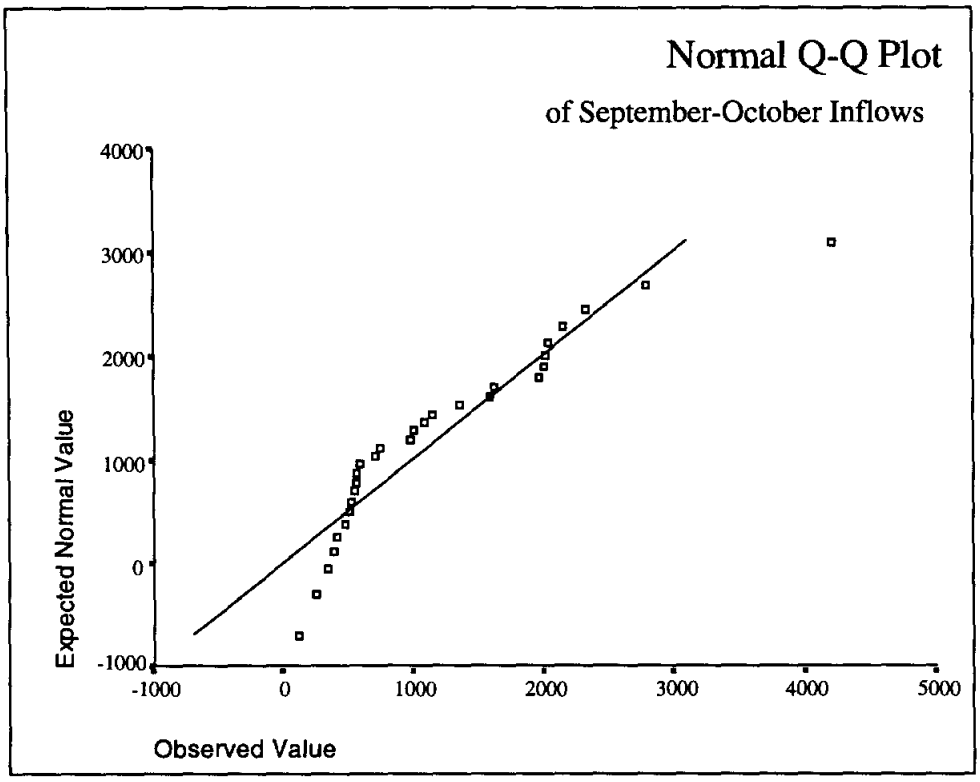

Ln(July-August Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0

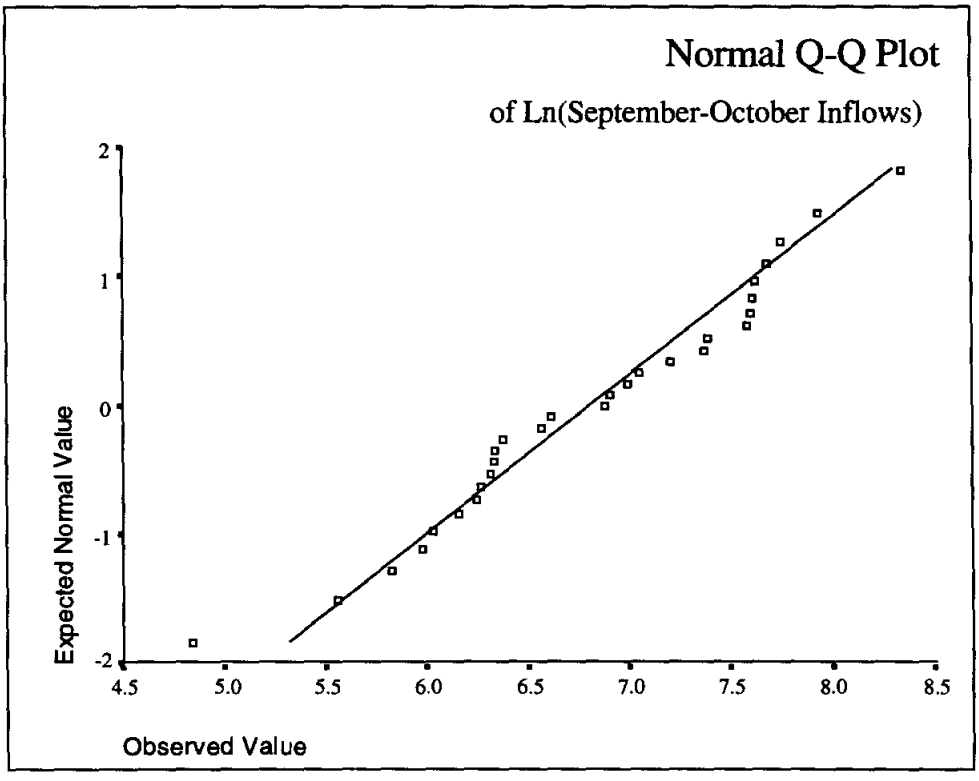
Descriptives

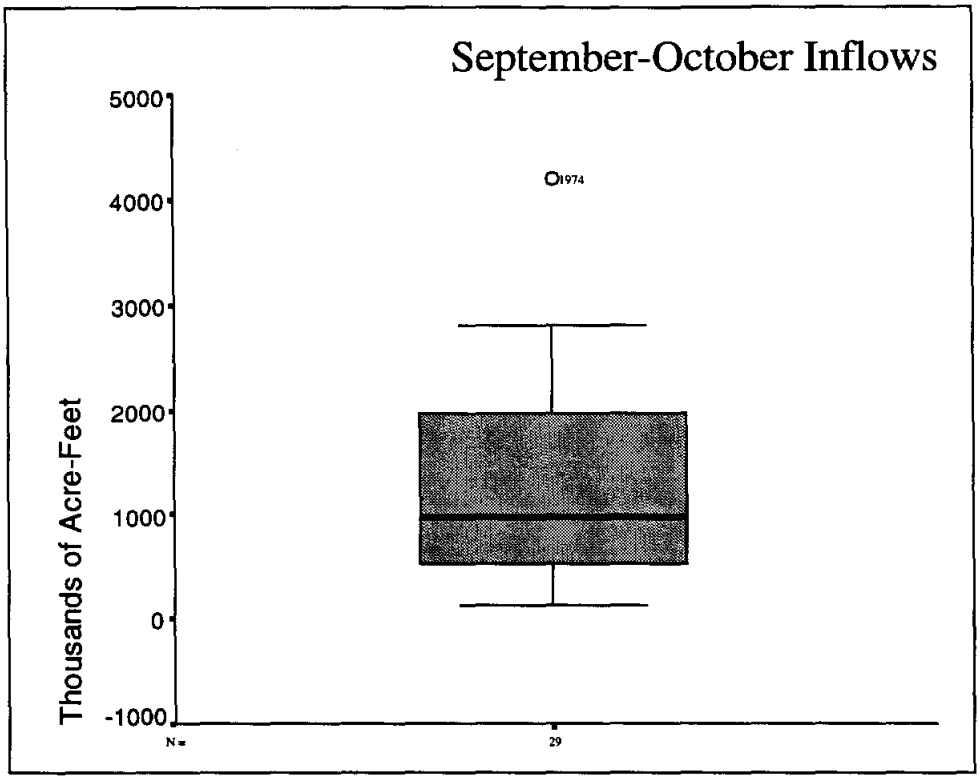
			Statistic	Std. Error
SO_INFL	Mean		*1213.1228*	*173.7714*
	95% Confidence Interval for Mean	*Lower Bound*	*857.1681*	
		Upper Bound	*1569.0774*	
	5% Trimmed Mean		*1128.5317*	
	Median		*978.5000*	
	Variance		*875698.8*	
	Std. Deviation		*935.7878*	
	Minimum		*126.83*	
	Maximum		*4222.20*	
	Range		*4095.37*	
	Interquartile Range		*1469.6800*	
	Skewness		*1.378*	*.434*
	Kurtosis		*2.282*	*.845*

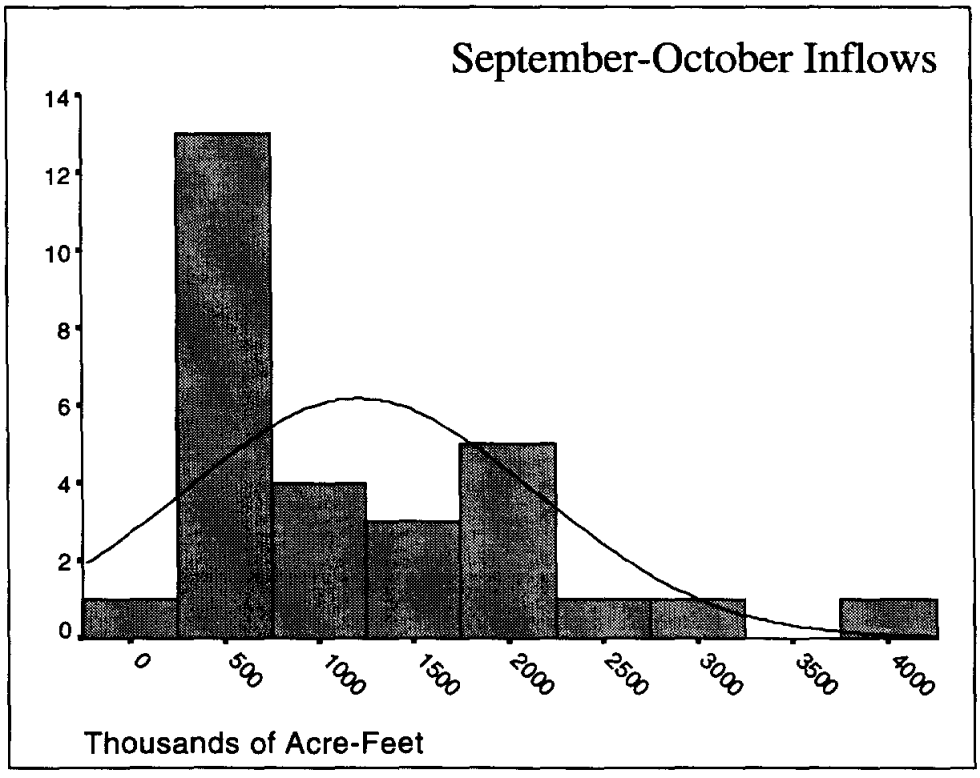
Extreme Values

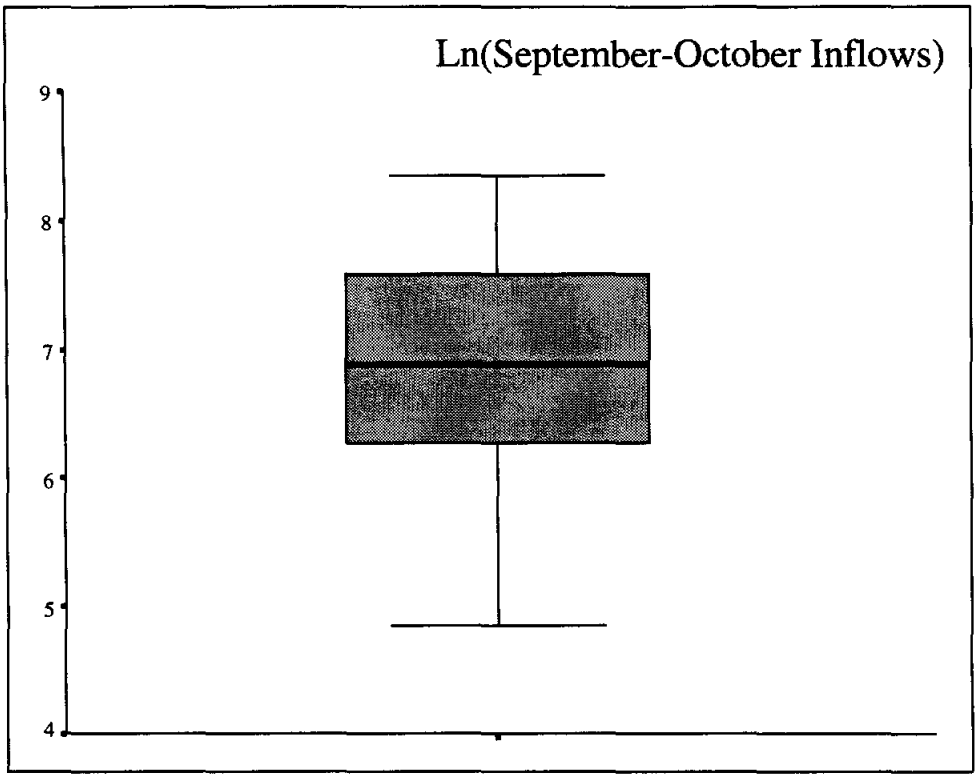
			Case Number	YEAR	Value
SO_INFL	Highest	1	*16*	*1974*	*4222.20*
		2	*22*	*1980*	*2799.02*
		3	*24*	*1982*	*2326.50*
		4	*4*	*1962*	*2163.94*
		5	*1*	*1959*	*2054.00*
	Lowest	1	*6*	*1964*	*126.83*
		2	*8*	*1966*	*260.65*
		3	*25*	*1983*	*339.35*
		4	*12*	*1970*	*395.35*
		5	*21*	*1979*	*418.13*


Normal Q-Q Plot
of September-October Inflows
Expected Normal Value
Observed Value
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal Value
Observed Value
2
1
0
-1
-2
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5


September-October Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
O1974
N=
29


September-October Inflows
14
12
10
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

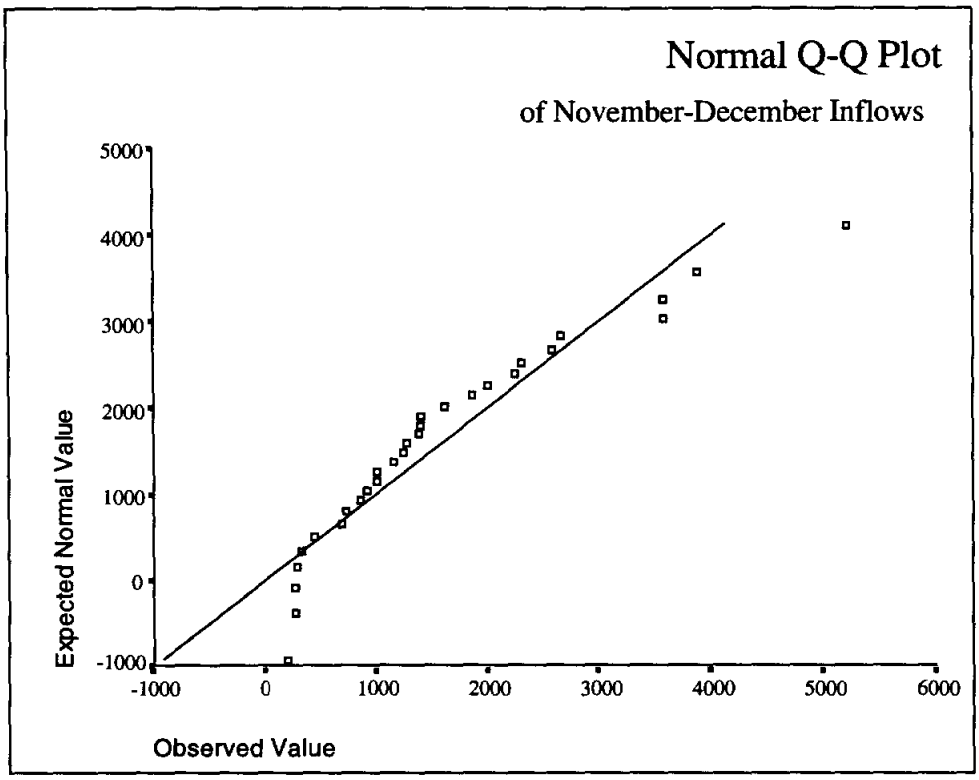

Ln(September-October Inflows)
9
8
7
6
5
4

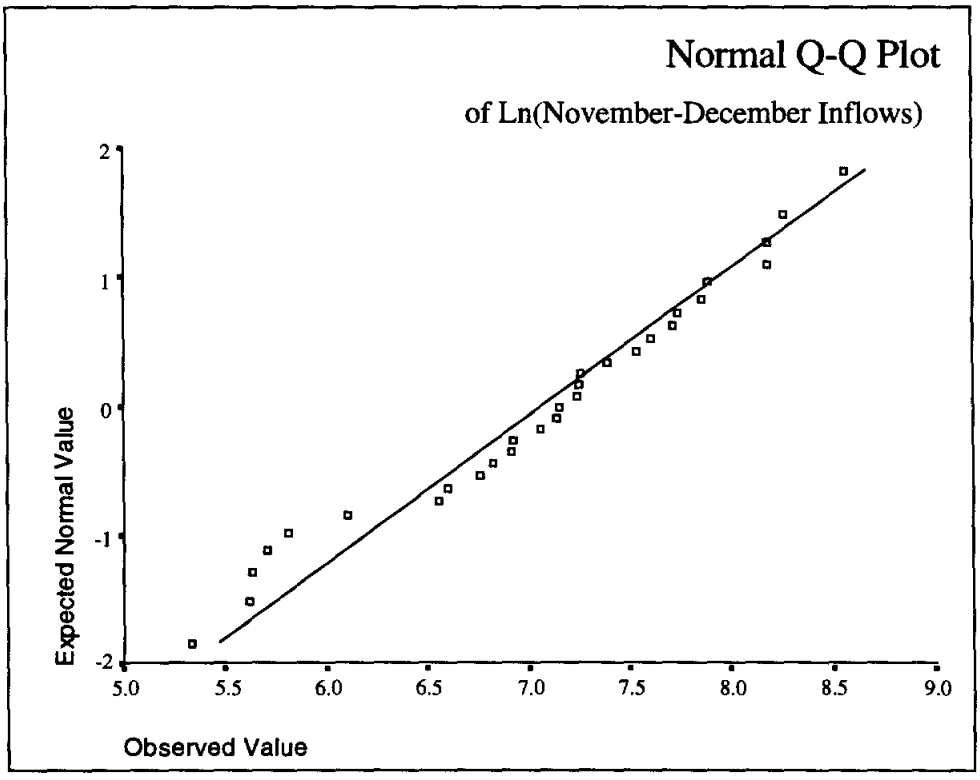
Descriptives

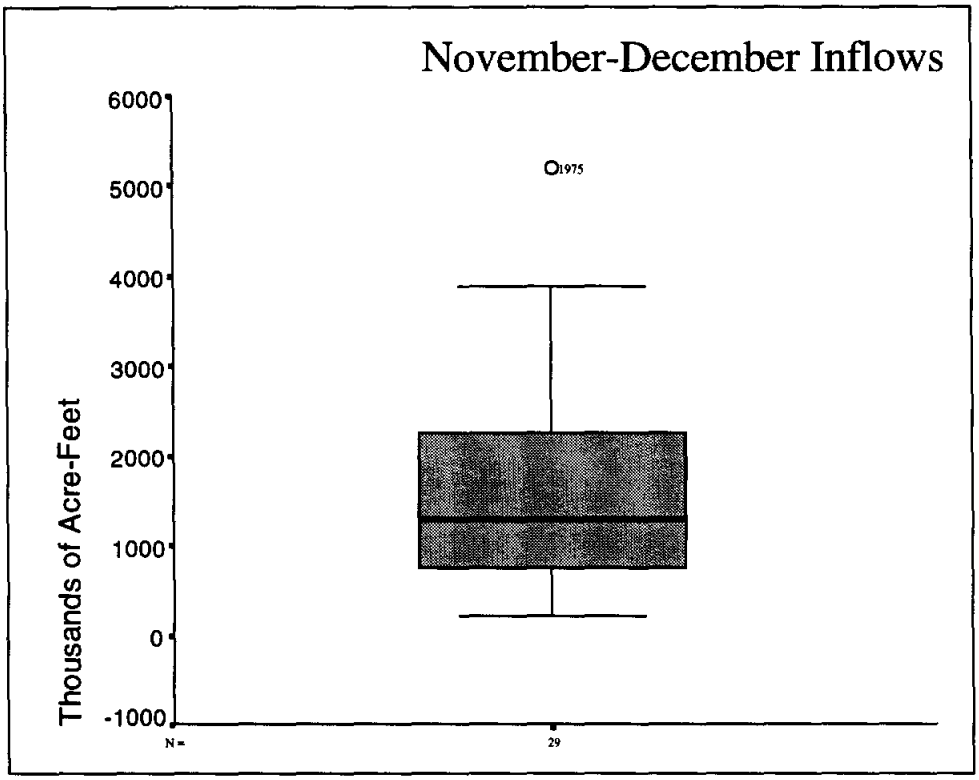
			Statistic	Std. Error
ND_INFL	Mean		*1609.1290*	*230.8751*
	95% Confidence Interval for Mean	*Lower Bound*	*1136.2027*	
		Upper Bound	*2082.0552*	
	5% Trimmed Mean		*1508.2872*	
	Median		*1288.4000*	
	Variance		*1545796*	
	Std. Deviation		*1243.3005*	
	Minimum		*207.00*	
	Maximum		*5217.90*	
	Range		*5010.90*	
	Interquartile Range		*1558.4700*	
	Skewness		*1.218*	*.434*
	Kurtosis		*1.267*	*.845*

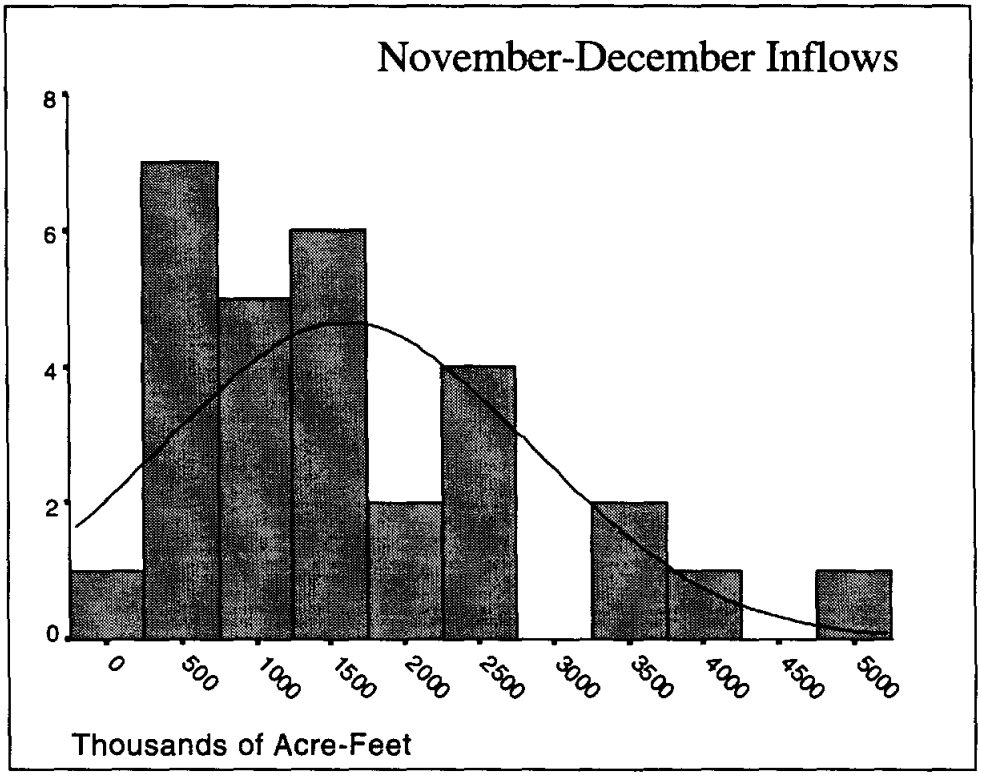
Extreme Values

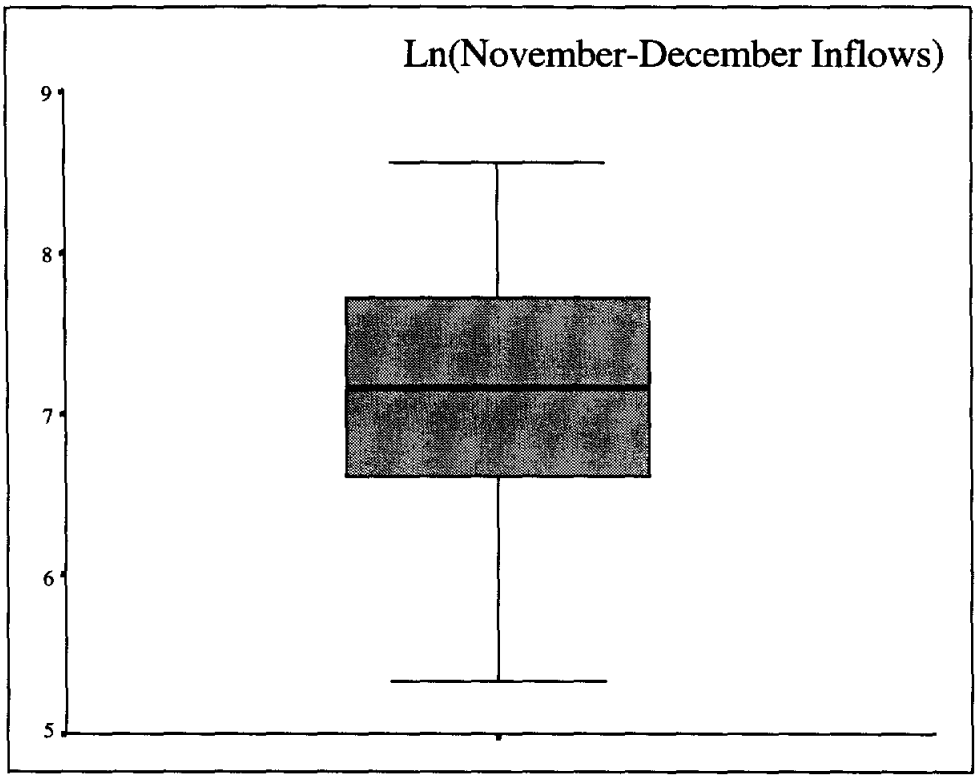
			Case Number	YEAR	Value
ND_INFL	Highest	1	*17*	*1975*	*5217.90*
		2	*29*	*1987*	*3886.93*
		3	*3*	*1961*	*3586.10*
		4	*28*	*1986*	*3585.61*
		5	*24*	*1982*	*2674.10*
	Lowest	1	*1*	*1959*	*207.00*
		2	*6*	*1964*	*276.50*
		3	*13*	*1971*	*280.35*
		4	*23*	*1981*	*300.79*
		5	*9*	*1967*	*336.49*


Normal Q-Q Plot
of November-December Inflows
Expected Normal Value
Observed Value
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal Value
Observed Value
2
1
0
-1
-2
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0


November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
1975
N =
29

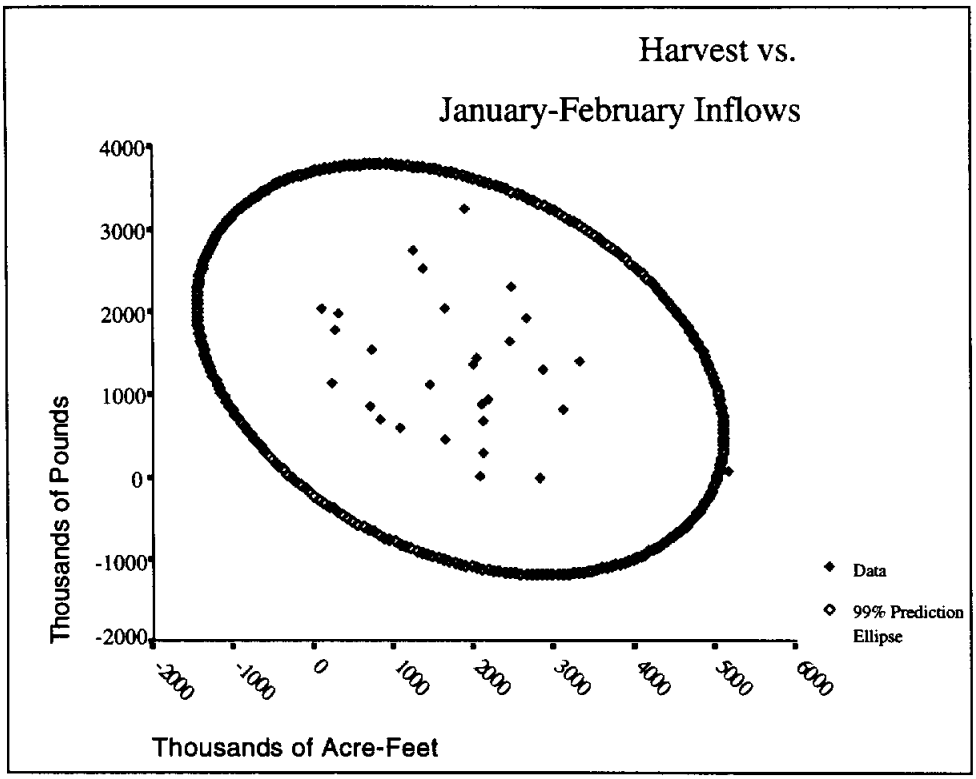

November-December Inflows
8
6
4
2
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Thousands of Acre-Feet


Ln(November-December Inflows)
9
8
7
6
5

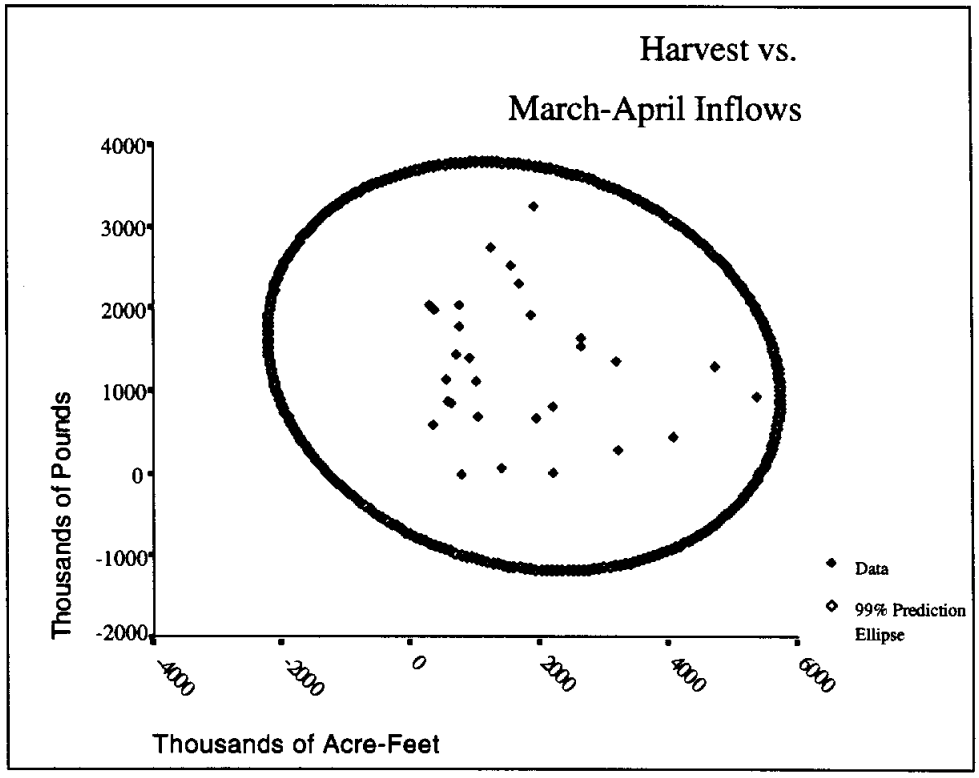
Percentiles

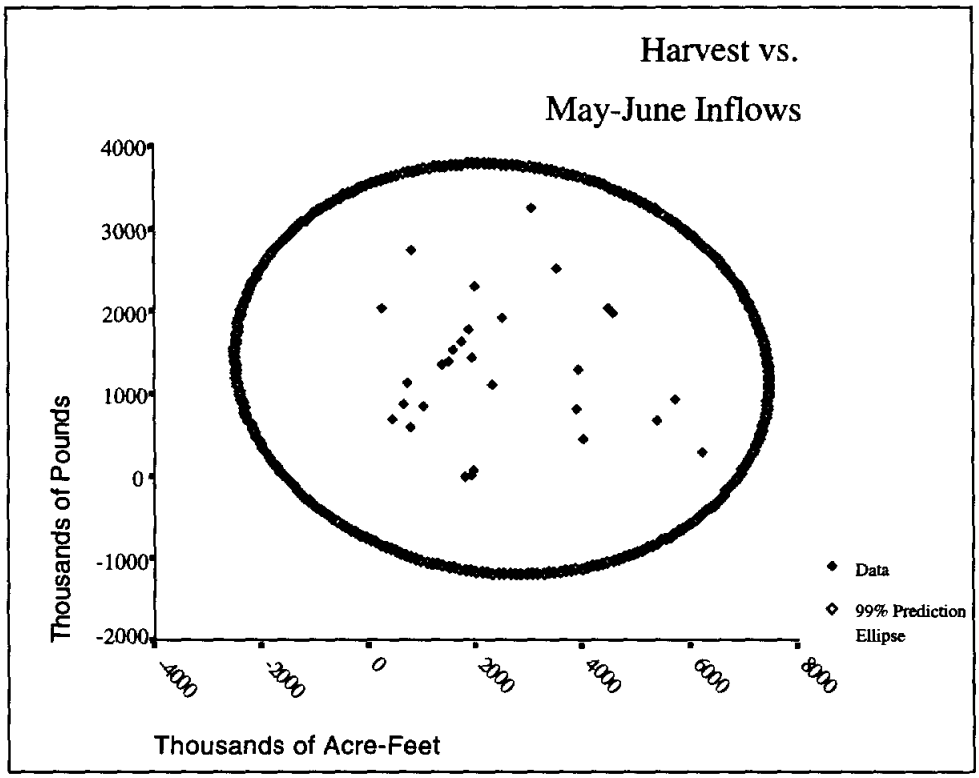
		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Brown Shrimp Harvest	15.9500	82.9000	699.1000	1315.0000	1966.3500	2535.3000	3016.2000
	Ln(Brown Shrimp Harvest)	2.6501	4.4176	6.5495	7.1816	7.5838	7.8381	8.0084
	Square Root of Brown Shrimp Harvest	3.879792	9.104944	26.438308	36.262929	44.342609	50.351763	54.874479
	January-February Inflows	195.9150	300.4100	977.0250	2017.8400	2475.9650	3138.9800	4261.0000
	March-April Inflows	331.5400	393.9100	743.4850	1440.1000	2456.6250	4102.0000	5063.7750
	May-June Inflows	359.4200	673.6800	1209.2900	1966.7700	3924.5250	5402.3000	6005.4200
	July-August Inflows	208.5950	243.9900	407.7850	626.8700	1356.3550	2282.8000	3067.9450
	September-October Inflows	193.7400	339.3500	522.3000	978.5000	1991.9800	2326.5000	3510.6100
	November-December Inflows	241.7500	280.3500	721.6050	1288.4000	2280.0750	3586.1000	4552.4150
	Ln(January-February Inflows)	5.2256	5.7051	6.8763	7.6098	7.8144	8.0517	8.3334
	Ln(March-April Inflows)	5.8008	5.9761	6.6106	7.2725	7.8027	8.3192	8.5279
	Ln(May-June Inflows)	5.8547	6.5128	7.0875	7.5841	8.2750	8.5946	8.6995
	Ln(July-August Inflows)	5.3399	5.4971	6.0107	6.4407	7.2107	7.7332	8.0286
	Ln(September-October Inflows)	5.2030	5.8270	6.2581	6.8860	7.5968	7.7521	8.1426
	Ln(November-December Inflows)	5.4775	5.6360	6.5811	7.1612	7.7319	8.1848	8.4126
Tukey's Hinges	Brown Shrimp Harvest			717.1000	1315.0000	1940.8000		
	Ln(Brown Shrimp Harvest)			6.5752	7.1816	7.5709		
	Square Root of Brown Shrimp Harvest			26.778723	36.262929	44.054512		
	January-February Inflows			1102.1000	2017.8400	2468.3000		
	March-April Inflows			771.3700	1440.1000	2242.4700		
	May-June Inflows			1381.7800	1966.7700	3911.7600		
	July-August Inflows			412.7900	626.8700	1274.7600		
	September-October Inflows			529.5000	978.5000	1972.3700		
	November-December Inflows			740.9100	1288.4000	2250.9500		
	Ln(January-February Inflows)			7.0050	7.6098	7.8113		
	Ln(March-April Inflows)			6.6482	7.2725	7.7153		
	Ln(May-June Inflows)			7.2311	7.5841	8.2717		
	Ln(July-August Inflows)			6.0229	6.4407	7.1505		
	Ln(September-October Inflows)			6.2719	6.8860	7.5870		
	Ln(November-December Inflows)			6.6079	7.1612	7.7191		

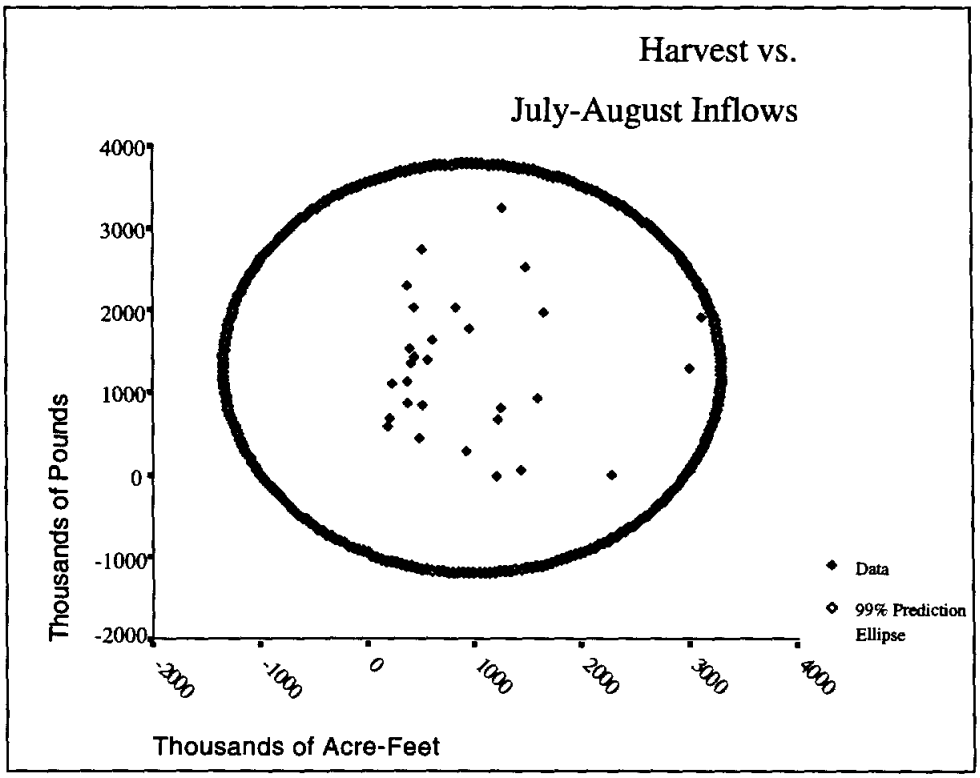
99% Prediction Ellipses



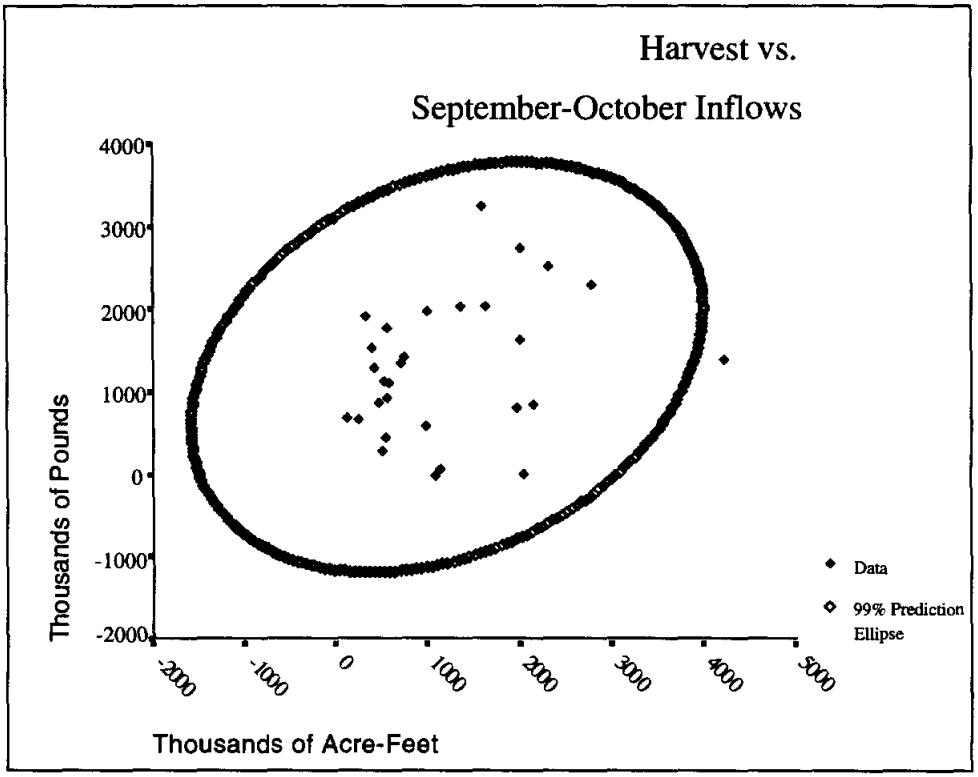
Outside ellipse: 1961.



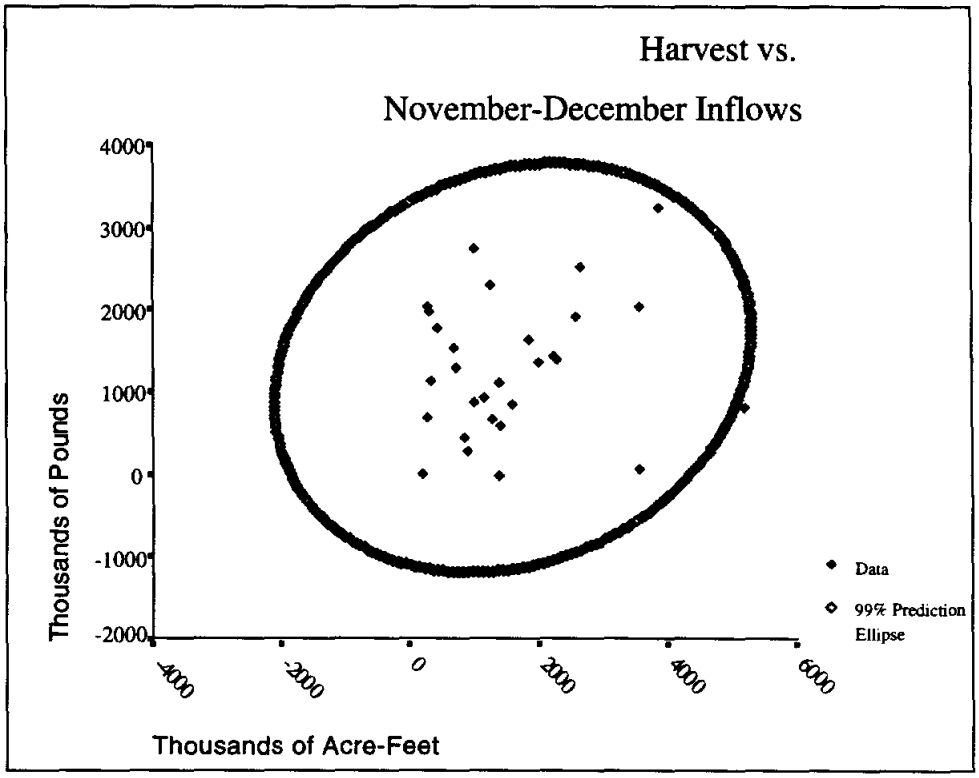




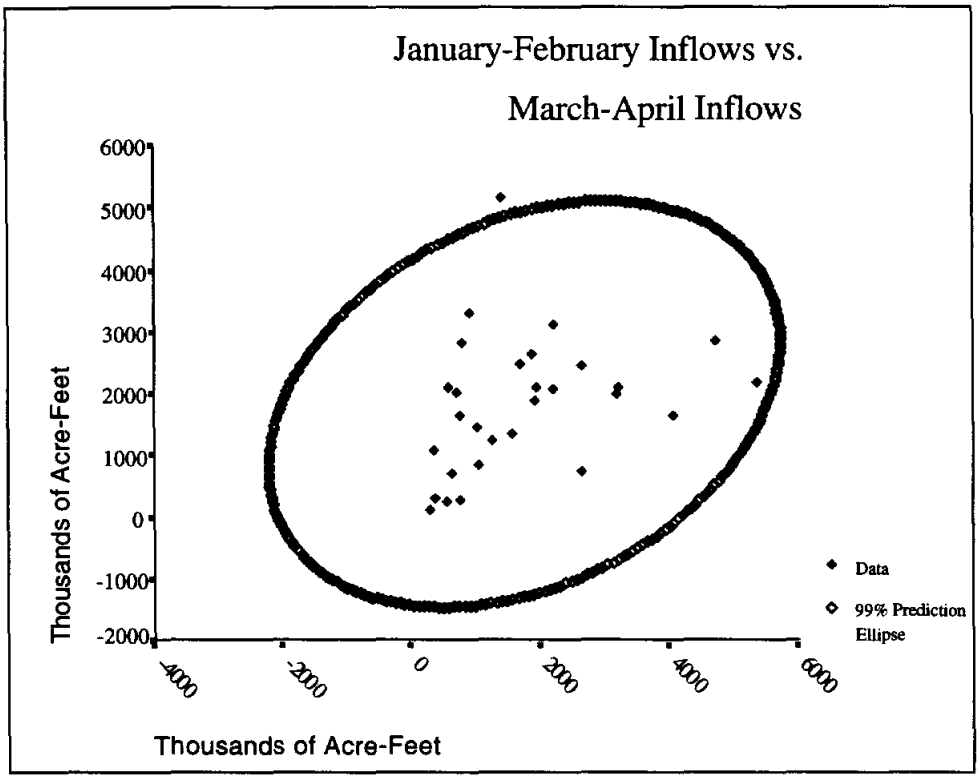
Near edge of ellipse: 1983.



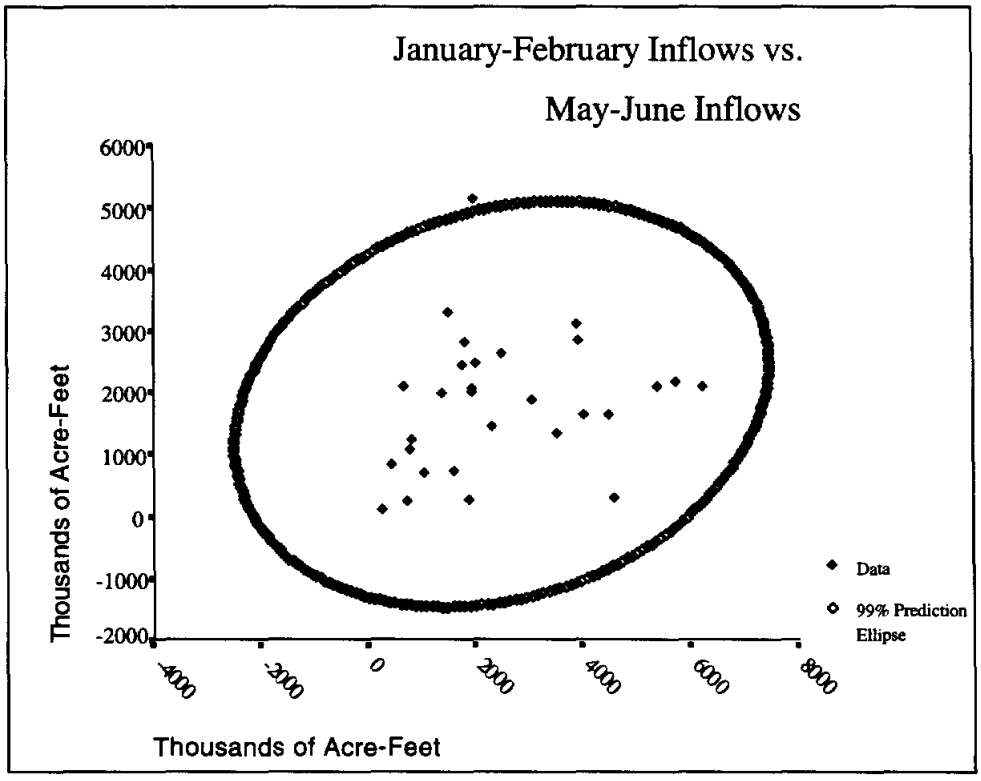
Outside ellipse: 1974.



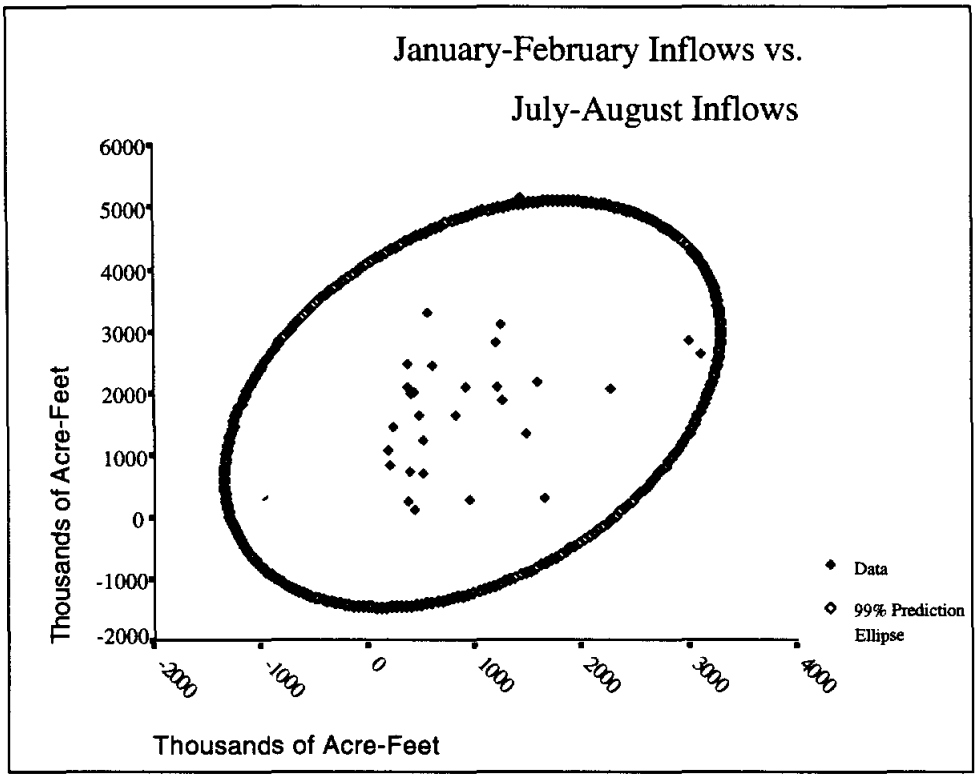
Outside ellipse: 1975. Near edge of ellipse: 1973.



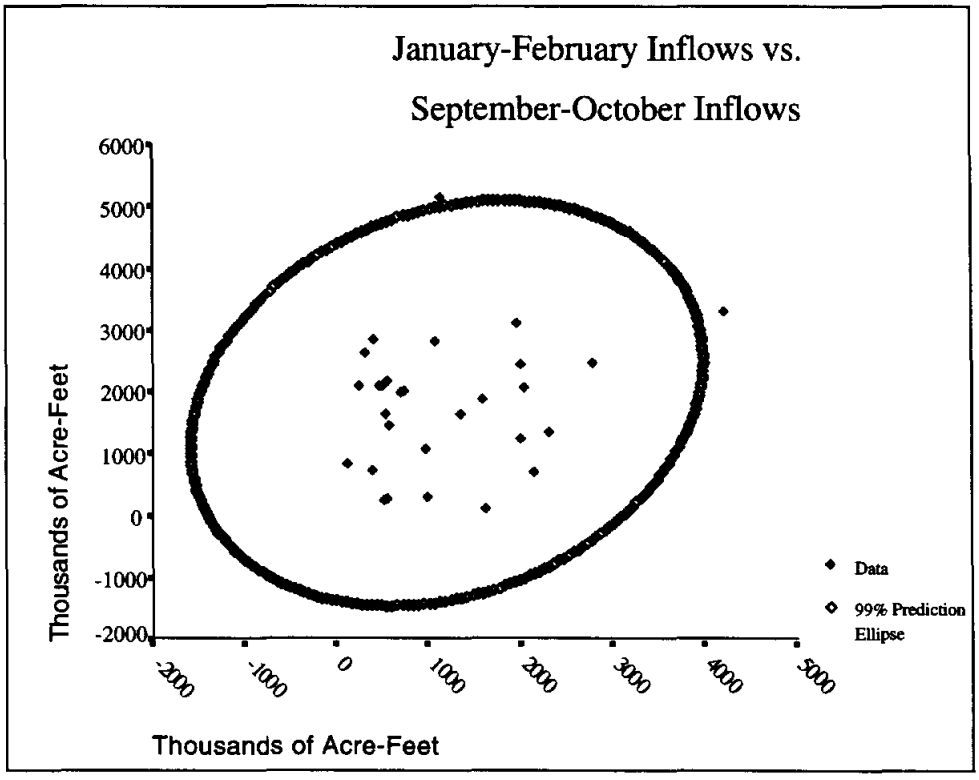
Outside ellipse: 1961. Near edge of ellipse: 1973.



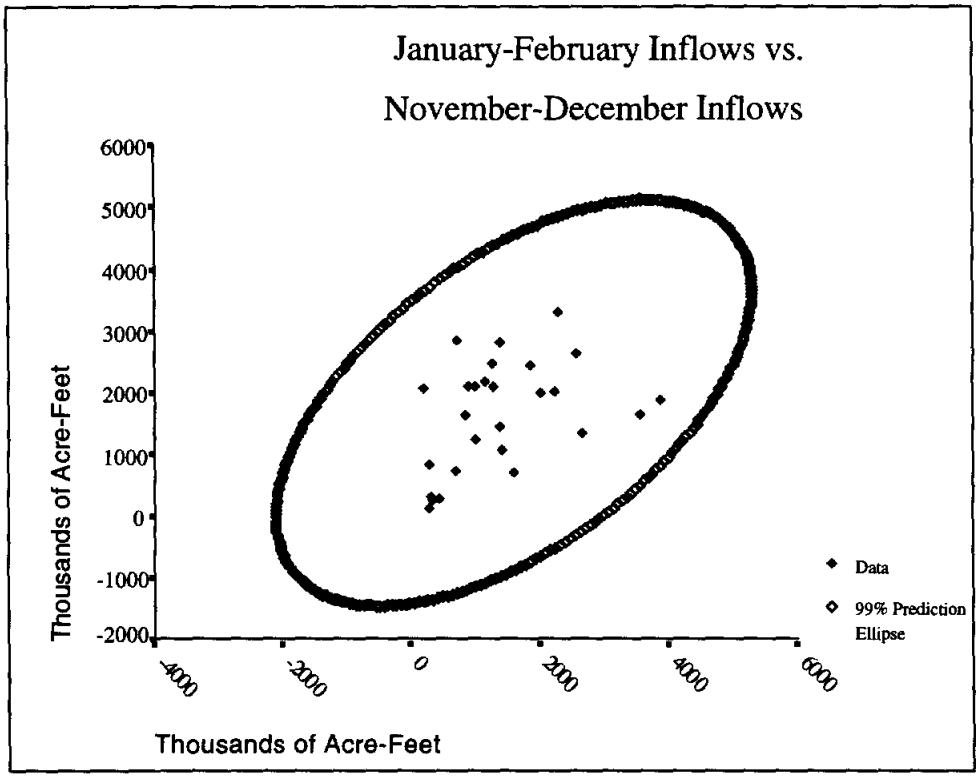
Outside ellipse: 1961.

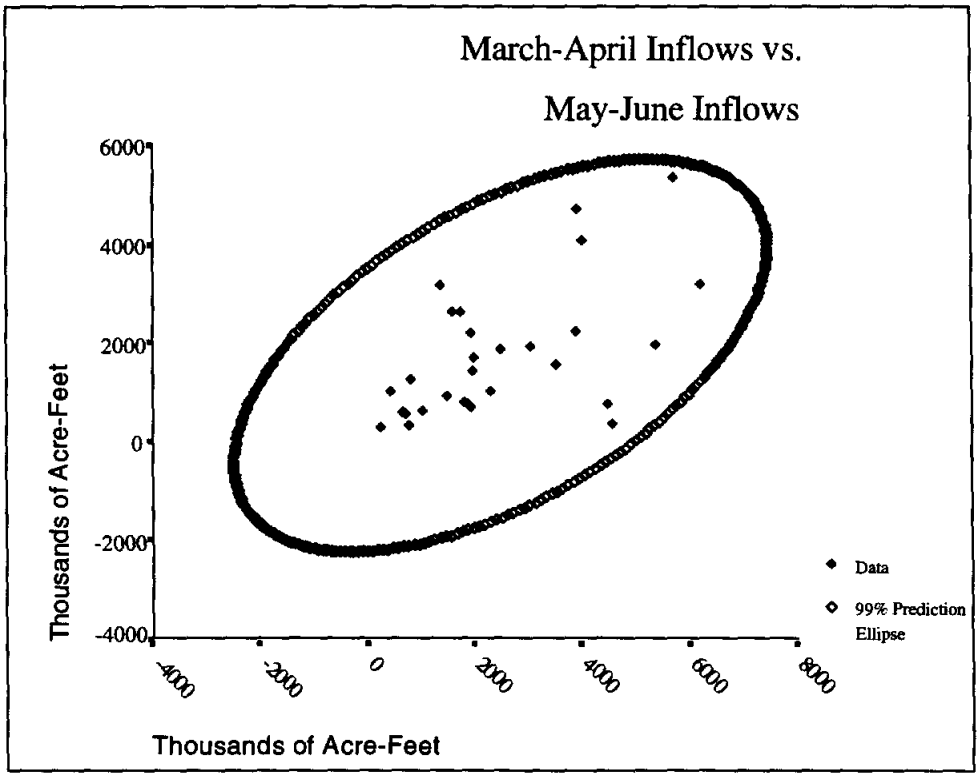


Outside ellipse: 1961. Near edge of ellipse: 1979, 1983.

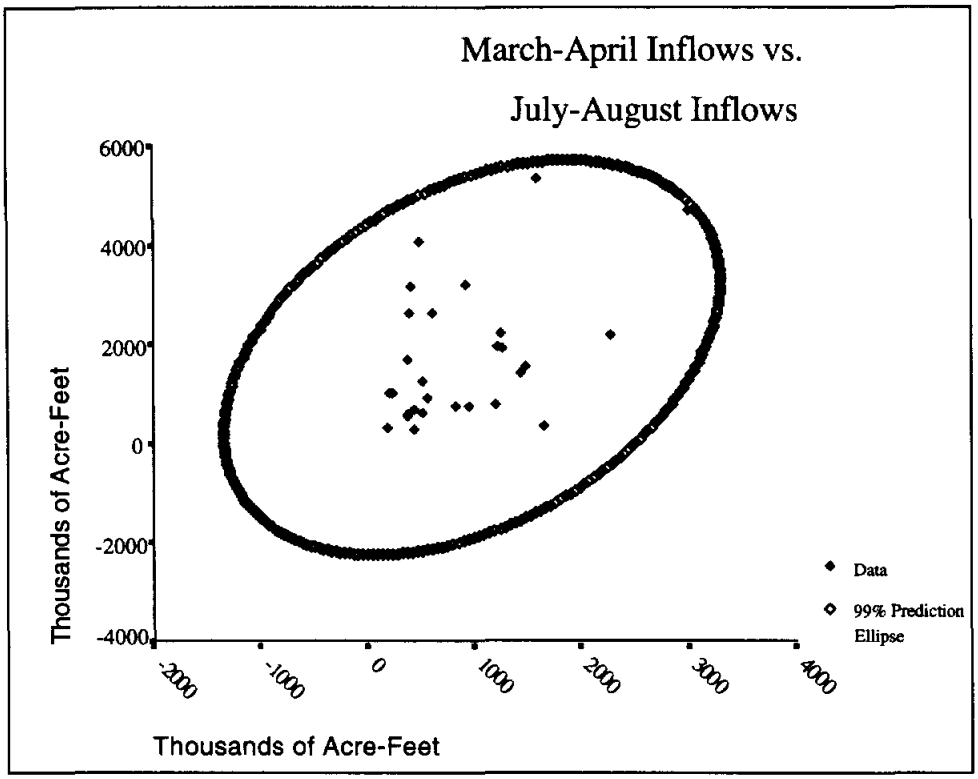


Outside ellipse: 1961, 1974.

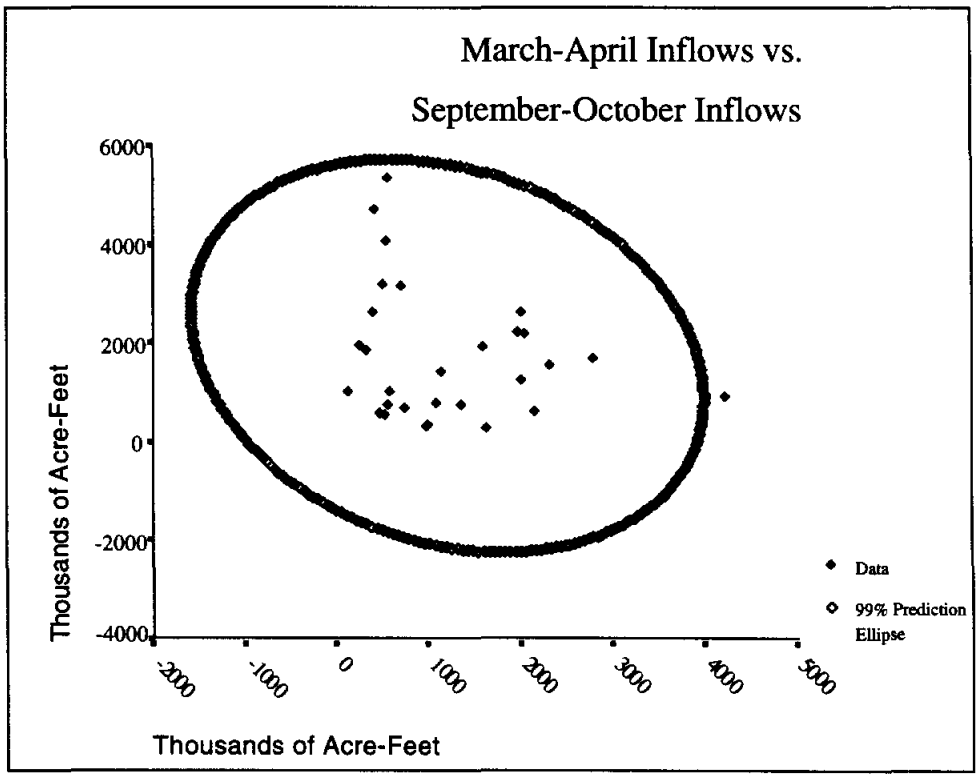




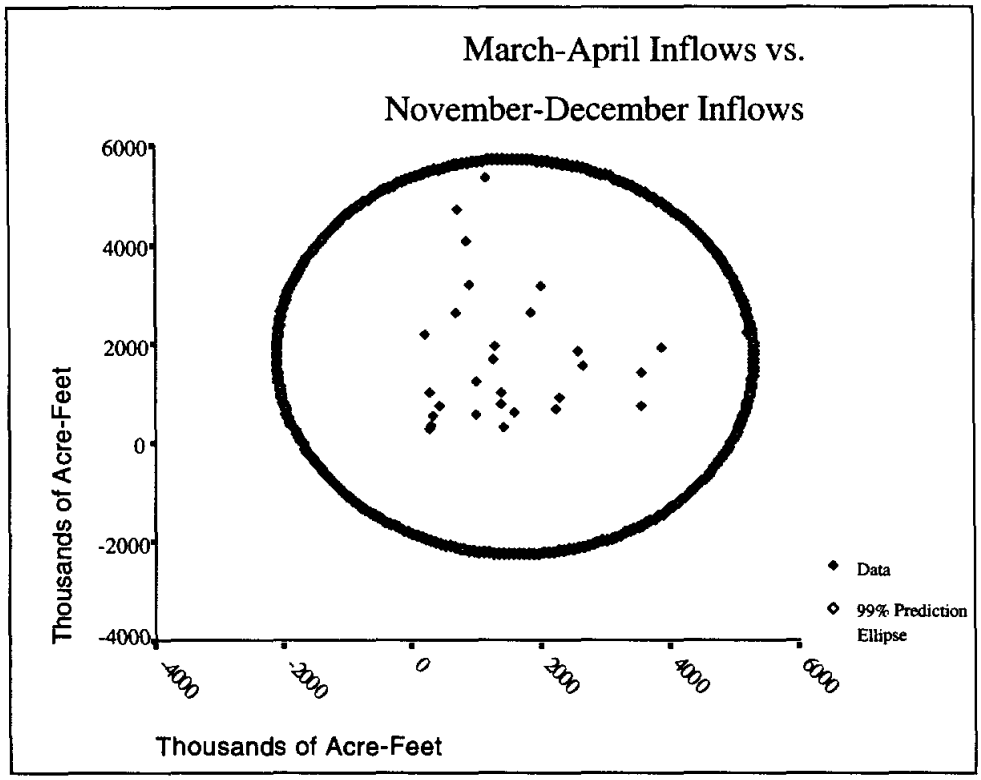
Outside ellipse: 1973.



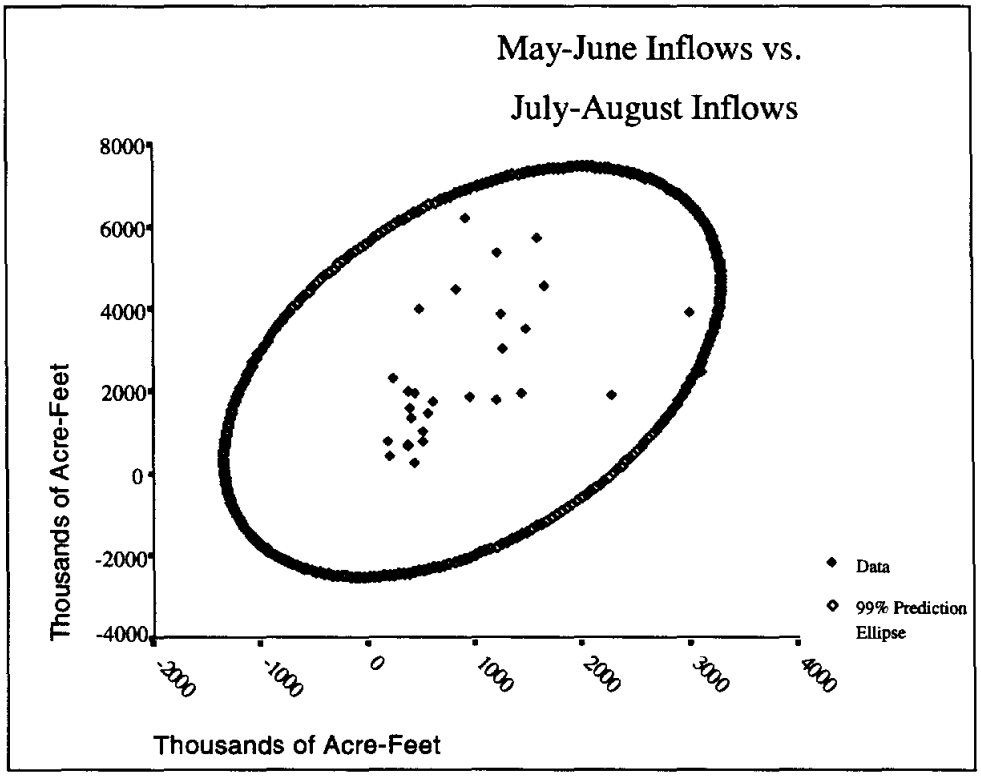
Near edge of ellipse: 1973, 1979.



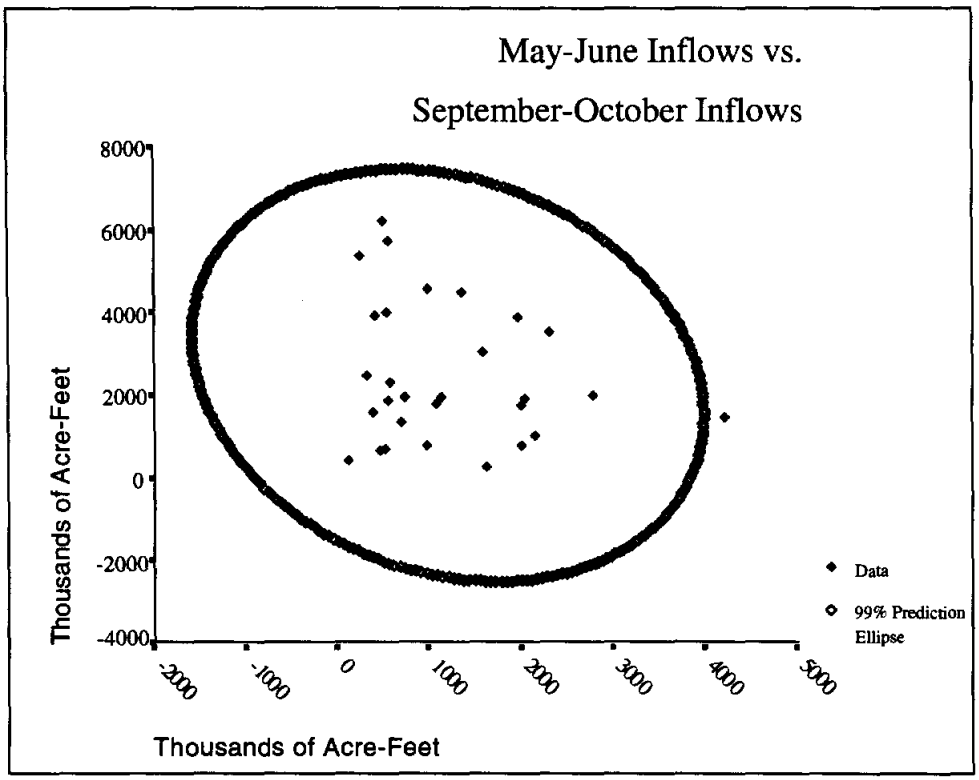
Outside ellipse: 1974. Near edge of ellipse: 1973.



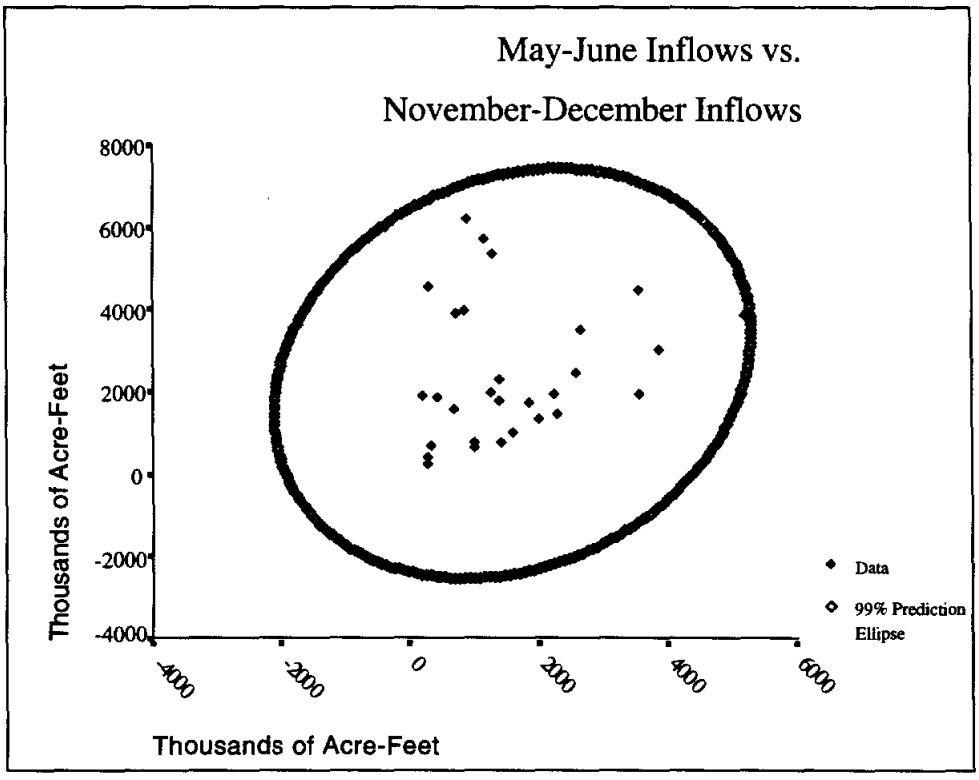
Lying on ellipse: 1975. Near edge of ellipse: 1973.



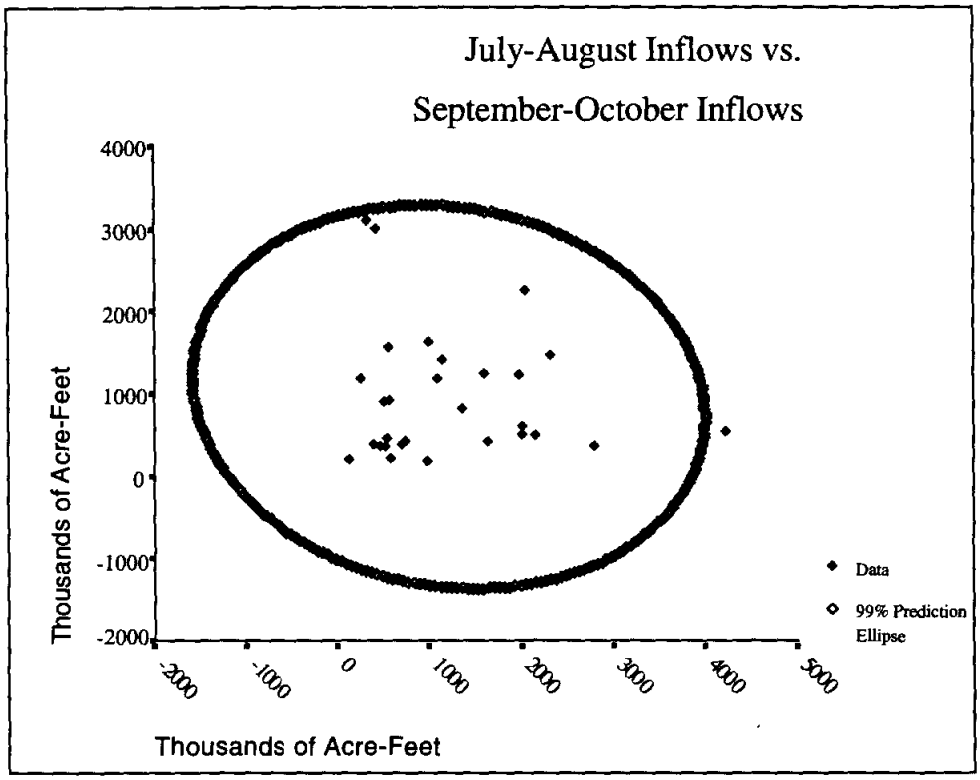
Lying on ellipse: 1983. Near edge of ellipse: 1968, 1979.



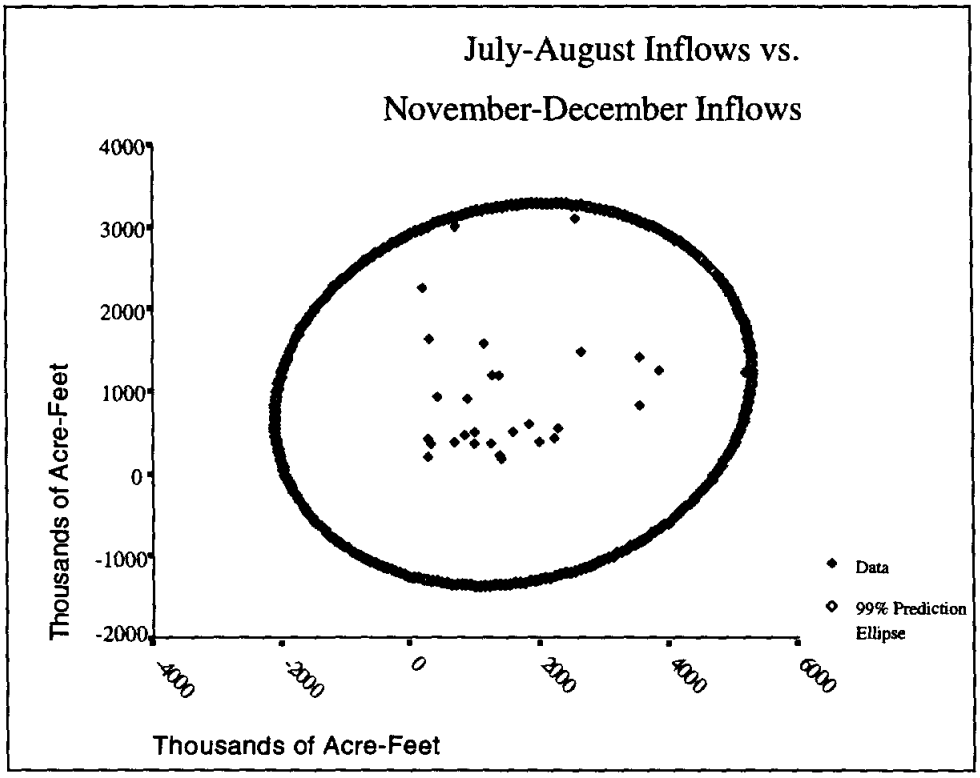
Outside ellipse: 1974.



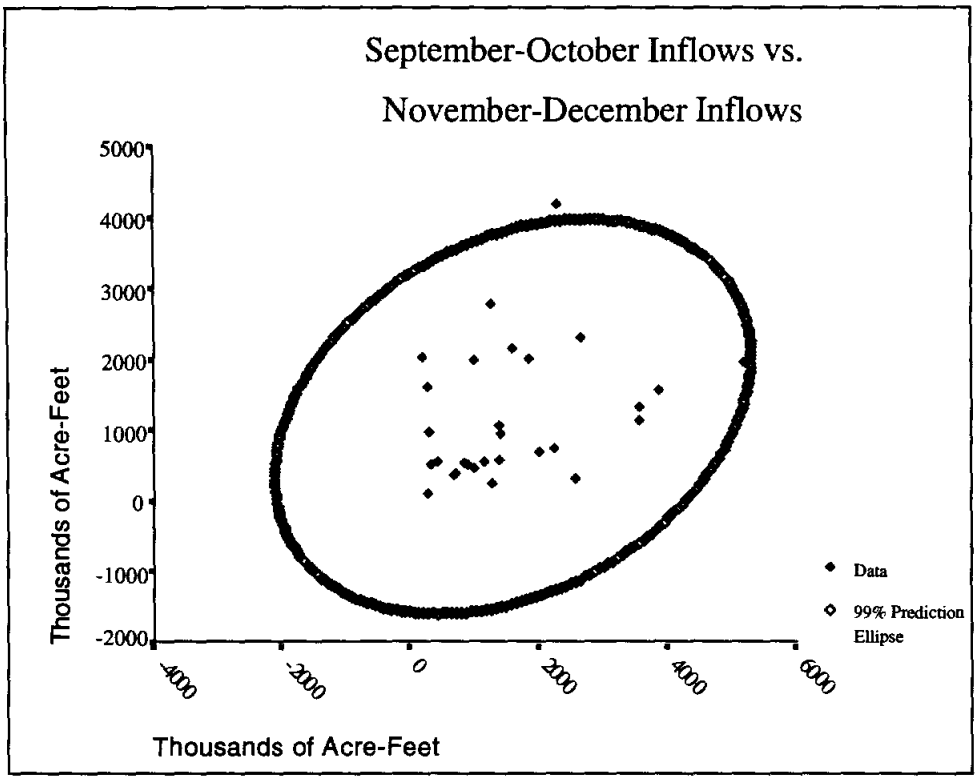
Lying on ellipse: 1975.



Outside ellipse: 1974. Near edge of ellipse: 1979, 1983.



Lying on ellipse: 1975. Near edge of ellipse: 1979, 1983.



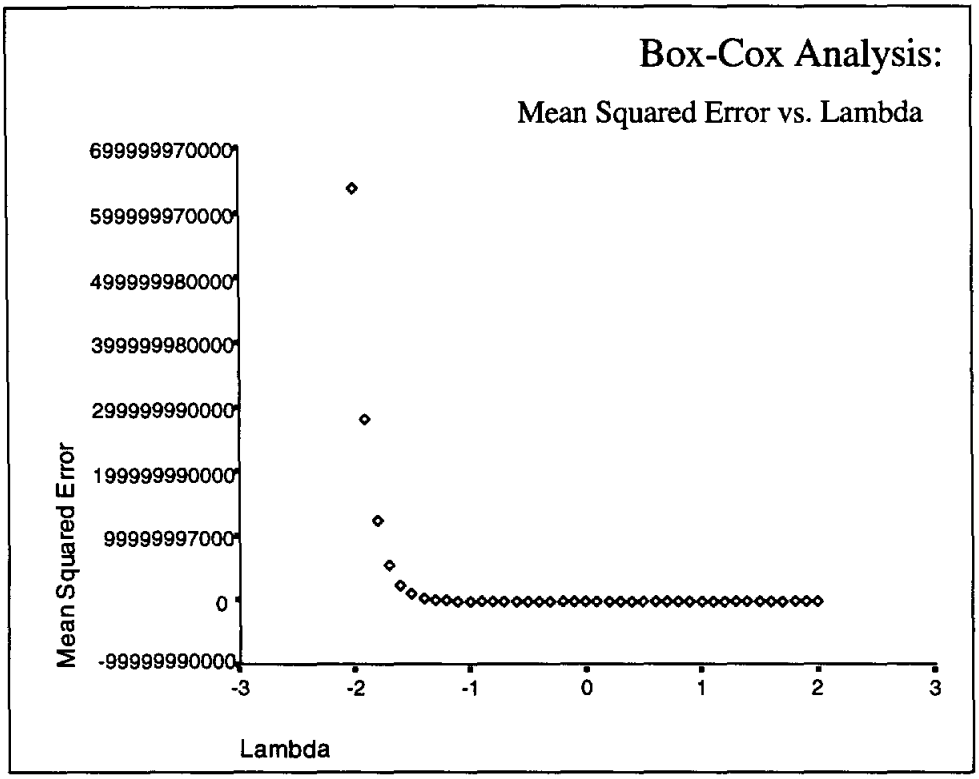
Outside ellipse: 1974. Lying on ellipse: 1975.

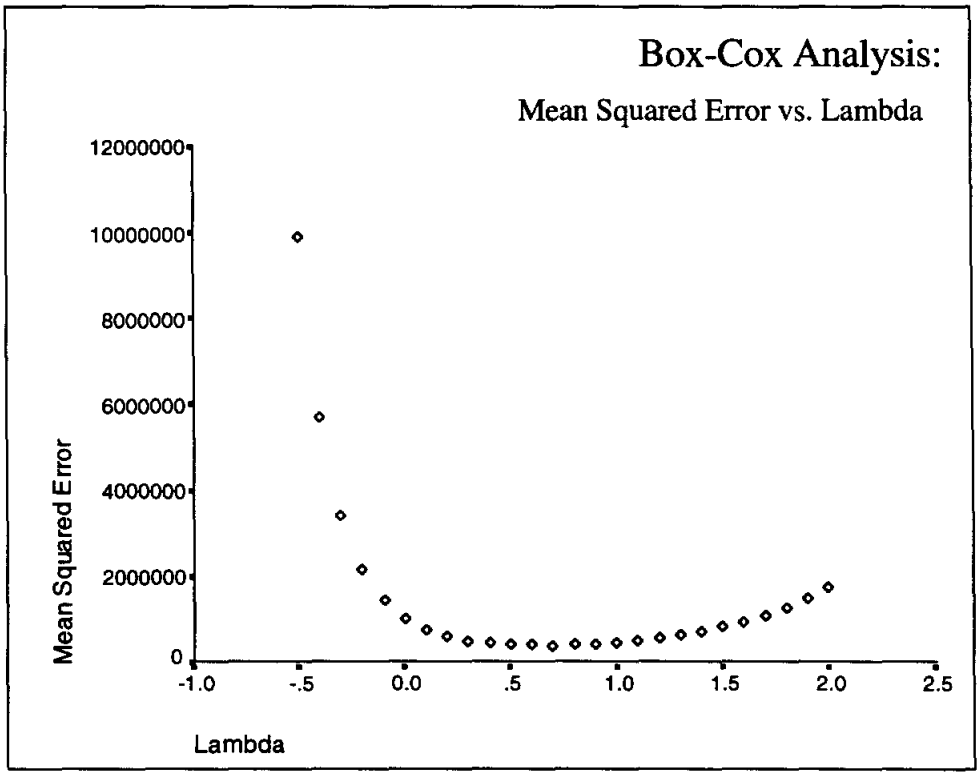
Box–Cox Analysis

Numerical Results

Lambda	Mean Squared Error
-2.00	640000000000.00
-1.90	283000000000.00
-1.80	126000000000.00
-1.70	56300000000.00
-1.60	25300000000.00
-1.50	11500000000.00
-1.40	5280000000.00
-1.30	2440000000.00
-1.20	1150000000.00
-1.10	545000000.00
-1.00	263000000.00
-0.90	130000000.00
-0.80	65280622.00
-0.70	33759912.00
-0.60	18007616.00
-0.50	9958246.00
-0.40	5741047.00
-0.30	3469977.00
-0.20	2210326.00
-0.10	1490052.00
0.00	1065774.00
0.10	809161.30
0.20	650924.70
0.30	552734.90
0.40	492891.70
0.50	458865.10
0.60	443335.80
0.70	442051.30
0.80	452643.60
0.90	473970.20
1.00	505746.20
1.10	548346.30
1.20	602708.60
1.30	670306.20
1.40	753166.60
1.50	853930.80
1.60	975948.40
1.70	1123410.00
1.80	1301521.00
1.90	1516728.00
2.00	1776994.00

Plots


Box-Cox Analysis:
Mean Squared Error vs. Lambda
Mean Squared Error
699999970000
599999970000
499999980000
399999980000
299999990000
199999990000
99999997000
0
-99999990000
-3
-2
-1
0
1
2
3
Lambda


Box-Cox Analysis:
Mean Squared Error vs. Lambda
Mean Squared Error
12000000
10000000
8000000
6000000
4000000
2000000
0
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
Lambda

Model Choice Diagnostics

Untransformed Data

N = 29 Regression Models for Dependent Variable: BRSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1000	0.0666	9.627	390.0	648605	392.8	JF_INFL
1	0.0848	0.0510	10.21	390.5	659492	393.2	SO_INFL
1	0.0323	-.0035	12.23	392.1	697327	394.9	ND_INFL
1	0.0222	-.0140	12.62	392.4	704653	395.2	MA_INFL
2	0.2871	0.2322	4.427	385.3	533511	389.4	JF_INFL ND_INFL
2	0.2377	0.1790	6.329	387.2	570495	391.3	JF_INFL SO_INFL
2	0.1141	0.0460	11.08	391.6	662956	395.7	JF_INFL JA_INFL
2	0.1026	0.0336	11.52	391.9	671556	396.0	JF_INFL MA_INFL
3	0.3648	0.2885	3.439	383.9	494392	389.4	JF_INFL SO_INFL ND_INFL
3	0.3125	0.2300	5.450	386.2	535081	391.7	JF_INFL JA_INFL ND_INFL
3	0.2900	0.2048	6.314	387.1	552563	392.6	JF_INFL MA_INFL ND_INFL
3	0.2889	0.2036	6.358	387.2	553446	392.7	JF_INFL MJ_INFL ND_INFL
4	0.4115	0.3135	3.640	383.7	477080	390.5	JF_INFL JA_INFL SO_INFL ND_INFL
4	0.3830	0.2802	4.737	385.1	500204	391.9	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.3662	0.2606	5.382	385.8	513796	392.7	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.3265	0.2142	6.913	387.6	546054	394.5	JF_INFL MJ_INFL JA_INFL ND_INFL
5	0.4182	0.2918	5.382	385.4	492157	393.6	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.4137	0.2863	5.555	385.6	495971	393.8	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.3846	0.2509	6.675	387.0	520582	395.2	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.3328	0.1878	8.667	389.3	564393	397.5	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
6	0.4282	0.2722	7.000	386.9	505746	396.4	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	BRSHRIMP	805.360	1759.08	-0.23949	.
2	MODEL1	PARMS	BRSHRIMP	812.091	1002.56	.	.
3	MODEL1	PARMS	BRSHRIMP	835.061	1123.30	.	.
4	MODEL1	PARMS	BRSHRIMP	839.436	1481.99	.	-0.09298
5	MODEL1	PARMS	BRSHRIMP	730.418	1605.76	-0.46240	.
6	MODEL1	PARMS	BRSHRIMP	755.311	1466.25	-0.30376	.
7	MODEL1	PARMS	BRSHRIMP	814.221	1689.39	-0.27469	.
8	MODEL1	PARMS	BRSHRIMP	819.485	1795.21	-0.22646	-0.03398
9	MODEL1	PARMS	BRSHRIMP	703.130	1403.17	-0.47792	.
10	MODEL1	PARMS	BRSHRIMP	731.492	1506.82	-0.51731	.
11	MODEL1	PARMS	BRSHRIMP	743.346	1561.89	-0.48344	0.03677
12	MODEL1	PARMS	BRSHRIMP	743.939	1645.84	-0.45755	.
13	MODEL1	PARMS	BRSHRIMP	690.710	1236.02	-0.55614	.
14	MODEL1	PARMS	BRSHRIMP	707.251	1261.91	-0.53450	0.09516
15	MODEL1	PARMS	BRSHRIMP	716.795	1357.10	-0.48313	.
16	MODEL1	PARMS	BRSHRIMP	738.955	1596.03	-0.52082	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	BRSHRIMP	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	27
2	.	.	0.25948	.	-1	1	2	27
3	.	.	.	0.12059	-1	1	2	27
4	.	.	.	.	-1	1	2	27
5	.	.	.	0.35079	-1	2	3	26
6	.	.	0.33910	.	-1	2	3	26
7	.	0.13673	.	.	-1	2	3	26
8	.	.	.	.	-1	2	3	26
9	.	.	0.26177	0.29713	-1	3	4	25
10	.	0.18393	.	0.36270	-1	3	4	25
11	.	.	.	0.36171	-1	3	4	25
12	-0.021795	.	.	0.35423	-1	3	4	25
13	.	0.25418	0.30105	0.30555	-1	4	5	24
14	.	.	0.29759	0.31805	-1	4	5	24
15	0.020550	.	0.27248	0.29169	-1	4	5	24
16	-0.066446	0.24519	.	0.37716	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	648605.12	0.09996	0.06662	9.6267	390.022	392.757
2	659491.69	0.08485	0.05095	10.2079	390.505	393.240
3	697326.51	0.03235	-0.00349	12.2278	392.123	394.858
4	704652.69	0.02218	-0.01403	12.6189	392.426	395.161
5	533510.76	0.28709	0.23225	4.4274	385.263	389.365
6	570495.14	0.23767	0.17903	6.3287	387.207	391.309
7	662956.11	0.11411	0.04597	11.0820	391.563	395.665
8	671555.63	0.10262	0.03359	11.5241	391.936	396.038
9	494392.06	0.36477	0.28854	3.4387	383.917	389.386
10	535081.15	0.31249	0.22999	5.4501	386.211	391.680
11	552562.73	0.29003	0.20483	6.3142	387.143	392.612
12	553445.80	0.28889	0.20356	6.3579	387.189	392.659
13	477080.19	0.41153	0.31346	3.6397	383.700	390.536
14	500203.52	0.38301	0.28018	4.7370	385.072	391.909
15	513795.64	0.36625	0.26062	5.3820	385.850	392.686
16	546053.80	0.32646	0.21420	6.9128	387.616	394.452

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	BRSHRIMP	701.539	1164.37	-0.58370	0.05970
18	MODEL1	PARMS	BRSHRIMP	704.252	1281.88	-0.55620	.
19	MODEL1	PARMS	BRSHRIMP	721.513	1292.36	-0.53874	0.11316
20	MODEL1	PARMS	BRSHRIMP	751.261	1571.37	-0.55020	0.06628
21	MODEL1	PARMS	BRSHRIMP	711.158	1227.36	-0.60269	0.10054

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	BRSHRIMP	_IN_	_P_	_EDF_
17	.	0.22838	0.31954	0.31782	-1	5	6	23
18	-0.027036	0.27663	0.29043	0.31345	-1	5	6	23
19	-0.025501	.	0.29108	0.32876	-1	5	6	23
20	-0.093578	0.23677	.	0.40058	-1	5	6	23
21	-0.066050	0.26557	0.30624	0.34551	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	492157.41	0.41823	0.29176	5.3820	385.368	393.572
18	495971.04	0.41372	0.28627	5.5555	385.592	393.795
19	520581.60	0.38463	0.25085	6.6747	386.996	395.200
20	564393.07	0.33284	0.18781	8.6671	389.339	397.543
21	505746.21	0.42816	0.27220	7.0000	386.869	396.440

Square Root of Harvest (Box–Cox Transformation)

N = 29 Regression Models for Dependent Variable: SQRTBRSH

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1432	0.1115	7.559	149.7	163.1	152.4	JF_INFL
1	0.0457	0.0104	11.26	152.8	181.7	155.5	SO_INFL
1	0.0199	-.0164	12.25	153.6	186.6	156.3	ND_INFL
1	0.0128	-.0237	12.51	153.8	187.9	156.5	MA_INFL
2	0.3263	0.2745	2.602	144.7	133.2	148.8	JF_INFL ND_INFL
2	0.2368	0.1781	6.004	148.3	150.9	152.4	JF_INFL SO_INFL
2	0.1467	0.0811	9.425	151.5	168.7	155.6	JF_INFL JA_INFL
2	0.1440	0.0781	9.530	151.6	169.2	155.7	JF_INFL MJ_INFL
3	0.3716	0.2962	2.881	144.7	129.2	150.1	JF_INFL SO_INFL ND_INFL
3	0.3391	0.2598	4.114	146.1	135.9	151.6	JF_INFL MA_INFL ND_INFL
3	0.3361	0.2564	4.230	146.3	136.5	151.7	JF_INFL JA_INFL ND_INFL
3	0.3265	0.2457	4.593	146.7	138.5	152.2	JF_INFL MJ_INFL ND_INFL
4	0.4032	0.3037	3.680	145.2	127.8	152.0	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.3917	0.2904	4.115	145.7	130.3	152.6	JF_INFL JA_INFL SO_INFL ND_INFL
4	0.3738	0.2695	4.795	146.6	134.1	153.4	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.3486	0.2400	5.755	147.7	139.5	154.6	JF_INFL MA_INFL MJ_INFL ND_INFL
5	0.4130	0.2855	5.305	146.7	131.2	154.9	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.4064	0.2773	5.558	147.0	132.7	155.2	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.3918	0.2596	6.113	147.7	135.9	155.9	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.3592	0.2200	7.350	149.2	143.2	157.4	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
6	0.4211	0.2632	7.000	148.3	135.3	157.9	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	SQRTBRSH	12.7715	42.3599	-0.004660	.
2	MODEL1	PARMS	SQRTBRSH	13.4787	30.0096	.	.
3	MODEL1	PARMS	SQRTBRSH	13.6601	31.2943	.	.
4	MODEL1	PARMS	SQRTBRSH	13.7091	35.7995	.	-.0011488
5	MODEL1	PARMS	SQRTBRSH	11.5408	39.8952	-0.008243	.
6	MODEL1	PARMS	SQRTBRSH	12.2837	38.4370	-0.005521	.
7	MODEL1	PARMS	SQRTBRSH	12.9881	41.7957	-0.004945	.
8	MODEL1	PARMS	SQRTBRSH	13.0090	41.9237	-0.004733	.
9	MODEL1	PARMS	SQRTBRSH	11.3670	37.3812	-0.008436	.
10	MODEL1	PARMS	SQRTBRSH	11.6568	38.4061	-0.008957	0.0012481
11	MODEL1	PARMS	SQRTBRSH	11.6835	38.8965	-0.008797	.
12	MODEL1	PARMS	SQRTBRSH	11.7674	40.1253	-0.008215	.
13	MODEL1	PARMS	SQRTBRSH	11.3059	34.3590	-0.009646	0.0020358
14	MODEL1	PARMS	SQRTBRSH	11.4138	35.5976	-0.009271	.
15	MODEL1	PARMS	SQRTBRSH	11.5805	36.4549	-0.008540	.
16	MODEL1	PARMS	SQRTBRSH	11.8118	39.3315	-0.009165	0.0019948

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	SQRTBRSH	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	27
2	.	.	.0030958	.	-1	1	2	27
3	.	.	.	.0015356	-1	1	2	27
4	.	.	.	.	-1	1	2	27
5	.	.	.	.0056393	-1	2	3	26
6	.	.	.0045429	.	-1	2	3	26
7	.	.0011070	.	.	-1	2	3	26
8	0.0002287	.	.	.	-1	2	3	26
9	.	.	.0032484	.0049735	-1	3	4	25
10	.	.	.	.0060100	-1	3	4	25
11	.	.0018565	.	.0057596	-1	3	4	25
12	-.0001251	.	.	.0056591	-1	3	4	25
13	.	.	.0040148	.0054211	-1	4	5	24
14	.	.0027123	.0036676	.0050633	-1	4	5	24
15	0.0004132	.	.0034637	.0048642	-1	4	5	24
16	-.0009879	.	.	.0063877	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	163.111	0.14323	0.11150	7.5588	149.666	152.401
2	181.676	0.04572	0.01037	11.2646	152.792	155.527
3	186.599	0.01986	-0.01645	12.2474	153.568	156.302
4	187.939	0.01282	-0.02375	12.5149	153.775	156.510
5	133.191	0.32630	0.27448	2.6018	144.695	148.797
6	150.888	0.23679	0.17808	6.0036	148.313	152.415
7	168.690	0.14675	0.08111	9.4253	151.547	155.649
8	169.234	0.14399	0.07815	9.5300	151.640	155.742
9	129.208	0.37158	0.29617	2.8810	144.677	150.146
10	135.882	0.33913	0.25982	4.1145	146.138	151.607
11	136.505	0.33610	0.25643	4.2296	146.270	151.739
12	138.472	0.32653	0.24571	4.5933	146.685	152.154
13	127.824	0.40319	0.30372	3.6801	145.181	152.017
14	130.275	0.39174	0.29036	4.1151	145.732	152.568
15	134.108	0.37384	0.26948	4.7952	146.573	153.409
16	139.519	0.34858	0.24001	5.7553	147.720	154.556

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	SQRTBRSH	11.4533	33.5201	-0.010069	0.0017308
18	MODEL1	PARMS	SQRTBRSH	11.5181	35.0549	-0.009743	0.0024471
19	MODEL1	PARMS	SQRTBRSH	11.6589	35.7033	-0.009271	.
20	MODEL1	PARMS	SQRTBRSH	11.9667	38.9446	-0.009660	0.0018793
21	MODEL1	PARMS	SQRTBRSH	11.6302	34.4410	-0.010347	0.0023279

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	SQRTBRSH	_IN_	_P_	_EDF_
17	.	.0019644	.0042036	.0054191	-1	5	6	23
18	-.0005827	.	.0038659	.0056658	-1	5	6	23
19	-.0000623	.0027641	.0036431	.0050815	-1	5	6	23
20	-.0013260	.0021311	.	.0065449	-1	5	6	23
21	-.0009657	.0025081	.0040092	.0058239	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	131.177	0.41305	0.28545	5.3053	146.698	154.901
18	132.666	0.40639	0.27734	5.5585	147.025	155.229
19	135.929	0.39178	0.25956	6.1134	147.730	155.933
20	143.201	0.35925	0.21995	7.3499	149.241	157.445
21	135.262	0.42108	0.26320	7.0000	148.298	157.869

Logged Inflows

N = 29 Regression Models for Dependent Variable: BRSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0942	0.0607	7.608	390.2	652749	392.9	LGSOINFL
1	0.0701	0.0356	8.477	391.0	670148	393.7	LGJFINFL
1	0.0296	-.0063	9.934	392.2	699309	394.9	LGNDINFL
1	0.0105	-.0262	10.62	392.8	713103	395.5	LGMAINFL
2	0.2807	0.2254	2.895	385.5	538294	389.6	LGJFINFL LGNDINFL
2	0.1864	0.1239	6.288	389.1	608835	393.2	LGJFINFL LGSOINFL
2	0.0997	0.0305	9.409	392.0	673710	396.1	LGSOINFL LGNDINFL
2	0.0969	0.0275	9.509	392.1	675803	396.2	LGMAINFL LGSOINFL
3	0.3198	0.2381	3.488	385.9	529426	391.4	LGJFINFL LGSOINFL LGNDINFL
3	0.3174	0.2355	3.572	386.0	531230	391.5	LGJFINFL LGMAINFL LGNDINFL
3	0.3049	0.2215	4.022	386.5	540967	392.0	LGJFINFL LGJAINFL LGNDINFL
3	0.2848	0.1990	4.747	387.4	556631	392.8	LGJFINFL LGMJINFL LGNDINFL
4	0.3777	0.2740	3.403	385.3	504528	392.2	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.3395	0.2294	4.777	387.0	535462	393.9	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
4	0.3292	0.2174	5.147	387.5	543797	394.3	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.3279	0.2159	5.194	387.6	544865	394.4	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
5	0.3831	0.2490	5.207	387.1	521857	395.3	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.3782	0.2431	5.384	387.3	526004	395.5	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.3403	0.1969	6.750	389.0	558101	397.2	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.3396	0.1960	6.775	389.0	558690	397.2	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.3889	0.2222	7.000	388.8	540486	398.4	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	BRSHRIMP	807.929	-828.64	.	.
2	MODEL1	PARMS	BRSHRIMP	818.626	3194.35	-258.418	.
3	MODEL1	PARMS	BRSHRIMP	836.247	153.24	.	.
4	MODEL1	PARMS	BRSHRIMP	844.454	2103.59	.	-109.180
5	MODEL1	PARMS	BRSHRIMP	733.685	1911.55	-648.996	.
6	MODEL1	PARMS	BRSHRIMP	780.279	1084.10	-298.650	.
7	MODEL1	PARMS	BRSHRIMP	820.798	-1179.47	.	.
8	MODEL1	PARMS	BRSHRIMP	822.072	-359.18	.	-56.691
9	MODEL1	PARMS	BRSHRIMP	727.617	810.92	-613.355	.
10	MODEL1	PARMS	BRSHRIMP	728.855	886.15	-831.524	260.071
11	MODEL1	PARMS	BRSHRIMP	735.505	1037.72	-710.612	.
12	MODEL1	PARMS	BRSHRIMP	746.077	1587.34	-676.853	.
13	MODEL1	PARMS	BRSHRIMP	710.301	-808.43	-838.485	334.617
14	MODEL1	PARMS	BRSHRIMP	731.753	80.92	-671.171	.
15	MODEL1	PARMS	BRSHRIMP	737.426	413.76	-847.615	219.445
16	MODEL1	PARMS	BRSHRIMP	738.150	284.22	-650.850	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	BRSHRIMP	_IN_	_P_	_EDF_
1	.	.	315.153	.	-1	1	2	27
2	.	.	.	.	-1	1	2	27
3	.	.	.	164.783	-1	1	2	27
4	.	.	.	.	-1	1	2	27
5	.	.	.	583.163	-1	2	3	26
6	.	.	352.821	.	-1	2	3	26
7	.	.	288.278	75.566	-1	2	3	26
8	.	.	306.166	.	-1	2	3	26
9	.	.	217.190	492.970	-1	3	4	25
10	.	.	.	650.869	-1	3	4	25
11	.	180.775	.	600.921	-1	3	4	25
12	76.752	.	.	575.464	-1	3	4	25
13	.	.	276.396	555.497	-1	4	5	24
14	.	163.770	205.027	514.109	-1	4	5	24
15	.	130.864	.	653.148	-1	4	5	24
16	109.162	.	230.130	476.647	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	652749.15	0.09421	0.06066	7.6081	390.207	392.942
2	670148.45	0.07006	0.03562	8.4773	390.970	393.705
3	699308.67	0.02960	-0.00634	9.9340	392.205	394.940
4	713102.76	0.01046	-0.02619	10.6231	392.772	395.506
5	538294.19	0.28070	0.22536	2.8946	385.522	389.624
6	608835.46	0.18643	0.12385	6.2880	389.093	393.195
7	673709.70	0.09974	0.03049	9.4087	392.029	396.131
8	675802.67	0.09695	0.02748	9.5094	392.119	396.221
9	529426.20	0.31976	0.23813	3.4884	385.903	391.372
10	531230.13	0.31744	0.23553	3.5719	386.001	391.471
11	540967.40	0.30493	0.22152	4.0223	386.528	391.997
12	556630.55	0.28480	0.19898	4.7468	387.356	392.825
13	504527.87	0.37768	0.27396	3.4033	385.322	392.158
14	535462.40	0.33952	0.22944	4.7769	387.048	393.884
15	543797.22	0.32924	0.21745	5.1470	387.496	394.332
16	544864.81	0.32792	0.21591	5.1945	387.552	394.389

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	BRSHRIMP	722.397	-1058.03	-849.226	303.436
18	MODEL1	PARMS	BRSHRIMP	725.261	-736.84	-838.926	351.482
19	MODEL1	PARMS	BRSHRIMP	747.061	480.39	-859.931	285.587
20	MODEL1	PARMS	BRSHRIMP	747.455	53.82	-672.853	.
21	MODEL1	PARMS	BRSHRIMP	735.177	-947.18	-858.126	348.042

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	BRSHRIMP	_IN_	_P_	_EDF_
17	.	89.848	264.206	561.268	-1	5	6	23
18	-31.752	.	275.616	563.396	-1	5	6	23
19	-169.306	211.084	.	695.230	-1	5	6	23
20	12.006	156.855	206.964	511.421	-1	5	6	23
21	-123.284	149.999	253.017	595.802	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	521856.87	0.38312	0.24902	5.2073	387.067	395.271
18	526003.81	0.37822	0.24305	5.3837	387.297	395.500
19	558100.81	0.34028	0.19686	6.7496	389.014	397.218
20	558689.62	0.33958	0.19601	6.7747	389.045	397.249
21	540485.73	0.38888	0.22221	7.0000	388.795	398.366

Logged Harvest

N = 29 Regression Models for Dependent Variable: LBSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1525	0.1211	4.702	16.09	1.630	18.83	JF_INFL
1	0.0331	-.0027	8.888	19.92	1.859	22.65	JA_INFL
1	0.0109	-.0257	9.665	20.57	1.902	23.31	ND_INFL
1	0.0066	-.0302	9.817	20.70	1.910	23.44	SO_INFL
2	0.3062	0.2529	1.315	12.29	1.385	16.39	JF_INFL ND_INFL
2	0.1823	0.1194	5.658	17.06	1.633	21.16	JF_INFL SO_INFL
2	0.1628	0.0984	6.343	17.74	1.672	21.84	JF_INFL MA_INFL
2	0.1607	0.0961	6.416	17.81	1.676	21.91	JF_INFL MJ_INFL
3	0.3469	0.2685	1.889	12.54	1.356	18.01	JF_INFL MA_INFL ND_INFL
3	0.3134	0.2310	3.065	13.99	1.426	19.46	JF_INFL SO_INFL ND_INFL
3	0.3089	0.2260	3.221	14.18	1.435	19.65	JF_INFL MJ_INFL ND_INFL
3	0.3063	0.2230	3.313	14.29	1.441	19.76	JF_INFL JA_INFL ND_INFL
4	0.3678	0.2625	3.157	13.59	1.368	20.43	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.3529	0.2451	3.679	14.27	1.400	21.11	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.3518	0.2437	3.719	14.32	1.402	21.16	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.3196	0.2062	4.847	15.73	1.472	22.56	JF_INFL MJ_INFL SO_INFL ND_INFL
5	0.3708	0.2340	5.052	15.46	1.420	23.66	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.3706	0.2338	5.059	15.47	1.421	23.67	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.3553	0.2151	5.597	16.16	1.456	24.37	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.3201	0.1723	6.830	17.71	1.535	25.91	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.3723	0.2011	7.000	17.39	1.482	26.96	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	LBSHRIMP	1.27664	7.63453	-.00048330	.
2	MODEL1	PARMS	LBSHRIMP	1.36363	7.05628	.	.
3	MODEL1	PARMS	LBSHRIMP	1.37918	6.55892	.	.
4	MODEL1	PARMS	LBSHRIMP	1.38219	6.59973	.	.
5	MODEL1	PARMS	LBSHRIMP	1.17707	7.40754	-.00081332	.
6	MODEL1	PARMS	LBSHRIMP	1.27788	7.41203	-.00053213	.
7	MODEL1	PARMS	LBSHRIMP	1.29307	7.51884	-.00052503	.00010881
8	MODEL1	PARMS	LBSHRIMP	1.29467	7.49083	-.00050762	.
9	MODEL1	PARMS	LBSHRIMP	1.16467	7.14103	-.00094115	.00022338
10	MODEL1	PARMS	LBSHRIMP	1.19421	7.30741	-.00082100	.
11	MODEL1	PARMS	LBSHRIMP	1.19807	7.32795	-.00082296	.
12	MODEL1	PARMS	LBSHRIMP	1.20034	7.41446	-.00080949	.
13	MODEL1	PARMS	LBSHRIMP	1.16951	6.90866	-.00098070	.00026861
14	MODEL1	PARMS	LBSHRIMP	1.18320	7.21524	-.00095779	.00028326
15	MODEL1	PARMS	LBSHRIMP	1.18425	7.18647	-.00091378	.00024734
16	MODEL1	PARMS	LBSHRIMP	1.21330	7.15275	-.00083848	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LBSHRIMP	_IN_	_P_
1	.	.	.	.	-1	1	2
2	.	-.00031812	.	.	-1	1	2
3	.	.	.	.00011446	-1	1	2
4	.	.	.00011818	.	-1	1	2
5	.	.	.	.00051936	-1	2	3
6	.	.	.00025766	.	-1	2	3
7	.	.	.	.	-1	2	3
8	0.000075331	.	.	.	-1	2	3
9	.	.	.	.00058571	-1	3	4
10	.	.	.00012939	.00049284	-1	3	4
11	0.000043289	.	.	.00051253	-1	3	4
12	.	-.00001286	.	.00051853	-1	3	4
13	.	.	.00023050	.00055190	-1	4	5
14	-.000079222	.	.	.00061600	-1	4	5
15	.	-.00013762	.	.00058391	-1	4	5
16	0.000068983	.	.00016534	.00047459	-1	4	5

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	27	1.62980	0.15253	0.12115	4.70210	16.0929	18.8275
2	27	1.85949	0.03310	-0.00271	8.88816	19.9165	22.6511
3	27	1.90214	0.01092	-0.02571	9.66537	20.5741	23.3087
4	27	1.91046	0.00660	-0.03020	9.81696	20.7006	23.4352
5	26	1.38550	0.30625	0.25288	1.31472	12.2890	16.3909
6	26	1.63298	0.18233	0.11943	5.65790	17.0550	21.1569
7	26	1.67202	0.16278	0.09838	6.34306	17.7402	21.8421
8	26	1.67618	0.16070	0.09614	6.41595	17.8122	21.9141
9	25	1.35645	0.34691	0.26854	1.88944	12.5372	18.0064
10	25	1.42615	0.31336	0.23096	3.06547	13.9901	19.4593
11	25	1.43537	0.30892	0.22599	3.22116	14.1772	19.6464
12	25	1.44082	0.30629	0.22305	3.31309	14.2870	19.7562
13	24	1.36775	0.36782	0.26245	3.15680	13.5938	20.4303
14	24	1.39995	0.35293	0.24509	3.67854	14.2687	21.1052
15	24	1.40246	0.35177	0.24374	3.71908	14.3205	21.1570
16	24	1.47209	0.31959	0.20619	4.84712	15.7258	22.5623

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	LBSHRIMP	1.19184	6.97623	-.00099011	.00030854
18	MODEL1	PARMS	LBSHRIMP	1.19201	6.95357	-.00095805	.00028493
19	MODEL1	PARMS	LBSHRIMP	1.20647	7.23341	-.00093455	.00028869
20	MODEL1	PARMS	LBSHRIMP	1.23895	7.16521	-.00082637	.
21	MODEL1	PARMS	LBSHRIMP	1.21718	6.99585	-.00097080	.00031235

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LBSHRIMP	_IN_	_P_
17	-.000056578	.	.00021605	.00057565	-1	5	6
18	.	-.00010515	.00022040	.00055201	-1	5	6
19	-.000063344	-.00010007	.	.00060862	-1	5	6
20	0.000076868	-.00004584	.00016236	.00047098	-1	5	6
21	-.000044335	-.00008018	.00021147	.00057059	-1	6	7

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	23	1.42047	0.37080	0.23402	5.05211	15.4564	23.6602
18	23	1.42090	0.37062	0.23379	5.05876	15.4652	23.6689
19	23	1.45557	0.35526	0.21510	5.59693	16.1642	24.3680
20	23	1.53499	0.32008	0.17227	6.83000	17.7050	25.9088
21	22	1.48153	0.37229	0.20110	7.00000	17.3878	26.9589

All Variables Logged

N = 29 Regression Models for Dependent Variable: LBSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1024	0.0691	9.791	17.76	1.726	20.49	LGJFINFL
1	0.0455	0.0101	12.00	19.54	1.836	22.28	LGJAINFL
1	0.0201	-.0162	12.98	20.30	1.884	23.04	LGNDINFL
1	0.0033	-.0336	13.63	20.80	1.917	23.53	LGMAINFL
2	0.3204	0.2682	3.339	11.69	1.357	15.79	LGJFINFL LGNDINFL
2	0.1266	0.0594	10.85	18.97	1.744	23.07	LGJFINFL LGMAINFL
2	0.1178	0.0499	11.19	19.26	1.762	23.36	LGJFINFL LGMJINFL
2	0.1168	0.0488	11.23	19.29	1.764	23.39	LGJFINFL LGJAINFL
3	0.4054	0.3340	2.048	9.819	1.235	15.29	LGJFINFL LGMAINFL LGNDINFL
3	0.3314	0.2512	4.913	13.22	1.389	18.69	LGJFINFL LGSOINFL LGNDINFL
3	0.3269	0.2461	5.089	13.41	1.398	18.88	LGJFINFL LGMJINFL LGNDINFL
3	0.3266	0.2458	5.100	13.43	1.399	18.89	LGJFINFL LGJAINFL LGNDINFL
4	0.4315	0.3368	3.033	10.51	1.230	17.35	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.4097	0.3113	3.880	11.61	1.277	18.44	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
4	0.4071	0.3083	3.979	11.73	1.283	18.57	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.3505	0.2423	6.172	14.38	1.405	21.21	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
5	0.4321	0.3087	5.010	12.48	1.282	20.69	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.4319	0.3084	5.019	12.49	1.283	20.70	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4116	0.2837	5.804	13.51	1.328	21.71	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.3551	0.2149	7.997	16.17	1.456	24.38	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.4324	0.2776	7.000	14.47	1.340	24.04	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LBSHRIMP	1.31387	10.4498	-0.51032	.
2	MODEL1	PARMS	LBSHRIMP	1.35489	9.2772	.	.
3	MODEL1	PARMS	LBSHRIMP	1.37277	5.1762	.	.
4	MODEL1	PARMS	LBSHRIMP	1.38449	7.4642	.	-0.10013
5	MODEL1	PARMS	LBSHRIMP	1.16498	8.3176	-1.15951	.
6	MODEL1	PARMS	LBSHRIMP	1.32069	9.3292	-0.68570	0.33250
7	MODEL1	PARMS	LBSHRIMP	1.32738	9.3759	-0.61424	.
8	MODEL1	PARMS	LBSHRIMP	1.32812	11.4967	-0.44796	.
9	MODEL1	PARMS	LBSHRIMP	1.11134	5.7709	-1.61283	0.64591
10	MODEL1	PARMS	LBSHRIMP	1.17839	9.2718	-1.19041	.
11	MODEL1	PARMS	LBSHRIMP	1.18238	7.6528	-1.21662	.
12	MODEL1	PARMS	LBSHRIMP	1.18264	9.0378	-1.10872	.
13	MODEL1	PARMS	LBSHRIMP	1.10901	6.9202	-1.57368	0.74475
14	MODEL1	PARMS	LBSHRIMP	1.13011	6.0788	-1.61495	0.72461
15	MODEL1	PARMS	LBSHRIMP	1.13255	6.2474	-1.61087	0.62495
16	MODEL1	PARMS	LBSHRIMP	1.18538	8.4785	-1.17235	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBSHRIMP	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	27
2	.	-0.38305	.	.	-1	1	2	27
3	.	.	.	0.22181	-1	1	2	27
4	.	.	.	.	-1	1	2	27
5	.	.	.	0.96929	-1	2	3	26
6	.	.	.	.	-1	2	3	26
7	0.24161	.	.	.	-1	2	3	26
8	.	-0.22671	.	.	-1	2	3	26
9	.	.	.	1.13744	-1	3	4	25
10	.	.	-0.18829	1.04748	-1	3	4	25
11	0.15737	.	.	0.95350	-1	3	4	25
12	.	-0.14900	.	0.95465	-1	3	4	25
13	.	-0.31839	.	1.13190	-1	4	5	24
14	-0.14635	.	.	1.17261	-1	4	5	24
15	.	.	-0.07771	1.16426	-1	4	5	24
16	0.37179	-0.35820	.	0.89681	-1	4	5	24

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	1.72625	0.10238	0.06913	9.7910	17.7603	20.4949
2	1.83571	0.04546	0.01011	11.9972	19.5433	22.2779
3	1.88450	0.02009	-0.01620	12.9804	20.3039	23.0385
4	1.91680	0.00330	-0.03362	13.6315	20.7968	23.5314
5	1.35717	0.32043	0.26816	3.3395	11.6898	15.7917
6	1.74423	0.12662	0.05944	10.8514	18.9663	23.0681
7	1.76193	0.11776	0.04990	11.1949	19.2590	23.3609
8	1.76389	0.11678	0.04884	11.2331	19.2914	23.3933
9	1.23507	0.40536	0.33400	2.0479	9.8185	15.2877
10	1.38861	0.33143	0.25121	4.9131	13.2165	18.6857
11	1.39802	0.32690	0.24613	5.0888	13.4125	18.8817
12	1.39864	0.32660	0.24579	5.1004	13.4254	18.8946
13	1.22990	0.43153	0.33679	3.0333	10.5130	17.3494
14	1.27716	0.40969	0.31130	3.8800	11.6064	18.4429
15	1.28267	0.40714	0.30833	3.9787	11.7314	18.5678
16	1.40512	0.35054	0.24230	6.1725	14.3756	21.2121

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LBSHRIMP	1.13226	6.8947	-1.56897	0.71944
18	MODEL1	PARMS	LBSHRIMP	1.13250	7.1167	-1.57346	0.73354
19	MODEL1	PARMS	LBSHRIMP	1.15251	6.5839	-1.61294	0.70423
20	MODEL1	PARMS	LBSHRIMP	1.20664	9.1113	-1.19012	.
21	MODEL1	PARMS	LBSHRIMP	1.15744	7.0633	-1.56918	0.71207

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBSHRIMP	_IN_	_P_	_EDF_
17	0.06478	-0.34909	.	1.11580	-1	5	6	23
18	.	-0.31292	-0.03526	1.14416	-1	5	6	23
19	-0.14927	.	-0.08138	1.20139	-1	5	6	23
20	0.33614	-0.32785	-0.12410	0.95490	-1	5	6	23
21	0.05935	-0.34187	-0.02987	1.12754	-1	6	7	22

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	1.28200	0.43214	0.30869	5.0098	12.4820	20.6858
18	1.28256	0.43189	0.30839	5.0194	12.4946	20.6984
19	1.32827	0.41164	0.28374	5.8042	13.5102	21.7140
20	1.45599	0.35507	0.21487	7.9969	16.1727	24.3765
21	1.33968	0.43239	0.27759	7.0000	14.4691	24.0401

Regression—Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.654*	*.428*	*.272*	*711.1584*	*.959*

a. Dependent Variable: Brown Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*8330789.178*	*6*	*1388464.863*	*2.745*	*.038*[b]
	Residual	*11126416.612*	*22*	*505746.210*		
	Total	*19457205.790*	*28*			

a. Dependent Variable: Brown Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*1227.362*	*361.974*		*3.391*	*.003*	*476.675*	*1978.050*
	January-February Inflows	*-.603*	*.171*	*-.796*	*-3.528*	*.002*	*-.957*	*-.248*
	March-April Inflows	*.101*	*.135*	*.161*	*.745*	*.464*	*-.179*	*.380*
	May-June Inflows	*-6.605E-02*	*.107*	*-.132*	*-.618*	*.543*	*-.288*	*.156*
	July-August Inflows	*.266*	*.205*	*.248*	*1.294*	*.209*	*-.160*	*.691*
	September-October Inflows	*.306*	*.160*	*.344*	*1.915*	*.069*	*-.025*	*.638*
	November-December Inflows	*.346*	*.144*	*.515*	*2.402*	*.025*	*.047*	*.644*

a. Dependent Variable: Brown Shrimp Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	*.511*	*1.957*
	March-April Inflows	*.557*	*1.796*
	May-June Inflows	*.566*	*1.767*
	July-August Inflows	*.707*	*1.414*
	September-October Inflows	*.807*	*1.240*
	November-December Inflows	*.565*	*1.770*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	*5.541*	*1.000*	*.00*	*.00*	*.00*
	2	*.608*	*3.019*	*.00*	*.00*	*.07*
	3	*.266*	*4.562*	*.04*	*.03*	*.07*
	4	*.230*	*4.904*	*.00*	*.00*	*.12*
	5	*.171*	*5.698*	*.01*	*.26*	*.23*
	6	*.106*	*7.244*	*.89*	*.01*	*.13*
	7	*7.785E-02*	*8.437*	*.05*	*.69*	*.38*

a. Dependent Variable: Brown Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Variance Proportions			
			May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	*5.541*	*.00*	*.01*	*.01*	*.01*
	2	*.608*	*.03*	*.05*	*.20*	*.05*
	3	*.266*	*.00*	*.02*	*.33*	*.35*
	4	*.230*	*.06*	*.80*	*.03*	*.05*
	5	*.171*	*.42*	*.01*	*.01*	*.02*
	6	*.106*	*.05*	*.03*	*.43*	*.02*
	7	*7.785E-02*	*.43*	*.09*	*.00*	*.50*

a. Dependent Variable: Brown Shrimp Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*93.9599*	*2351.9456*	*1317.3414*	*545.4614*	*29*
Std. Predicted Value	*-2.243*	*1.897*	*.000*	*1.000*	*29*
Standard Error of Predicted Value	*229.0293*	*494.6881*	*340.0924*	*81.5041*	*29*
Adjusted Predicted Value	*104.3286*	*2730.5278*	*1320.7135*	*599.3845*	*29*
Residual	*-1347.8309*	*1150.5192*	*-2.2737E-13*	*630.3745*	*29*
Std. Residual	*-1.895*	*1.618*	*.000*	*.886*	*29*
Stud. Residual	*-2.281*	*1.828*	*-.002*	*1.018*	*29*
Deleted Residual	*-1952.1873*	*1469.3358*	*-3.3721*	*838.4705*	*29*
Stud. Deleted Residual	*-2.550*	*1.940*	*-.017*	*1.080*	*29*
Mahal. Distance	*1.939*	*12.583*	*5.793*	*3.236*	*29*
Cook's Distance	*.000*	*.370*	*.049*	*.092*	*29*
Centered Leverage Value	*.069*	*.449*	*.207*	*.116*	*29*

a. Dependent Variable: Brown Shrimp Harvest

Case Values for Residuals Diagnostics

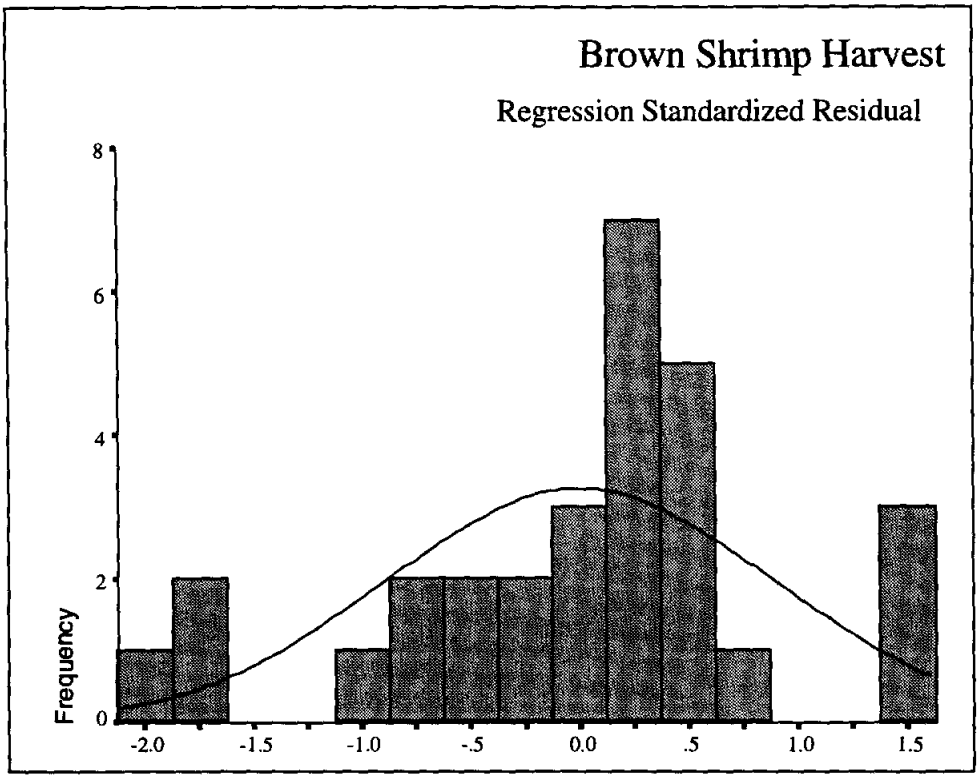
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	1371.13097	-1347.83097	-1952.18725	1975.48725	.09861	-1.89526	-2.28093	*-2.55036
1960	618.54251	-609.94251	-725.74147	734.34147	-1.28112	-.85767	-.93555	-.93279
1961	93.95991	-11.05991	-21.42862	104.32862	-2.24284	-.01555	-.02165	-.02115
1962	2149.54826	-1281.04826	-1499.28862	2367.78862	1.52569	-1.80135	-1.94876	-2.09317
1963	1389.48229	-788.68229	-882.83140	1483.63140	.13226	-1.10901	-1.17334	-1.18401
1964	982.76379	-265.66379	-321.99078	1039.09078	-.61338	-.37356	-.41126	-.40336
1965	1021.71030	110.48970	123.27545	1008.92455	-.54198	.15537	.16411	.16043
1966	636.99763	44.10237	58.51861	622.58139	-1.24728	.06201	.07144	.06980
1967	1461.75605	-313.25605	-366.57702	1515.07702	.26476	-.44049	-.47650	-.46797
1968	578.67496	-270.87496	-403.33438	711.13438	-1.35420	-.38089	-.46478	-.45634
1969	970.25448	-494.75448	-641.86230	1117.36230	-.63632	-.69570	-.79241	-.78548
1970	1406.21396	149.78604	180.65451	1375.34549	.16293	.21062	.23131	.22627
1971	1873.65477	176.44523	214.55081	1835.54919	1.01989	.24811	.27359	.26776
1972	1063.03226	389.96774	440.82732	1012.17268	-.46623	.54836	.58302	.57407
1973	1068.35930	-112.95930	-167.00583	1122.40583	-.45646	-.15884	-.19313	-.18885
1974	1449.68509	-26.98509	-50.97180	1473.67180	.24263	-.03795	-.05215	-.05095
1975	2041.96140	-1213.56140	-1902.12772	2730.52772	1.32845	-1.70646	-2.13641	-2.34463
1976	1583.62640	214.37360	246.72512	1551.27488	.48818	.30144	.32339	.31671
1977	1269.59158	111.90842	146.30781	1235.19219	-.08754	.15736	.17993	.17592
1978	566.25979	316.94021	387.61482	495.58518	-1.37697	.44567	.49286	.48421
1979	899.45765	415.54235	696.28623	618.71377	-.76611	.58432	.75637	.74878
1980	1163.98089	1150.51911	1469.33577	845.16423	-.28116	1.61781	1.82827	1.93966
1981	1615.55794	376.34206	615.99584	1375.90416	.54672	.52920	.67704	.66847
1982	2351.94560	183.35440	230.27715	2305.02285	1.89675	.25782	.28894	.28283
1983	1468.07303	472.72697	849.47411	1091.32589	.27634	.66473	.89107	.88674
1984	1649.80960	1121.19040	1256.26888	1514.73112	.60952	1.57657	1.66884	1.74463
1985	1326.13588	324.86412	373.73301	1277.26699	.01612	.45681	.48997	.48133
1986	1889.11385	158.28615	216.66970	1830.73030	1.04824	.22258	.26041	.25481
1987	2241.61984	1019.78016	1331.04066	1930.35934	1.69449	1.43397	1.63826	1.70818

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

[1]Values greater than 3 are flagged.

[2]This is flagged if it exceeds $t_{n-p-2,a} = t_{21,0.01} = 2.518$.

Graphics


Brown Shrimp Harvest
Regression Standardized Residual
Frequency
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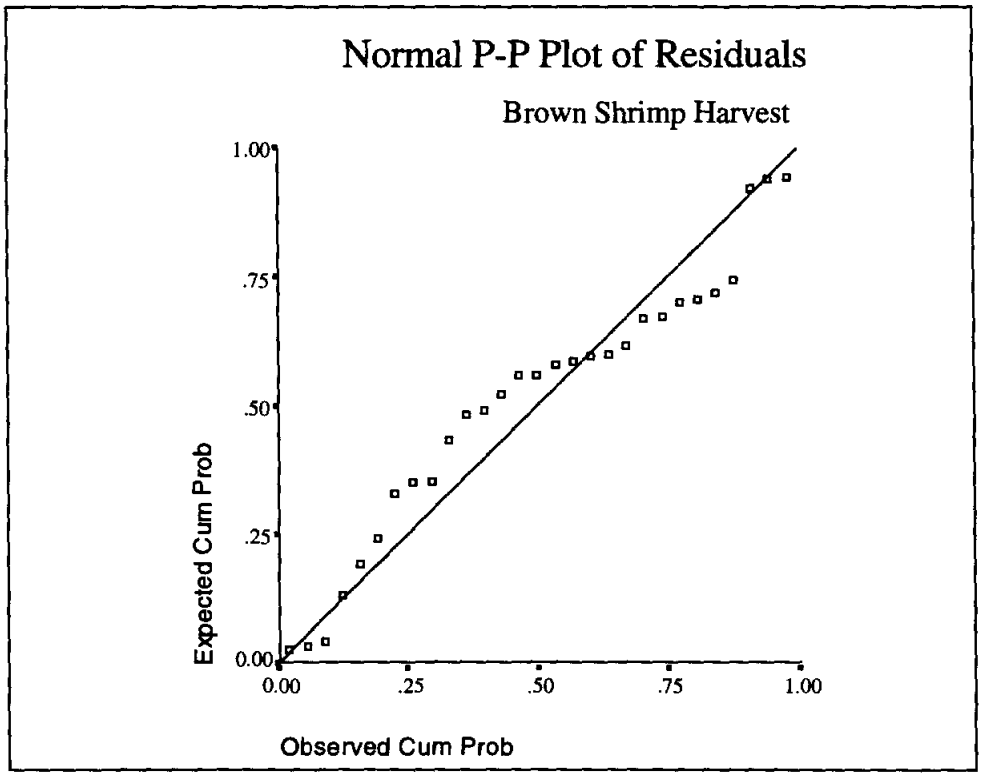
6
4
2
0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5


Normal P-P Plot of Residuals
Brown Shrimp Harvest
Expected Cum Prob
Observed Cum Prob
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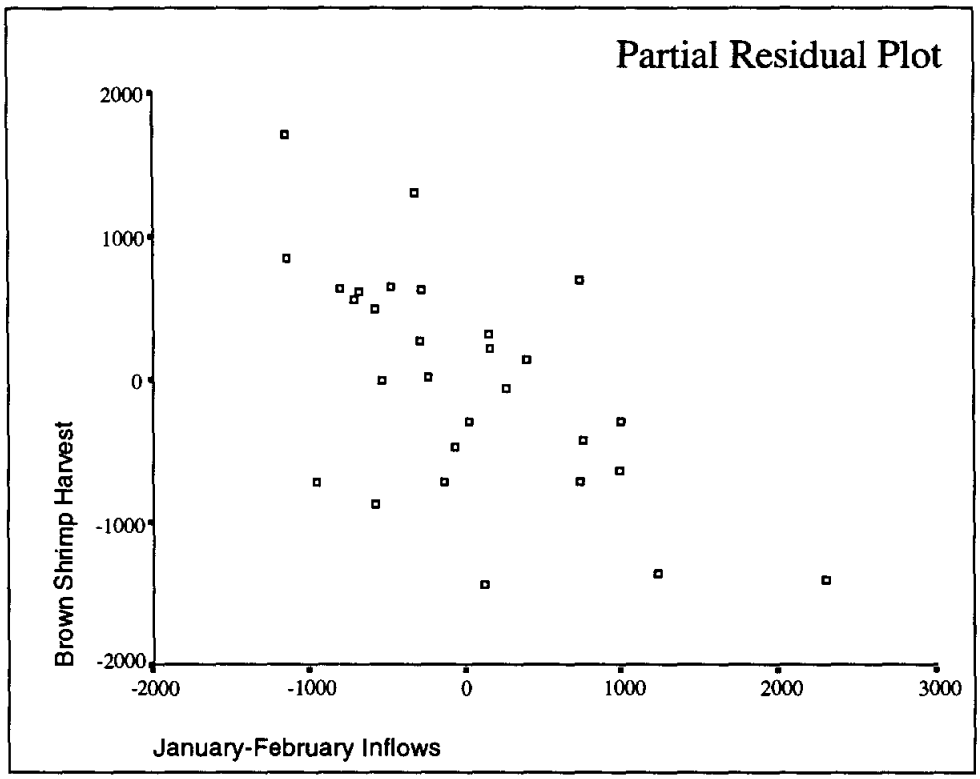
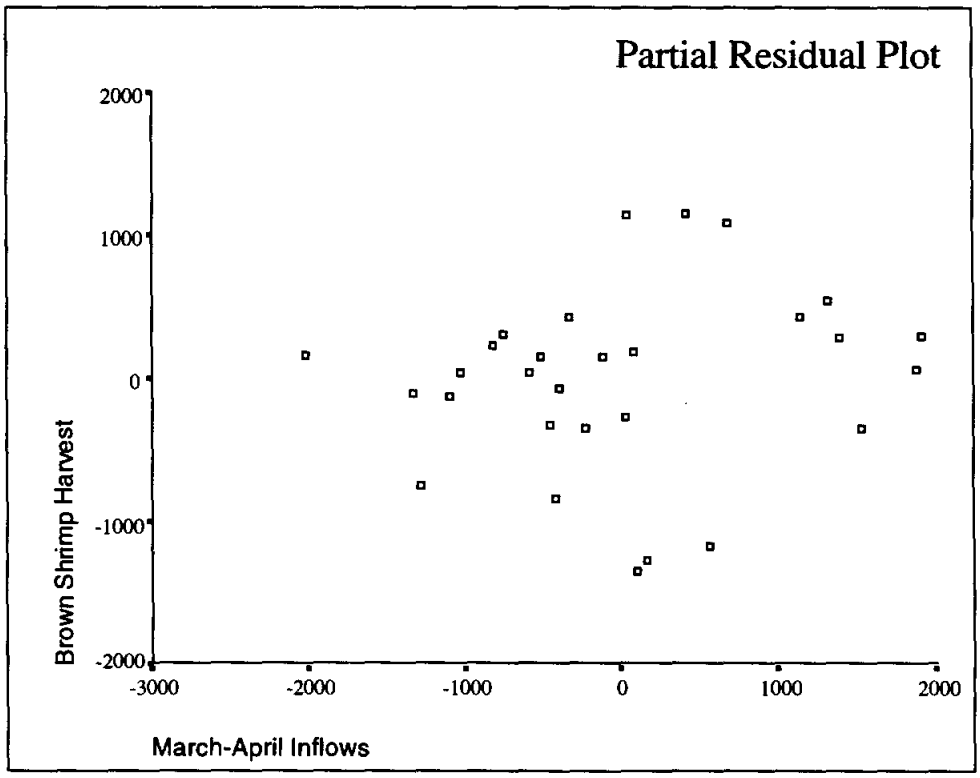
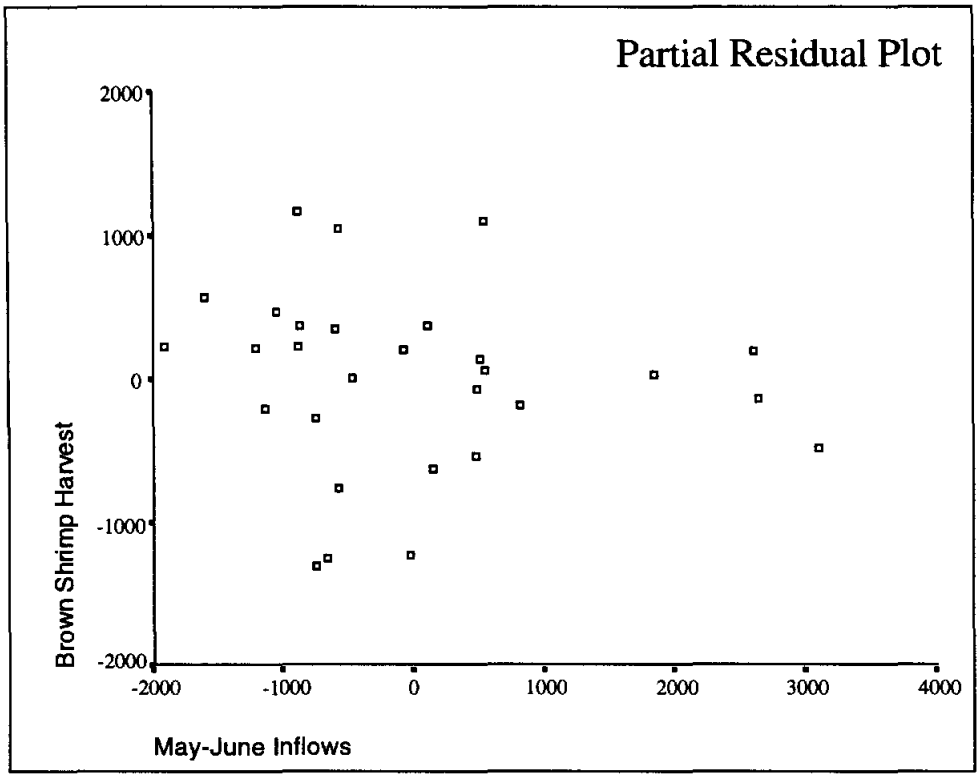
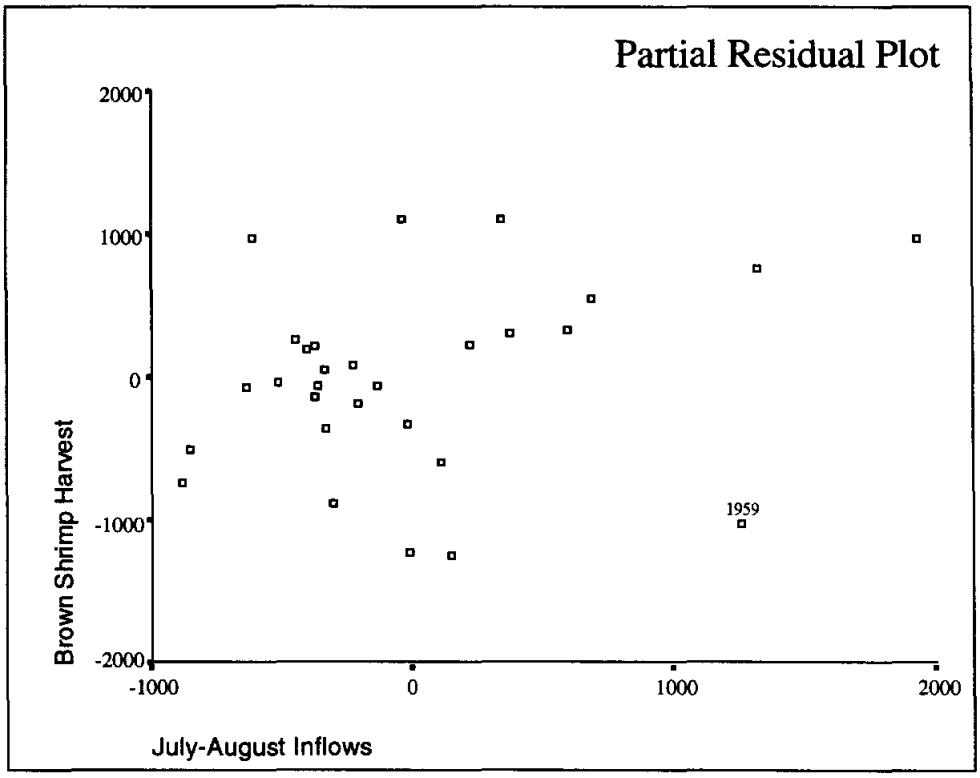
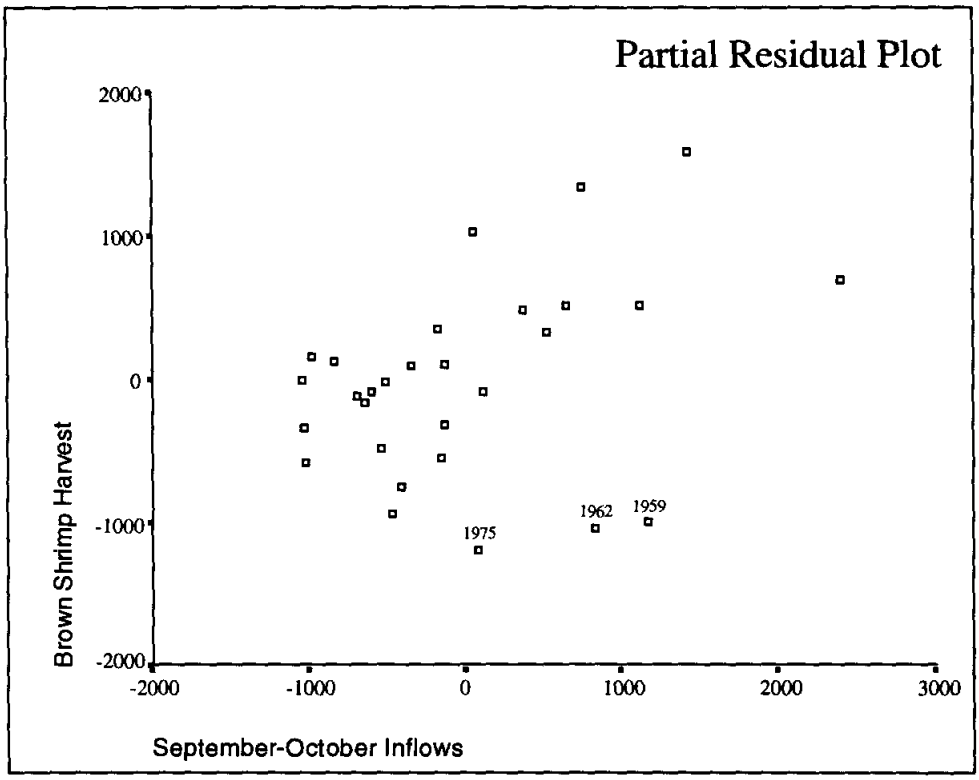
.50
.25
0.00
0.00
.25
.50
.75
1.00

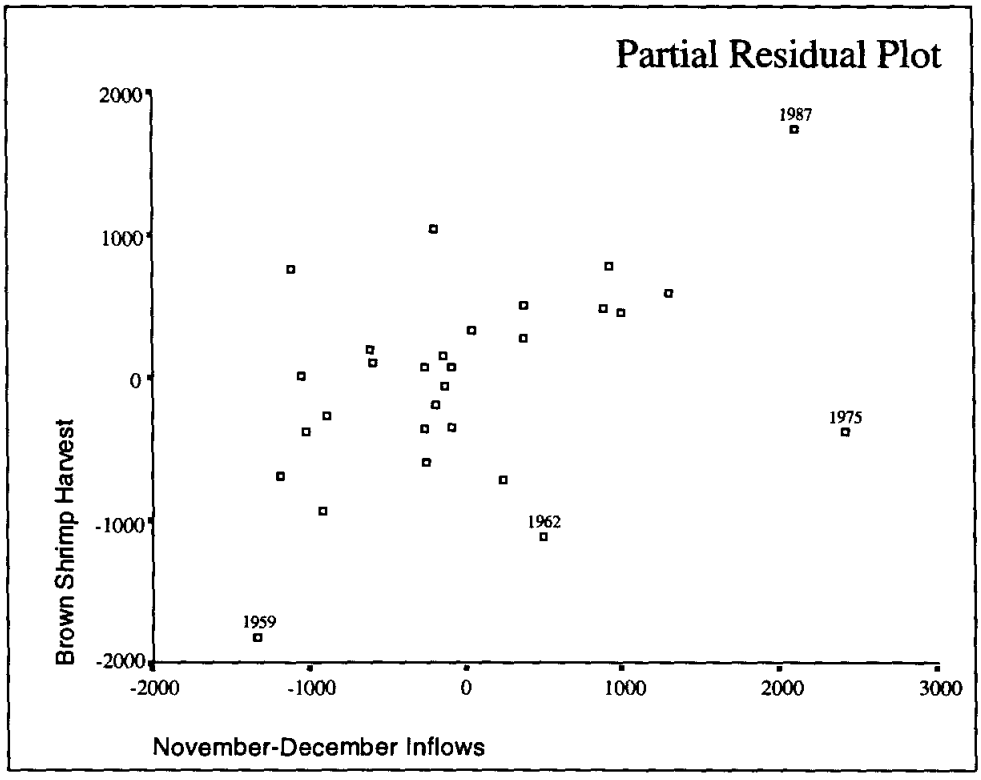

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-2000
-1000
0
1000
2000
3000
January-February Inflows

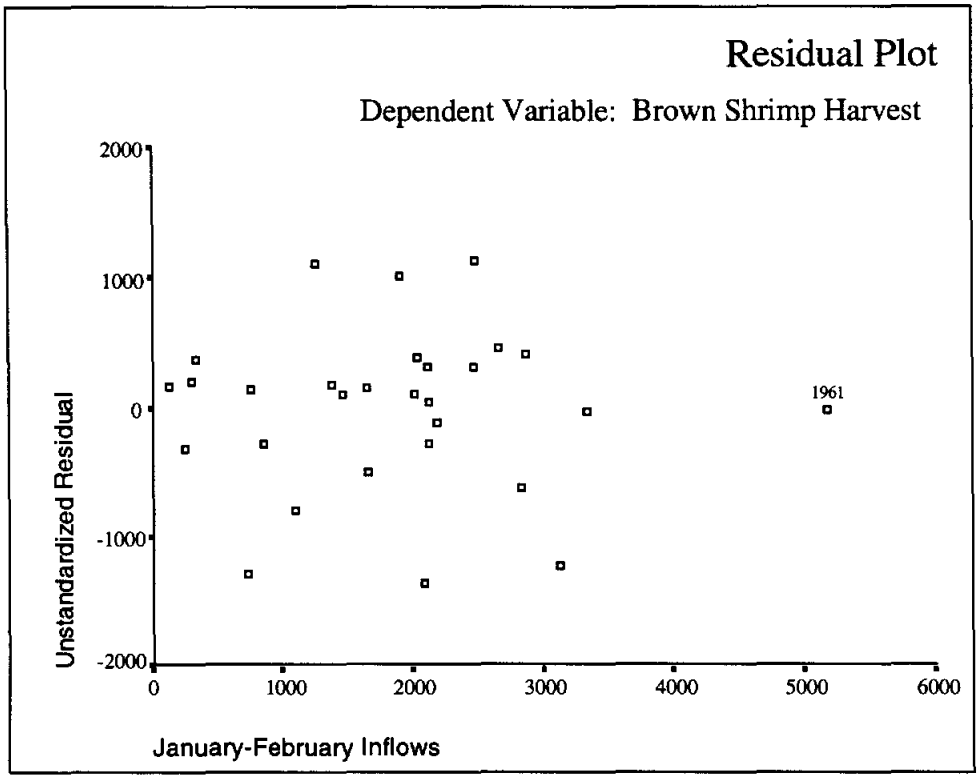

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-3000
-2000
-1000
0
1000
2000
March-April Inflows

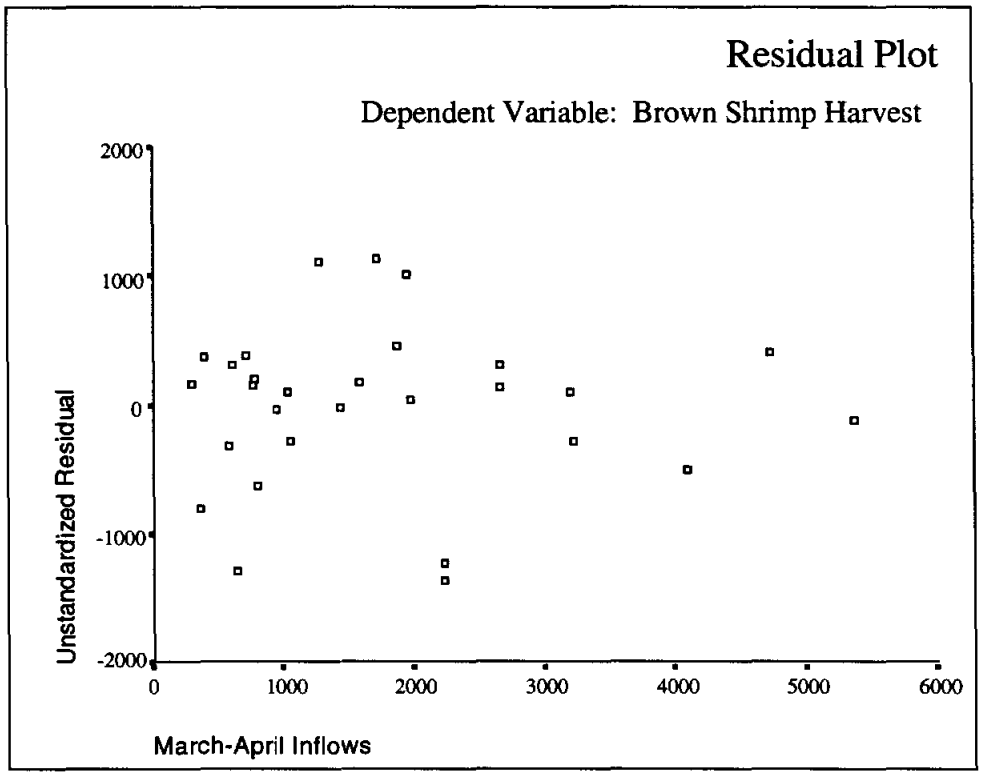

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
-2000
-1000
0
1000
2000
3000
4000
May-June Inflows

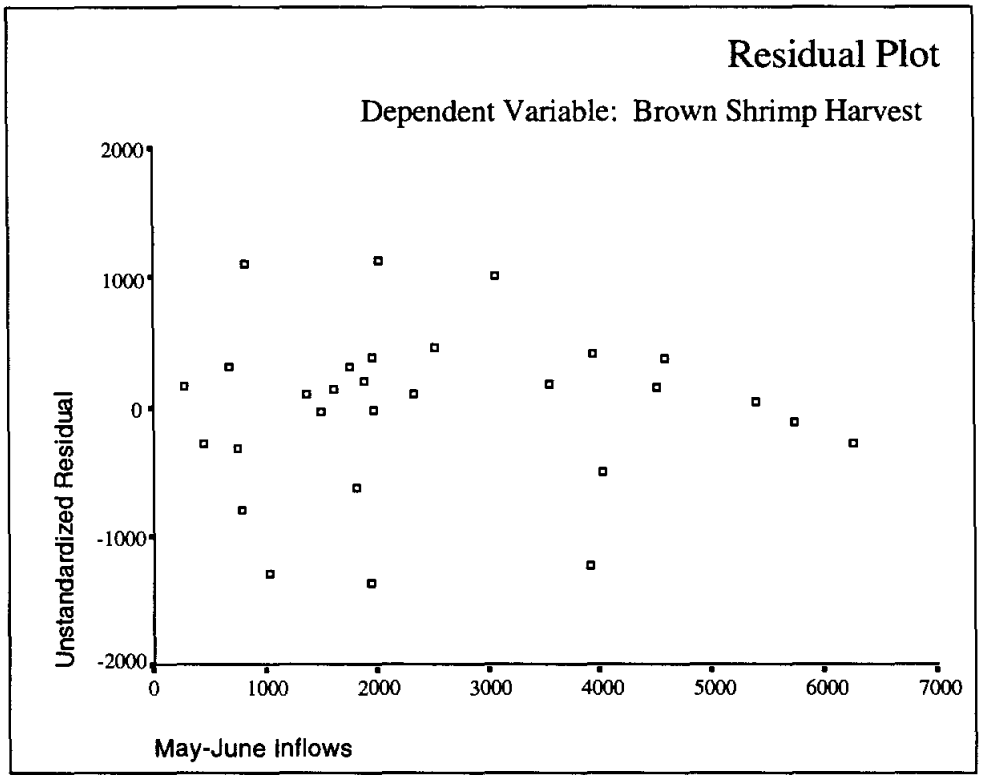

Partial Residual Plot
2000
1000
0
-1000
-2000
Brown Shrimp Harvest
1959
-1000
0
1000
2000
July-August Inflows

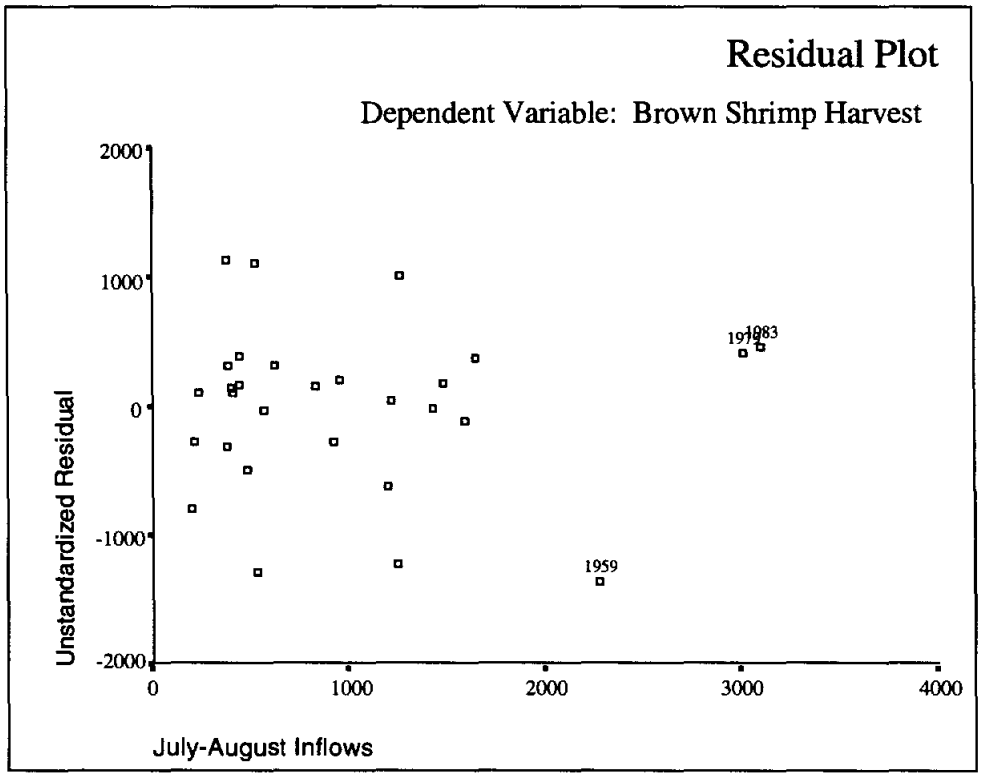

Partial Residual Plot
Brown Shrimp Harvest
2000
1000
0
-1000
-2000
1962
1959
1975
-2000
-1000
0
1000
2000
3000
September-October Inflows

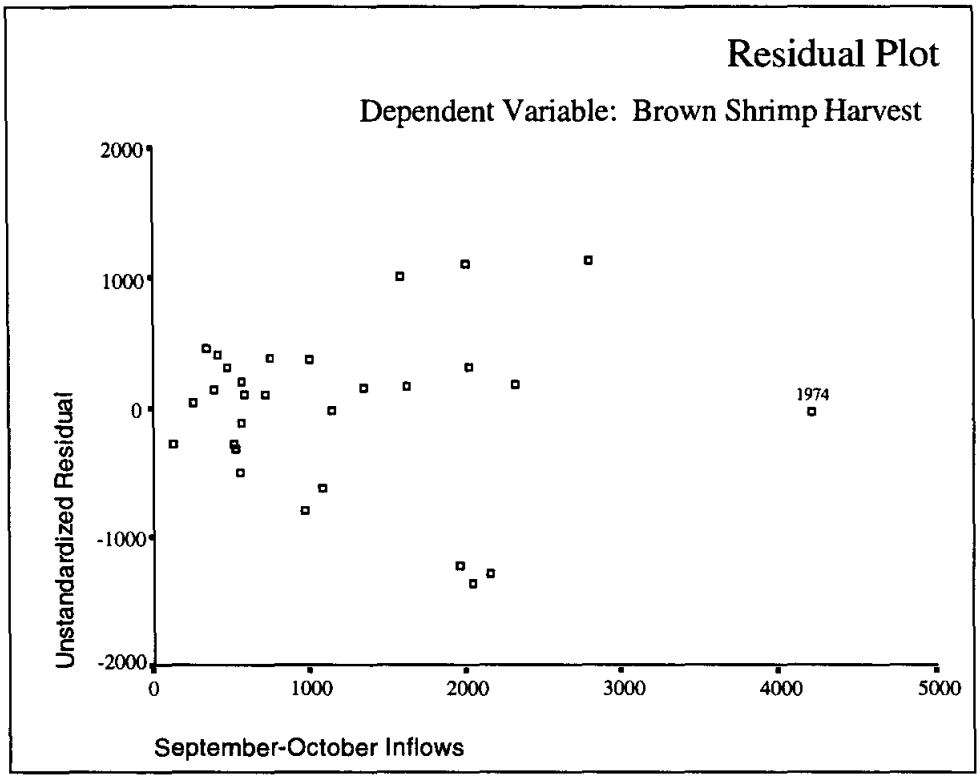

Partial Residual Plot
Brown Shrimp Harvest
2000
1000
0
-1000
-2000
1987
1975
1962
1959
-2000
-1000
0
1000
2000
3000
November-December Inflows

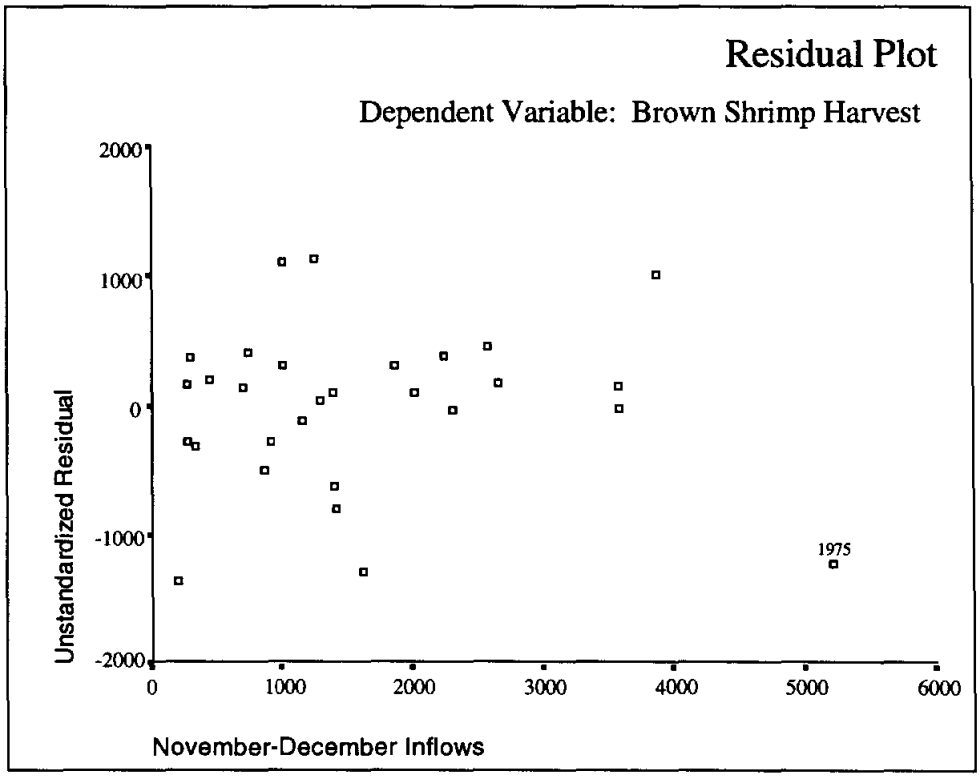

Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
1961
0
1000
2000
3000
4000
5000
6000
January-February Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
6000
March-April Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
1983
1959
0
1000
2000
3000
4000
July-August Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
1974
0
1000
2000
3000
4000
5000
September-October Inflows


Residual Plot
Dependent Variable: Brown Shrimp Harvest
Unstandardized Residual
2000
1000
0
-1000
-2000
1975
0
1000
2000
3000
4000
5000
6000
November-December Inflows

Prediction Intervals for Brown Shrimp Harvest

YEAR	BRSHRIMP	LICI_1	UICI_1
1959	23.30	-922.84926	3665.11121
1960	8.60	-1540.04836	2777.13337
1961	82.90	-2347.90699	2535.82682
1962	868.50	4.02501	4295.07151
1963	600.80	-719.28120	3498.24579
1964	717.10	-1190.08980	3155.61738
1965	1132.20	-1084.26201	3127.68261
1966	681.10	-1600.92137	2874.91662
1967	1148.50	-683.66772	3607.17982
1968	307.80	-1731.74024	2889.09015
1969	475.50	-1252.20142	3192.71039
1970	1556.00	-762.87911	3575.30703
1971	2050.10	-301.66886	4048.97839
1972	1453.00	-1054.03122	3180.09575
1973	955.40	-1237.88639	3374.60499
1974	1422.70	-981.22729	3880.59747
1975	828.40	-297.47927	4381.40208
1976	1798.00	-548.33271	3715.58552
1977	1381.50	-958.21654	3497.39970
1978	883.20	-1613.42426	2745.94383
1979	1315.00	-1475.10636	3274.02167
1980	2314.50	-1047.41019	3375.37197
1981	1991.90	-747.00237	3978.11824
1982	2535.30	152.59266	4551.29855
1983	1940.80	-940.35214	3876.49821
1984	2771.00	-459.79127	3759.41046
1985	1651.00	-805.47930	3457.75106
1986	2047.40	-369.45383	4147.68152
1987	3261.40	14.95655	4468.28313

BRSHRIMP Brown shrimp harvest
LICI_1 Lower limit for 99% prediction interval for brown shrimp harvest
UICI_1 Upper limit for 99% prediction interval for brown shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	7.70270	.33326	.27510	.3595	.0699
1960	3.50215	.02374	.12508	.8350	.0000
1961	12.58289	.00006	.44939	.0829	.0000
1962	3.11024	.09243	.11108	.8746	.0017
1963	2.02053	.02348	.07216	.9587	.0000
1964	3.93262	.00512	.14045	.7875	.0000
1965	1.93856	.00045	.06923	.9632	.0000
1966	5.93237	.00024	.21187	.5477	.0000
1967	3.10726	.00552	.11097	.8749	.0000
1968	8.22999	.01509	.29393	.3128	.0000
1969	5.45178	.02667	.19471	.6050	.0000
1970	3.81885	.00158	.13639	.8004	.0000
1971	4.00746	.00231	.14312	.7789	.0000
1972	2.26493	.00633	.08089	.9437	.0000
1973	8.09586	.00255	.28914	.3242	.0000
1974	12.21094	.00035	.43611	.0938	.0000
1975	9.17043	.36996	.32752	.2407	.0900
1976	2.70595	.00225	.09664	.9108	.0000
1977	5.61775	.00142	.20063	.5850	.0000
1978	4.13978	.00774	.14785	.7635	.0000
1979	10.32413	.05522	.36872	.1709	.0003
1980	5.10993	.13232	.18250	.6466	.0053
1981	9.92791	.04170	.35457	.1927	.0001
1982	4.73994	.00305	.16928	.6917	.0000
1983	11.45266	.09040	.40902	.1201	.0016
1984	2.04514	.04793	.07304	.9573	.0002
1985	2.69573	.00516	.09628	.9117	.0000
1986	6.57933	.00357	.23498	.4740	.0000
1987	5.58221	.11703	.19936	.5893	.0036

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	*-1.70777	.19393	-.09294	-.06208
1960	-.40643	-.10419	-.30107	.24651
1961	-.02048	.00188	-.01626	.00613
1962	-.86395	-.28879	.51649	-.07183
1963	-.40908	-.35432	.03917	.09982
1964	-.18573	-.17325	-.00357	-.00310
1965	.05458	.03724	.01077	-.01861
1966	.03991	.00221	.01466	-.02023
1967	-.19307	-.18529	.06521	.02110
1968	-.31912	.03837	-.09770	.04710
1969	-.42831	-.02160	.01357	-.26109
1970	.10272	.05941	-.04196	.06579
1971	.12443	.08184	-.05633	-.00606
1972	.20732	.11487	.05863	-.08651
1973	-.13063	.03853	.01313	-.08190
1974	-.04804	.01716	-.01666	.00518
1975	*-1.76610	.59806	.40619	-.31594
1976	.12303	.09508	-.05539	-.03307
1977	.09754	.02537	-.01385	.07290
1978	.22865	.15717	.12855	-.08347
1979	.61546	-.12368	.03476	.24211
1980	*1.02105	-.18196	.38661	.01694
1981	.53344	.08957	-.09706	-.32585
1982	.14308	-.03502	-.08625	.00498
1983	.79162	.03561	-.07846	-.07465
1984	.60556	.21671	-.14074	.14825
1985	.18669	-.02028	.01978	.11273
1986	.15476	-.00253	-.04111	-.05783
1987	.94372	-.09792	-.53929	.25568

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for January-February inflows
SDFBETA_2 Standardized dfbeta for March-April inflows

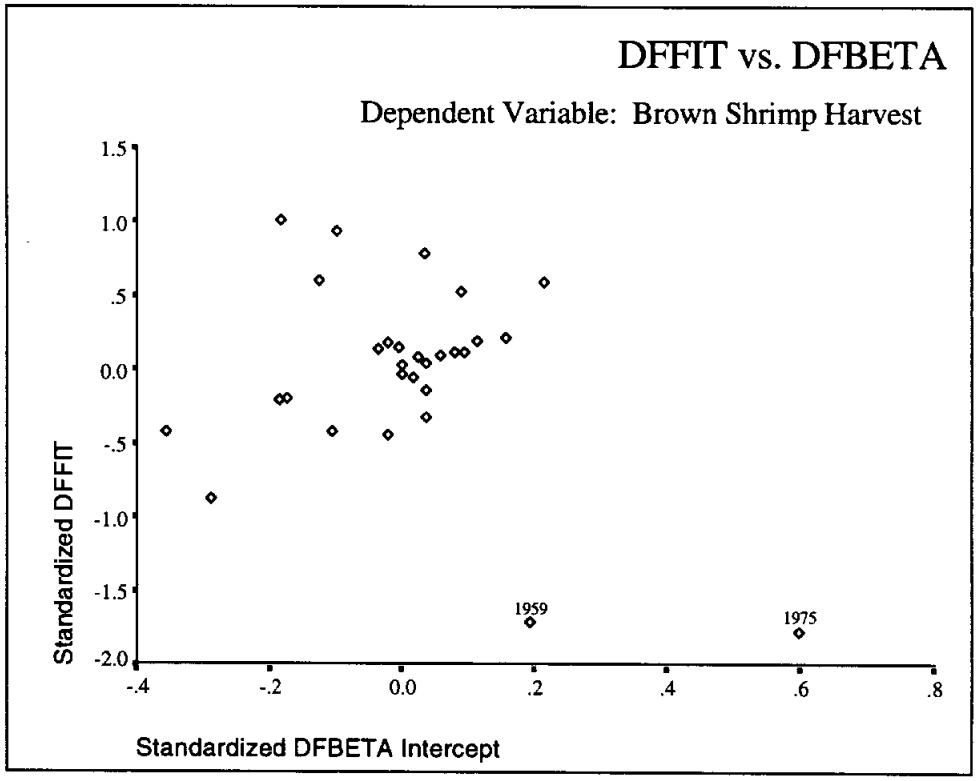
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

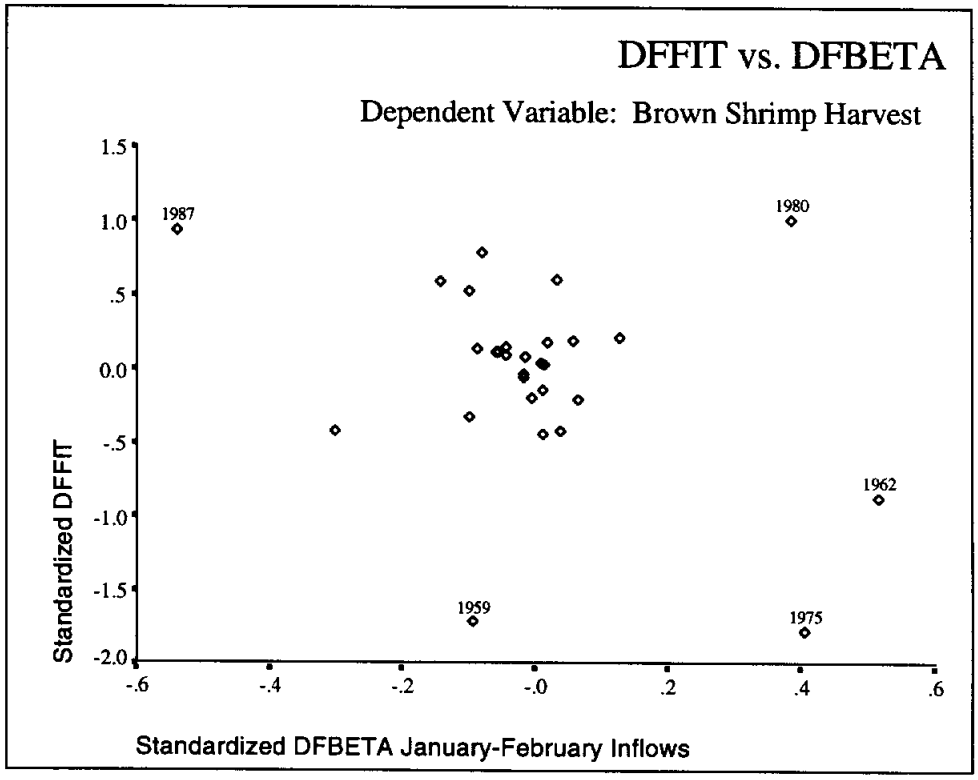
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.34119	*-1.11686	-.81161	.82304
1960	-.02262	-.03335	.09241	.18845
1961	.00203	.00112	.00681	.00072
1962	.22237	-.09762	-.42789	-.23049
1963	.10775	.10902	.12907	-.06282
1964	.07548	.04207	.10117	.02320
1965	.01418	-.03119	-.02625	-.00291
1966	.03216	-.00832	-.01152	-.01427
1967	.05647	.00197	.06030	.00805
1968	-.26020	.13661	.01585	.13359
1969	-.06538	.22694	.02816	.04385
1970	-.04511	-.02376	-.02794	.01895
1971	-.03878	.01928	.03530	-.01534
1972	.01060	-.07814	-.11409	.04608
1973	-.02851	.01347	-.00653	.00871
1974	-.00525	.00753	-.03789	.01433
1975	.00952	.00914	-.06137	*-1.44095
1976	-.00350	.03689	-.02603	-.00950
1977	-.05780	-.02978	-.02686	.04056
1978	-.04804	-.06256	-.12423	-.06370
1979	-.15317	.37131	-.03529	-.11860
1980	.17973	-.38708	.70675	-.48932
1981	.33737	.17008	.07347	-.18097
1982	.02487	.05450	.08000	.05728
1983	-.28644	.66447	-.26065	.22366
1984	-.24422	-.01669	.31407	-.07107
1985	-.06714	-.05574	.07644	.00532
1986	.08314	-.01920	-.00829	.07883
1987	-.16772	.19455	.02515	.83329

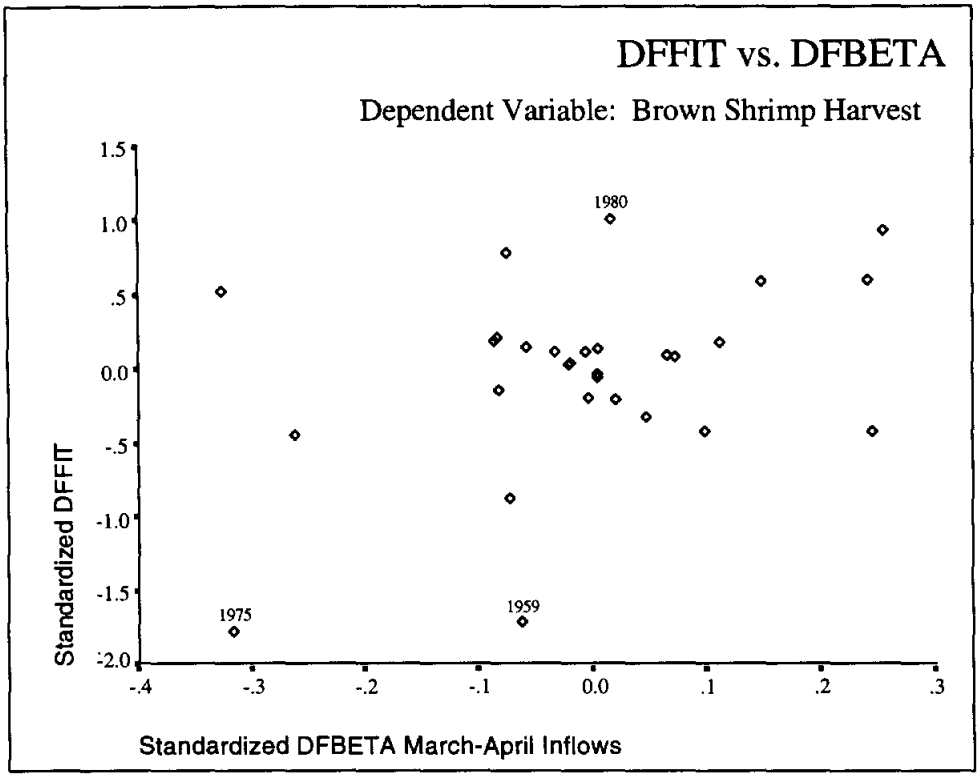
SDFBETA_3 Standardized dfbeta for May-June inflows
SDFBETA_4 Standardized dfbeta for July-August inflows
SDFBETA_5 Standardized dfbeta for September-October inflows
SDFBETA_6 Standardized dfbeta for November-December inflows

*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

Graphics


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1959
1975
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFBETA Intercept


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1987
1980
1962
1959
1975
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA January-February Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
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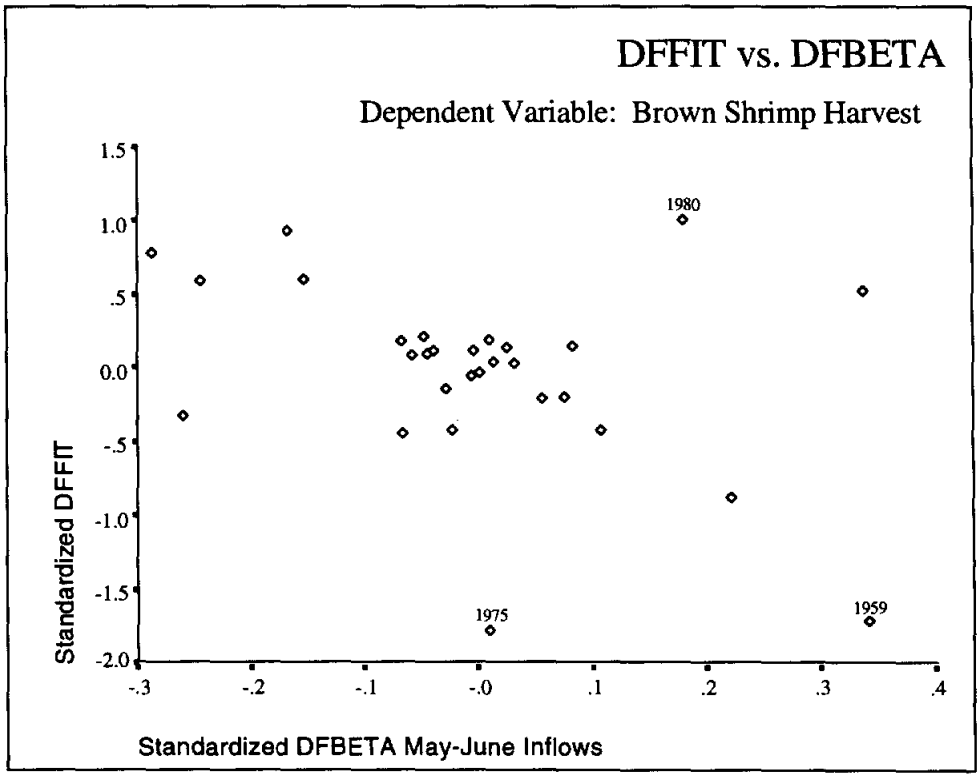
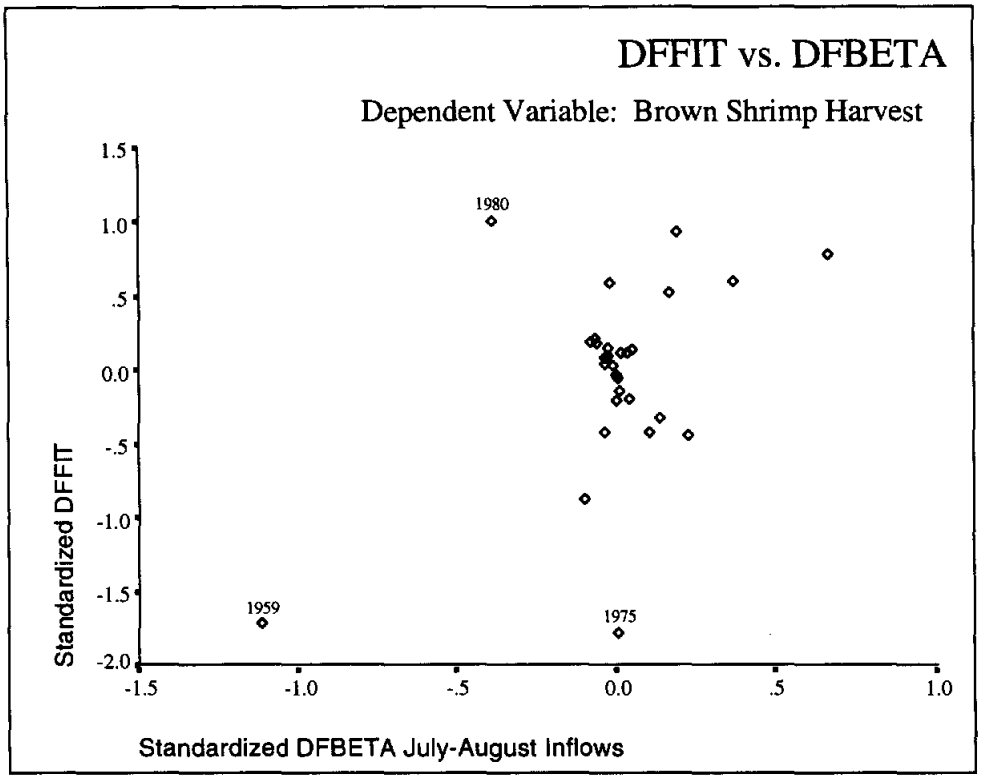
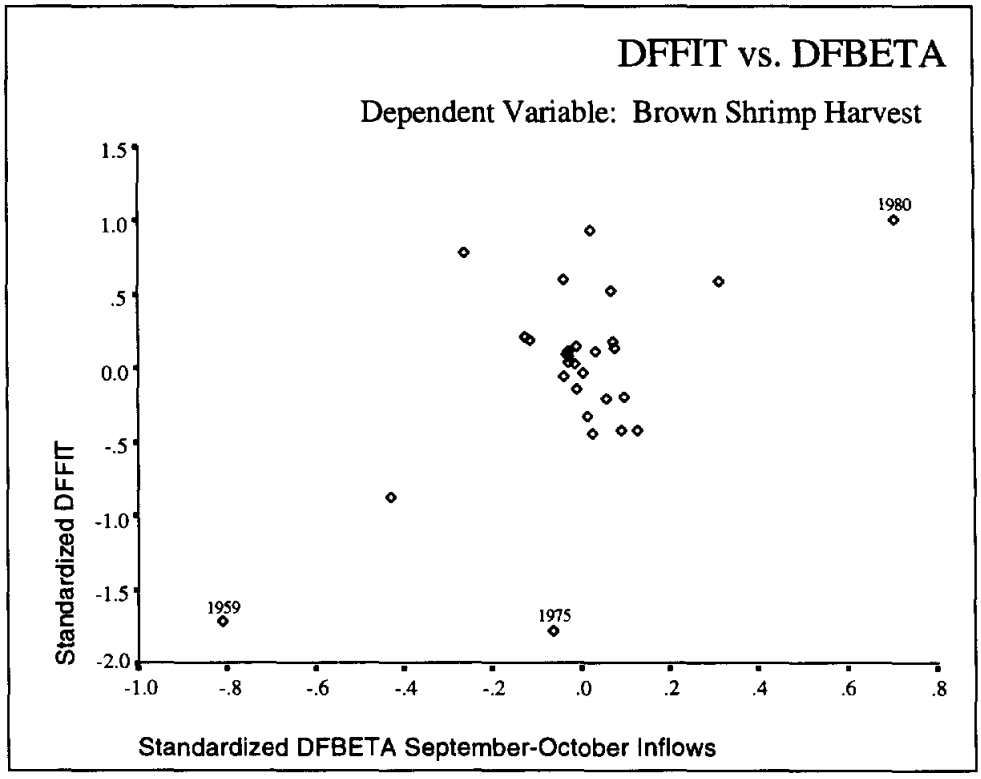
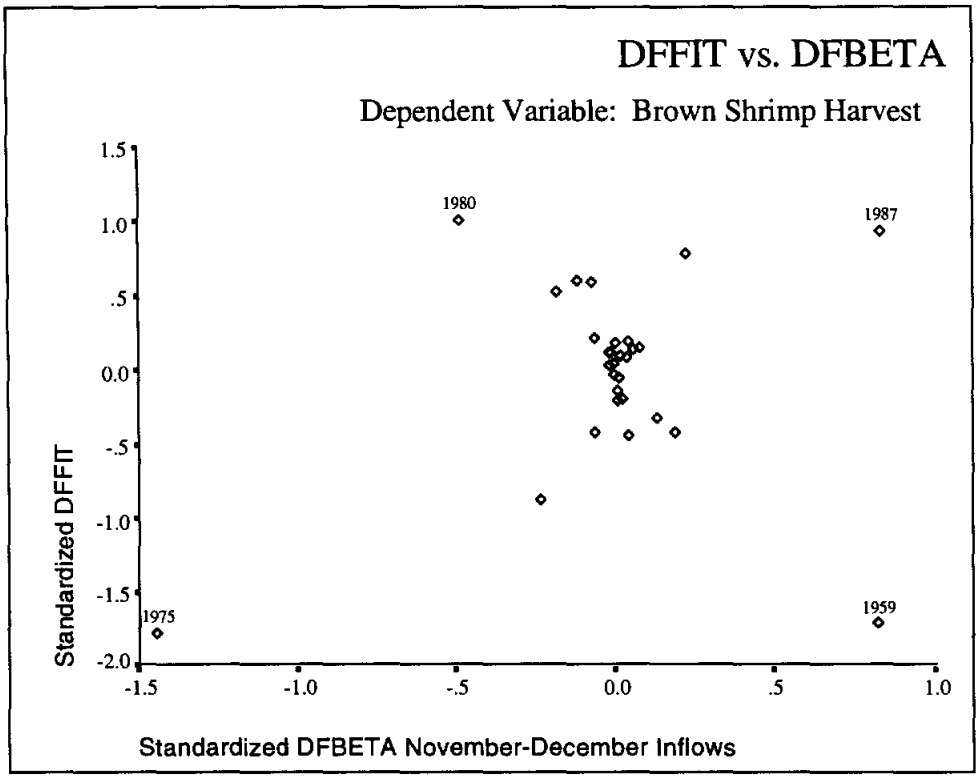
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1975
1959
-.4
-.3
-.2
-.1
0.0
.1
.2
.3
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1975
1959
-.3
-.2
-.1
-.0
.1
.2
.3
.4
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1959
1975
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA July-August Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1959
1975
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
.8
Standardized DFBETA September-October Inflows


DFFIT vs. DFBETA
Dependent Variable: Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1980
1987
1975
1959
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA November-December Inflows

Regression—Square Root of Harvest (Box–Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows*[c,d]	.	*.649*	*.421*	*.263*	*11.630239*	*.780*

a. Dependent Variable: Square Root of Brown Shrimp Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2164.467*	*6*	*360.744*	*2.667*	*.042*[b]
	Residual	*2975.774*	*22*	*135.262*		
	Total	*5140.241*	*28*			

a. Dependent Variable: Square Root of Brown Shrimp Harvest

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, September-October Inflows, July-August Inflows, May-June Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*34.441*	*5.920*		*5.818*	*.000*	*22.164*	*46.718*
	January-February Inflows	*-1.035E-02*	*.003*	*-.840*	*-3.703*	*.001*	*-.016*	*-.005*
	March-April Inflows	*2.328E-03*	*.002*	*.229*	*1.055*	*.303*	*-.002*	*.007*
	May-June Inflows	*-9.657E-04*	*.002*	*-.119*	*-.553*	*.586*	*-.005*	*.003*
	July-August Inflows	*2.508E-03*	*.003*	*.144*	*.747*	*.463*	*-.004*	*.009*
	September-October Inflows	*4.009E-03*	*.003*	*.277*	*1.533*	*.140*	*-.001*	*.009*
	November-December Inflows	*5.824E-03*	*.002*	*.534*	*2.476*	*.021*	*.001*	*.011*

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	*.511*	*1.957*
	March-April Inflows	*.557*	*1.796*
	May-June Inflows	*.566*	*1.767*
	July-August Inflows	*.707*	*1.414*
	September-October Inflows	*.807*	*1.240*
	November-December Inflows	*.565*	*1.770*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	*5.541*	*1.000*	*.00*	*.00*	*.00*
	2	*.608*	*3.019*	*.00*	*.00*	*.07*
	3	*.266*	*4.562*	*.04*	*.03*	*.07*
	4	*.230*	*4.904*	*.00*	*.00*	*.12*
	5	*.171*	*5.698*	*.01*	*.26*	*.23*
	6	*.106*	*7.244*	*.89*	*.01*	*.13*
	7	*7.785E-02*	*8.437*	*.05*	*.69*	*.38*

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	*.00*	*.01*	*.01*	*.01*
	2	*.03*	*.05*	*.20*	*.05*
	3	*.00*	*.02*	*.33*	*.35*
	4	*.06*	*.80*	*.03*	*.05*
	5	*.42*	*.01*	*.01*	*.02*
	6	*.05*	*.03*	*.43*	*.02*
	7	*.43*	*.09*	*.00*	*.50*

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*11.404783*	*49.052925*	*33.765244*	*8.792178*	*29*
Std. Predicted Value	*-2.543*	*1.739*	*.000*	*1.000*	*29*
Standard Error of Predicted Value	*3.745531*	*8.090097*	*5.561849*	*1.332914*	*29*
Adjusted Predicted Value	*13.560889*	*53.952686*	*33.625028*	*9.796531*	*29*
Residual	*-26.486700*	*17.796707*	*3.92024E-15*	*10.309105*	*29*
Std. Residual	*-2.277*	*1.530*	*.000*	*.886*	*29*
Stud. Residual	*-2.741*	*1.729*	*.004*	*1.031*	*29*
Deleted Residual	*-38.363117*	*22.728296*	*.140216*	*14.083108*	*29*
Stud. Deleted Residual	*-3.300*	*1.818*	*-.020*	*1.106*	*29*
Mahal. Distance	*1.939*	*12.583*	*5.793*	*3.236*	*29*
Cook's Distance	*.001*	*.481*	*.056*	*.101*	*29*
Centered Leverage Value	*.069*	*.449*	*.207*	*.116*	*29*

a. Dependent Variable: Square Root of Brown Shrimp Harvest

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	31.31371	-26.48670	-38.36312	43.19012	-.27883	-2.27740	-2.74083	*-3.29982
1960	20.78512	-17.85254	-21.24189	24.17446	-1.47633	-1.53501	-1.67440	-1.75129
1961	11.40478	-2.29984	-4.45595	13.56089	-2.54322	-.19775	-.27525	-.26939
1962	46.86934	-17.39902	-20.36313	49.83345	1.49043	-1.49602	-1.61844	-1.68470
1963	35.78469	-11.27347	-12.61925	37.13047	.22969	-.96932	-1.02555	-1.02682
1964	30.32554	-3.54682	-4.29883	31.07755	-.39122	-.30497	-.33574	-.32887
1965	30.54047	3.10771	3.46733	30.18084	-.36678	.26721	.28225	.27626
1966	23.43665	2.66124	3.53115	22.56674	-1.17475	.22882	.26358	.25793
1967	37.45778	-3.56825	-4.17562	38.06515	.41998	-.30681	-.33189	-.32508
1968	23.65713	-6.11290	-9.10214	26.64637	-1.14967	-.52560	-.64137	-.63256
1969	31.38095	-9.57499	-12.42197	34.22793	-.27118	-.82328	-.93773	-.93504
1970	37.99895	1.44721	1.74546	37.70070	.48153	.12444	.13666	.13357
1971	42.78393	2.49410	3.03273	42.24530	1.02576	.21445	.23647	.23133
1972	30.29671	7.82152	8.84161	29.27663	-.39450	.67252	.71503	.70685
1973	31.81112	-.90157	-1.33294	32.24248	-.22226	-.07752	-.09426	-.09211
1974	32.40037	5.31833	10.04572	27.67297	-.15524	.45728	.62848	.61961
1975	44.84093	-16.05899	-25.17075	53.95269	1.25972	-1.38080	-1.72870	-1.81685
1976	38.61798	3.78485	4.35603	38.04680	.55194	.32543	.34913	.34205
1977	35.37200	1.79654	2.34877	34.81977	.18275	.15447	.17662	.17269
1978	22.06747	7.65121	9.35735	20.36133	-1.33047	.65787	.72753	.71951
1979	25.53312	10.72981	17.97896	18.28397	-.93630	.92258	1.19423	1.20654
1980	30.31254	17.79671	22.72830	25.38096	-.39270	1.53021	1.72928	1.81756
1981	37.43063	7.20008	11.78507	32.84564	.41689	.61908	.79204	.78510
1982	49.05292	1.29884	1.63123	48.72053	1.73878	.11168	.12515	.12232
1983	33.03898	11.01553	19.79454	24.25998	-.08260	.94715	1.26966	1.28857
1984	38.90819	13.73210	15.38651	37.25378	.58495	1.18072	1.24983	1.26690
1985	34.02352	6.60898	7.60316	33.02934	.02938	.56826	.60950	.60058
1986	43.21988	2.02833	2.77647	42.47173	1.07535	.17440	.20405	.19954
1987	48.52666	8.58201	11.20144	45.90723	1.67893	.73790	.84303	.83728

PRE_1 Predicted value of harvest

RES_1 Ordinary residual; observed harvest minus predicted harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of harvest

ZRE_1 Z-score of the residual

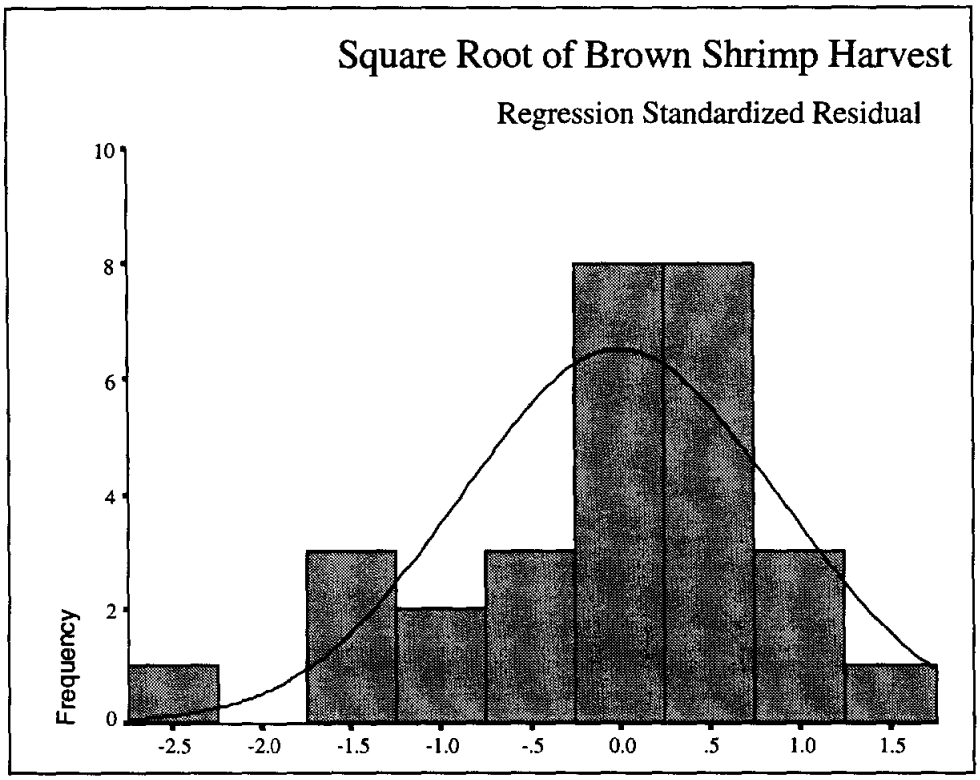
SRE_1 Studentized residual

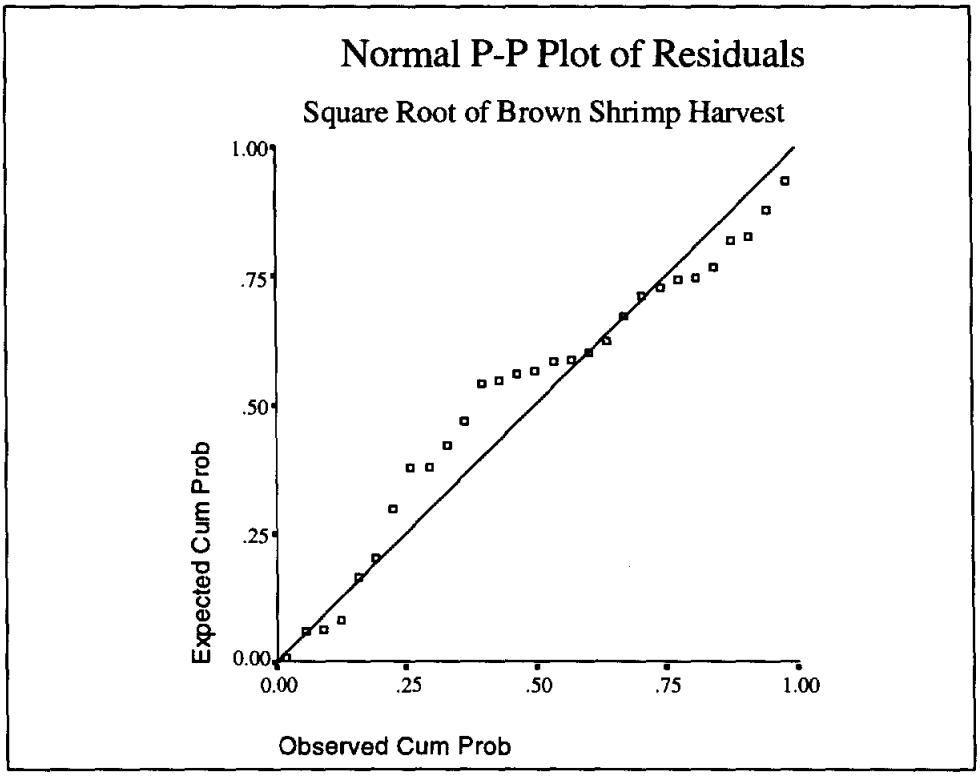
SDR_1 Studentized deleted residuals

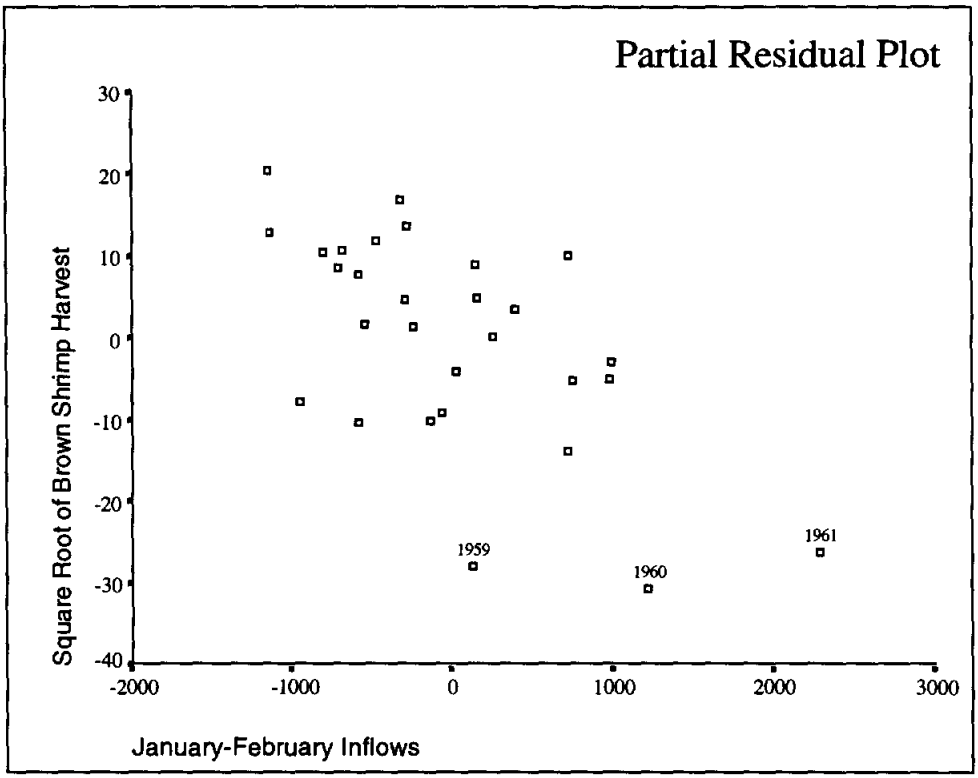
[1]Values greater than 3 are flagged.

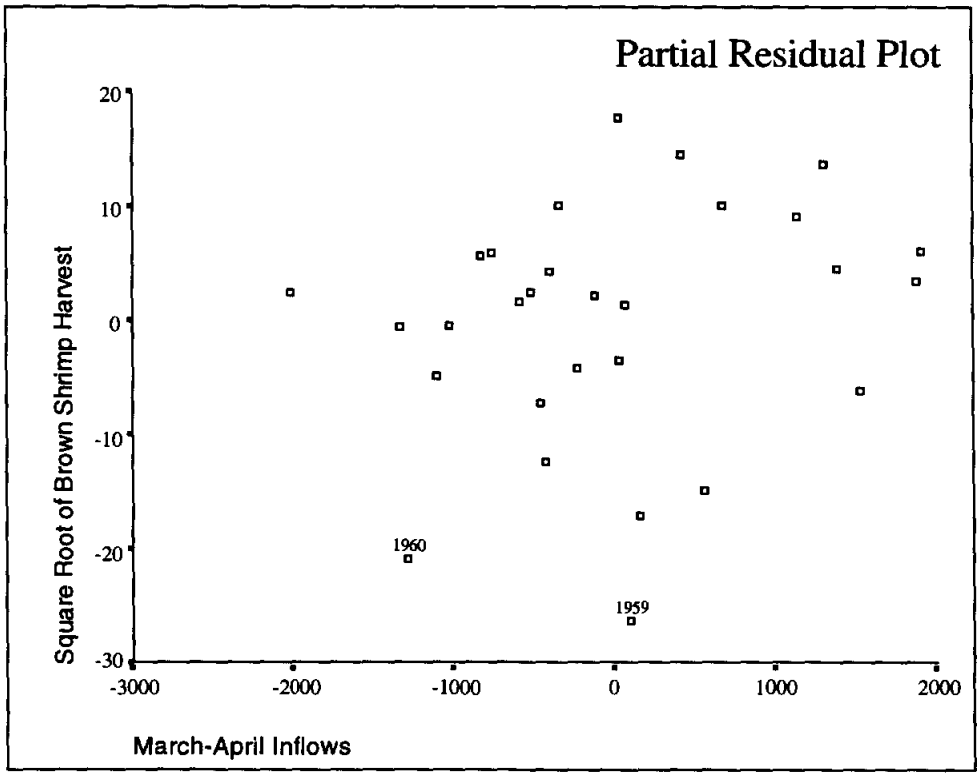
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{21,0.01} = 2.518$.

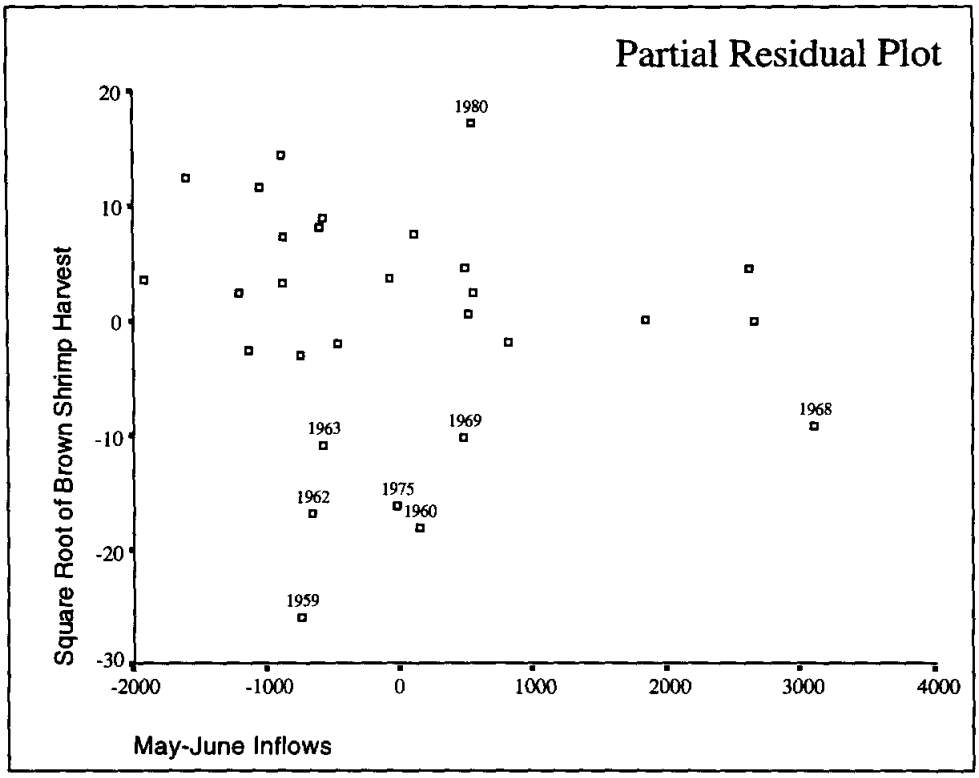
Graphics

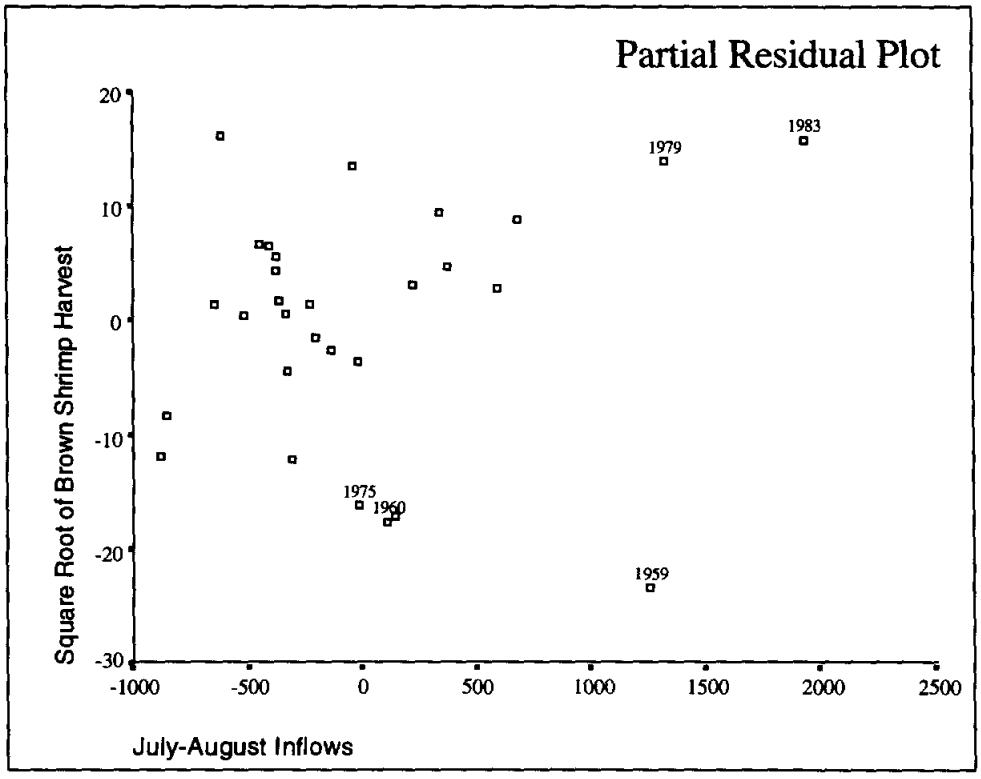

Square Root of Brown Shrimp Harvest
Regression Standardized Residual
Frequency
10
8
6
4
2
0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

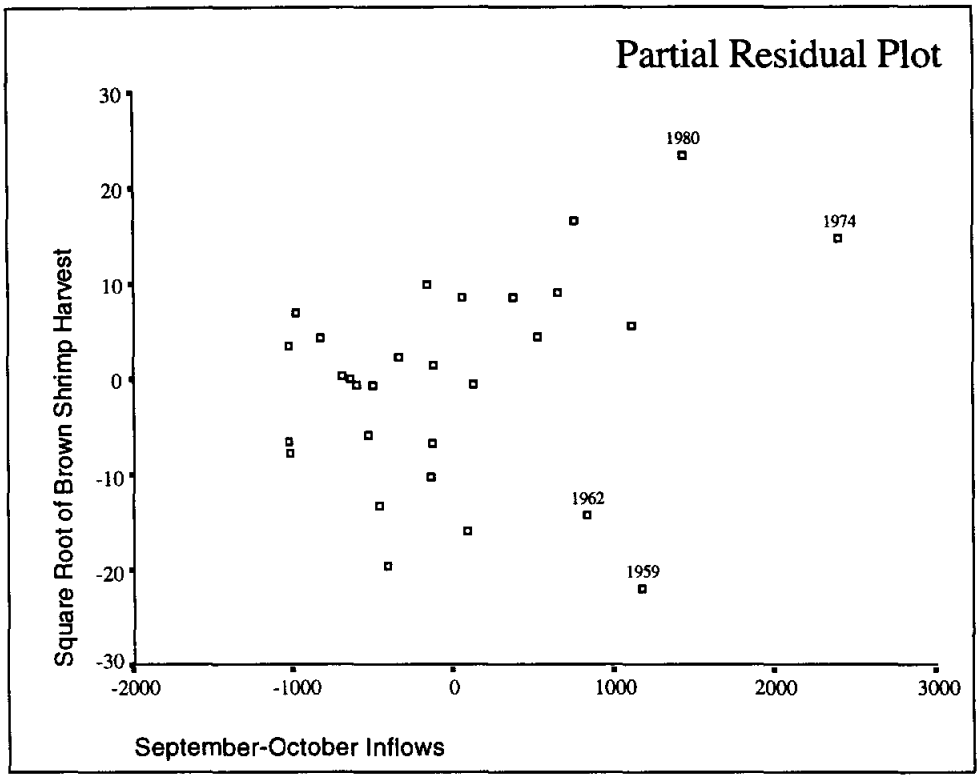

Normal P-P Plot of Residuals
Square Root of Brown Shrimp Harvest
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

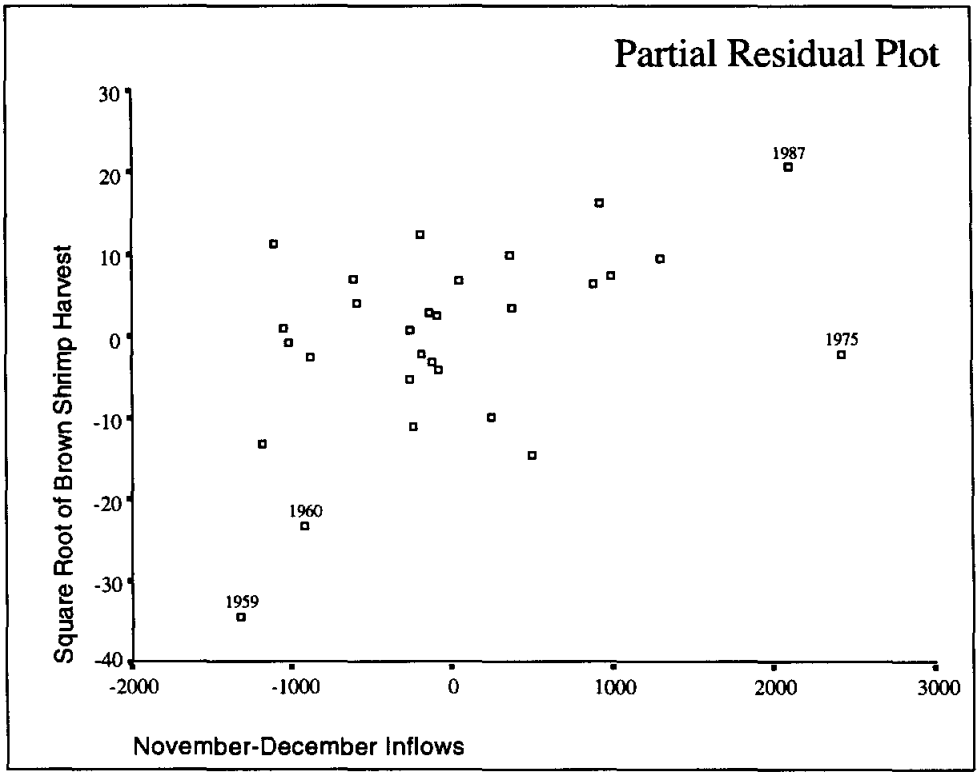

Partial Residual Plot
Square Root of Brown Shrimp Harvest
30
20
10
0
-10
-20
-30
-40
-2000
-1000
0
1000
2000
3000
1959
1960
1961
January-February Inflows

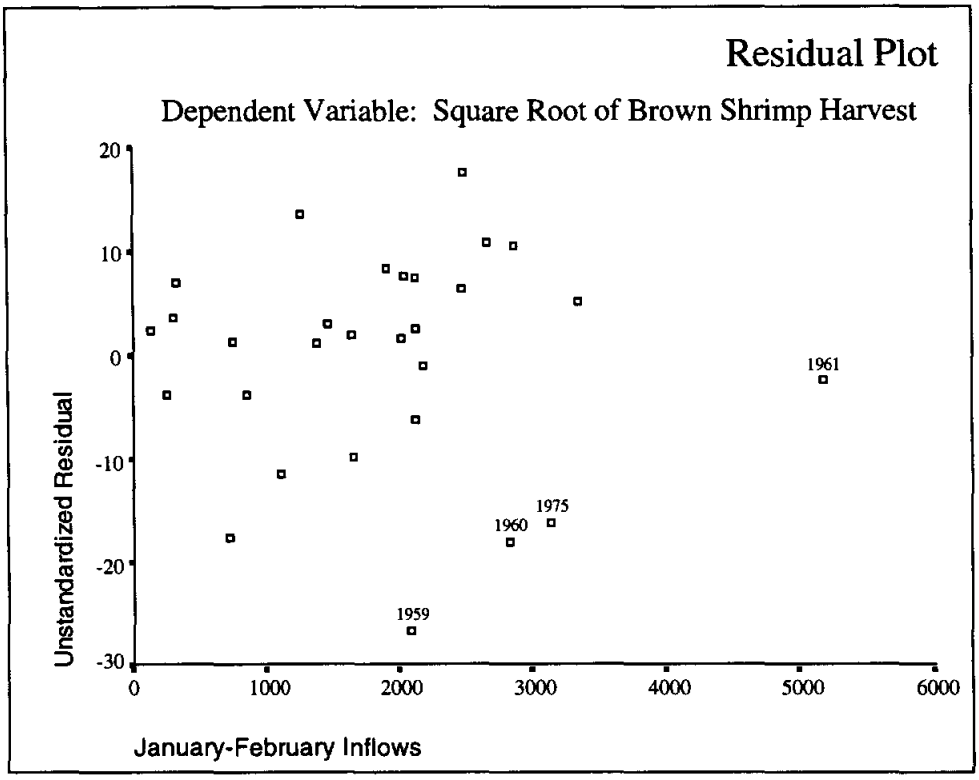

Partial Residual Plot
Square Root of Brown Shrimp Harvest
20
10
0
-10
-20
-30
-3000
-2000
-1000
0
1000
2000
1960
1959
March-April Inflows

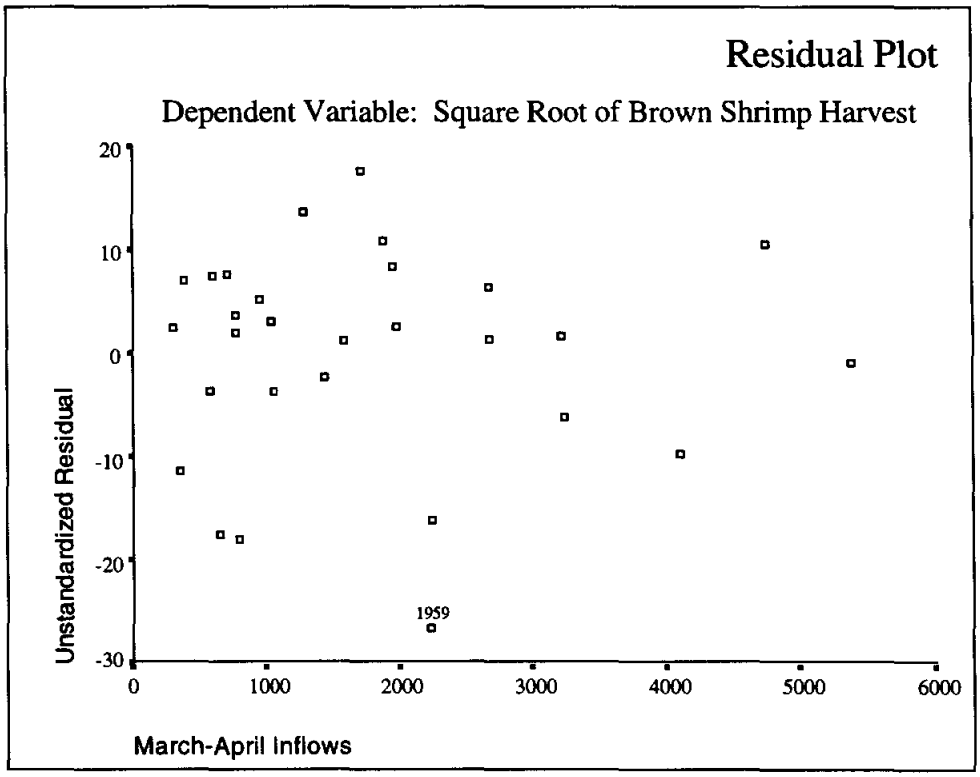

Partial Residual Plot
Square Root of Brown Shrimp Harvest
May-June Inflows
20
10
0
-10
-20
-30
-2000
-1000
0
1000
2000
3000
4000
1980
1968
1963
1969
1962
1975
1960
1959

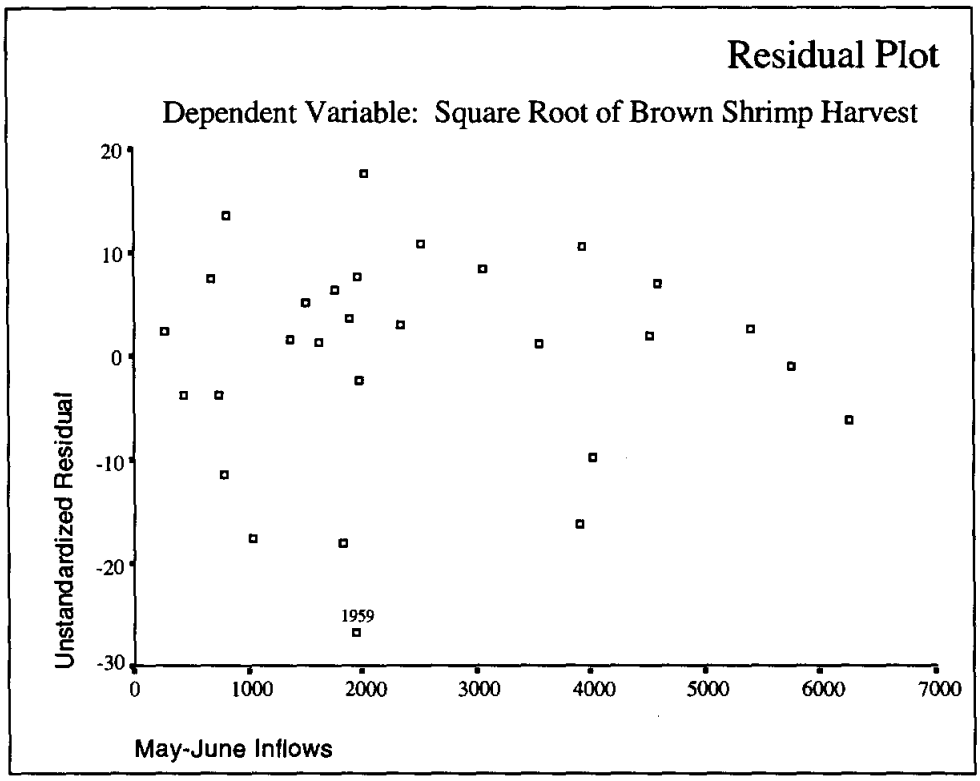

Partial Residual Plot
Square Root of Brown Shrimp Harvest
July-August Inflows
20
10
0
-10
-20
-30
-1000
-500
0
500
1000
1500
2000
2500
1983
1979
1975
1960
1959

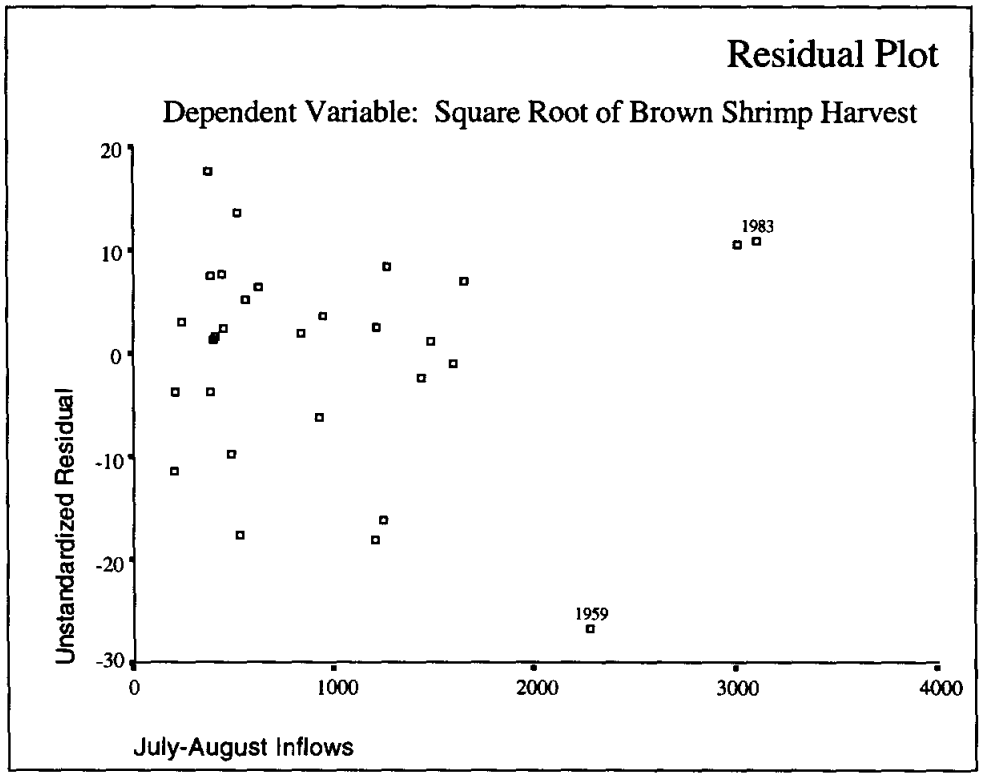

Partial Residual Plot
Square Root of Brown Shrimp Harvest
September-October Inflows
30
20
10
0
-10
-20
-30
-2000
-1000
0
1000
2000
3000
1980
1974
1962
1959

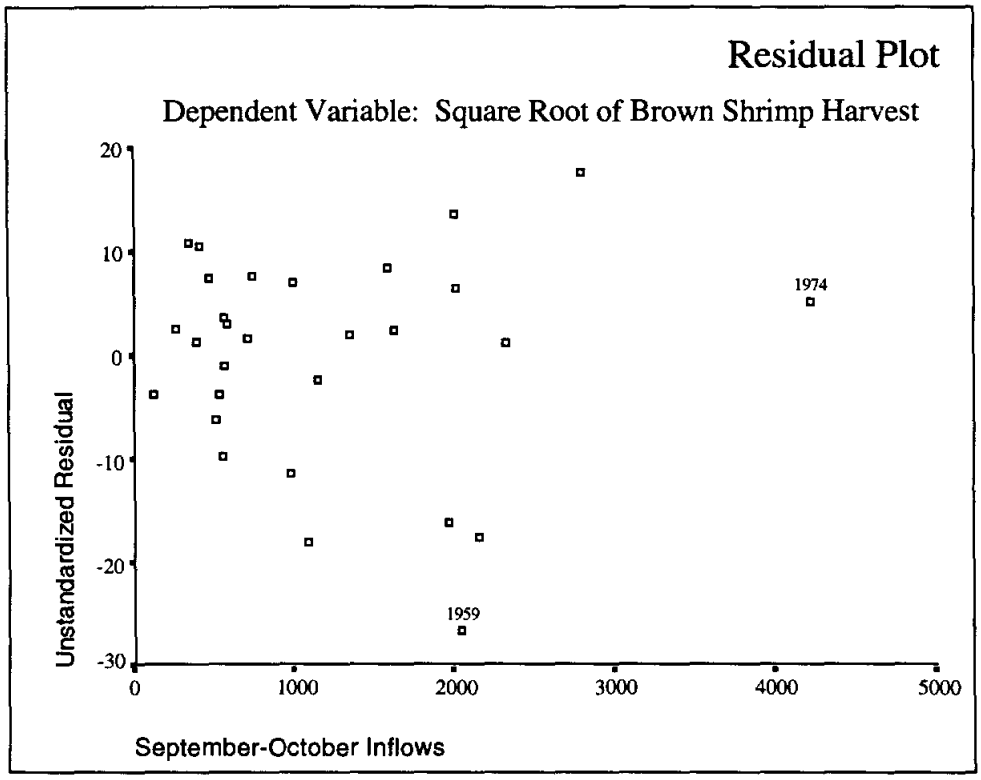

Partial Residual Plot
Square Root of Brown Shrimp Harvest
November-December Inflows
30
20
10
0
-10
-20
-30
-40
-2000
-1000
0
1000
2000
3000
1987
1975
1960
1959

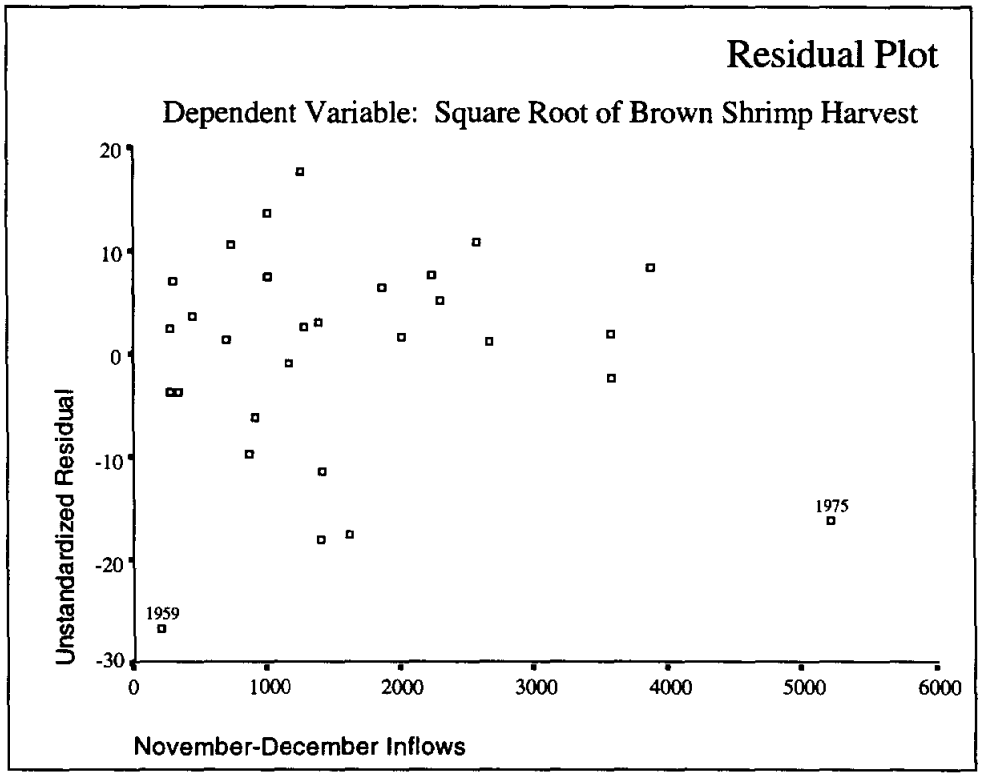

Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
5000
6000
1961
1975
1960
1959
January-February Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
5000
6000
1959
March-April Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1959
0
1000
2000
3000
4000
5000
6000
7000
May-June Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1983
1959
0
1000
2000
3000
4000
July-August Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1974
1959
0
1000
2000
3000
4000
5000
September-October Inflows


Residual Plot
Dependent Variable: Square Root of Brown Shrimp Harvest
Unstandardized Residual
20
10
0
-10
-20
-30
1975
1959
0
1000
2000
3000
4000
5000
6000
November-December Inflows

Prediction Intervals for the Square Root of Brown Shrimp Harvest

YEAR	SQRTBRSH	LICI_1	UICI_1
1959	4.8270	-6.20190	68.82932
1960	2.9326	-14.51634	56.08658
1961	9.1049	-28.52936	51.33892
1962	29.4703	11.78159	81.95709
1963	24.5112	1.29811	70.27128
1964	26.7787	-5.20917	65.86026
1965	33.6482	-3.90047	64.98141
1966	26.0979	-13.16214	60.03544
1967	33.8895	2.37165	72.54391
1968	17.5442	-14.12726	61.44151
1969	21.8060	-4.96495	67.72686
1970	39.4462	2.52574	73.47216
1971	45.2780	7.20883	78.35904
1972	38.1182	-4.32561	64.91904
1973	30.9095	-5.90508	69.52732
1974	37.7187	-7.35462	72.15536
1975	28.7819	6.58186	83.09999
1976	42.4028	3.75205	73.48391
1977	37.1685	-1.06143	71.80543
1978	29.7187	-13.57894	57.71389
1979	36.2629	-13.30035	64.36659
1980	48.1093	-5.85241	66.47750
1981	44.6307	-1.20653	76.06780
1982	50.3518	13.08484	85.02100
1983	44.0545	-6.34826	72.42621
1984	52.6403	4.40791	73.40847
1985	40.6325	-.83678	68.88382
1986	45.2482	6.28340	80.15635
1987	57.1087	12.11194	84.94137

SQRTBRSH Square root of brown shrimp harvest

LICI_1 Lower limit for 99% prediction interval for the square root of brown shrimp harvest

UICI_1 Upper limit for 99% prediction interval for the square root of brown shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	7.70270	.48120	.27510	.3595	.1621
1960	3.50215	.07604	.12508	.8350	.0009
1961	12.58289	.01015	.44939	.0829	.0000
1962	3.11024	.06375	.11108	.8746	.0005
1963	2.02053	.01794	.07216	.9587	.0000
1964	3.93262	.00341	.14045	.7875	.0000
1965	1.93856	.00132	.06923	.9632	.0000
1966	5.93237	.00324	.21187	.5477	.0000
1967	3.10726	.00268	.11097	.8749	.0000
1968	8.22999	.02874	.29393	.3128	.0000
1969	5.45178	.03735	.19471	.6050	.0001
1970	3.81885	.00055	.13639	.8004	.0000
1971	4.00746	.00173	.14312	.7789	.0000
1972	2.26493	.00953	.08089	.9437	.0000
1973	8.09586	.00061	.28914	.3242	.0000
1974	12.21094	.05016	.43611	.0938	.0002
1975	9.17043	.24223	.32752	.2407	.0305
1976	2.70595	.00263	.09664	.9108	.0000
1977	5.61775	.00137	.20063	.5850	.0000
1978	4.13978	.01686	.14785	.7635	.0000
1979	10.32413	.13765	.36872	.1709	.0060
1980	5.10993	.11838	.18250	.6466	.0038
1981	9.92791	.05707	.35457	.1927	.0004
1982	4.73994	.00057	.16928	.6917	.0000
1983	11.45266	.18353	.40902	.1201	.0140
1984	2.04514	.02688	.07304	.9573	.0000
1985	2.69573	.00798	.09628	.9117	.0000
1986	6.57933	.00219	.23498	.4740	.0000
1987	5.58221	.03099	.19936	.5893	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1959	*-2.20963	.25092	-.12026	-.08032
1960	-.76307	-.19562	-.56525	.46282
1961	-.26083	.02396	-.20713	.07807
1962	-.69535	-.23244	.41570	-.05781
1963	-.35477	-.30728	.03397	.08657
1964	-.15143	-.14125	-.00291	-.00253
1965	.09398	.06413	.01854	-.03204
1966	.14747	.00815	.05419	-.07475
1967	-.13412	-.12871	.04530	.01465
1968	-.44234	.05319	-.13543	.06529
1969	-.50986	-.02571	.01615	-.31081
1970	.06064	.03507	-.02477	.03883
1971	.10750	.07070	-.04867	-.00523
1972	.25527	.14144	.07219	-.10653
1973	-.06371	.01879	.00641	-.03995
1974	.58418	-.20863	.20254	-.06302
1975	*-1.36855	.46344	.31476	-.24482
1976	.13288	.10269	-.05982	-.03572
1977	.09574	.02491	-.01359	.07156
1978	.33977	.23355	.19102	-.12403
1979	.99172	-.19929	.05601	.39013
1980	.95678	-.17051	.36228	.01587
1981	.62651	.10520	-.11400	-.38270
1982	.06188	-.01515	-.03730	.00215
1983	*1.15035	.05174	-.11402	-.10848
1984	.43974	.15736	-.10220	.10766
1985	.23294	-.02530	.02468	.14066
1986	.12119	-.00198	-.03219	-.04529
1987	.46257	-.04800	-.26434	.12532

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for January-February inflows
SDFBETA_2 Standardized dfbeta for March-April inflows

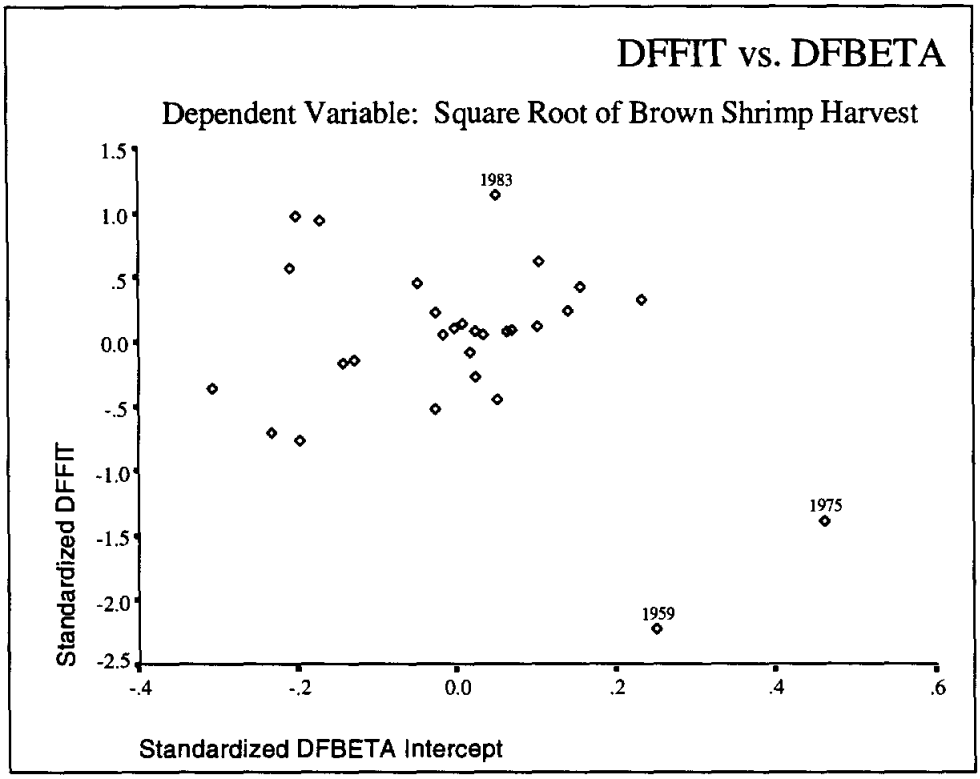
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

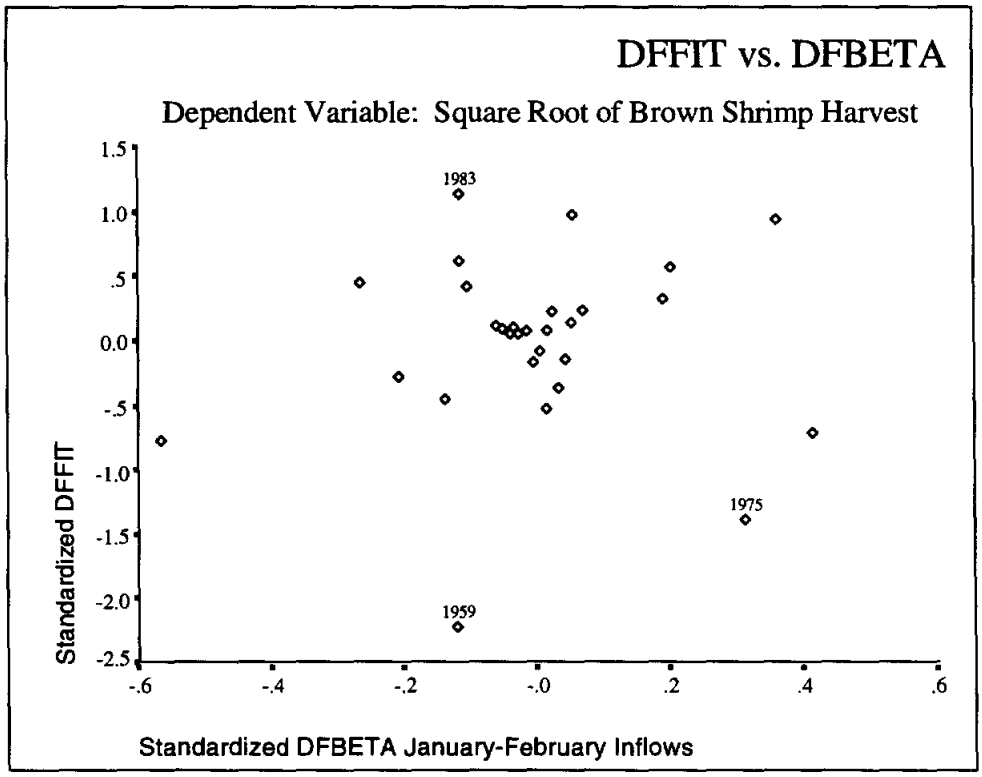
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.44146	*-1.44507	*-1.05012	*1.06491
1960	-.04247	-.06262	.17350	.35381
1961	.02583	.01433	.08668	.00923
1962	.17897	-.07857	-.34439	-.18551
1963	.09345	.09454	.11193	-.05448
1964	.06154	.03430	.08249	.01892
1965	.02442	-.05371	-.04520	-.00500
1966	.11884	-.03076	-.04257	-.05272
1967	.03923	.00137	.04189	.00559
1968	-.36067	.18936	.02197	.18518
1969	-.07782	.27015	.03353	.05219
1970	-.02663	-.01403	-.01649	.01119
1971	-.03351	.01666	.03050	-.01326
1972	.01305	-.09622	-.14048	.05674
1973	-.01390	.00657	-.00318	.00425
1974	.06382	-.09153	.46077	-.17430
1975	.00738	.00709	-.04755	*-1.11659
1976	-.00378	.03984	-.02811	-.01025
1977	-.05674	-.02923	-.02637	.03981
1978	-.07138	-.09296	-.18460	-.09466
1979	-.24681	.59830	-.05686	-.19110
1980	.16842	-.36271	.66226	-.45852
1981	.39623	.19975	.08628	-.21255
1982	.01076	.02357	.03460	.02477
1983	-.41625	.96559	-.37877	.32502
1984	-.17735	-.01212	.22806	-.05161
1985	-.08378	-.06955	.09538	.00664
1986	.06510	-.01503	-.00649	.06173
1987	-.08221	.09536	.01233	.40845

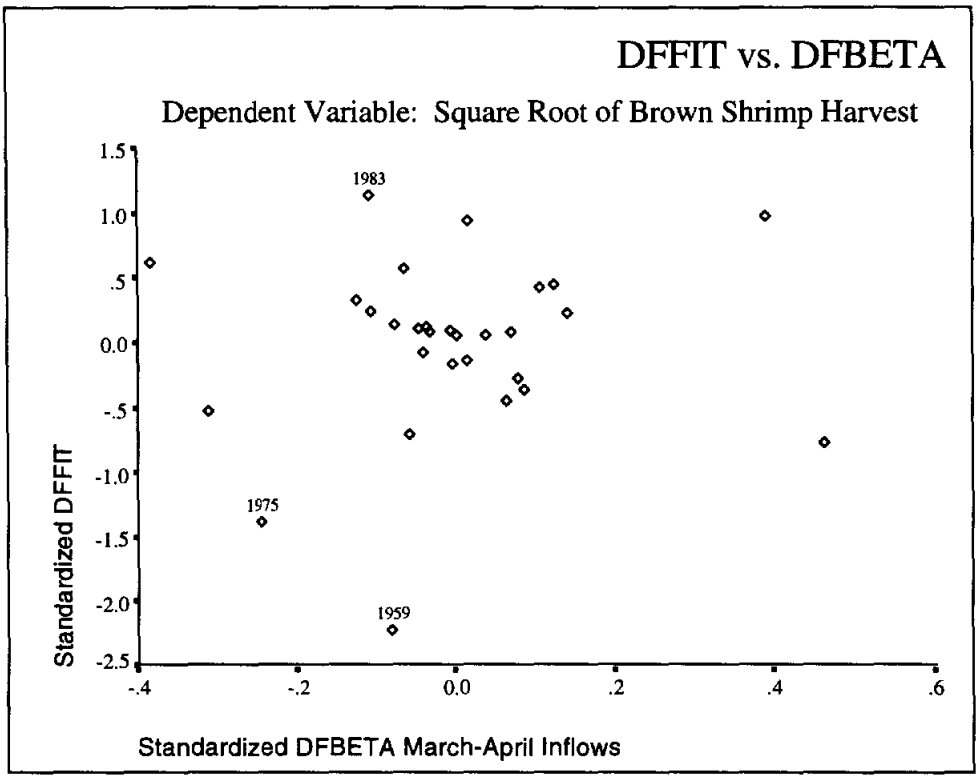
SDFBETA_3 Standardized dfbeta for May-June inflows
SDFBETA_4 Standardized dfbeta for July-August inflows
SDFBETA_5 Standardized dfbeta for September-October inflows
SDFBETA_6 Standardized dfbeta for November-December inflows

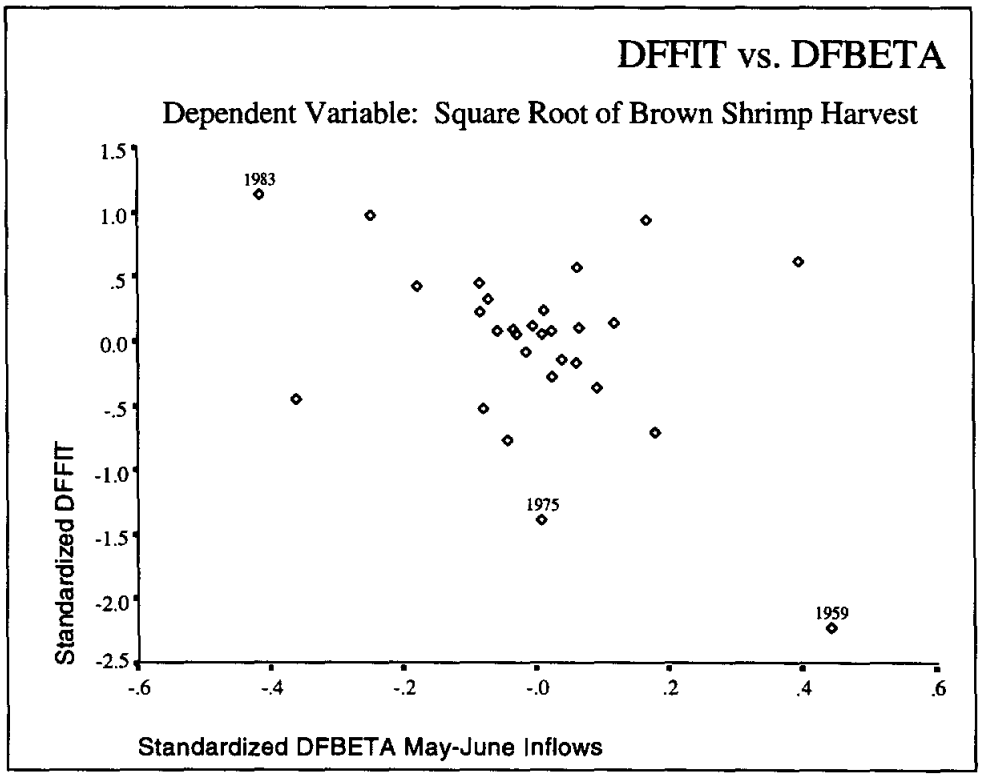
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

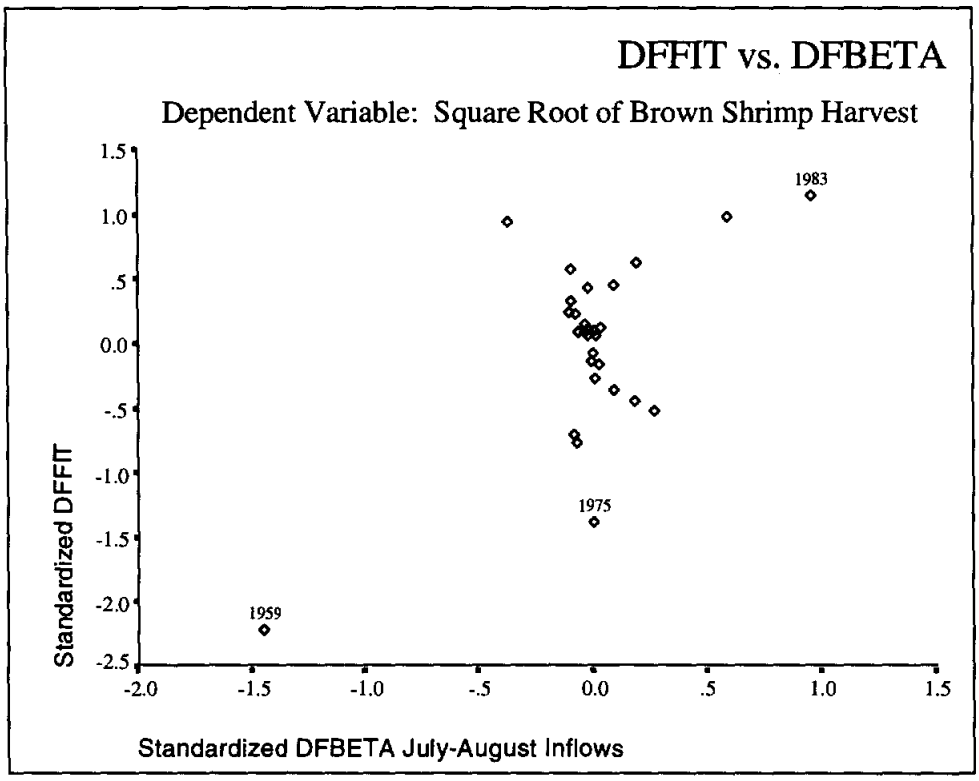
Graphics

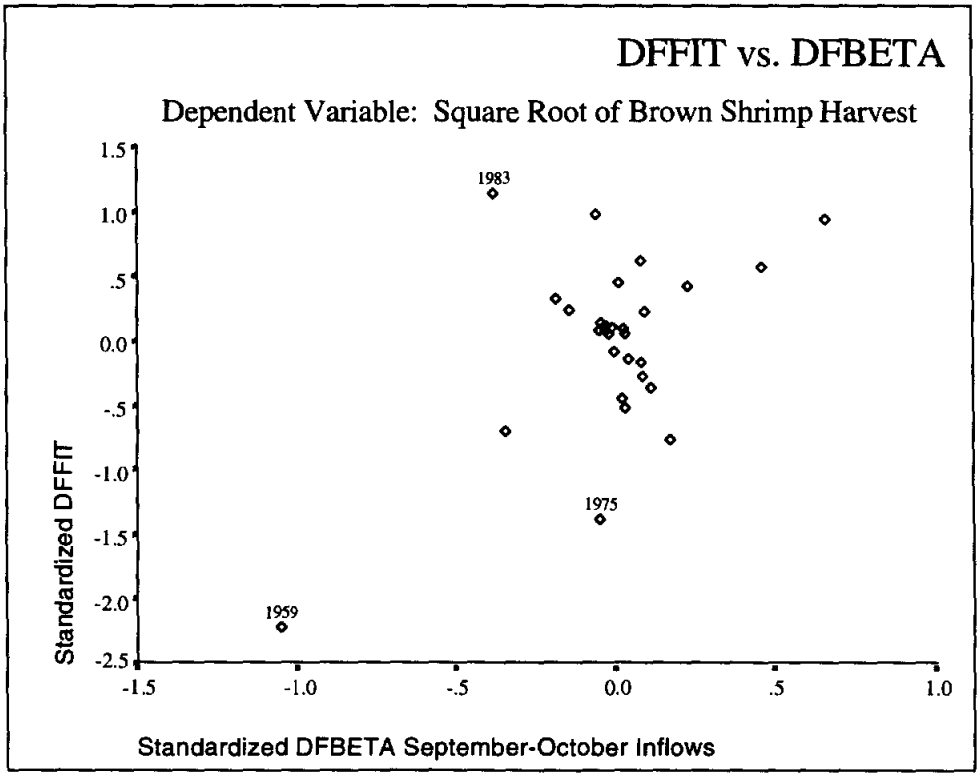

DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Intercept

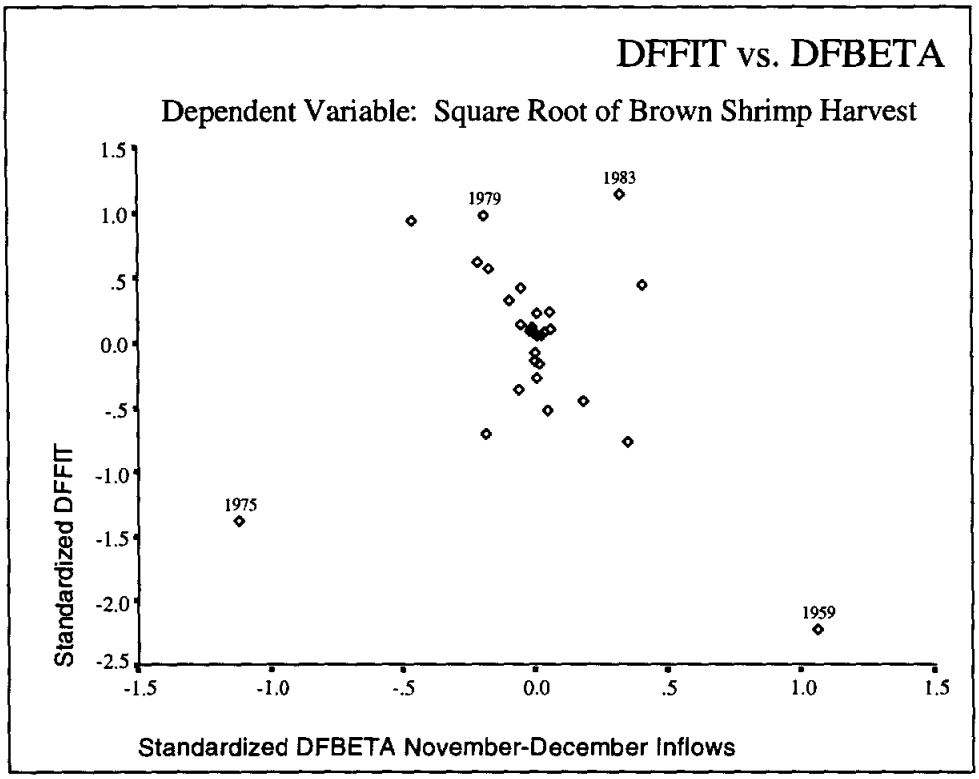

DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA January-February Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
Standardized DFFIT
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
Standardized DFFIT
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA July-August Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1975
1959
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA September-October Inflows


DFFIT vs. DFBETA
Dependent Variable: Square Root of Brown Shrimp Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-2.5
1983
1979
1975
1959
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA November-December Inflows

Regression—All Variables Logged

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(May-June Inflows), Ln(January-February Inflows)*[c,d]	.	*.657*	*.431*	*.276*	*1.1585*	*.756*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*22.386*	*6*	*3.731*	*2.780*	*.036*[b]
	Residual	*29.529*	*22*	*1.342*		
	Total	*51.915*	*28*			

a. Dependent Variable: Ln(Brown Shrimp Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*7.065*	*3.203*		*2.206*	*.038*	*.423*	*13.707*
	Ln(January-February Inflows)	*-1.567*	*.425*	*-.983*	*-3.687*	*.001*	*-2.448*	*-.685*
	Ln(March-April Inflows)	*.708*	*.411*	*.406*	*1.721*	*.099*	*-.145*	*1.560*
	Ln(May-June Inflows)	*6.161E-02*	*.427*	*.036*	*.144*	*.887*	*-.824*	*.947*
	Ln(July-August Inflows)	*-.340*	*.381*	*-.189*	*-.890*	*.383*	*-1.130*	*.451*
	Ln(September-October Inflows)	*-3.080E-02*	*.302*	*-.018*	*-.102*	*.920*	*-.656*	*.595*
	Ln(November-December Inflows)	*1.126*	*.381*	*.720*	*2.953*	*.007*	*.335*	*1.916*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.364*	*2.750*
	Ln(March-April Inflows)	*.465*	*2.152*
	Ln(May-June Inflows)	*.422*	*2.370*
	Ln(July-August Inflows)	*.573*	*1.746*
	Ln(September-October Inflows)	*.800*	*1.249*
	Ln(November-December Inflows)	*.435*	*2.298*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	*6.952*	*1.000*	*.00*	*.00*	*.00*
	2	*1.827E-02*	*19.504*	*.00*	*.00*	*.05*
	3	*1.305E-02*	*23.083*	*.01*	*.09*	*.00*
	4	*6.725E-03*	*32.152*	*.08*	*.00*	*.28*
	5	*4.421E-03*	*39.656*	*.18*	*.35*	*.00*
	6	*3.353E-03*	*45.531*	*.62*	*.01*	*.09*
	7	*2.293E-03*	*55.059*	*.11*	*.54*	*.57*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	*.00*	*.00*	*.00*	*.00*
	2	*.02*	*.03*	*.32*	*.03*
	3	*.00*	*.14*	*.10*	*.15*
	4	*.05*	*.26*	*.05*	*.16*
	5	*.23*	*.25*	*.10*	*.12*
	6	*.34*	*.14*	*.45*	*.02*
	7	*.36*	*.18*	*.00*	*.52*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*4.1547*	*7.8852*	*6.7430*	*.8942*	*29*
Std. Predicted Value	*-2.895*	*1.277*	*.000*	*1.000*	*29*
Standard Error of Predicted Value	*.4327*	*.8711*	*.5570*	*.1190*	*29*
Adjusted Predicted Value	*5.0799*	*8.0215*	*6.7151*	*.9415*	*29*
Residual	*-3.1865*	*1.5606*	*-6.7379E-16*	*1.0269*	*29*
Std. Residual	*-2.750*	*1.347*	*.000*	*.886*	*29*
Stud. Residual	*-3.027*	*1.563*	*.011*	*1.027*	*29*
Deleted Residual	*-3.8605*	*2.4105*	*2.792E-02*	*1.4064*	*29*
Stud. Deleted Residual	*-3.872*	*1.620*	*-.013*	*1.133*	*29*
Mahal. Distance	*2.939*	*14.864*	*5.793*	*3.185*	*29*
Cook's Distance	*.000*	*.323*	*.058*	*.094*	*29*
Centered Leverage Value	*.105*	*.531*	*.207*	*.114*	*29*

a. Dependent Variable: Ln(Brown Shrimp Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1959	4.15473	-1.00628	-2.31516	5.46362	-2.89462	-.86858	-1.31747	-1.34117
1960	5.33828	-3.18652	-3.86052	6.01229	-1.57097	-2.75047	*-3.02741	*-3.87246
1961	5.80674	-1.38911	-1.75456	6.17220	-1.04705	-1.19902	-1.34754	-1.37451
1962	7.70145	-.93468	-1.08847	7.85524	1.07194	-.80678	-.87062	-.86565
1963	6.81542	-.41716	-.53686	6.93512	.08103	-.36007	-.40848	-.40061
1964	6.15495	.42027	.72038	5.85484	-.65763	.36276	.47494	.46641
1965	7.12397	-.09206	-.11602	7.14794	.42611	-.07946	-.08920	-.08717
1966	6.43723	.08648	.10736	6.41635	-.34194	.07465	.08317	.08127
1967	7.61937	-.57316	-.70761	7.75382	.98015	-.49473	-.54970	-.54079
1968	6.48556	-.75611	-.92355	6.65300	-.28789	-.65264	-.72129	-.71319
1969	7.15586	-.99150	-1.27990	7.44426	.46177	-.85582	-.97235	-.97109
1970	7.88519	-.53532	-.67163	8.02150	1.27743	-.46206	-.51756	-.50877
1971	7.82722	-.20158	-.37217	7.99781	1.21260	-.17400	-.23642	-.23128
1972	6.65918	.62220	.72808	6.55331	-.09371	.53706	.58096	.57201
1973	6.87508	-.01295	-.01570	6.87783	.14775	-.01118	-.01231	-.01202
1974	5.96117	1.29914	1.69286	5.56745	-.87435	1.12136	1.28006	1.29997
1975	7.39969	-.68020	-.81747	7.53696	.73446	-.58712	-.64364	-.63485
1976	7.65211	-.15768	-.19721	7.69164	1.01676	-.13610	-.15221	-.14879
1977	7.62127	-.39035	-.48838	7.71930	.98227	-.33693	-.37687	-.36940
1978	5.57964	1.20391	1.60957	5.17398	-1.30104	1.03917	1.20155	1.21445
1979	5.62098	1.56061	2.10169	5.07990	-1.25481	1.34705	1.56323	1.61990
1980	6.33085	1.41610	1.86028	5.88667	-.46091	1.22232	1.40096	1.43422
1981	6.41281	1.18403	2.41055	5.18630	-.36924	1.02201	1.45824	1.49900
1982	7.61895	.21911	.26302	7.57505	.97968	.18913	.20721	.20265
1983	6.45986	1.11100	1.86000	5.71085	-.31663	.95896	1.24080	1.25706
1984	6.79415	1.13282	1.31641	6.61056	.05723	.97780	1.05406	1.05686
1985	6.93175	.47738	.55814	6.85100	.21113	.41206	.44555	.43728
1986	7.38377	.24056	.30599	7.31833	.71665	.20764	.23418	.22909
1987	7.73890	.35101	.42043	7.66949	1.11382	.30298	.33159	.32478

PRE_1 Predicted value of the natural log of harvest

RES_1 Ordinary residual; observed log harvest minus predicted log harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of the log of harvest

ZRE_1 Z-score of the residual

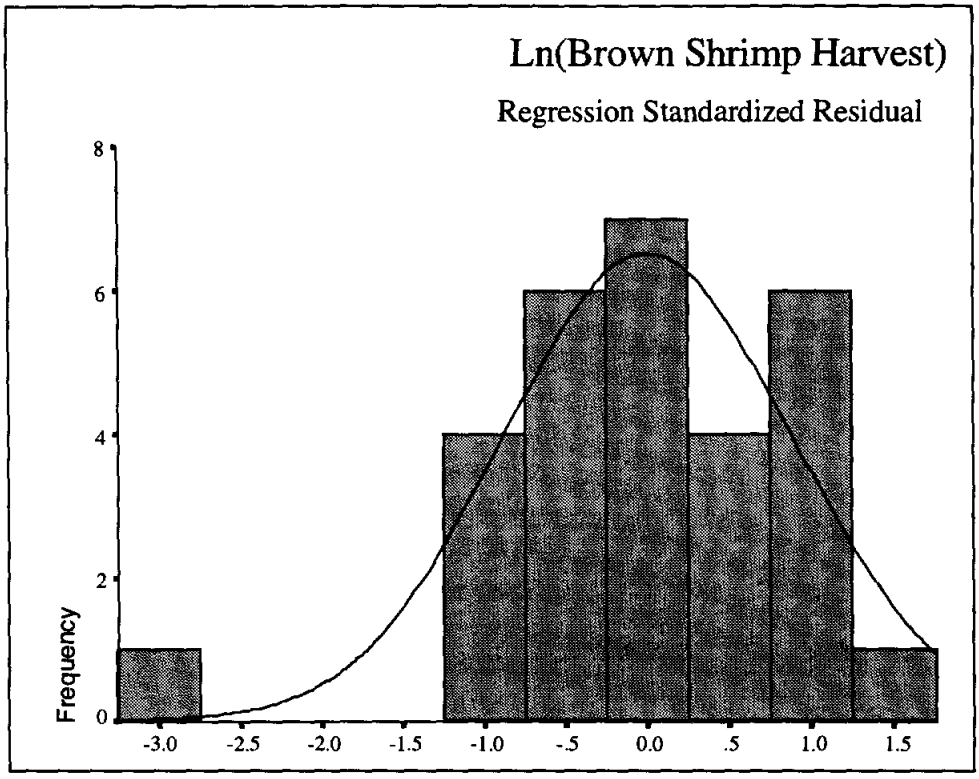
SRE_1 Studentized residual

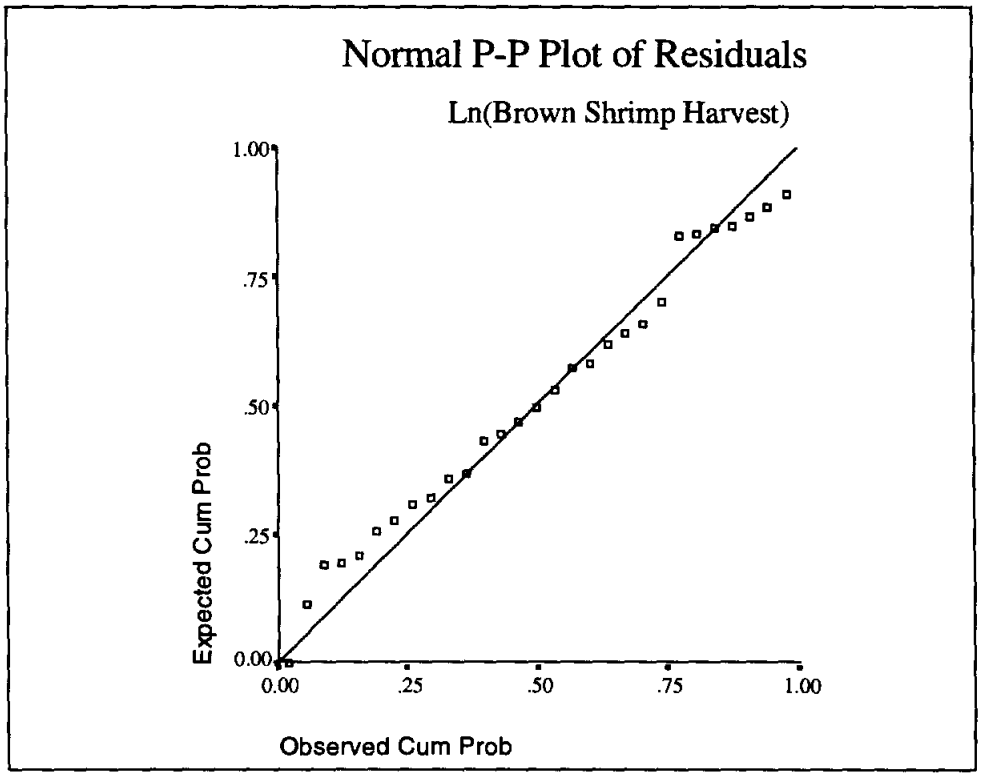
SDR_1 Studentized deleted residuals

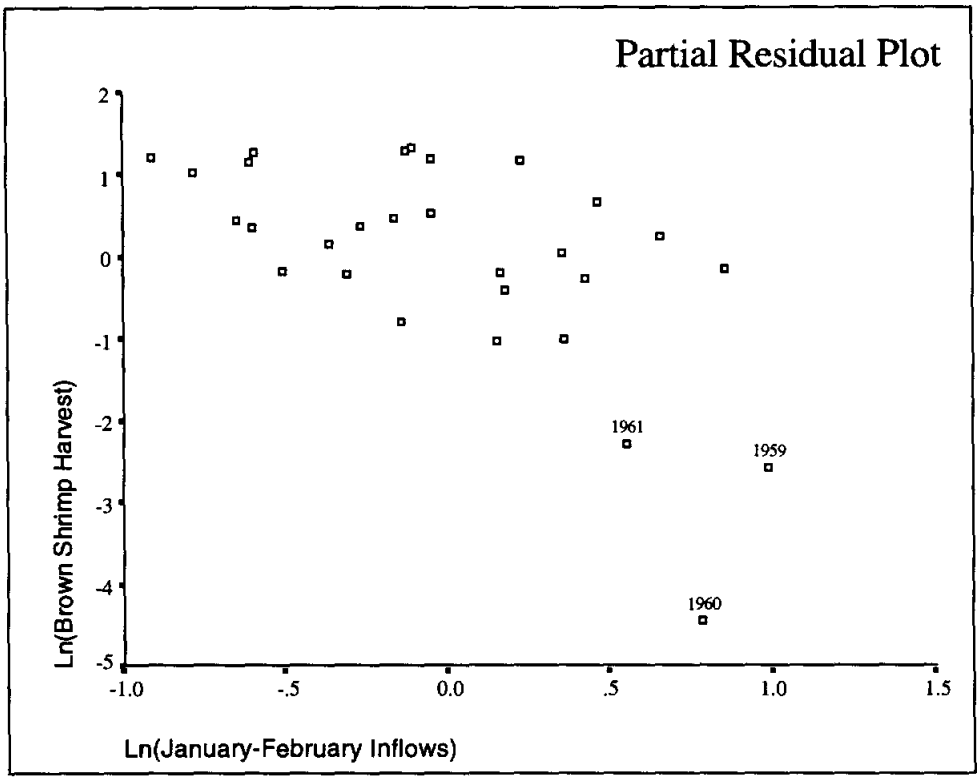
[1]Values greater than 3 are flagged.

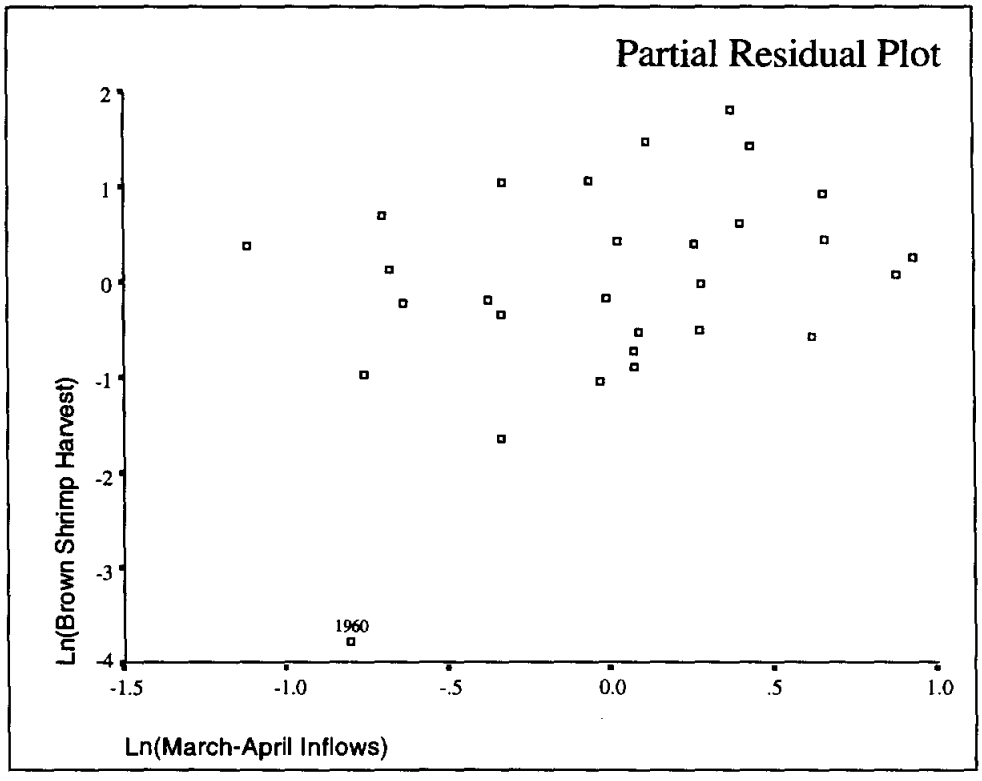
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{21,0.01} = 2.518$.

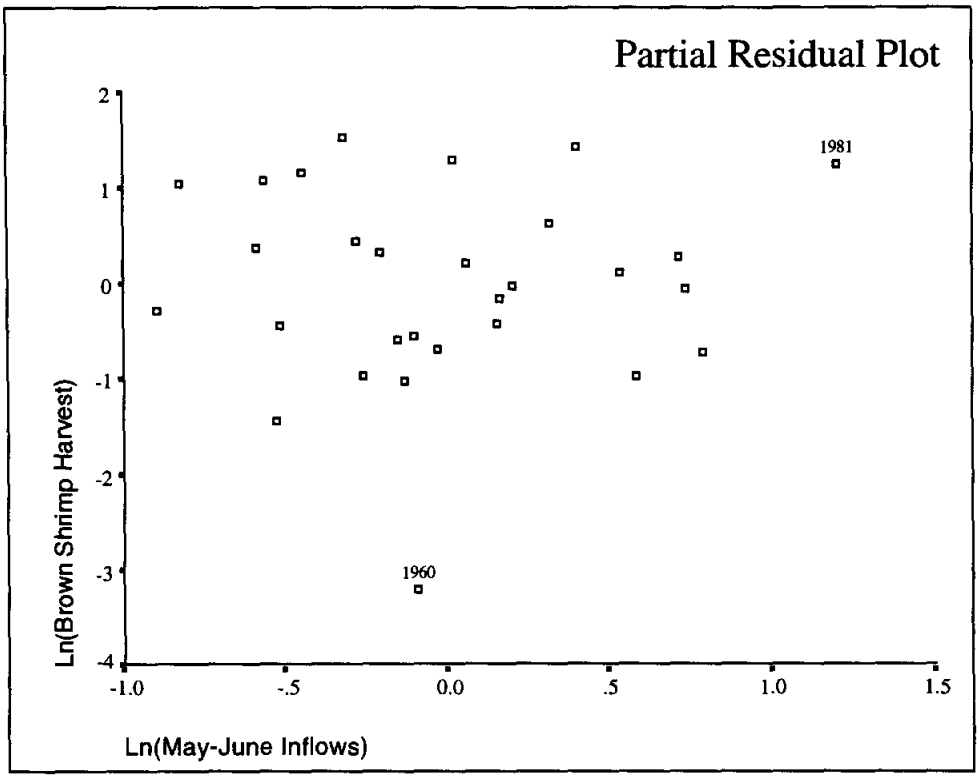
Graphics

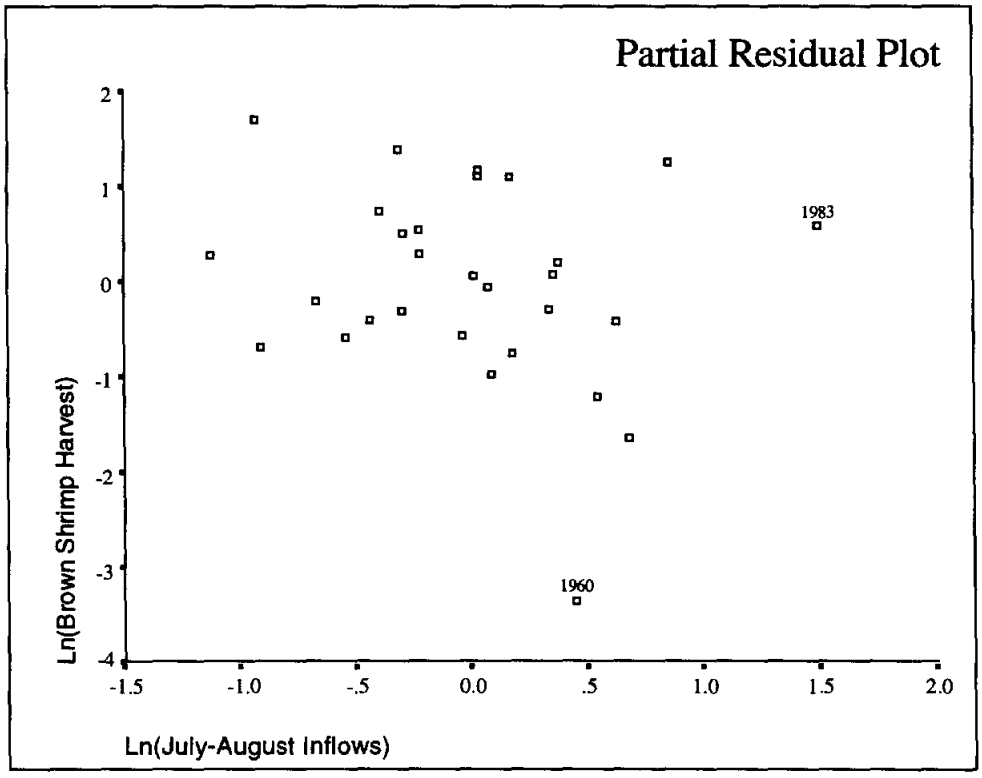

Ln(Brown Shrimp Harvest)
Regression Standardized Residual
Frequency
8
6
4
2
0
-3.0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

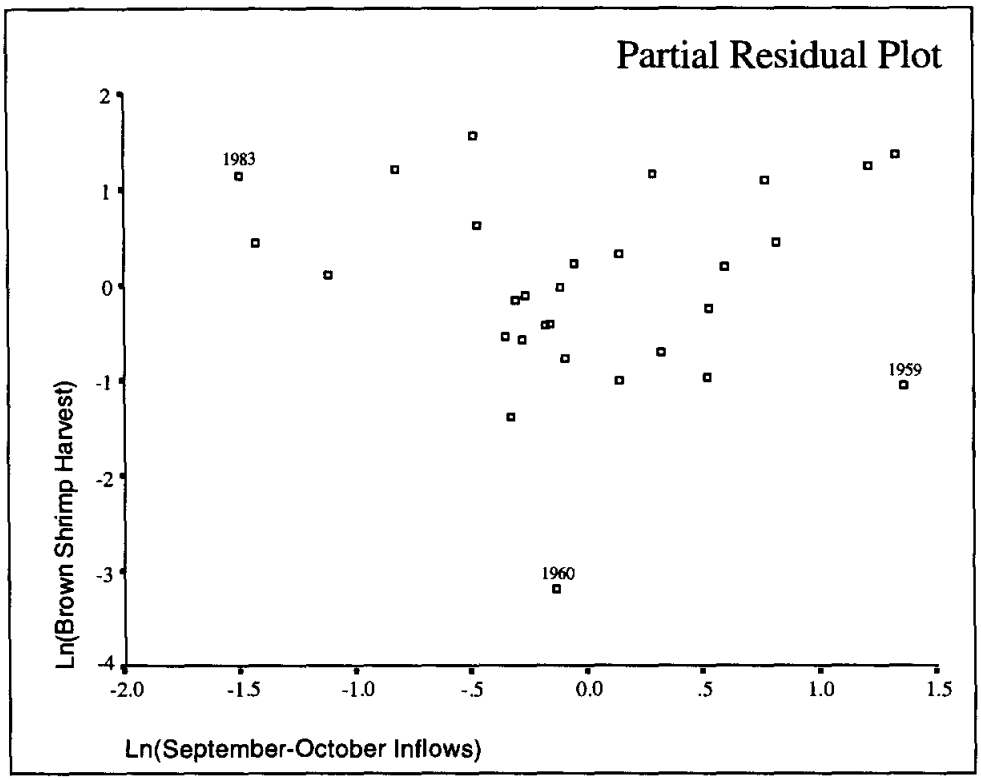

Normal P-P Plot of Residuals
Ln(Brown Shrimp Harvest)
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

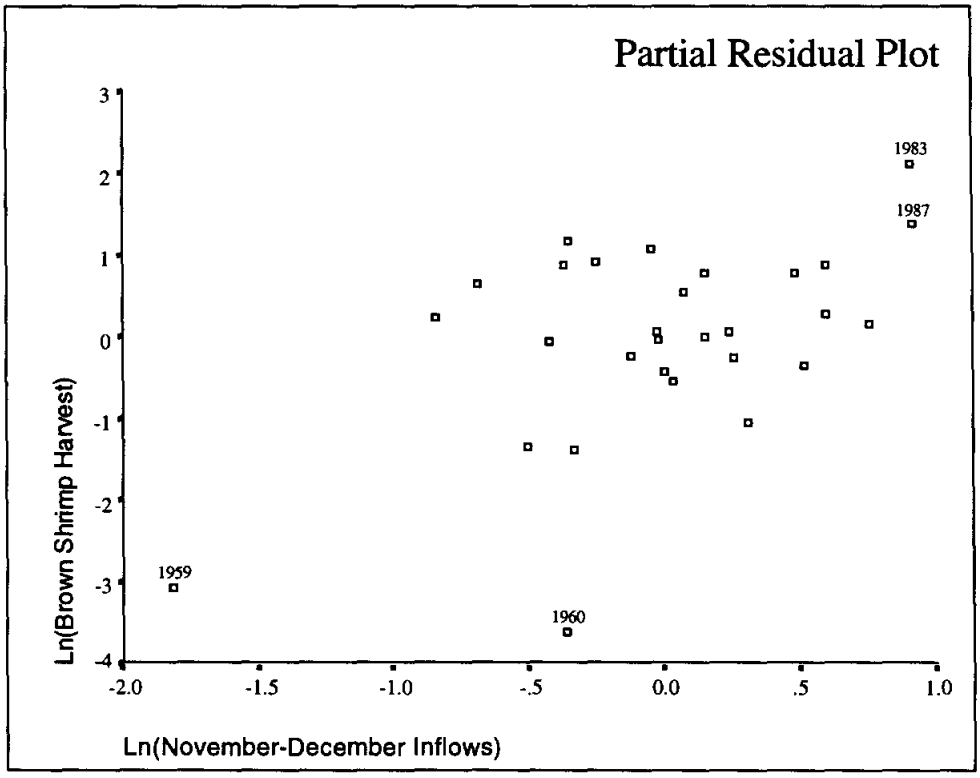

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(January-February Inflows)
2
1
0
-1
-2
-3
-4
-5
-1.0
-.5
0.0
.5
1.0
1.5
1961
1959
1960

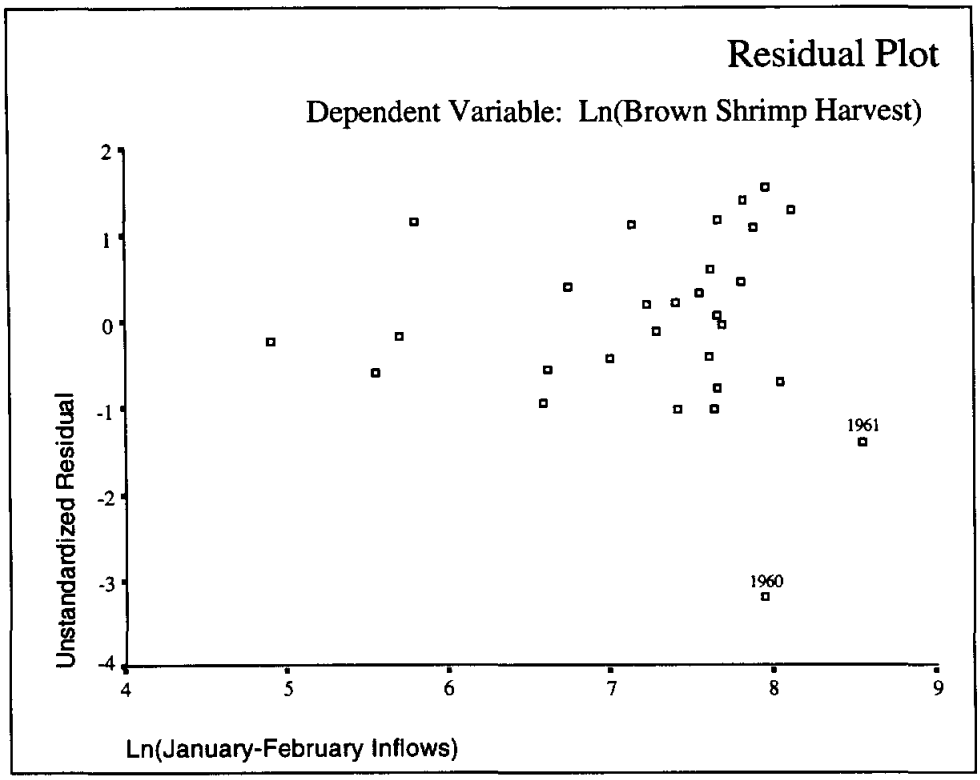

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(March-April Inflows)
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1960

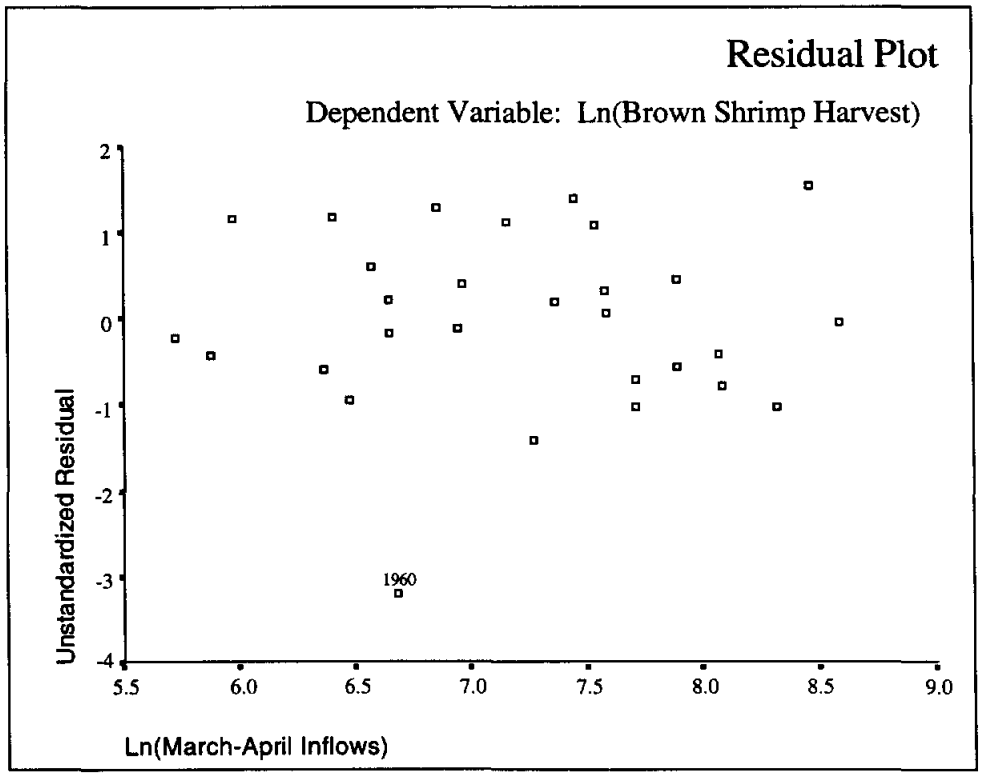

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(May-June Inflows)
1981
1960
2
1
0
-1
-2
-3
-4
-1.0
-.5
0.0
.5
1.0
1.5

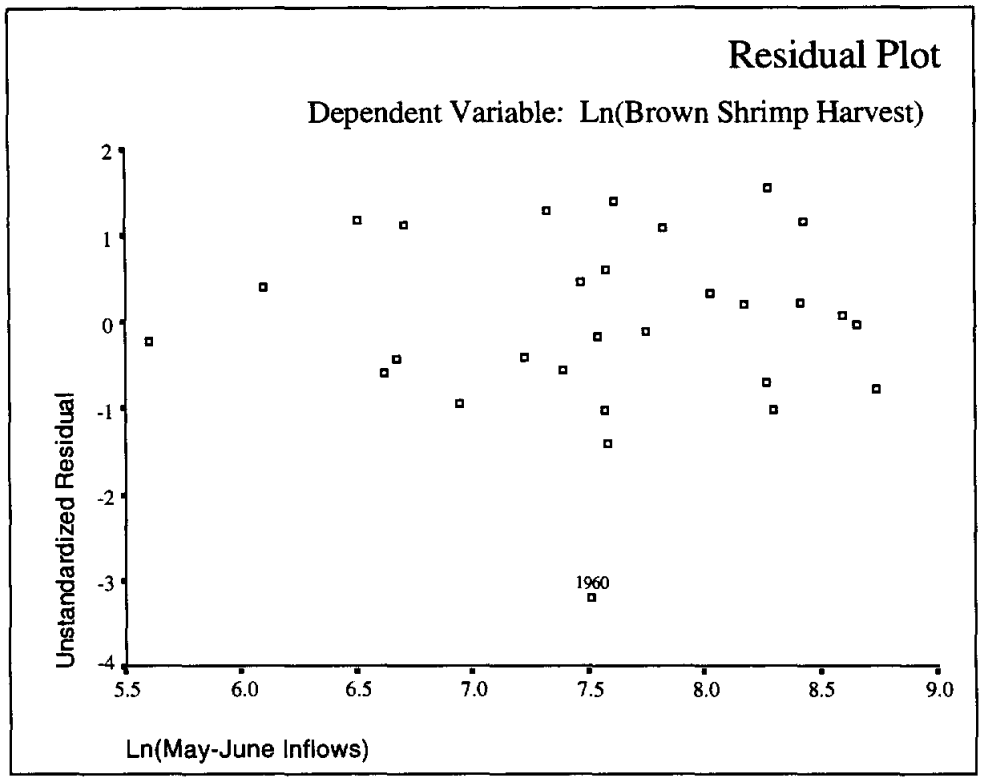

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(July-August Inflows)
1983
1960
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0

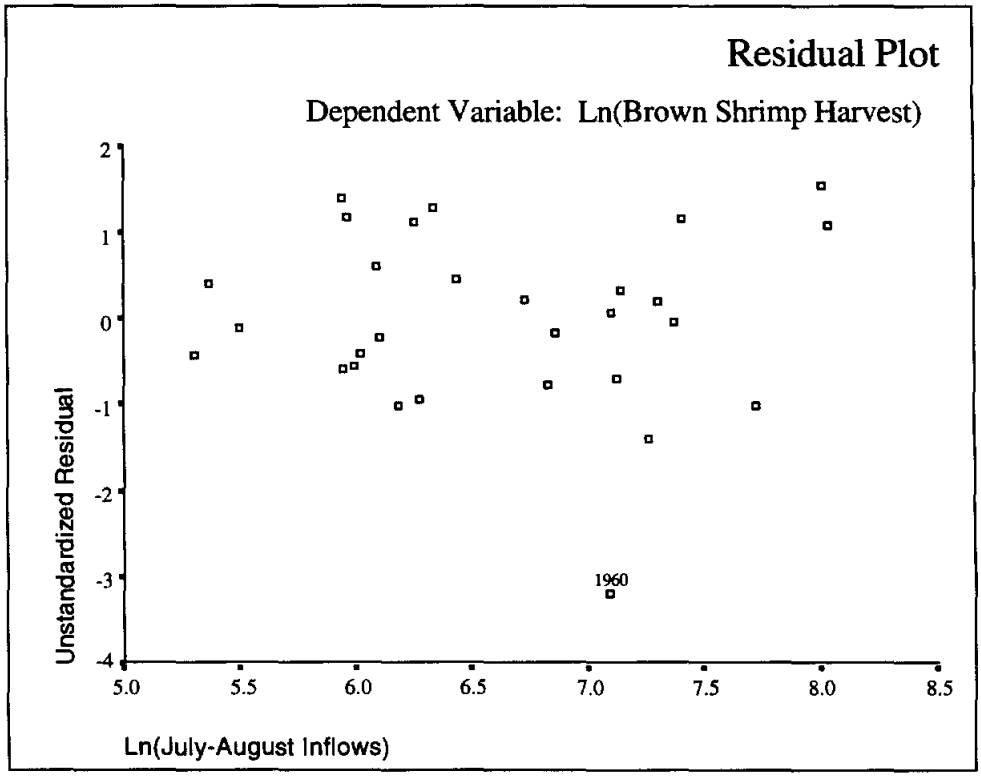

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(September-October Inflows)
1983
1959
1960
2
1
0
-1
-2
-3
-4
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

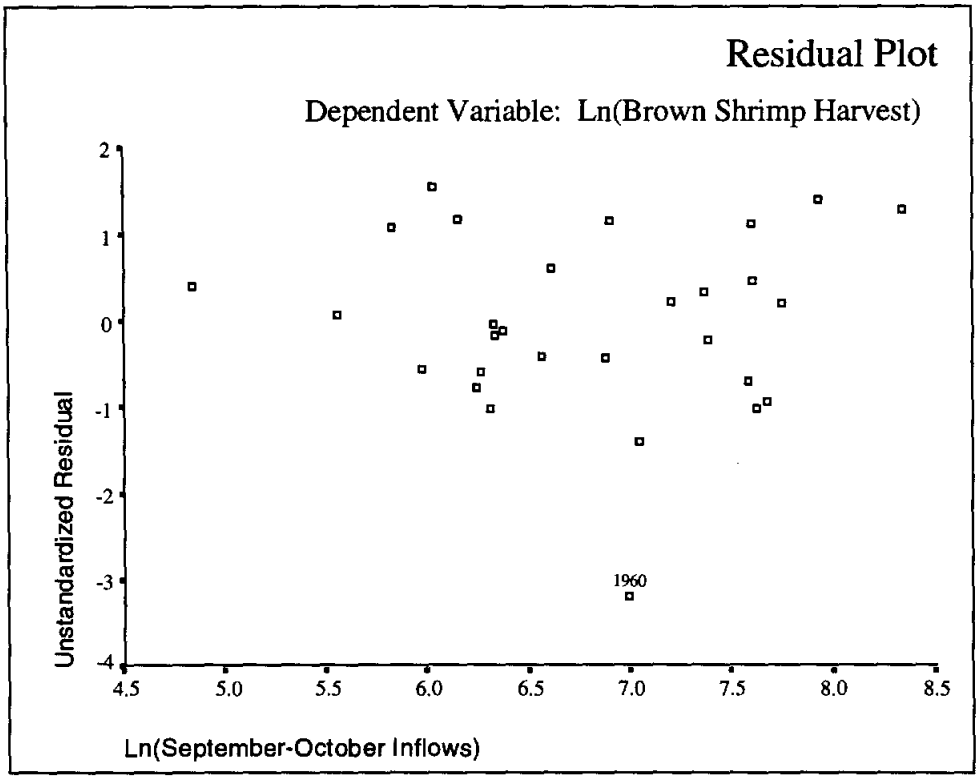

Partial Residual Plot
Ln(Brown Shrimp Harvest)
Ln(November-December Inflows)
1983
1987
1959
1960
3
2
1
0
-1
-2
-3
-4
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

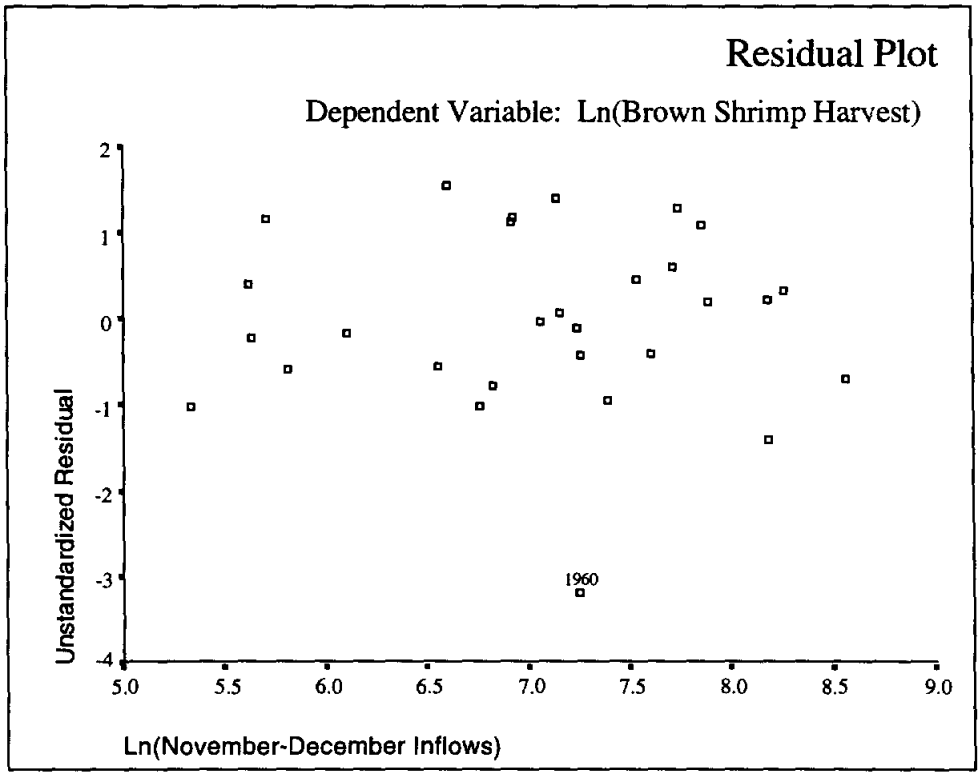

Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1961
1960
4
5
6
7
8
9
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Brown Shrimp Harvest)
Unstandardized Residual
2
1
0
-1
-2
-3
-4
1960
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Brown Shrimp Harvest

YEAR	LBSHRIMP	LICI_1	UICI_1
1959	3.15	.06897	8.24050
1960	2.15	1.79904	8.87753
1961	4.42	2.21709	9.39640
1962	6.77	4.21274	11.19016
1963	6.40	3.20403	10.42681
1964	6.58	2.26816	10.04174
1965	7.03	3.53692	10.71103
1966	6.52	2.86822	10.00623
1967	7.05	4.05697	11.18177
1968	5.73	2.93621	10.03490
1969	6.16	3.54098	10.77075
1970	7.35	4.30347	11.46692
1971	7.63	3.88356	11.77089
1972	7.28	3.16416	10.15420
1973	6.86	3.33500	10.41516
1974	7.26	2.33561	9.58672
1975	6.72	3.87051	10.92887
1976	7.49	4.07414	11.23009
1977	7.23	4.04286	11.19968
1978	6.78	1.92559	9.23369
1979	7.18	1.95902	9.28293
1980	7.75	2.69619	9.96550
1981	7.60	2.40151	10.42411
1982	7.84	4.09127	11.14664
1983	7.57	2.59220	10.32752
1984	7.93	3.30822	10.28007
1985	7.41	3.43785	10.42566
1986	7.62	3.78586	10.98168
1987	8.09	4.21398	11.26382

LBSHRIMP Natural log of brown shrimp harvest

LICI_1 Lower limit for 99% prediction interval for the natural log of brown shrimp harvest

UICI_1 Upper limit for 99% prediction interval for the natural log of brown shrimp harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1959	14.86434	.32253	*.53087	.0378	.0644
1960	3.92296	.27694	.14011	.7886	.0436
1961	4.86651	.06825	.17380	.6762	.0006
1962	2.99049	.01782	.10680	.8859	.0000
1963	5.27754	.00684	.18848	.6261	.0000
1964	10.69927	.02301	.38212	.1523	.0000
1965	4.81750	.00030	.17205	.6822	.0000
1966	4.47835	.00024	.15994	.7233	.0000
1967	4.35469	.01013	.15552	.7381	.0000
1968	4.11096	.01646	.14682	.7669	.0000
1969	5.34374	.03929	.19085	.6181	.0001
1970	4.71720	.00974	.16847	.6944	.0000
1971	11.86852	.00676	.42388	.1050	.0000
1972	3.10623	.00820	.11094	.8750	.0000
1973	3.93854	.00000	.14066	.7868	.0000
1974	5.54663	.07094	.19809	.5936	.0007
1975	3.73624	.01194	.13344	.8096	.0000
1976	4.64673	.00083	.16595	.7030	.0000
1977	4.65497	.00510	.16625	.7020	.0000
1978	6.09129	.06949	.21755	.5291	.0007
1979	6.24310	.12104	.22297	.5117	.0040
1980	5.72005	.08795	.20429	.5728	.0015
1981	13.28118	.31468	.47433	.0655	.0606
1982	3.70842	.00123	.13244	.8127	.0000
1983	10.30985	.14828	.36821	.1717	.0075
1984	2.93943	.02572	.10498	.8905	.0000
1985	3.08575	.00480	.11021	.8770	.0000
1986	5.02228	.00213	.17937	.6572	.0000
1987	3.65725	.00311	.13062	.8183	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SBDBETA_1	SDFBETA_2
1959	*-1.52959	.29789	-.73793	.02161
1960	*-1.78098	-.15345	*-1.22906	*1.21146
1961	-.70501	.13980	-.31607	.18231
1962	-.35113	-.00546	.17210	-.02555
1963	-.21460	-.12417	-.06060	.12207
1964	.39414	.30652	.09535	.00581
1965	-.04447	-.01486	-.00654	.01165
1966	.03993	.00591	.00557	-.01201
1967	-.26192	-.17751	.13227	-.01887
1968	-.33562	.05568	-.04488	-.02115
1969	-.52373	.06582	.05594	-.24408
1970	-.25673	-.05037	.13577	-.17758
1971	-.21276	-.08048	.10501	-.03144
1972	.23596	.07911	.08093	-.14937
1973	-.00554	.00246	.00128	-.00310
1974	.71565	-.21053	.35865	-.17396
1975	-.28519	.18917	.07878	-.06828
1976	-.07450	-.02454	.04756	.00058
1977	-.18512	.01595	.05447	-.13685
1978	.70496	.42562	.44136	-.34908
1979	.95383	-.22621	.15849	.24932
1980	.80325	-.22042	.28069	.06826
1981	*1.52565	.22922	-.08338	-.84698
1982	.09071	-.05364	-.04934	.02056
1983	*1.03215	-.01342	-.07448	-.03536
1984	.42546	-.03521	-.01939	.17563
1985	.17985	-.08748	-.00785	.11054
1986	.11948	-.01579	-.01511	-.05840
1987	.14442	-.07511	-.07748	.05031

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

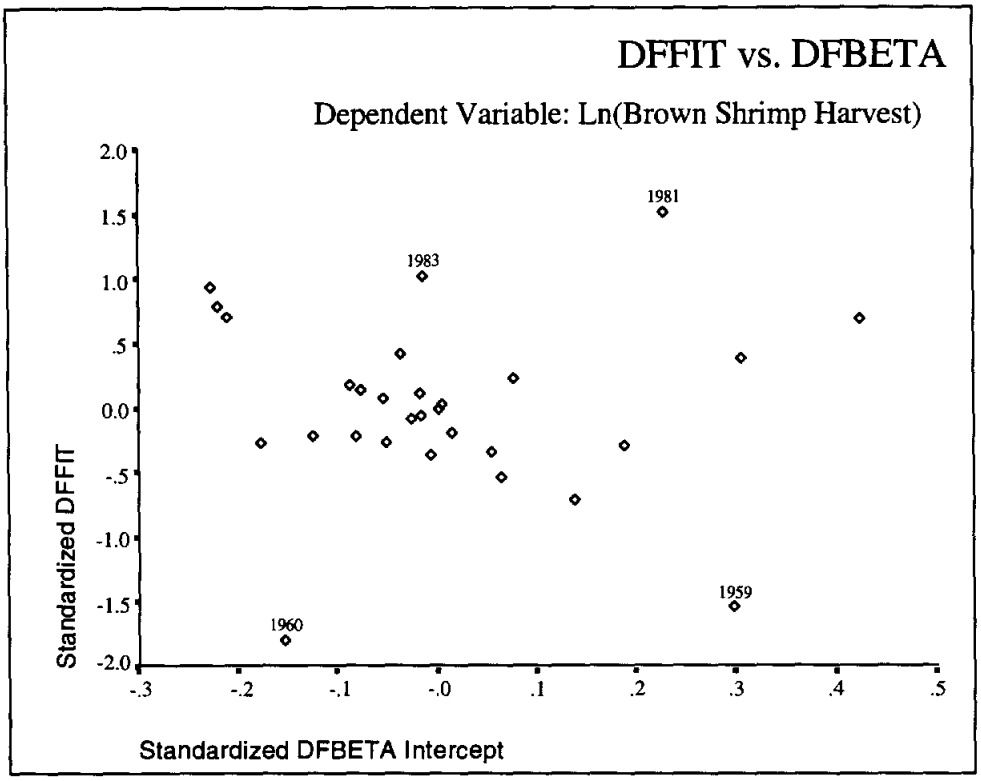
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

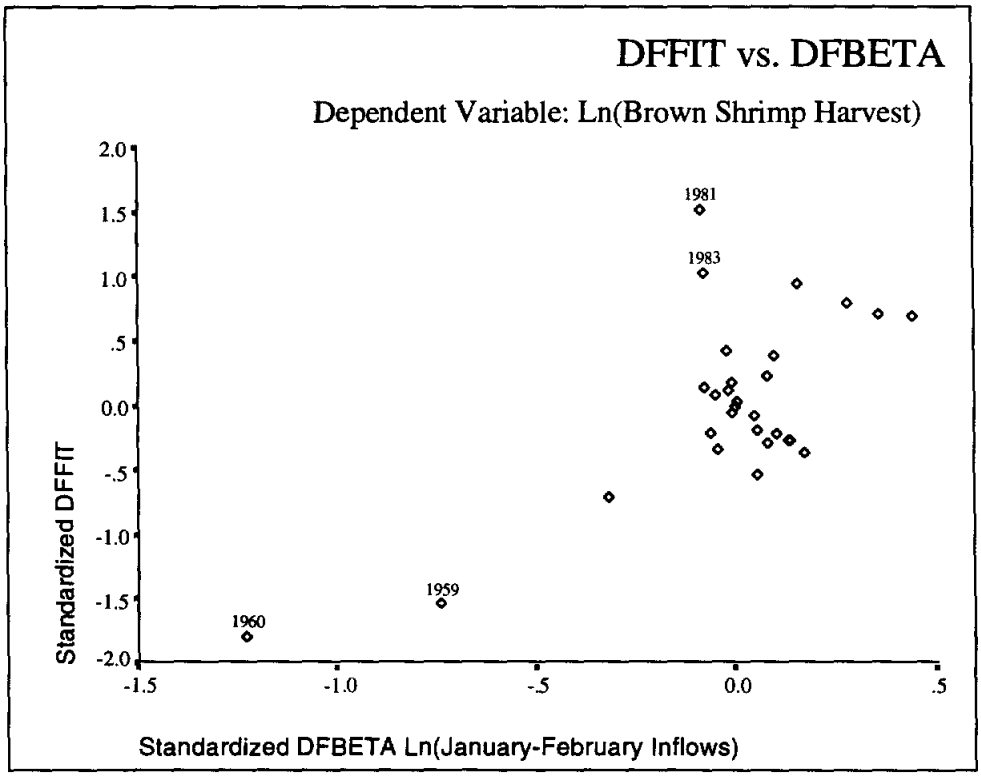
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1959	.09751	-.36748	-.72139	*1.21485
1960	.14296	-.63466	.14964	.50523
1961	.29931	-.34757	.13082	-.16067
1962	.08966	-.02734	-.12751	-.16130
1963	-.02657	.10008	.02062	-.00137
1964	-.13282	-.05865	-.22720	-.08348
1965	-.02658	.03625	.00666	.00376
1966	.01783	.00040	-.02631	-.00058
1967	.03263	.00695	.04375	-.00775
1968	-.23068	.13954	.01808	.12917
1969	-.23882	.33026	-.04173	.11861
1970	.02120	.08076	.05159	-.04944
1971	.10347	-.06499	-.04319	-.02516
1972	.07296	-.07970	-.07600	.03155
1973	-.00101	-.00033	.00038	.00006
1974	.01265	-.15156	.46909	-.17847
1975	.00697	-.04190	-.05900	-.17463
1976	-.01026	-.01863	.01319	-.00874
1977	.07820	.04044	.01632	-.08130
1978	-.23174	.01593	-.30149	-.11434
1979	-.22025	.53221	-.23669	-.21247
1980	.24463	-.50168	.57068	-.36913
1981	.94749	.12389	.16107	-.59039
1982	.00497	.02621	.03481	.04396
1983	-.49383	.80346	-.63596	.48936
1984	-.23762	.01358	.22806	-.01347
1985	-.04844	-.03461	.10066	.01234
1986	.06849	-.01857	-.00319	.04172
1987	-.02637	.04500	.01298	.10769

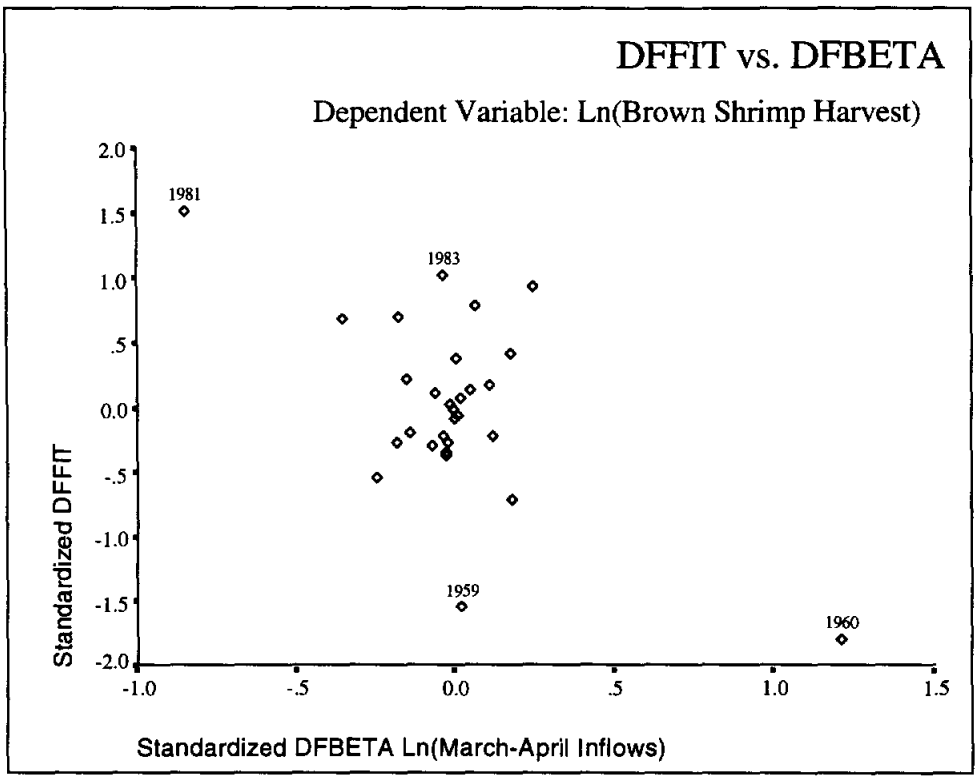
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

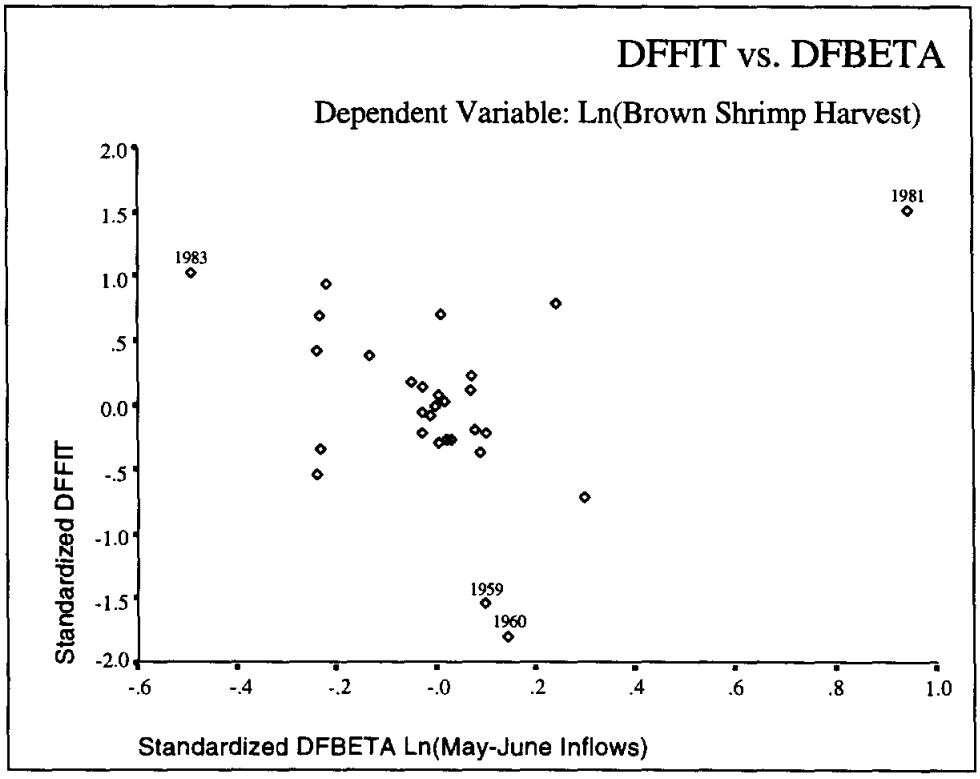
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

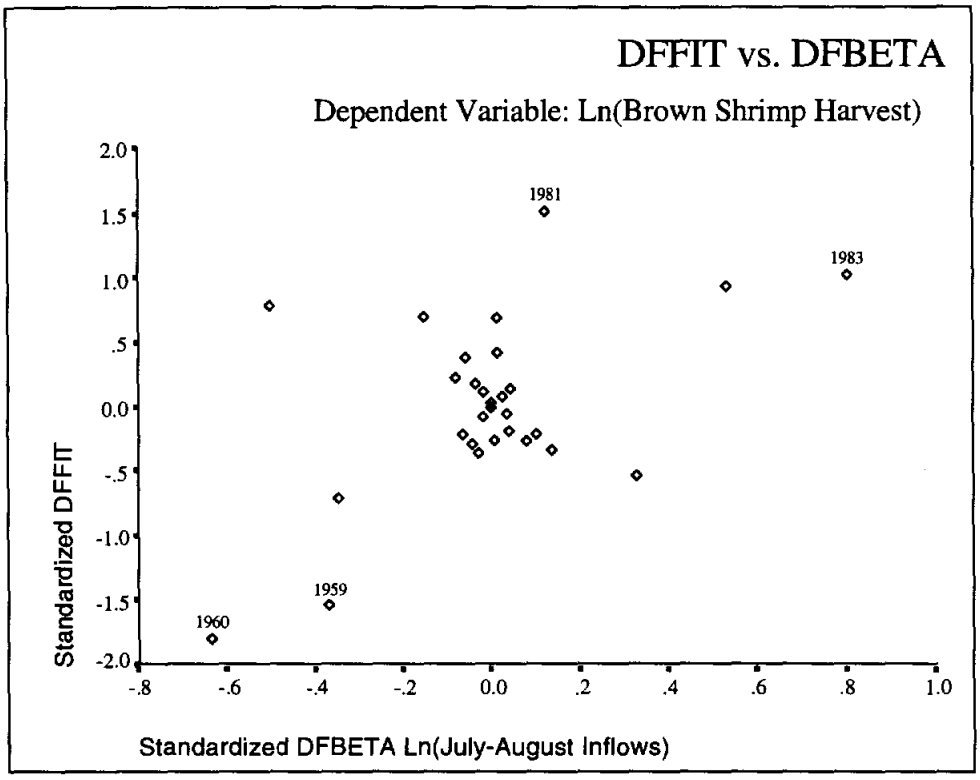
Graphics

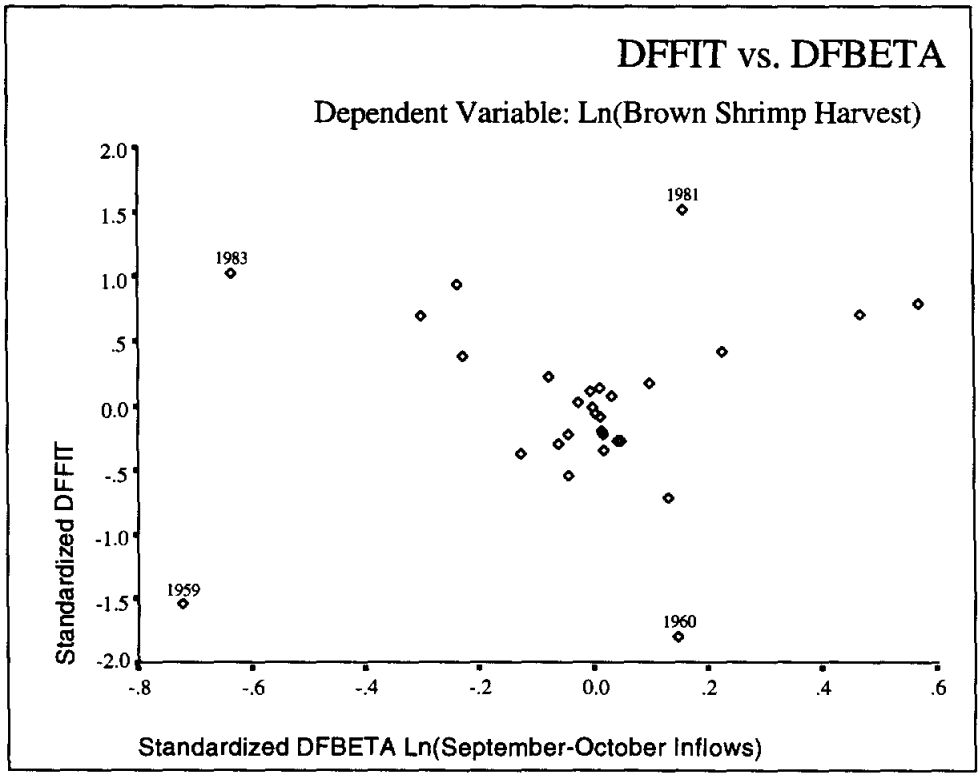

DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-.3
-.2
-.1
-.0
.1
.2
.3
.4
.5
Standardized DFBETA Intercept

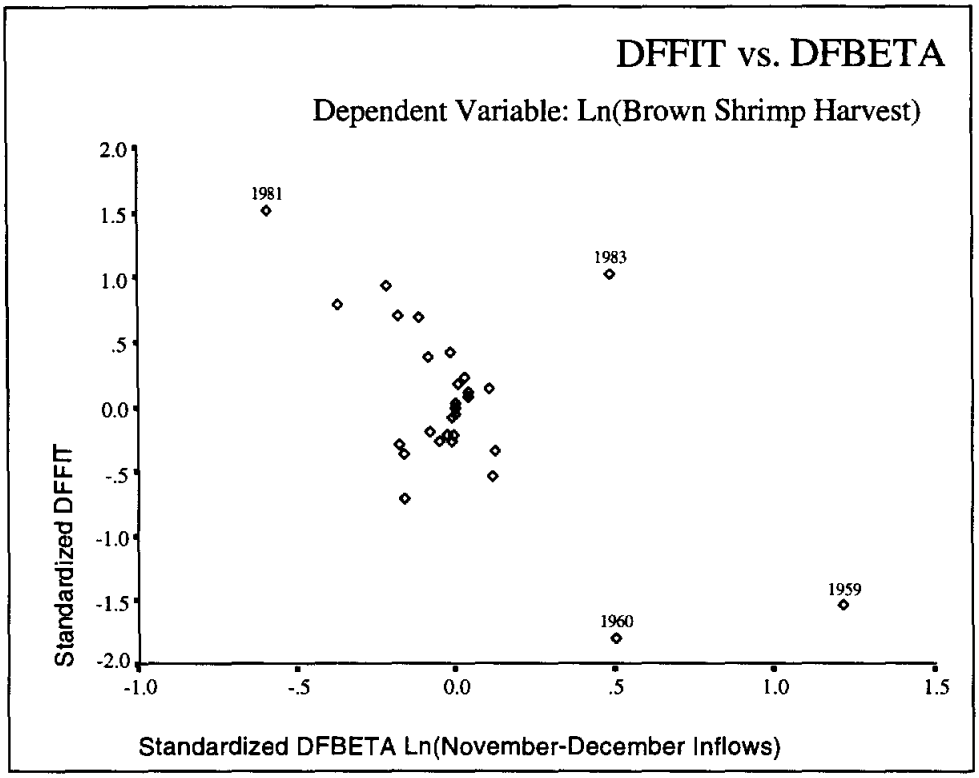

DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-1.5
-1.0
-.5
0.0
.5
Standardized DFBETA Ln(January-February Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA Ln(March-April Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-.6
-.4
-.2
-.0
.2
.4
.6
.8
1.0
Standardized DFBETA Ln(May-June Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1.0
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Brown Shrimp Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1981
1983
1959
1960
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA Ln(November-December Inflows)

Examining Subsets of the Data

Untransformed Data: 1959 and 1975 Omitted

N = 27 Regression Models for Dependent Variable: BRSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1558	0.1221	20.05	360.6	588407	363.2	SO_INFL
1	0.0894	0.0530	23.44	362.7	634708	365.3	JF_INFL
1	0.0577	0.0200	25.06	363.6	656838	366.2	ND_INFL
1	0.0163	-.0230	27.17	364.8	685667	367.3	MA_INFL
2	0.3384	0.2833	12.74	356.0	480359	359.9	JF_INFL ND_INFL
2	0.3006	0.2423	14.67	357.5	507826	361.4	JF_INFL SO_INFL
2	0.1924	0.1251	20.19	361.4	586370	365.3	JA_INFL SO_INFL
2	0.1693	0.1000	21.37	362.2	603189	366.1	SO_INFL ND_INFL
3	0.4501	0.3784	9.045	353.0	416626	358.2	JF_INFL SO_INFL ND_INFL
3	0.4466	0.3745	9.222	353.2	419259	358.4	JF_INFL JA_INFL SO_INFL
3	0.3933	0.3141	11.94	355.7	459696	360.9	JF_INFL JA_INFL ND_INFL
3	0.3497	0.2649	14.17	357.6	492701	362.8	JF_INFL MA_INFL ND_INFL
4	0.5712	0.4933	4.866	348.3	339607	354.8	JF_INFL JA_INFL SO_INFL ND_INFL
4	0.4922	0.3998	8.900	352.9	402250	359.4	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.4551	0.3560	10.79	354.8	431625	361.3	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.4492	0.3490	11.09	355.1	436304	361.6	JF_INFL MJ_INFL JA_INFL SO_INFL
5	0.5851	0.4863	6.161	349.4	344302	357.2	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.5769	0.4762	6.576	350.0	351053	357.7	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.4942	0.3738	10.79	354.8	419688	362.6	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.4527	0.3224	12.91	356.9	454141	364.7	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
6	0.6078	0.4902	7.000	349.9	341685	359.0	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	BRSHRIMP	767.077	988.10	.	.
2	MODEL1	PARMS	BRSHRIMP	796.686	1777.29	-0.22037	.
3	MODEL1	PARMS	BRSHRIMP	810.456	1094.60	.	.
4	MODEL1	PARMS	BRSHRIMP	828.050	1514.99	.	-0.07581
5	MODEL1	PARMS	BRSHRIMP	693.079	1502.46	-0.47488	.
6	MODEL1	PARMS	BRSHRIMP	712.619	1425.18	-0.28552	.
7	MODEL1	PARMS	BRSHRIMP	765.748	757.65	.	.
8	MODEL1	PARMS	BRSHRIMP	776.652	881.25	.	.
9	MODEL1	PARMS	BRSHRIMP	645.466	1289.09	-0.47497	.
10	MODEL1	PARMS	BRSHRIMP	647.502	1118.43	-0.41535	.
11	MODEL1	PARMS	BRSHRIMP	678.009	1373.38	-0.54108	.
12	MODEL1	PARMS	BRSHRIMP	701.927	1412.63	-0.51696	0.06899
13	MODEL1	PARMS	BRSHRIMP	582.758	1019.83	-0.57796	.
14	MODEL1	PARMS	BRSHRIMP	634.232	1071.66	-0.55946	0.13850
15	MODEL1	PARMS	BRSHRIMP	656.981	1206.73	-0.48445	.
16	MODEL1	PARMS	BRSHRIMP	660.533	1166.50	-0.41285	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	BRSHRIMP	_IN_	_P_	_EDF_
1	.	.	0.34257	.	-1	1	2	25
2	.	.	.	.	-1	1	2	25
3	.	.	.	0.18906	-1	1	2	25
4	.	.	.	.	-1	1	2	25
5	.	.	.	0.47779	-1	2	3	24
6	.	.	0.40608	.	-1	2	3	24
7	.	0.20898	0.37449	.	-1	2	3	24
8	.	.	0.30725	0.09663	-1	2	3	24
9	.	.	0.30739	0.38536	-1	3	4	23
10	.	0.45839	0.50500	.	-1	3	4	23
11	.	0.26958	.	0.47626	-1	3	4	23
12	.	.	.	0.50743	-1	3	4	23
13	.	0.41928	0.40607	0.35332	-1	4	5	22
14	.	.	0.36085	0.42879	-1	4	5	22
15	0.035820	.	0.32624	0.37819	-1	4	5	22
16	-0.027883	0.48532	0.49756	.	-1	4	5	22

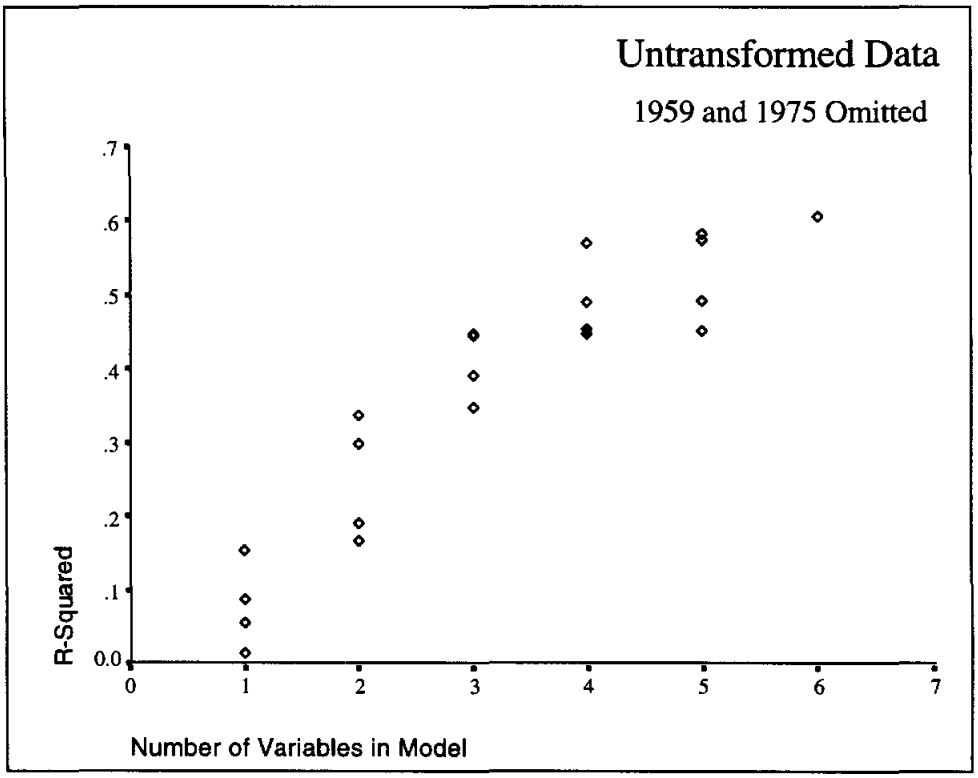
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	588407.29	0.15584	0.12208	20.0519	360.622	363.213
2	634707.94	0.08942	0.05299	23.4396	362.667	365.259
3	656838.35	0.05767	0.01997	25.0588	363.592	366.184
4	685667.42	0.01631	-0.02304	27.1681	364.752	367.344
5	480358.71	0.33842	0.28329	12.7405	356.042	359.929
6	507826.49	0.30059	0.24230	14.6698	357.543	361.431
7	586369.52	0.19241	0.12512	20.1867	361.426	365.313
8	603188.59	0.16925	0.10002	21.3681	362.189	366.077
9	416626.38	0.45010	0.37838	9.0446	353.049	358.233
10	419259.19	0.44663	0.37445	9.2218	353.219	358.403
11	459695.54	0.39326	0.31412	11.9437	355.705	360.889
12	492700.86	0.34970	0.26487	14.1654	357.578	362.761
13	339607.36	0.57125	0.49329	4.8662	348.330	354.809
14	402250.12	0.49216	0.39983	8.8996	352.901	359.380
15	431624.60	0.45508	0.35600	10.7909	354.804	361.283
16	436303.76	0.44917	0.34902	11.0922	355.095	361.574

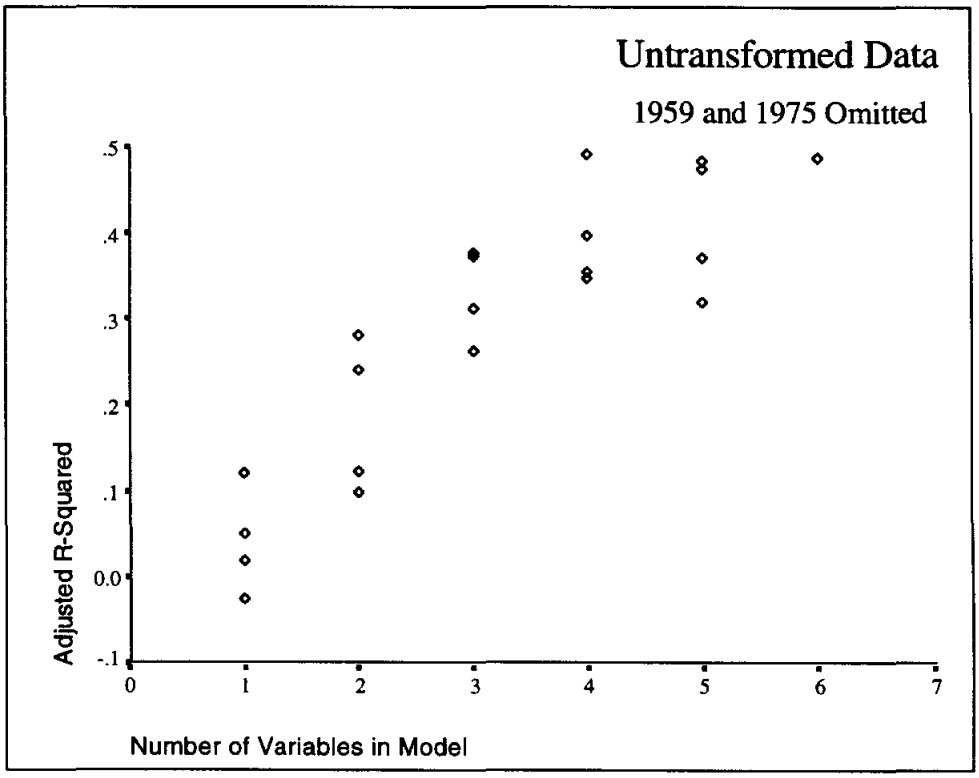
OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	BRSHRIMP	586.772	915.41	-0.61869	0.08233
18	MODEL1	PARMS	BRSHRIMP	592.498	1090.48	-0.57666	.
19	MODEL1	PARMS	BRSHRIMP	647.833	1104.11	-0.56400	0.15778
20	MODEL1	PARMS	BRSHRIMP	673.900	1142.06	-0.42649	0.04533
21	MODEL1	PARMS	BRSHRIMP	584.538	1002.91	-0.64448	0.14045

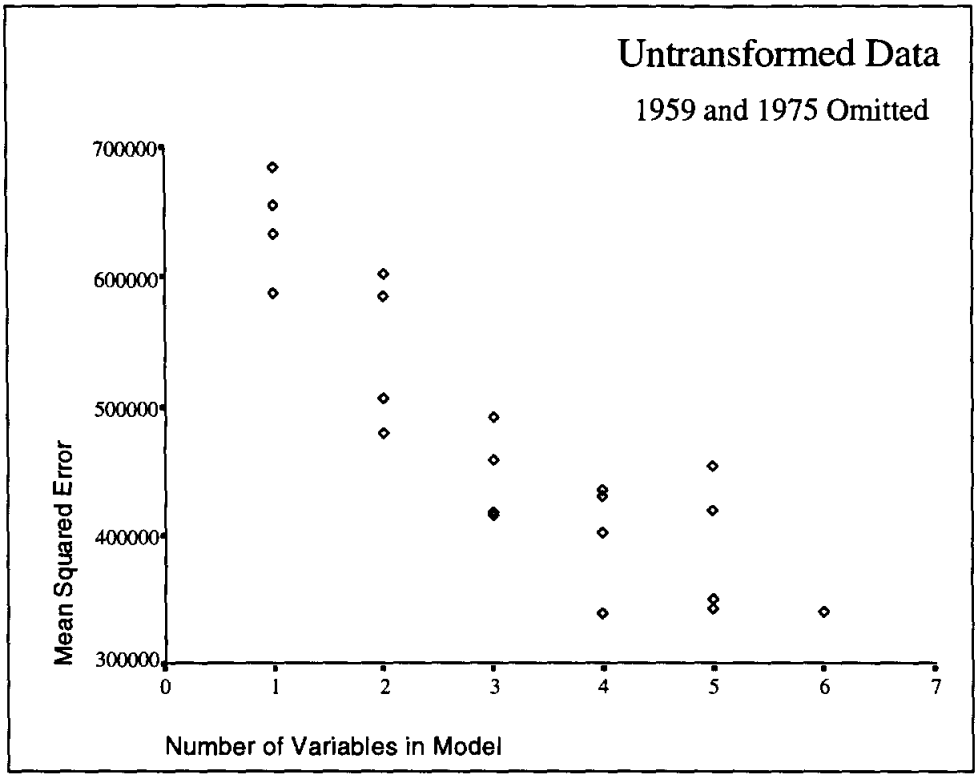
OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	BRSHRIMP	_IN_	_P_	_EDF_
17	.	0.38062	0.42875	0.38209	-1	5	6	21
18	-0.041846	0.45910	0.39342	0.35865	-1	5	6	21
19	-0.027278	.	0.35394	0.44030	-1	5	6	21
20	-0.044495	0.48183	0.51006	.	-1	5	6	21
21	-0.095494	0.44419	0.41590	0.41458	-1	6	7	20

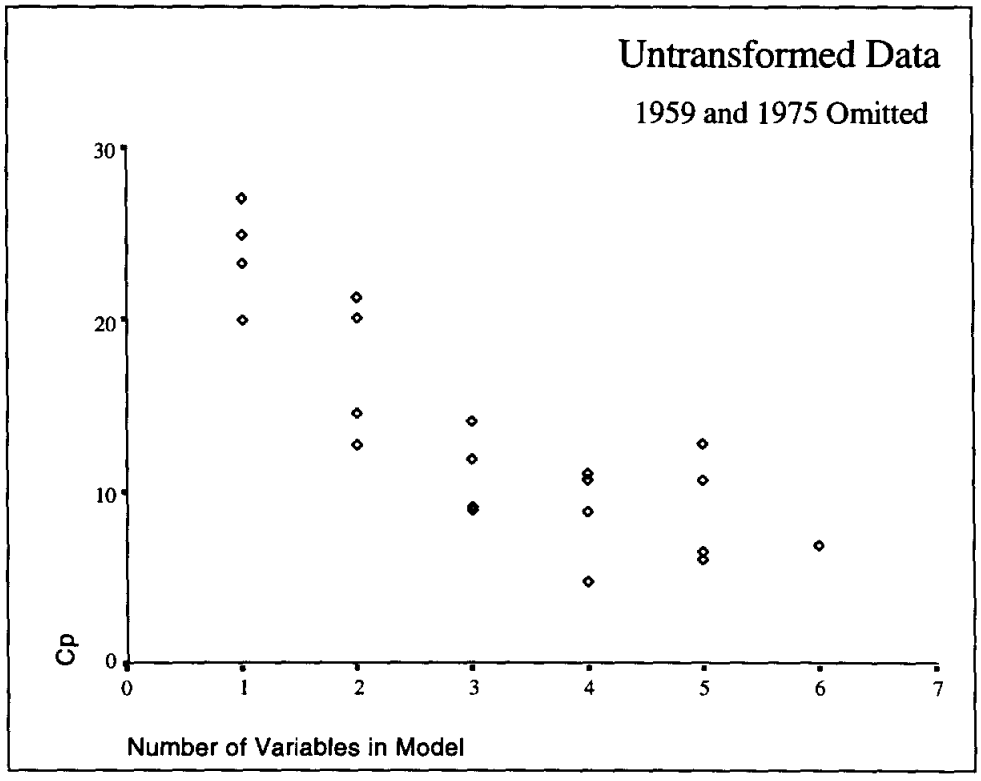
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	344301.81	0.58508	0.48629	6.1608	349.445	357.220
18	351053.45	0.57694	0.47622	6.5758	349.969	357.744
19	419688.21	0.49423	0.37381	10.7941	354.791	362.566
20	454140.73	0.45271	0.32241	12.9116	356.921	364.696
21	341684.69	0.60784	0.49019	7.0000	349.922	358.992

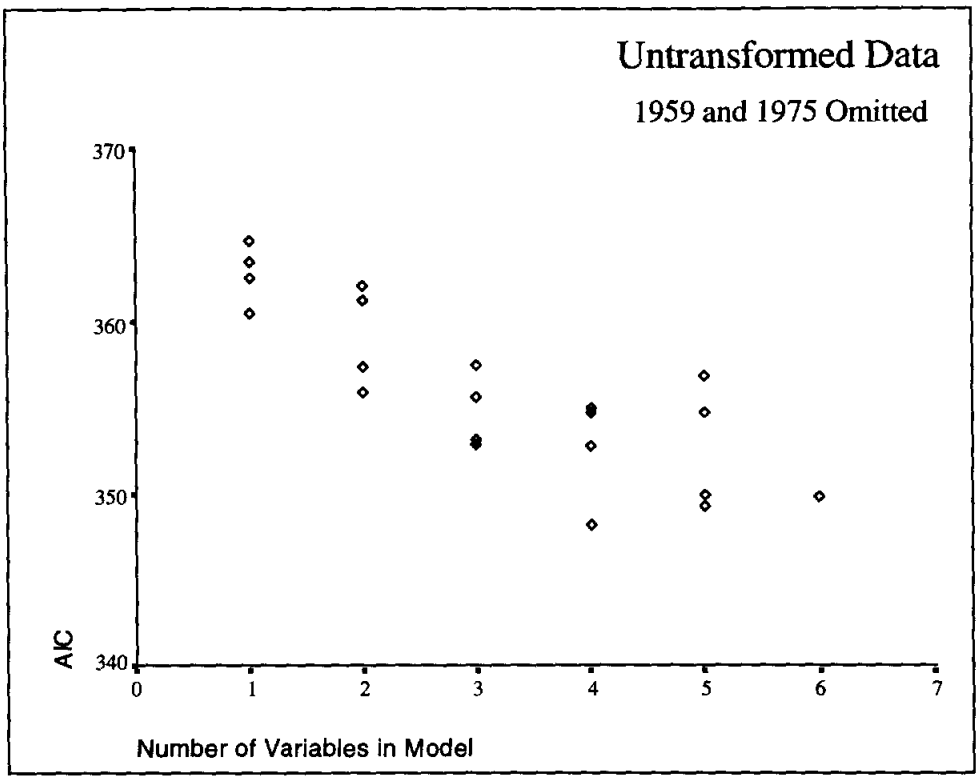
Scree Plots

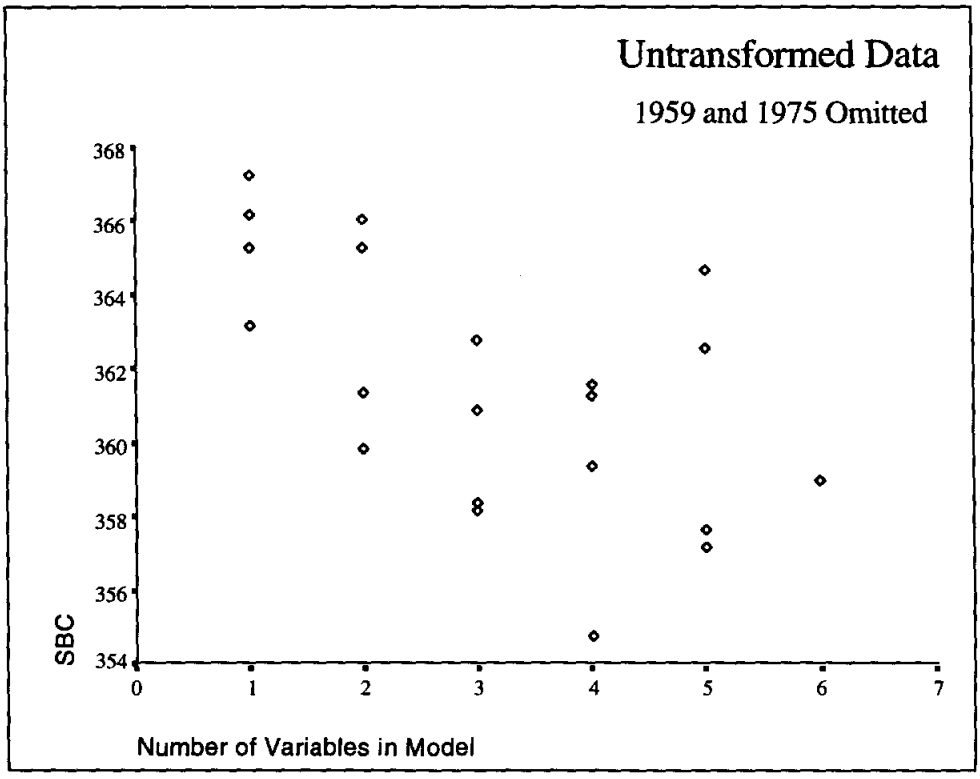

Untransformed Data
1959 and 1975 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
Adjusted R-Squared
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
Mean Squared Error
700000
600000
500000
400000
300000
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
Cp
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
370
360
350
340
AIC
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1959 and 1975 Omitted
368
366
364
362
360
358
356
354
SBC
0
1
2
3
4
5
6
7
Number of Variables in Model

Square Root of Harvest (Box–Cox Transformation): 1959, 1975, and 1979 Omitted

N = 26 Regression Models for Dependent Variable: SQRTBRSH

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1586	0.1235	17.68	131.9	148.4	134.4	JF_INFL
1	0.1197	0.0831	19.51	133.1	155.3	135.6	SO_INFL
1	0.0195	-.0213	24.24	135.9	173.0	138.4	ND_INFL
1	0.0116	-.0296	24.61	136.1	174.4	138.6	MA_INFL
2	0.3989	0.3467	8.345	125.2	110.6	129.0	JF_INFL ND_INFL
2	0.3591	0.3034	10.22	126.8	118.0	130.6	JF_INFL SO_INFL
2	0.1982	0.1284	17.81	132.7	147.6	136.4	JF_INFL JA_INFL
2	0.1588	0.0857	19.67	133.9	154.8	137.7	JF_INFL MJ_INFL
3	0.5177	0.4519	4.745	121.5	92.8	126.5	JF_INFL SO_INFL ND_INFL
3	0.4493	0.3742	7.967	124.9	106.0	129.9	JF_INFL JA_INFL SO_INFL
3	0.4077	0.3269	9.930	126.8	114.0	131.8	JF_INFL JA_INFL ND_INFL
3	0.4050	0.3238	10.06	126.9	114.5	131.9	JF_INFL MA_INFL ND_INFL
4	0.5562	0.4717	4.929	121.3	89.5	127.6	JF_INFL JA_INFL SO_INFL ND_INFL
4	0.5461	0.4596	5.406	121.9	91.5	128.2	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.5195	0.4280	6.660	123.4	96.9	129.6	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.4594	0.3565	9.491	126.4	109.0	132.7	JF_INFL MA_INFL JA_INFL SO_INFL
5	0.5782	0.4727	5.892	122.0	89.3	129.5	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.5577	0.4471	6.857	123.2	93.6	130.8	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.5489	0.4361	7.272	123.7	95.5	131.3	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.4692	0.3365	11.03	127.9	112.4	135.5	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
6	0.5971	0.4698	7.000	122.8	89.8	131.6	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	SQRTBRSH	12.1831	43.1167	-0.004664	.
2	MODEL1	PARMS	SQRTBRSH	12.4614	29.3726	.	.
3	MODEL1	PARMS	SQRTBRSH	13.1515	32.2715	.	.
4	MODEL1	PARMS	SQRTBRSH	13.2049	36.7650	.	-.0011054
5	MODEL1	PARMS	SQRTBRSH	10.5188	38.9330	-0.009171	.
6	MODEL1	PARMS	SQRTBRSH	10.8614	37.8027	-0.005883	.
7	MODEL1	PARMS	SQRTBRSH	12.1490	40.9057	-0.005426	.
8	MODEL1	PARMS	SQRTBRSH	12.4435	43.3478	-0.004636	.
9	MODEL1	PARMS	SQRTBRSH	9.6345	35.4246	-0.009388	.
10	MODEL1	PARMS	SQRTBRSH	10.2942	33.6168	-0.007237	.
11	MODEL1	PARMS	SQRTBRSH	10.6762	38.0445	-0.009345	.
12	MODEL1	PARMS	SQRTBRSH	10.7008	37.8761	-0.009536	0.0008397
13	MODEL1	PARMS	SQRTBRSH	9.4592	32.9176	-0.009804	.
14	MODEL1	PARMS	SQRTBRSH	9.5664	32.6239	-0.010232	0.0018763
15	MODEL1	PARMS	SQRTBRSH	9.8426	34.6553	-0.009450	.
16	MODEL1	PARMS	SQRTBRSH	10.4395	32.1227	-0.007604	0.0011135

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	SQRTBRSH	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	24
2	.	.	.0047382	.	-1	1	2	24
3	.	.	.	.0017349	-1	1	2	24
4	.	.	.	.	-1	1	2	24
5	.	.	.	.0077366	-1	2	3	23
6	.	.	.0062954	.	-1	2	3	23
7	.	.0041864	.	.	-1	2	3	23
8	-.0001163	.	.	.	-1	2	3	23
9	.	.	.0049770	.0064556	-1	3	4	22
10	.	.0064668	.0072084	.	-1	3	4	22
11	.	.0020227	.	.0074042	-1	3	4	22
12	.	.	.	.0079512	-1	3	4	22
13	.	.0044039	.0057892	.0055228	-1	4	5	21
14	.	.	.0056000	.0067748	-1	4	5	21
15	0.0003405	.	.0051466	.0063619	-1	4	5	21
16	.	.0063151	.0075954	.	-1	4	5	21

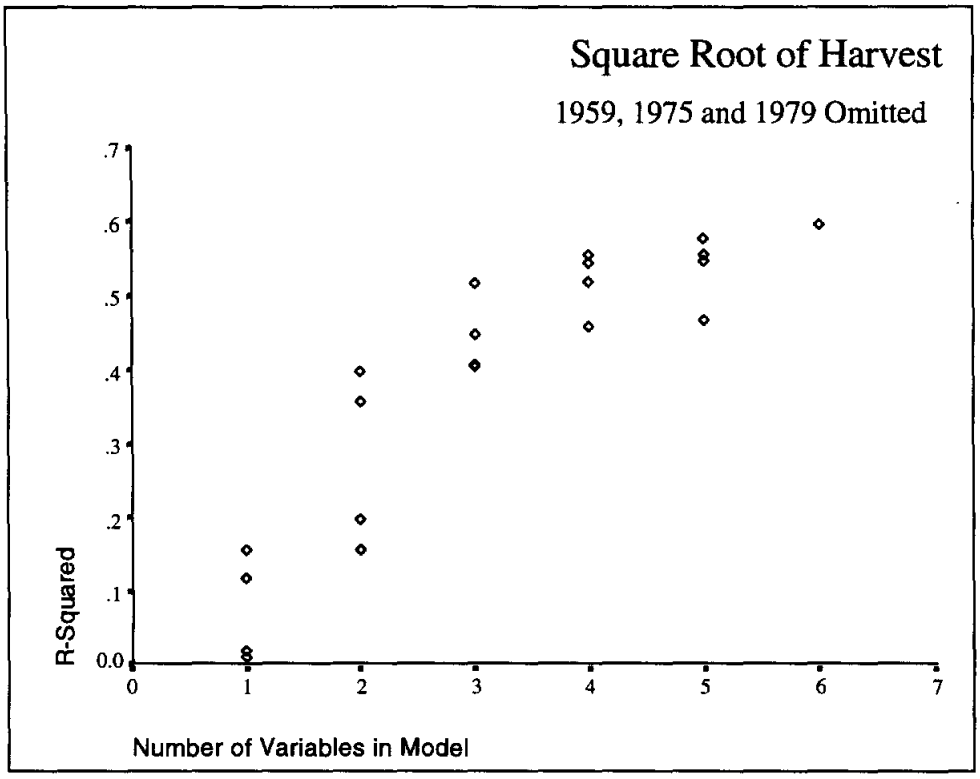
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	148.429	0.15860	0.12354	17.6774	131.922	134.438
2	155.286	0.11973	0.08305	19.5104	133.096	135.612
3	172.962	0.01953	-0.02132	24.2355	135.899	138.415
4	174.368	0.01156	-0.02963	24.6114	136.109	138.625
5	110.645	0.39892	0.34665	8.3448	125.177	128.951
6	117.969	0.35913	0.30340	10.2211	126.843	130.618
7	147.598	0.19817	0.12845	17.8113	132.669	136.443
8	154.840	0.15883	0.08568	19.6666	133.915	137.689
9	92.823	0.51766	0.45189	4.7453	121.455	126.487
10	105.971	0.44934	0.37425	7.9672	124.899	129.931
11	113.982	0.40771	0.32695	9.9301	126.794	131.826
12	114.508	0.40498	0.32384	10.0589	126.913	131.946
13	89.476	0.55619	0.47165	4.9287	121.290	127.581
14	91.515	0.54607	0.45961	5.4055	121.876	128.167
15	96.876	0.51948	0.42795	6.6595	123.356	129.647
16	108.983	0.45943	0.35647	9.4912	126.418	132.708

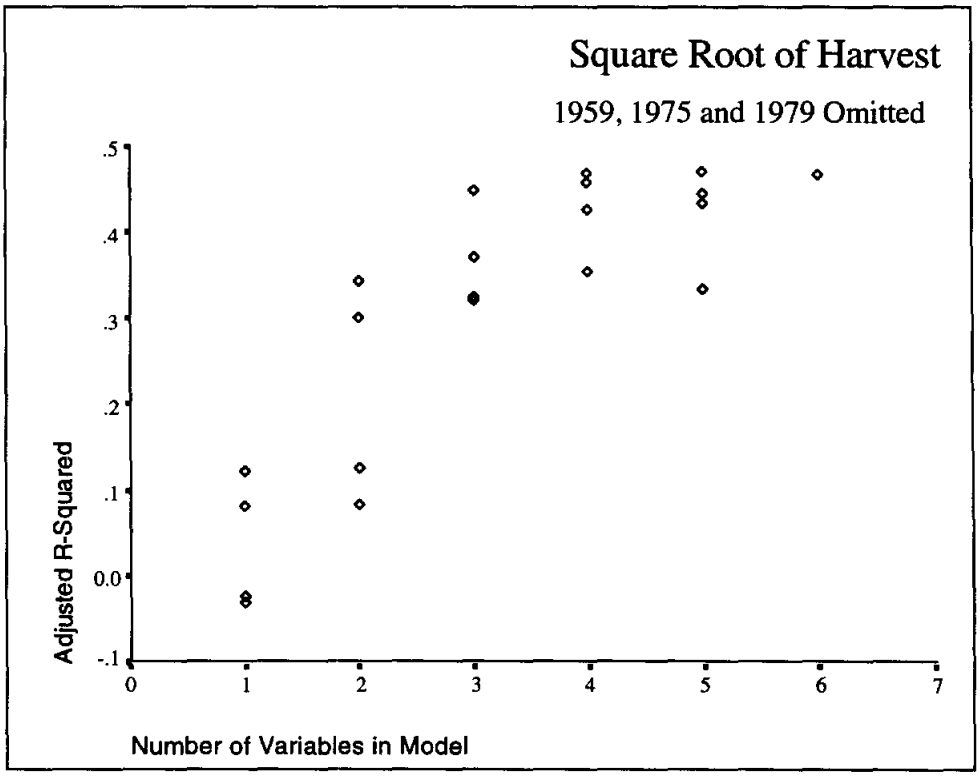
OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	SQRTBRSH	9.4496	30.6444	-0.010517	0.0016604
18	MODEL1	PARMS	SQRTBRSH	9.6762	33.4666	-0.009778	.
19	MODEL1	PARMS	SQRTBRSH	9.7719	33.2083	-0.010305	0.0022399
20	MODEL1	PARMS	SQRTBRSH	10.6000	32.8678	-0.007729	0.0017776
21	MODEL1	PARMS	SQRTBRSH	9.4753	31.6213	-0.010820	0.0026130

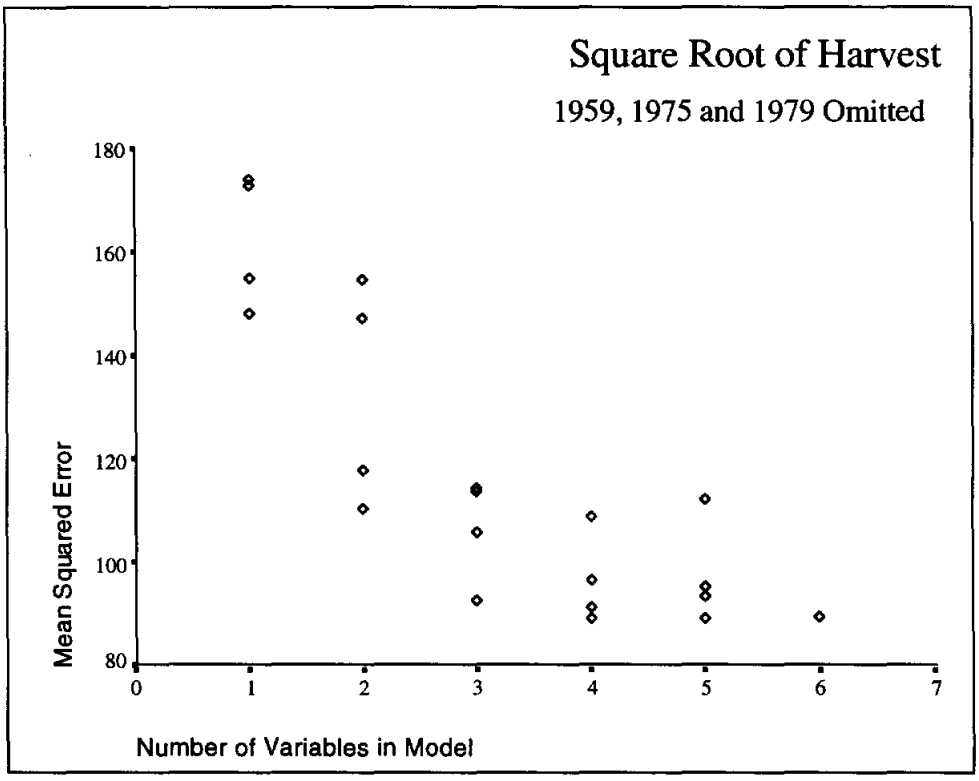
OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	SQRTBRSH	_IN_	_P_	_EDF_
17	.	.0040436	.0062740	.0058816	-1	5	6	20
18	-.0003387	.0047838	.0056905	.0055356	-1	5	6	20
19	-.0004989	.	.0054722	.0069739	-1	5	6	20
20	-.0010067	.0073679	.0075427	.	-1	5	6	20
21	-.0014078	.0054161	.0061423	.0061403	-1	6	7	19

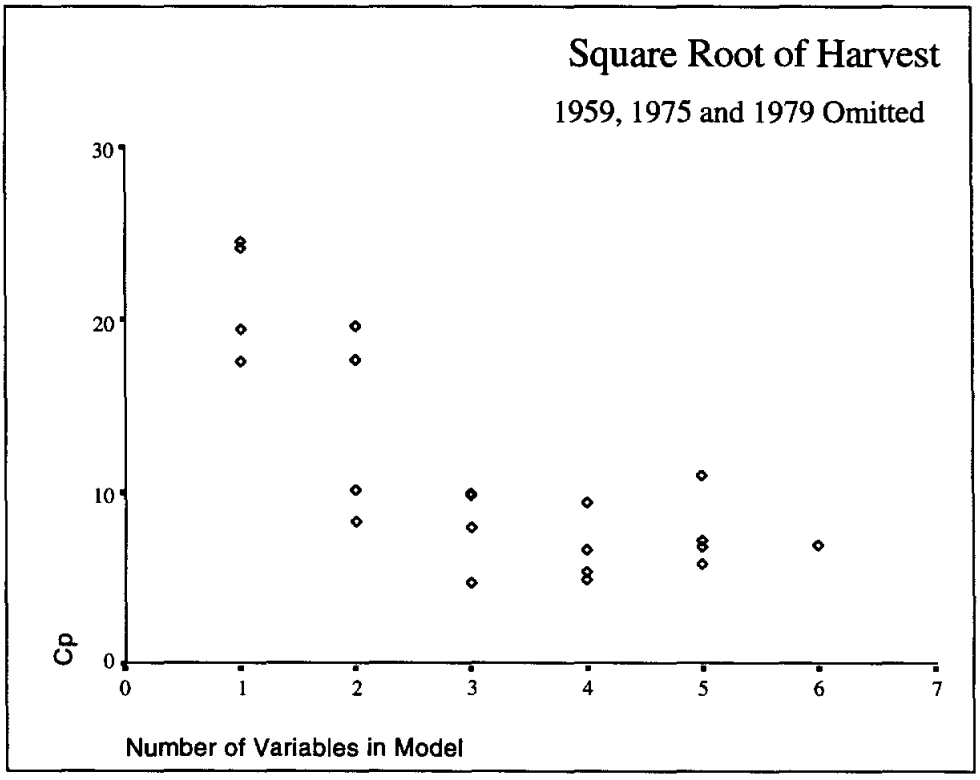
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	89.295	0.57818	0.47272	5.8917	121.969	129.518
18	93.630	0.55770	0.44713	6.8573	123.202	130.750
19	95.490	0.54891	0.43614	7.2716	123.713	131.262
20	112.360	0.46922	0.33652	11.0297	127.943	135.492
21	89.781	0.59709	0.46985	7.0000	122.777	131.583

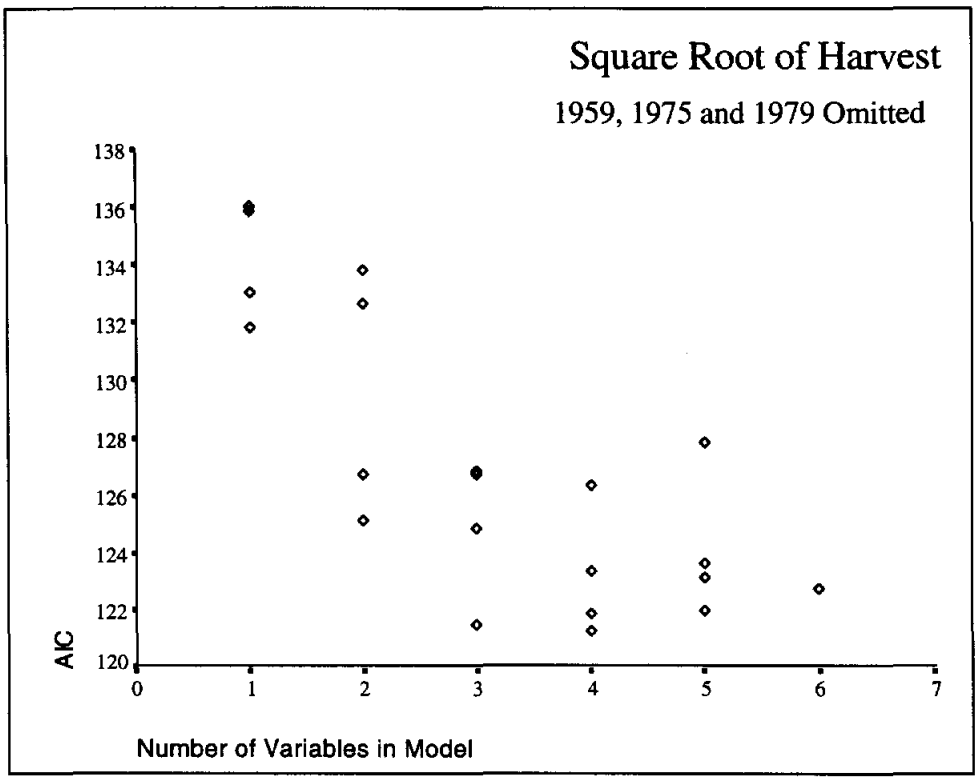
Scree Plots

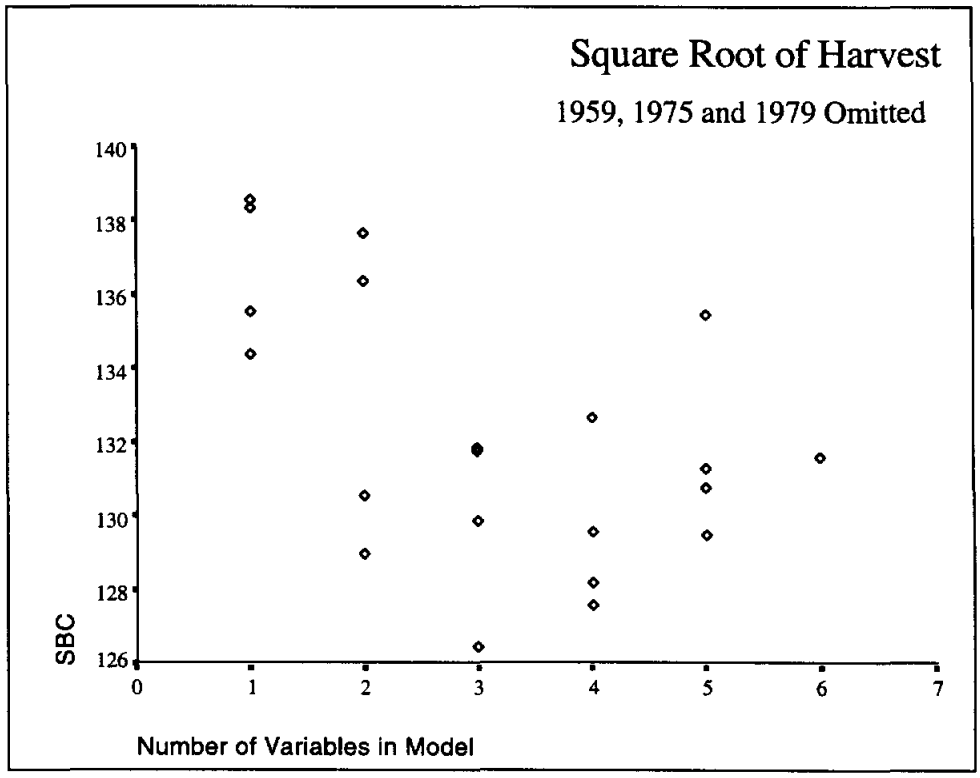

Square Root of Harvest
1959, 1975 and 1979 Omitted
R-Squared
.7
.6
.5
.4
.3
.2
.1
0.0
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
Adjusted R-Squared
.5
.4
.3
.2
.1
0.0
-.1
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
Mean Squared Error
180
160
140
120
100
80
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
Cp
30
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
AIC
138
136
134
132
130
128
126
124
122
120
0
1
2
3
4
5
6
7
Number of Variables in Model


Square Root of Harvest
1959, 1975 and 1979 Omitted
SBC
140
138
136
134
132
130
128
126
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1960 Omitted

N = 28 Regression Models for Dependent Variable: LBSHRIMP

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0853	0.0502	9.567	3.504	1.058	6.168	LGJFINFL
1	0.0490	0.0124	10.90	4.594	1.100	7.259	LGNDINFL
1	0.0348	-.0024	11.42	5.011	1.117	7.675	LGMAINFL
1	0.0312	-.0060	11.55	5.113	1.121	7.778	LGJAINFL
2	0.3884	0.3395	0.444	-5.767	0.736	-1.770	LGJFINFL LGNDINFL
2	0.1073	0.0359	10.76	4.823	1.074	8.819	LGMAINFL LGNDINFL
2	0.0952	0.0228	11.21	5.200	1.088	9.197	LGJFINFL LGSOINFL
2	0.0942	0.0218	11.24	5.230	1.090	9.227	LGJFINFL LGJAINFL
3	0.4150	0.3419	1.468	-5.012	0.733	0.317	LGJFINFL LGMAINFL LGNDINFL
3	0.3973	0.3220	2.118	-4.177	0.755	1.152	LGJFINFL LGSOINFL LGNDINFL
3	0.3908	0.3146	2.358	-3.875	0.763	1.454	LGJFINFL LGJAINFL LGNDINFL
3	0.3898	0.3135	2.394	-3.830	0.765	1.499	LGJFINFL LGMJINFL LGNDINFL
4	0.4256	0.3257	3.080	-3.522	0.751	3.139	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.4188	0.3177	3.330	-3.192	0.760	3.469	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.4171	0.3157	3.394	-3.109	0.762	3.552	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
4	0.3991	0.2945	4.054	-2.258	0.786	4.404	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4278	0.2977	5.001	-1.628	0.782	6.366	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4257	0.2952	5.076	-1.529	0.785	6.465	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.4210	0.2894	5.250	-1.298	0.792	6.695	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.4031	0.2675	5.904	-0.448	0.816	7.545	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.4278	0.2643	7.000	0.371	0.819	9.696	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LBSHRIMP	1.02859	9.5052	-0.35890	.
2	MODEL1	PARMS	LBSHRIMP	1.04882	5.0448	.	.
3	MODEL1	PARMS	LBSHRIMP	1.05665	8.7091	.	-0.24958
4	MODEL1	PARMS	LBSHRIMP	1.05858	8.5136	.	.
5	MODEL1	PARMS	LBSHRIMP	0.85774	7.6390	-0.95188	.
6	MODEL1	PARMS	LBSHRIMP	1.03628	6.9767	.	-0.33146
7	MODEL1	PARMS	LBSHRIMP	1.04329	8.7375	-0.37297	.
8	MODEL1	PARMS	LBSHRIMP	1.04385	10.1425	-0.32292	.
9	MODEL1	PARMS	LBSHRIMP	0.85618	6.5477	-1.16891	0.28873
10	MODEL1	PARMS	LBSHRIMP	0.86904	8.2980	-0.97458	.
11	MODEL1	PARMS	LBSHRIMP	0.87374	7.9819	-0.92891	.
12	MODEL1	PARMS	LBSHRIMP	0.87444	7.4078	-0.97296	.
13	MODEL1	PARMS	LBSHRIMP	0.86666	7.0909	-1.16137	0.34658
14	MODEL1	PARMS	LBSHRIMP	0.87178	7.0742	-1.16640	0.26531
15	MODEL1	PARMS	LBSHRIMP	0.87307	6.7050	-1.17190	0.33130
16	MODEL1	PARMS	LBSHRIMP	0.88645	8.5711	-0.95409	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBSHRIMP	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	26
2	.	.	.	0.26386	-1	1	2	26
3	.	.	.	.	-1	1	2	26
4	.	-0.24347	.	.	-1	1	2	26
5	.	.	.	0.87260	-1	2	3	25
6	.	.	.	0.32921	-1	2	3	25
7	.	.	0.12782	.	-1	2	3	25
8	.	-0.13606	.	.	-1	2	3	25
9	.	.	.	0.95447	-1	3	4	24
10	.	.	-0.12906	0.92690	-1	3	4	24
11	.	-0.07026	.	0.86616	-1	3	4	24
12	0.05548	.	.	0.86747	-1	3	4	24
13	.	-0.15613	.	0.95655	-1	4	5	23
14	.	.	-0.08577	0.98392	-1	4	5	23
15	-0.07635	.	.	0.97359	-1	4	5	23
16	.	-0.06042	-0.12480	0.91957	-1	4	5	23

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	1.05801	0.08534	0.05016	9.5675	3.50381	6.16822
2	1.10003	0.04901	0.01244	10.9006	4.59432	7.25872
3	1.11651	0.03476	-0.00236	11.4236	5.01078	7.67519
4	1.12060	0.03123	-0.00603	11.5533	5.11313	7.77754
5	0.73571	0.38843	0.33950	0.4443	-5.76680	-1.77019
6	1.07388	0.10732	0.03591	10.7607	4.82264	8.81925
7	1.08845	0.09521	0.02283	11.2051	5.19991	9.19652
8	1.08963	0.09424	0.02177	11.2410	5.23017	9.22679
9	0.73304	0.41503	0.34191	1.4681	-5.01183	0.31699
10	0.75523	0.39732	0.32199	2.1179	-4.17692	1.15190
11	0.76342	0.39078	0.31463	2.3578	-3.87485	1.45397
12	0.76464	0.38981	0.31353	2.3938	-3.82988	1.49893
13	0.75110	0.42559	0.32569	3.0805	-3.52206	3.13896
14	0.76000	0.41878	0.31770	3.3304	-3.19202	3.46900
15	0.76226	0.41706	0.31567	3.3937	-3.10907	3.55195
16	0.78580	0.39905	0.29454	4.0544	-2.25751	4.40352

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LBSHRIMP	0.88447	7.4580	-1.15995	0.32467
18	MODEL1	PARMS	LBSHRIMP	0.88603	7.0817	-1.15993	0.33775
19	MODEL1	PARMS	LBSHRIMP	0.88969	7.2496	-1.16945	0.30909
20	MODEL1	PARMS	LBSHRIMP	0.90329	8.3155	-0.97368	.
21	MODEL1	PARMS	LBSHRIMP	0.90526	7.4477	-1.15927	0.32072

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBSHRIMP	_IN_	_P_	_EDF_
17	.	-0.14551	-0.06583	0.97902	-1	5	6	22
18	0.02320	-0.16722	.	0.95089	-1	5	6	22
19	-0.07945	.	-0.08769	1.00448	-1	5	6	22
20	0.12120	-0.13126	-0.10599	0.89396	-1	5	6	22
21	0.01130	-0.15108	-0.06479	0.97590	-1	6	7	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.78228	0.42775	0.29770	5.0011	-1.62763	6.36560
18	0.78505	0.42572	0.29521	5.0756	-1.52859	6.46464
19	0.79155	0.42097	0.28938	5.2499	-1.29793	6.69530
20	0.81593	0.40314	0.26749	5.9044	-0.44850	7.54473
21	0.81949	0.42778	0.26429	7.0000	0.37084	9.69627

Seatrout Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Table of Contents

Summary Report 3

Description of the Problem 3

Constructing Models—General Discussion 3

Detecting Influential Points and Outliers 3

Variable Selection 4

Multicollinearity 4

Other Procedures 4

How the Final Model Was Chosen 4

Final Model 7

Exploring the Data 11

Listing of Data 11

Examination of Individual Variables 12

99% Prediction Ellipses 42

Box–Cox Analysis 53

Numerical Results 53

Plots 54

Model Choice Diagnostics 55

Untransformed Data 55

Square Root of Harvest (Box–Cox Transformation) 57

Logged Inflows 59

Logged Harvest 61

Logged Harvest and Inflows 63

Regression—Logged Inflows 65

ANOVA and Parameter Estimates 65

Collinearity Diagnostics 66

Residuals Diagnostics 68

Summary Information 68

Case Values for Residuals Diagnostics 69

Graphics 70

Prediction Intervals for Seatrout Harvest 77

Outlier and Influential Point Detection 78

Calculated Quantities 78

Graphics 81

Regression—Logged Harvest 85

ANOVA and Parameter Estimates 85

Collinearity Diagnostics 86

Residuals Diagnostics 88
Summary Information 88
Case Values for Residuals Diagnostics 89
Graphics 90

Prediction Intervals for the Natural Log of Seatrout Harvest 94

Outlier and Influential Point Detection 95
Calculated Quantities 95
Graphics 98

Regression—Logged Harvest and Inflows *102*

ANOVA and Parameter Estimates 102

Collinearity Diagnostics 103

Residuals Diagnostics 105
Summary Information 105
Case Values for Residuals Diagnostics 106
Graphics 107

Prediction Intervals for the Natural Log of Seatrout Harvest 114

Outlier and Influential Point Detection 115
Calculated Quantities 115
Graphics 118

Examining Subsets of the Data *122*

Logged Inflows: 1977 Omitted 122

Logged Harvest : 1962 and 1977 Omitted 124
Scree Plots 126

All Variables Logged: 1962 Omitted 129
Scree Plots 131

All Variables Logged: 1962 and 1977 Omitted 134
Scree Plots 136

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The recommended transformation was the square root of harvest. At this point, there were five data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Square root of harvest; remaining variables untransformed

3. Natural log of inflow variables; harvest untransformed
4. Natural log of harvest; inflows untransformed
5. Natural log of all variables

Selecting the Points to be Omitted. The results were quite poor for each of these five data sets; the highest value of R^2 was 0.21, which occurred with the fifth data set. The next highest value of R^2 was only 0.17, and this occurred with the fourth data set. Sometimes removing one or two outliers can have a dramatic impact on measures of fit. To this end, full regressions were performed on models from the last three data sets (which yielded the three highest values for R^2). Each model contained all predictors in the given data set. A number of diagnostics were employed to determine potentially influential points; the results are summarized in the table below. (An asterisk indicates that the observation year was deleted for subsequent analysis.) The abbreviation key and a similar summary table for points designated as potentially influential by box plots appear on the next page. A point was not considered to be a potential problem unless it garnered multiple flags.

	BOX	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 3								
1962						1		1
1965	1							1
***1977**						1	1	2
1978						1		1
1979			1					1
1981			1					1
Data Set 4								
***1962**	1	1				1	2	5
***1977**			1			1	1	3
1979			1					1
1981	1		1					2
Data Set 5								
***1962**	1	1				1	2	5
1965	1							1
***1977**						1		1
1979			1					1
1981			1					1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	Variable
1962	Natural log of Seatrout Harvest
1965	Natural log of July-August Inflows
1981	July-August Inflows

Summary of points flagged by box plots

Selecting the Final Candidate Models. After removing the flagged points, regression diagnostics were again run for twenty-one models for each of four data subsets: data set 3 without 1977, data set 4 without 1962 or 1977, data set 5 without 1962, and data set 5 without 1962 or 1977. The improvement in fit for the best models of each size was considerable, with the last data subset showing marked superiority to its nearest competitor. Thus, we limit our examination to the two best models from the data set with all variables logged, with 1962 and 1977 omitted.

1962 and 1977 Omitted:

5a. The natural log of harvest regressed on the natural logs of January-February, September-October, and November-December inflows

5b. The natural log of harvest regressed on the natuaral logs of January-February, March-April, September-October, and November-December inflows

Selecting the Final Model. These two models were tested on both the full data set and the subset with 1962 and 1977 omitted. In each case, the regression was performed and the set of adjusted predicted values obtained. (The adjusted predicted value for each observation is obtained by fitting the model without the given observation, then using that fitted model to make a prediction for that observation.) Each adjusted predicted value was translated back to the original units by exponentiating, and then the squared difference between this value and the observed harvest value was calculated. Various descriptive statistics were calculated for these squared differences. (See tabular results.) Model 5a clearly performs better than model 5b in both cases, whether using all 20 data points or the reduced set of 18 data points. The poorer results from the model with the larger number of predictors shows the danger of overfitting the model. Thus, we recommend model 5a as our final choice.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
5a	*18*	*134.3940*	*27671.9095*	*7600.531010*	*8740.136938*
5b	*18*	*59.2452*	*43018.0262*	*9503.882514*	*12603.945495*
5a	*20*	*1.5388*	*37284.0090*	*10581.852541*	*12466.057805*
5b	*20*	*11.7978*	*78363.5812*	*15711.217201*	*20358.251791*

Final Model

Ln(Seatrout Harvest) = 2.935 – 0.612*Ln(January-February Inflows)
– 0.430*Ln(September-October Inflows)
+ 1.348*Ln(November-December Inflows)

Notes on the results. There is no evidence of serial autocorrelation from examining the Durbin-Watson results. The relatively small variance inflation factors (VIF's) indicate no serious multicollinearity, while the condition index *does*. This apparent contradiction is caused by the presence of the intercept term. When the standardized data are analyzed via principal components, the apparent multicollinearity disappears. (See BMDP® output section.) We can get a more accurate version of the condition index (the ratio of largest to smallest eigenvalues) from this output: 2.22099/0.26815 = 8.2826, which is considerably smaller than the 67.493 indicated in the standard regression. (See the shaded area of the BMDP® output for the source of these values.) It is interesting to note that the principal components fitted model is extremely close to our least-squares model. This is the principal components model:

Ln(Seatrout Harvest) = 2.924 – 0.608*Ln(January-February Inflows)
– 0.432*Ln(September-October Inflows)
+ 1.348*Ln(November-December Inflows)

Full regression results for the ordinary least-squares model (at the top of the page) appear beginning on the next page.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(January-February Inflows), Ln(September-October Inflows)[c,d]*	.	*.692*	*.479*	*.367*	*.4355*	*1.964*

a. Dependent Variable: Ln(Seatrout Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(January-February Inflows), Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2.441*	*3*	*.814*	*4.289*	*.024[b]*
	Residual	*2.655*	*14*	*.190*		
	Total	*5.096*	*17*			

a. Dependent Variable: Ln(Seatrout Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(January-February Inflows), Ln(September-October Inflows)

Coefficients[a]

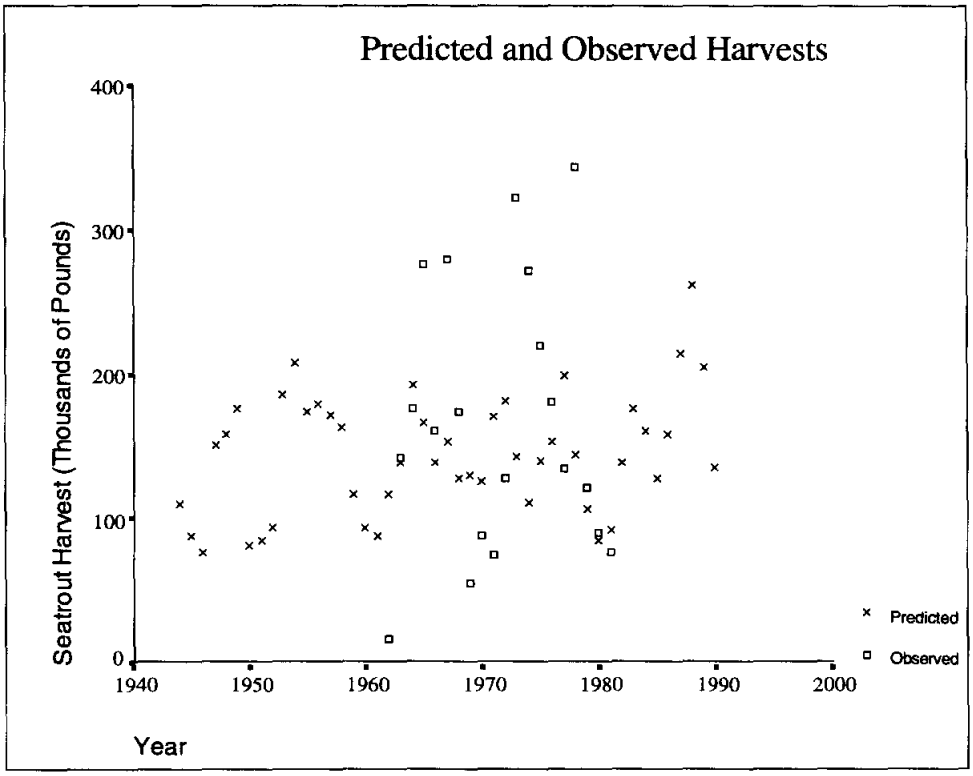
Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	*2.935*	*2.122*		*1.383*	*.188*		
	Ln(January-February Inflows)	*-.612*	*.377*	*-.419*	*-1.624*	*.127*	*.559*	*1.789*
	Ln(September-October Inflows)	*-.430*	*.241*	*-.468*	*-1.785*	*.096*	*.541*	*1.848*
	Ln(November-December Inflows)	*1.348*	*.378*	*1.087*	*3.565*	*.003*	*.400*	*2.500*

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Ln(January-February Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	*3.994*	*1.000*	*.00*	*.00*	*.00*	*.00*
	2	*4.005E-03*	*31.579*	*.17*	*.03*	*.61*	*.00*
	3	*1.422E-03*	*53.001*	*.63*	*.10*	*.32*	*.41*
	4	*8.767E-04*	*67.493*	*.20*	*.87*	*.06*	*.59*

a. Dependent Variable: Ln(Seatrout Harvest)



BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION

```
VARIABLES TO BE USED
     1 year        2 lgstrout    3 lgjfinfl    4 lgsoinfl    5 lgndinfl

  DEPENDENT VARIABLE. . . . .   2
INDEPENDENT VARIABLE(S) . . .   3   4   5
    MODEL SPECIFICATION . . . WITH INTERCEPT

  COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
  PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
  MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

  MAXIMUM NUMBER OF COMPONENTS TO ENTER . . . .       3
  NUMBER OF COMPONENTS TO ENTER LIMITED BY
  MAGNITUDE OF CORRELATION GREATER THAN . . . .  0.0100


NUMBER OF CASES READ. . . . . .      18
```

CORRELATION MATRIX

		lgstrout 2	lgjfinfl 3	lgsoinfl 4	lgndinfl 5
lgstrout	2	1.0000			
lgjfinfl	3	0.0712	1.0000		
lgsoinfl	4	0.0608	0.4894	1.0000	
lgndinfl	5	0.4941	0.6615	0.6751	1.0000

EIGENVALUES

2.22099	0.51086	0.26815

CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

0.74033	0.91062	1.00000

EIGENVECTORS

	1	2	3
3 lgjfinfl	0.5567	-0.7222	-0.4105
4 lgsoinfl	0.5616	0.6913	-0.4546
5 lgndinfl	0.6121	0.0226	0.7904

DEPENDENT VARIABLE 2 lgstrout

TOTAL SUM OF SQUARES	5.096161
DEGREES OF FREEDOM	17
MEAN SQUARE	0.299774

CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE

0.25245	0.00250	0.64436

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS

CONSTANT (MEAN OF Y)	COMPONENTS		
5.04637	0.09275	0.00191	0.68130

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

INDEX OF COMPONENTS ENTERING	RESIDUAL SUM OF SQUARES	F-VALUES REGRESSION MODEL	F-VALUES COMPONENT TO ENTER	R2	CONSTANT	VARIABLES 3 lgjfinfl
3	2.98024	11.36	11.36	0.4152	5.4369	-0.7456
1*	2.65546	6.89	1.83	0.4789	2.9237	-0.6079
2	2.65542	4.29	0.00	0.4789	2.9352	-0.6116

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION (CONTINUED)

	4 lgsoinfl	5 lgndinfl
3	-0.51948	1.21949
1*	-0.43213	1.34806
2	-0.42991	1.34815

---

* PREDICTED AND RESIDUAL VALUES ARE CALCULATED USING THE COEFFICIENTS BASED ON THESE 2 COMPONENTS, SINCE THOSE LISTED BELOW DO NOT PASS THE ENTRANCE LIMITS.

Exploring the Data

Listing of Data

YEAR	SEATROUT	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1962	17.00	2915.47	963.27	1615.30	1059.68	1469.86	2205.60
1963	142.90	2336.83	815.63	1270.07	724.21	1432.16	2208.27
1964	176.90	894.15	689.43	759.57	316.70	1089.76	1105.07
1965	277.00	1140.22	818.07	1192.23	220.39	564.65	1030.93
1966	161.70	1481.65	1358.37	2727.63	560.03	325.37	987.87
1967	280.40	1283.51	1199.18	2828.73	616.20	459.59	1007.86
1968	174.20	1504.38	1932.88	4136.47	844.60	435.08	848.36
1969	55.70	1349.94	2640.94	3676.87	600.78	533.83	706.48
1970	89.20	1514.87	3337.73	3968.77	607.07	489.11	828.41
1971	75.90	849.90	2360.83	1973.78	446.99	859.88	615.13
1972	128.40	976.26	1232.03	1288.20	431.40	923.73	1077.87
1973	323.80	1455.68	2134.83	2664.22	829.55	980.35	1232.31
1974	272.90	2524.91	2348.44	3077.98	868.72	1845.28	1908.59
1975	221.00	2890.51	2857.40	3726.31	1138.54	2253.25	2897.57
1976	181.50	2260.46	1321.18	2439.21	925.46	2254.37	2659.43
1977	134.90	1819.08	2075.70	2395.03	874.23	1085.72	2562.96
1978	344.20	1479.44	1530.34	1315.67	587.24	585.86	1162.82
1979	122.10	2336.64	2853.94	1997.58	1274.52	535.72	1259.39
1980	90.60	2491.90	2356.53	2213.29	1264.55	1229.99	1006.62
1981	77.80	1895.84	2285.70	3516.54	1686.25	1407.21	767.72

SEATROUT	Seatrout harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Examination of Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Seatrout Harvest	.140	20	.200*	.951	20	.423
Ln(Seatrout Harvest)	.131	20	.200*	.908	20	.059
Square Root of Seatrout Harvest	.112	20	.200*	.974	20	.793
January-February Inflows	.203	20	.030	.930	20	.205
March-April Inflows	.137	20	.200*	.948	20	.387
May-June Inflows	.115	20	.200*	.955	20	.455
July-August Inflows	.138	20	.200*	.962	20	.555
September-October Inflows	.178	20	.096	.897	20	.039
November-December Inflows	.280	20	.000	.832	20	.010*
Ln(January-February Inflows)	.144	20	.200*	.945	20	.361
Ln(March-April Inflows)	.171	20	.127	.929	20	.196
Ln(May-June Inflows)	.116	20	.200*	.940	20	.309
Ln(July-August Inflows)	.120	20	.200*	.971	20	.743
Ln(September-October Inflows)	.164	20	.162	.949	20	.402
Ln(November-December Inflows)	.198	20	.039	.911	20	.069

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

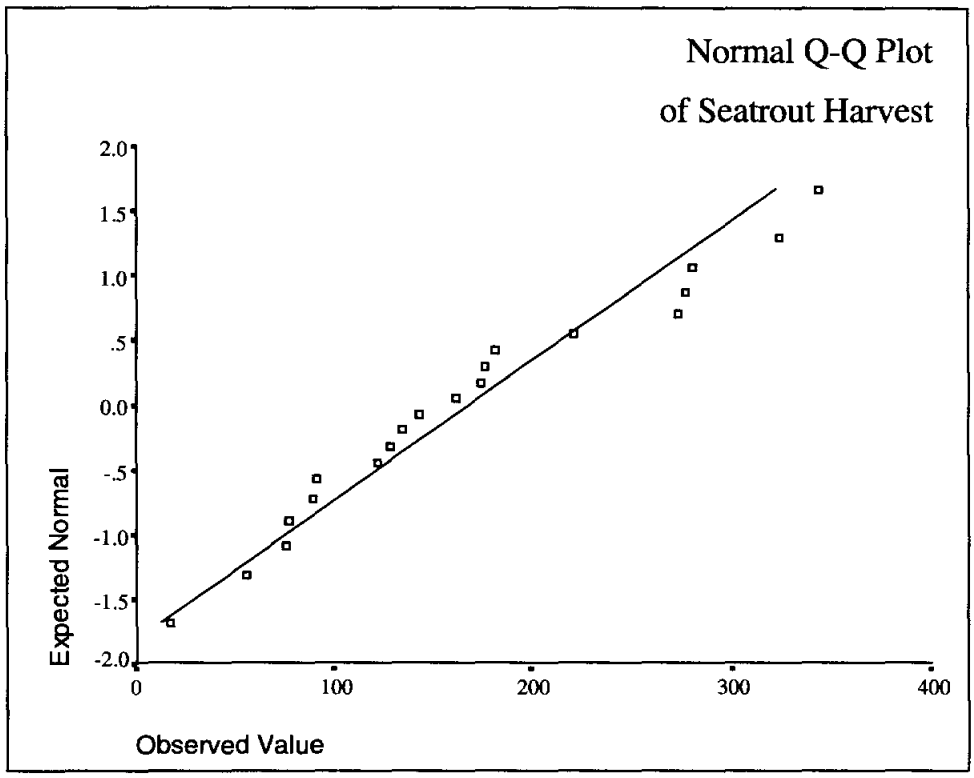
a. Lilliefors Significance Correction

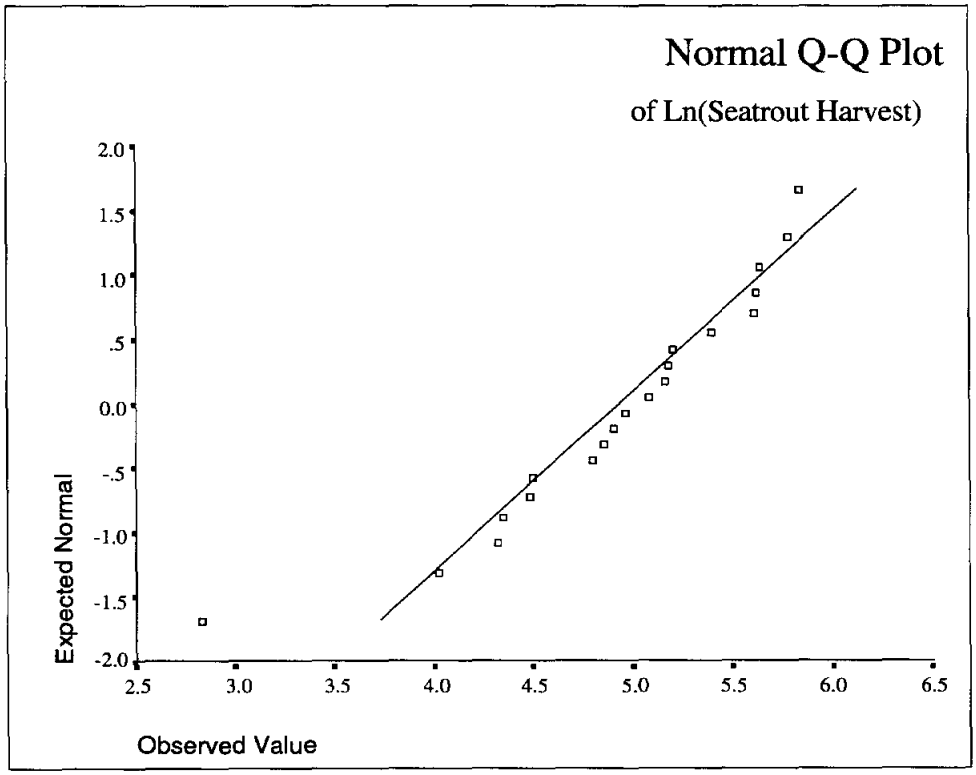
Descriptives

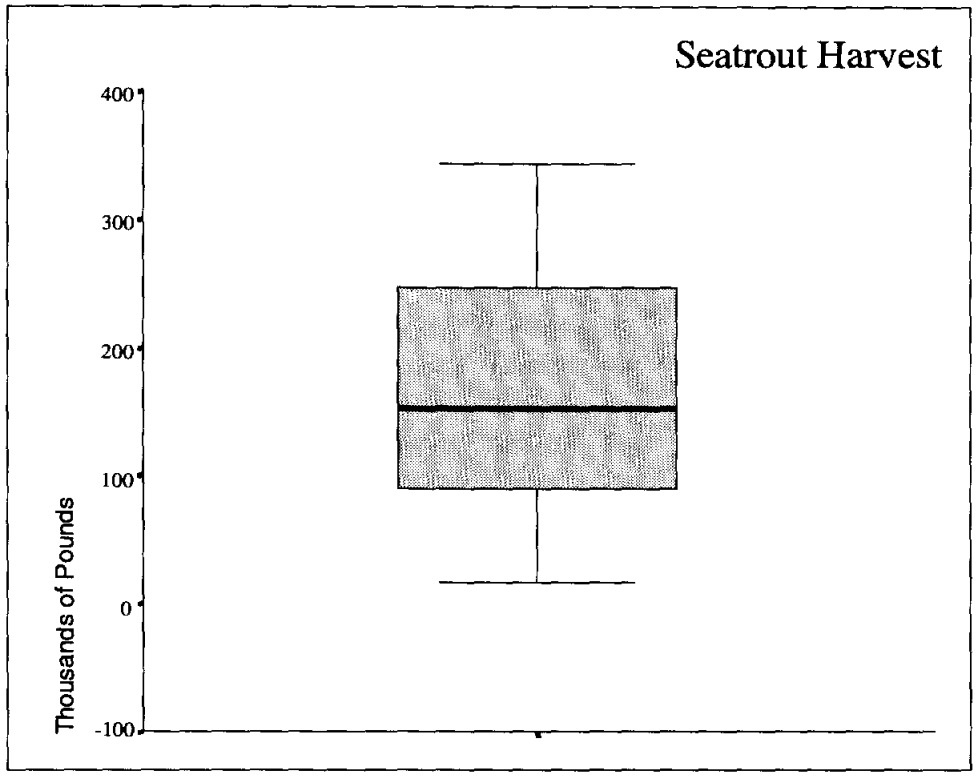
			Statistic	Std. Error
Seatrout Harvest	Mean		*167.4050*	*20.7499*
	95% Confidence Interval for Mean	Lower Bound	*123.9750*	
		Upper Bound	*210.8350*	
	5% Trimmed Mean		*165.9389*	
	Median		*152.3000*	
	Variance		*8611.152*	
	Std. Deviation		*92.7963*	
	Minimum		*17.00*	
	Maximum		*344.20*	
	Range		*327.20*	
	Interquartile Range		*170.3750*	
	Skewness		*.441*	*.512*
	Kurtosis		*-.717*	*.992*

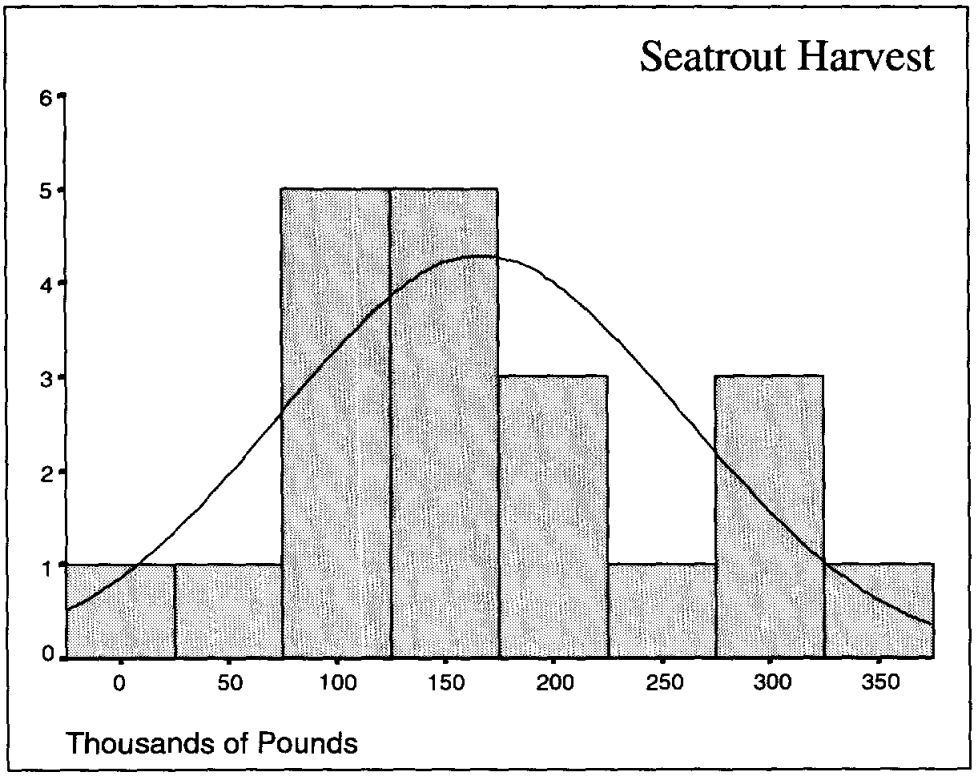
Extreme Values

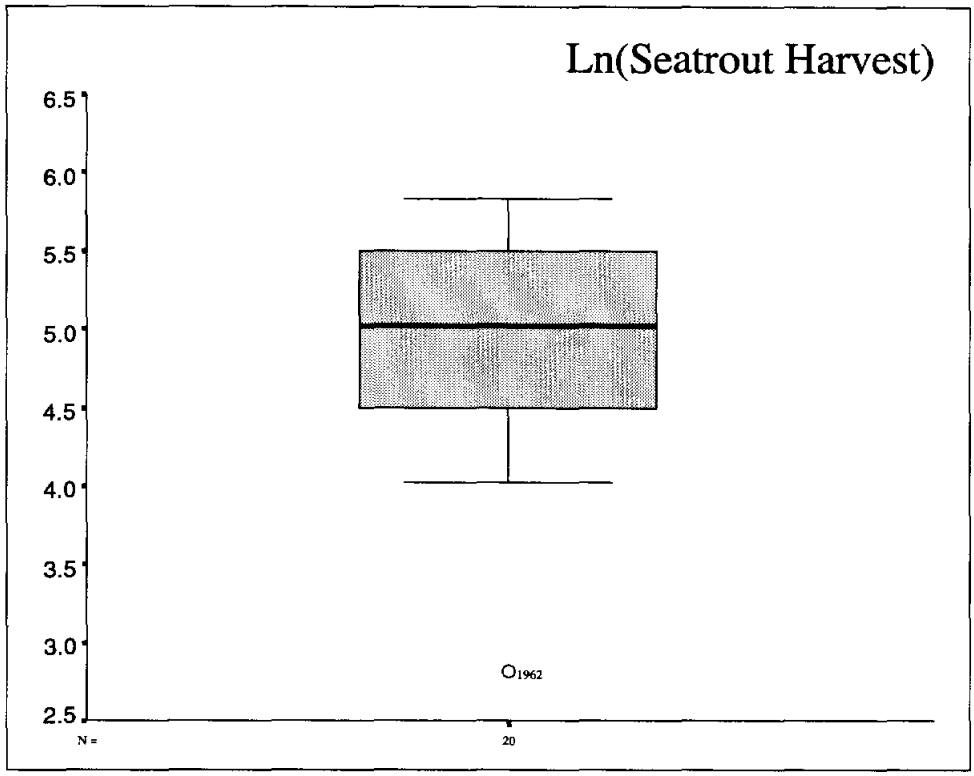
			Case Number	Year	Value
Seatrout Harvest	Highest	1	*17*	*1978*	*344.20*
		2	*12*	*1973*	*323.80*
		3	*6*	*1967*	*280.40*
		4	*4*	*1965*	*277.00*
		5	*13*	*1974*	*272.90*
	Lowest	1	*1*	*1962*	*17.00*
		2	*8*	*1969*	*55.70*
		3	*10*	*1971*	*75.90*
		4	*20*	*1981*	*77.80*
		5	*9*	*1970*	*89.20*

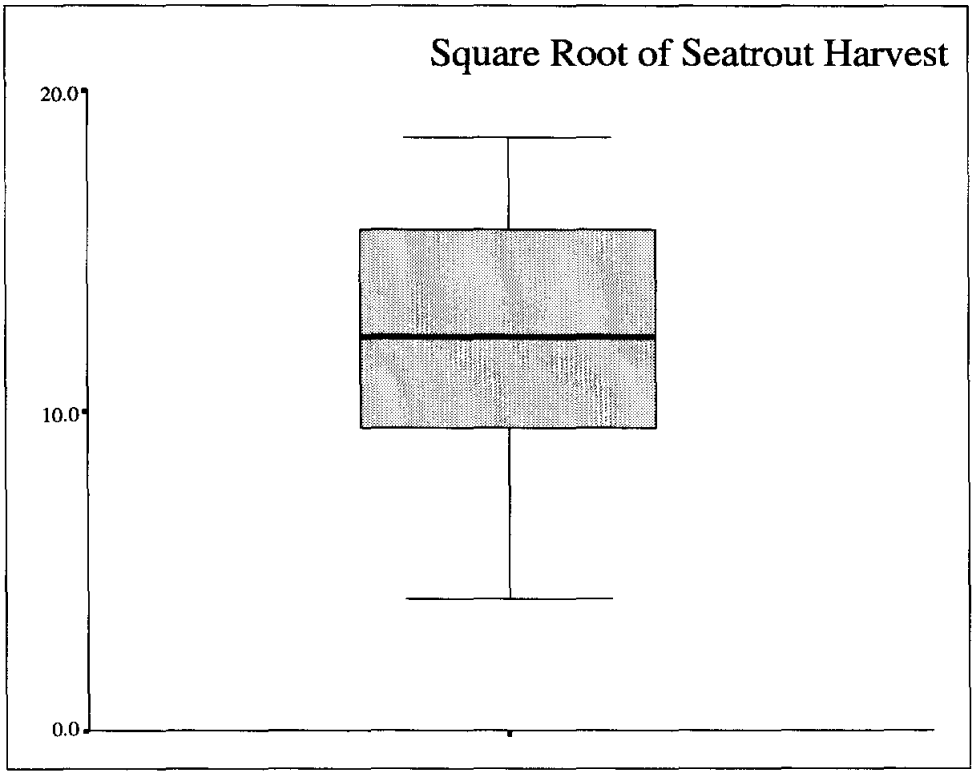

Normal Q-Q Plot
of Seatrout Harvest
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
100
200
300
400
Observed Value


Normal Q-Q Plot
of Ln(Seatrout Harvest)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
Observed Value


Seatrout Harvest
400
300
200
100
0
-100
Thousands of Pounds


Seatrout Harvest
6
5
4
3
2
1
0
0
50
100
150
200
250
300
350
Thousands of Pounds


Ln(Seatrout Harvest)
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
O1962
N =
20

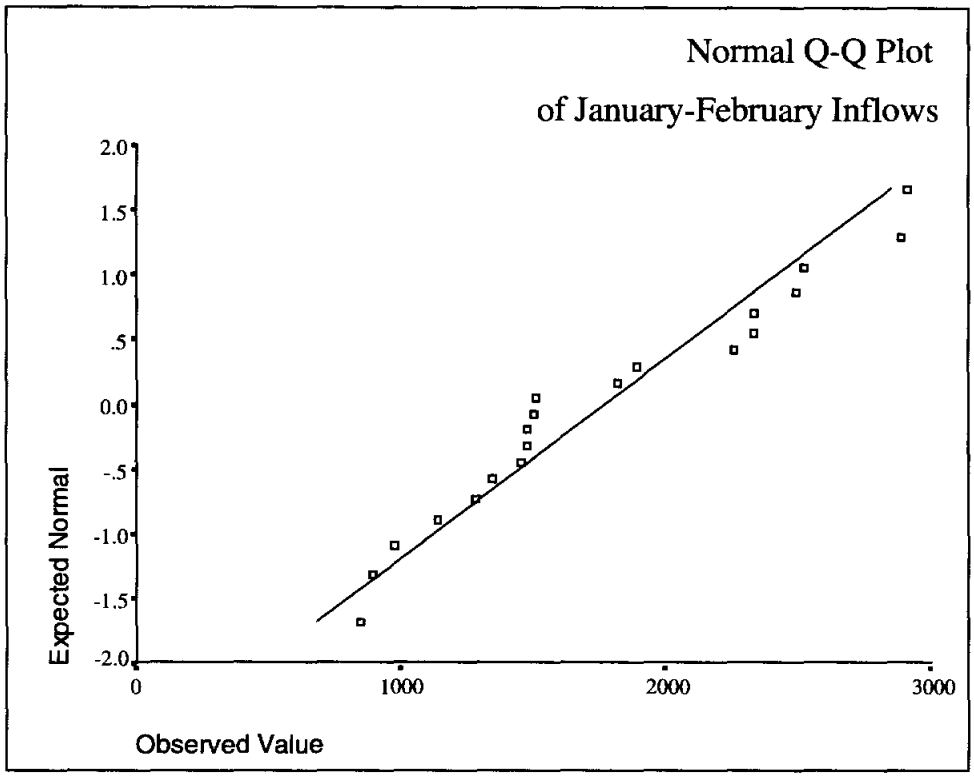

Square Root of Seatrout Harvest
20.0
10.0
0.0

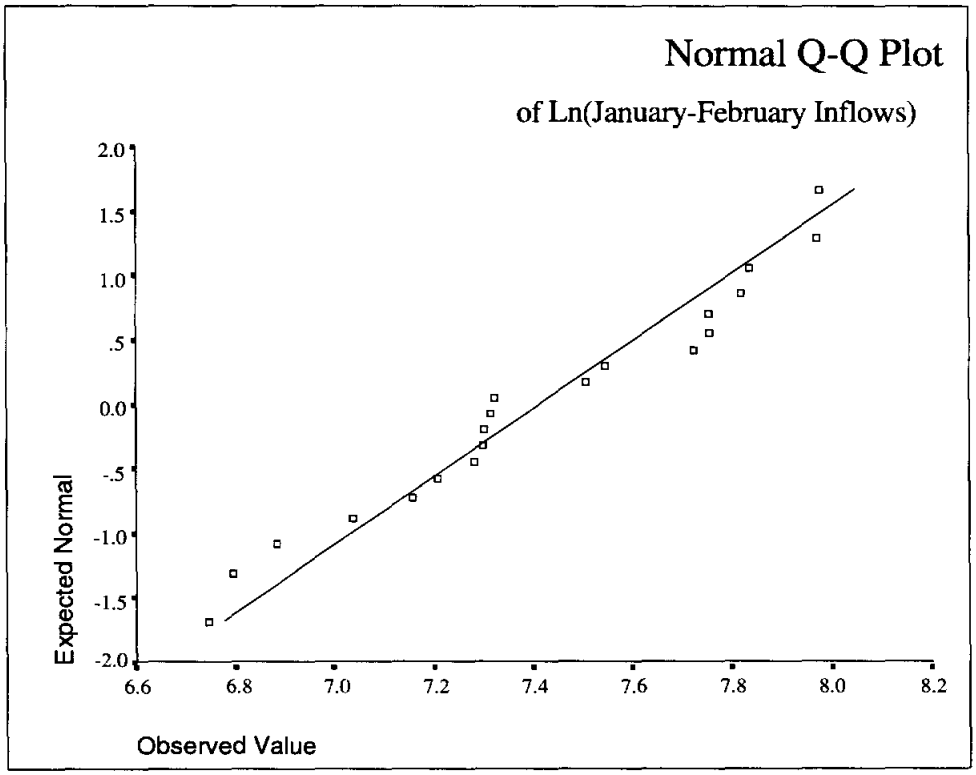
Descriptives

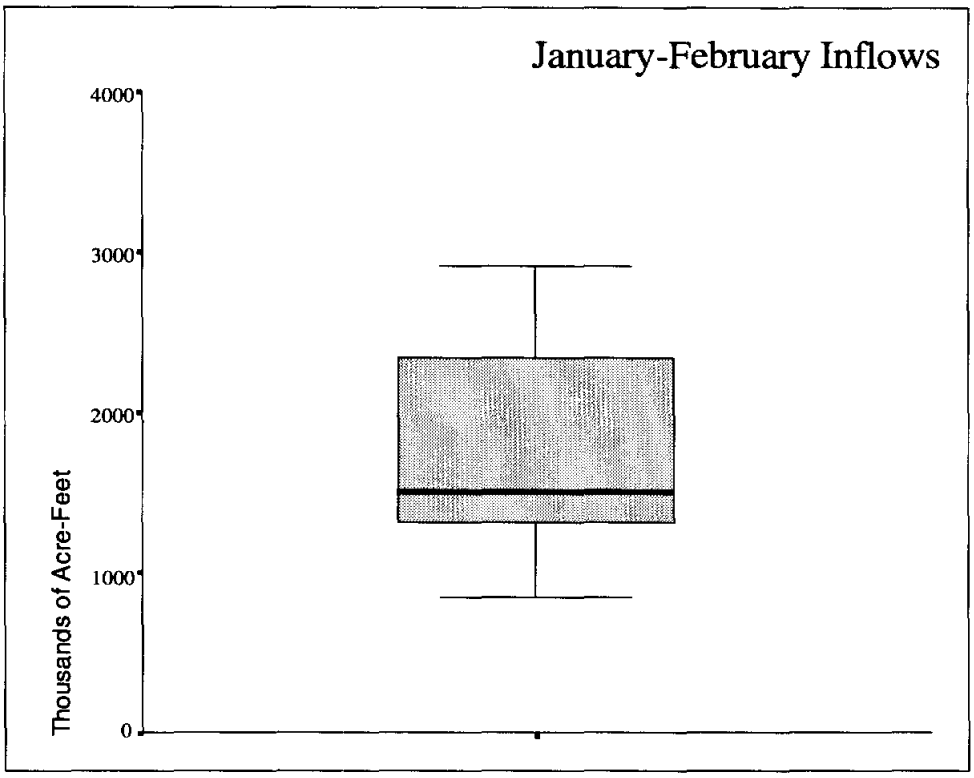
			Statistic	Std. Error
January-February Inflows	Mean		*1770.0820*	*145.2342*
	95% Confidence Interval for Mean	Lower Bound	*1466.1034*	
		Upper Bound	*2074.0606*	
	5% Trimmed Mean		*1757.5706*	
	Median		*1509.6250*	
	Variance		*421859.203*	
	Std. Deviation		*649.5069*	
	Minimum		*849.90*	
	Maximum		*2915.47*	
	Range		*2065.57*	
	Interquartile Range		*1036.6650*	
	Skewness		*.361*	*.512*
	Kurtosis		*-1.048*	*.992*

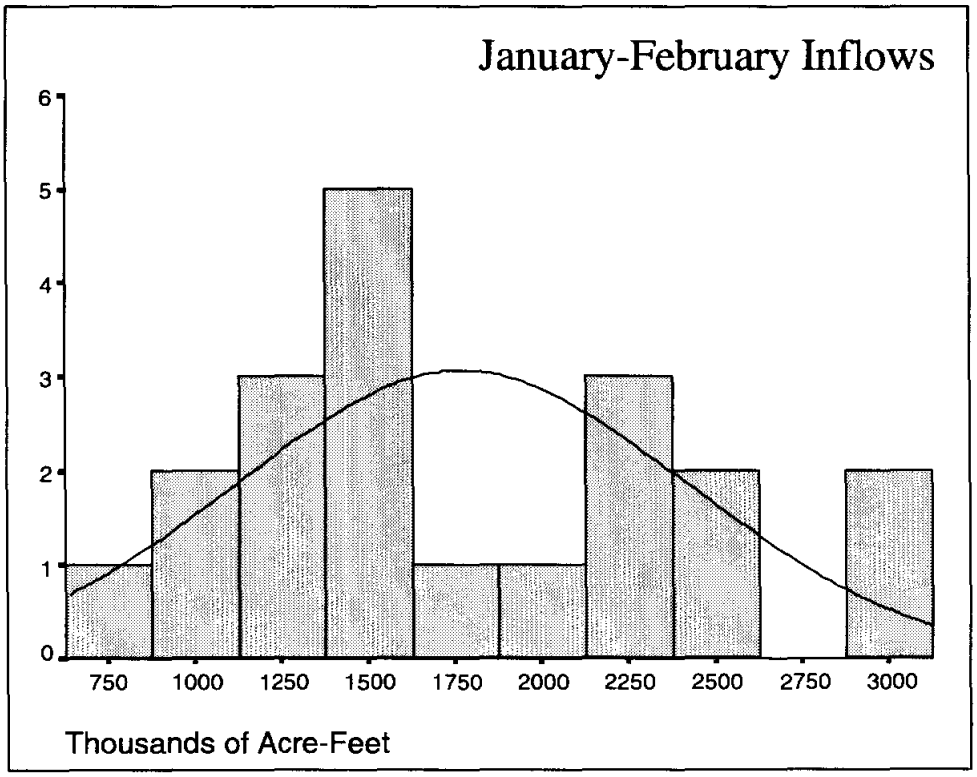
Extreme Values

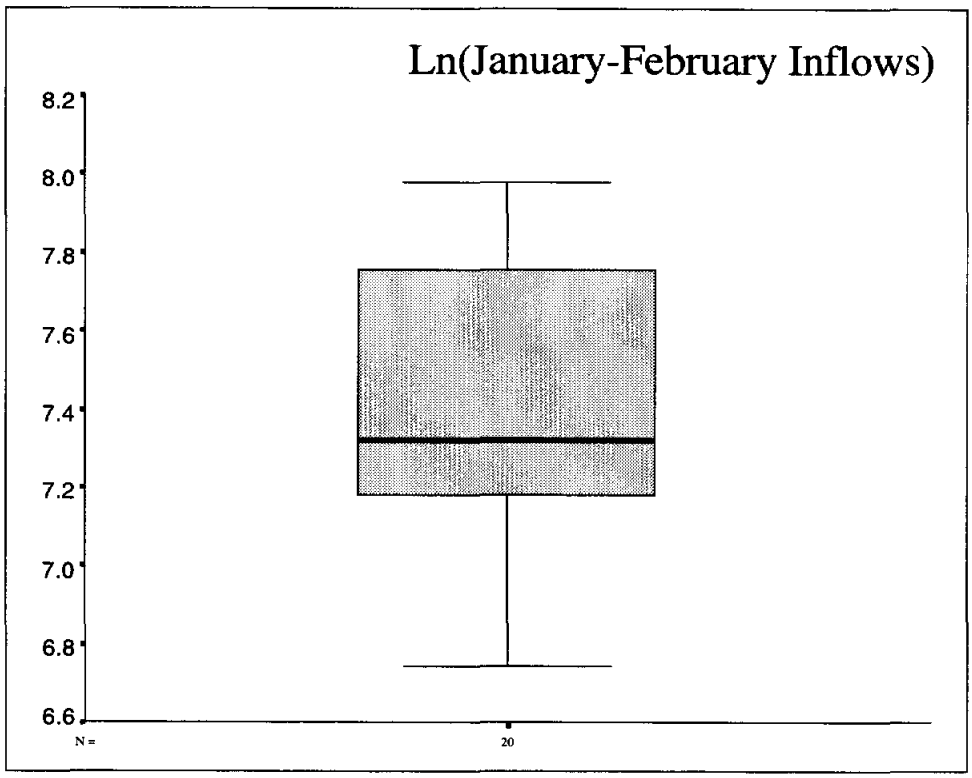
			Case Number	Year	Value
January-February Inflows	Highest	1	*1*	*1962*	*2915.47*
		2	*14*	*1975*	*2890.51*
		3	*13*	*1974*	*2524.91*
		4	*19*	*1980*	*2491.90*
		5	*2*	*1963*	*2336.83*
	Lowest	1	*10*	*1971*	*849.90*
		2	*3*	*1964*	*894.15*
		3	*11*	*1972*	*976.26*
		4	*4*	*1965*	*1140.22*
		5	*6*	*1967*	*1283.51*


Normal Q-Q Plot
of January-February Inflows
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Observed Value


January-February Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


January-February Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

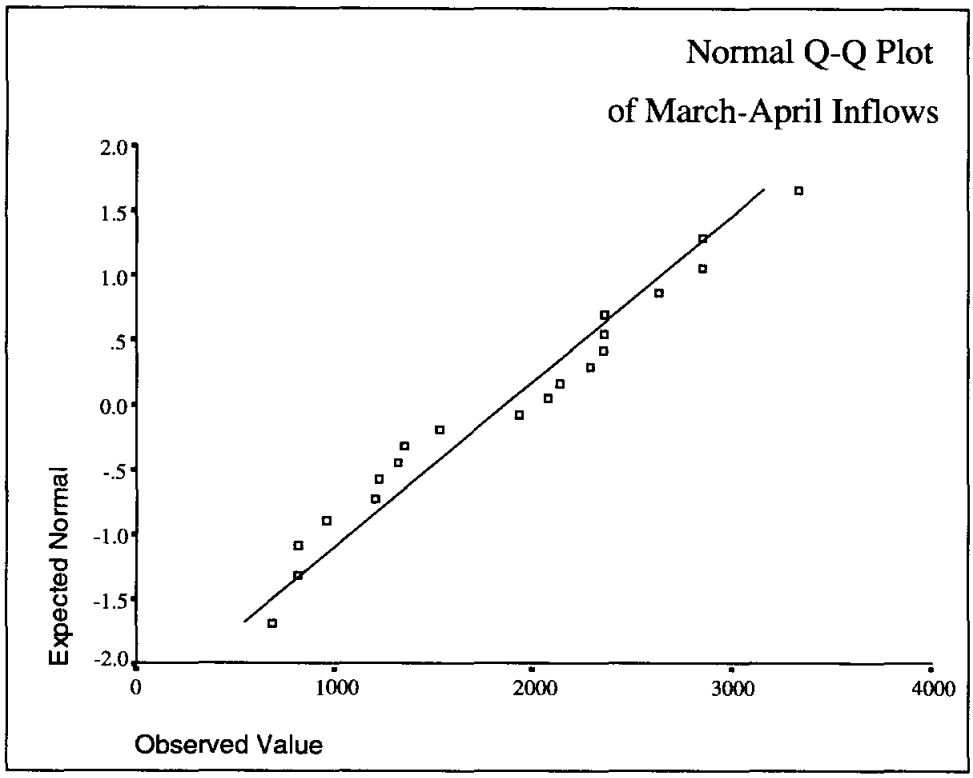

Ln(January-February Inflows)
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
N =
20

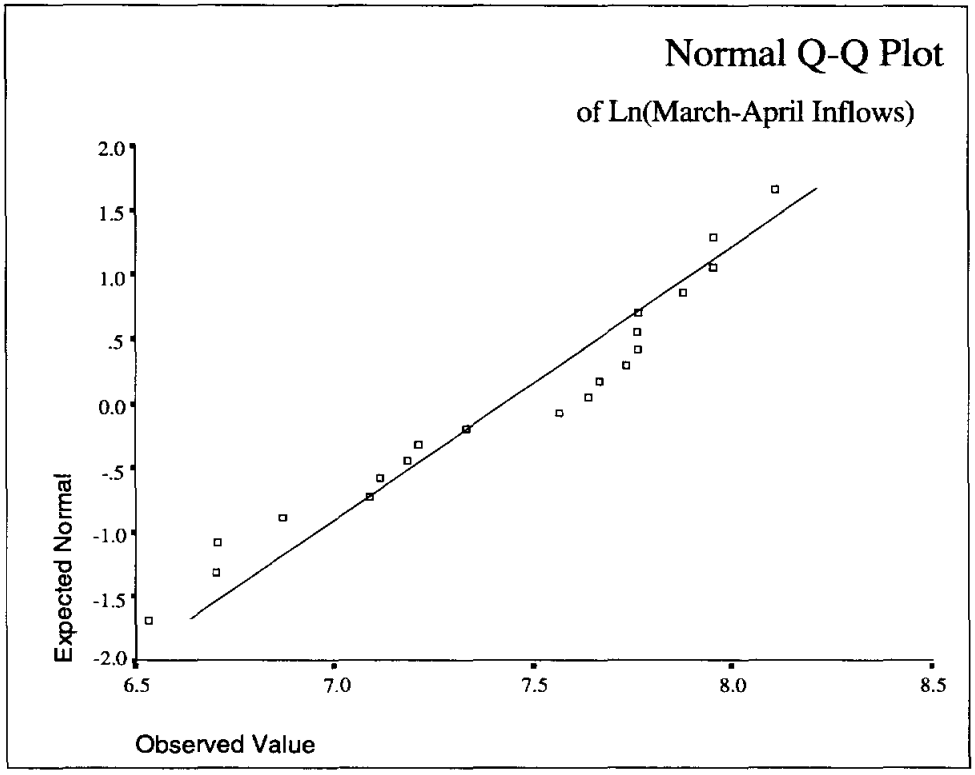
Descriptives

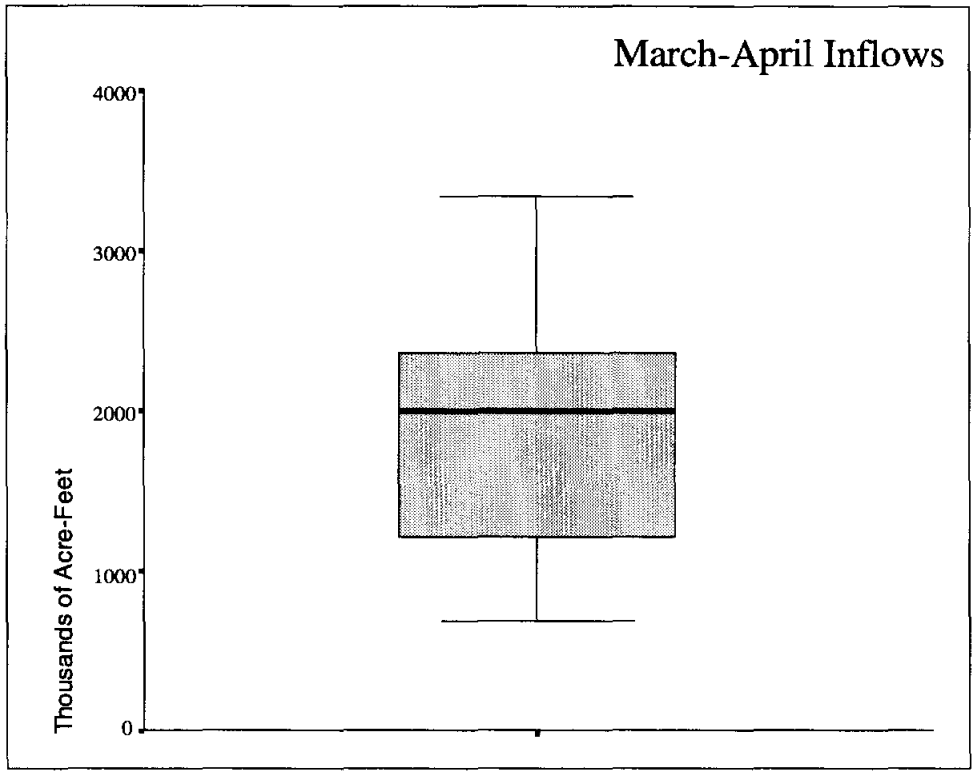
			Statistic	Std. Error
March-April Inflows	Mean		*1855.6210*	*175.1148*
	95% Confidence Interval for Mean	Lower Bound	*1489.1014*	
		Upper Bound	*2222.1406*	
	5% Trimmed Mean		*1838.0700*	
	Median		*2004.2900*	
	Variance		*613304.209*	
	Std. Deviation		*783.1374*	
	Minimum		*689.43*	
	Maximum		*3337.73*	
	Range		*2648.30*	
	Interquartile Range		*1152.3625*	
	Skewness		*.104*	*.512*
	Kurtosis		*-1.093*	*.992*

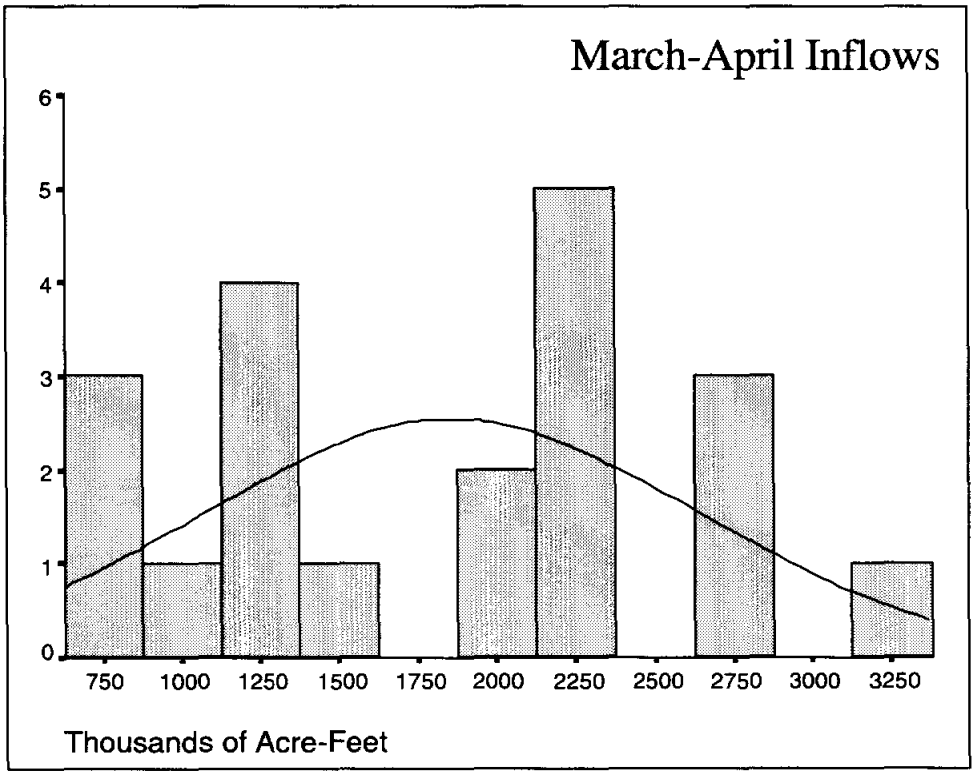
Extreme Values

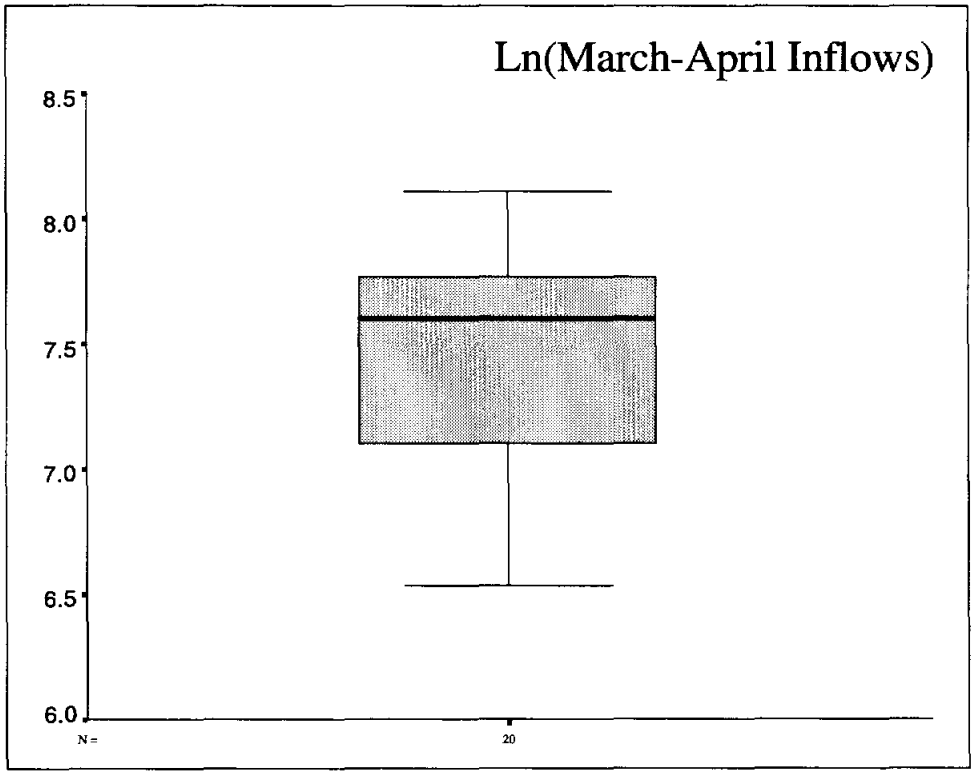
			Case Number	Year	Value
March-April Inflows	Highest	1	*9*	*1970*	*3337.73*
		2	*14*	*1975*	*2857.40*
		3	*18*	*1979*	*2853.94*
		4	*8*	*1969*	*2640.94*
		5	*10*	*1971*	*2360.83*
	Lowest	1	*3*	*1964*	*689.43*
		2	*2*	*1963*	*815.63*
		3	*4*	*1965*	*818.07*
		4	*1*	*1962*	*963.27*
		5	*6*	*1967*	*1199.18*


Normal Q-Q Plot
of March-April Inflows
Expected Normal
Observed Value
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
4000


Normal Q-Q Plot
of Ln(March-April Inflows)
Expected Normal
Observed Value
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.5
7.0
7.5
8.0
8.5


March-April Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


March-April Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Acre-Feet

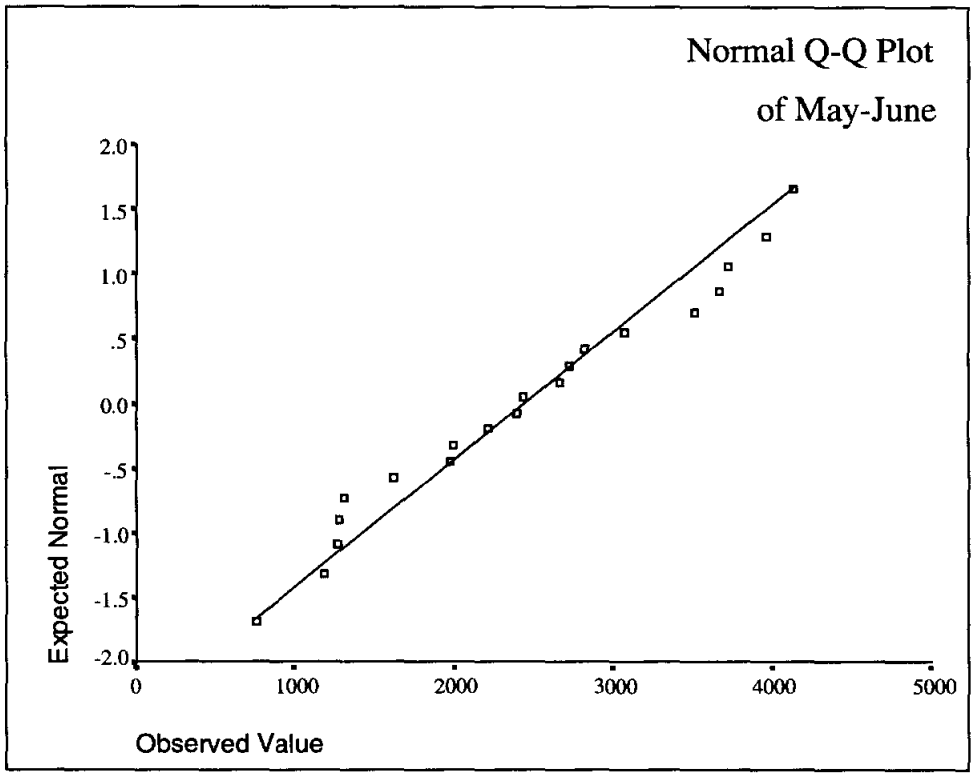

Ln(March-April Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

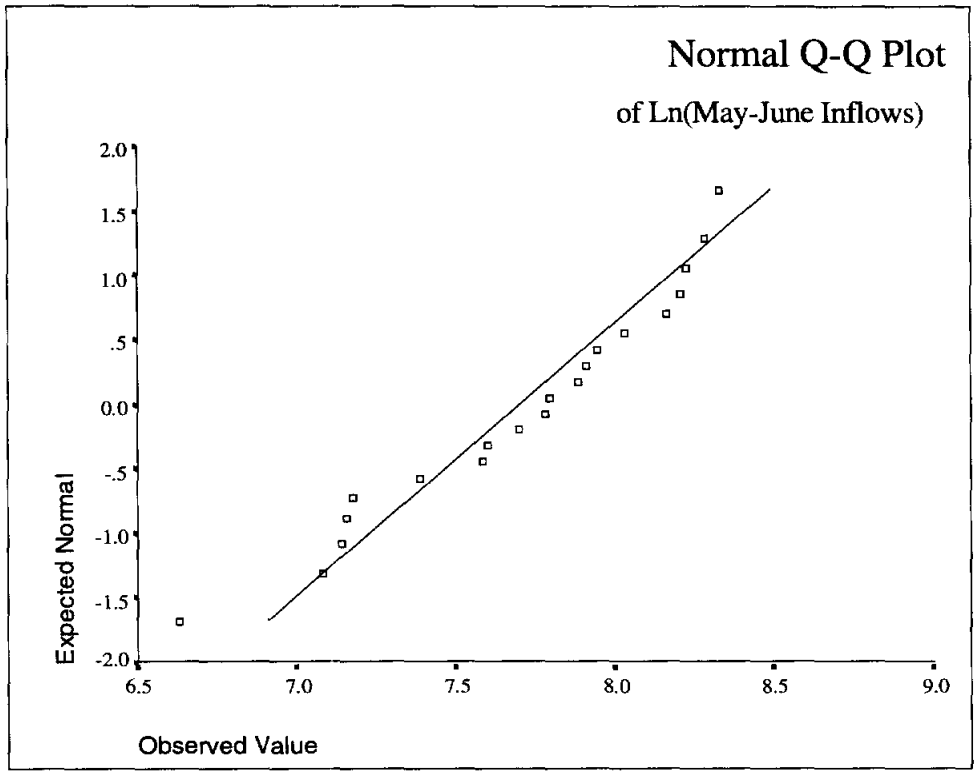
Descriptives

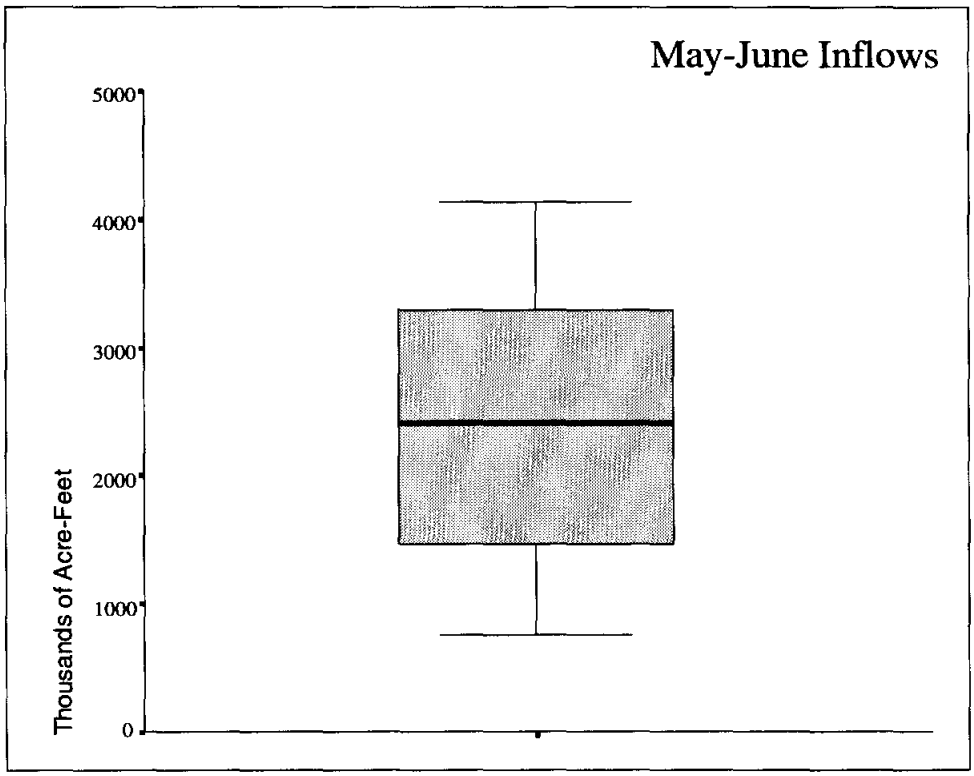
			Statistic	Std. Error
May-June Inflows	Mean		*2439.1725*	*227.8998*
	95% Confidence Interval for Mean	Lower Bound	*1962.1727*	
		Upper Bound	*2916.1723*	
	5% Trimmed Mean		*2438.1894*	
	Median		*2417.1200*	
	Variance		*1038766.743*	
	Std. Deviation		*1019.1991*	
	Minimum		*759.57*	
	Maximum		*4136.47*	
	Range		*3376.90*	
	Interquartile Range		*2016.3225*	
	Skewness		*.117*	*.512*
	Kurtosis		*-1.092*	*.992*

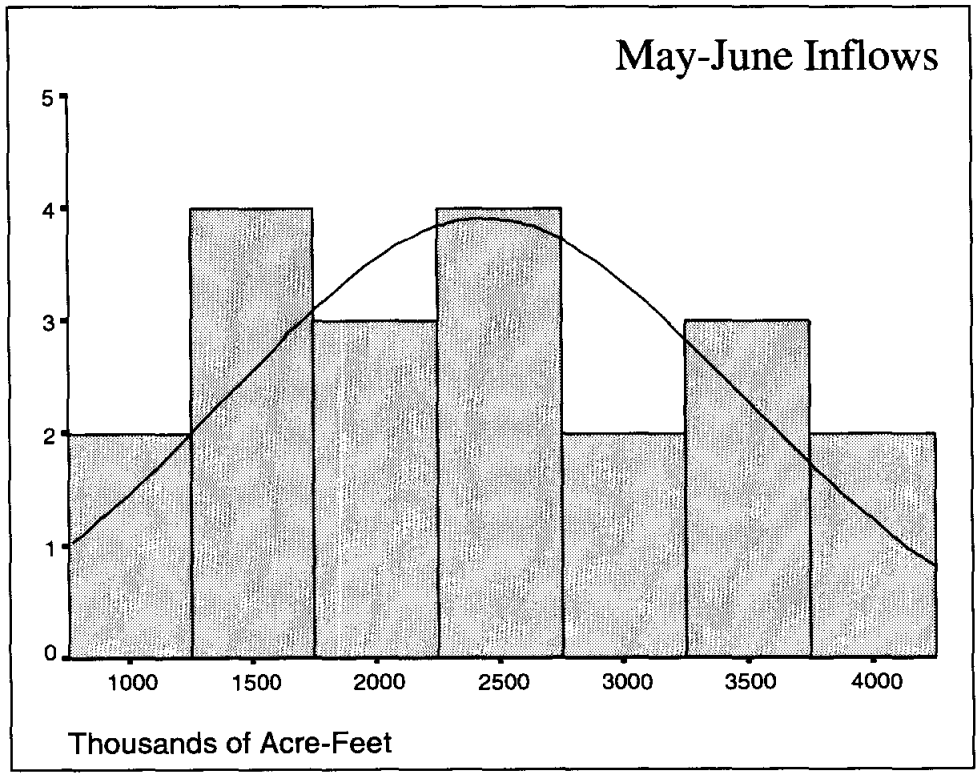
Extreme Values

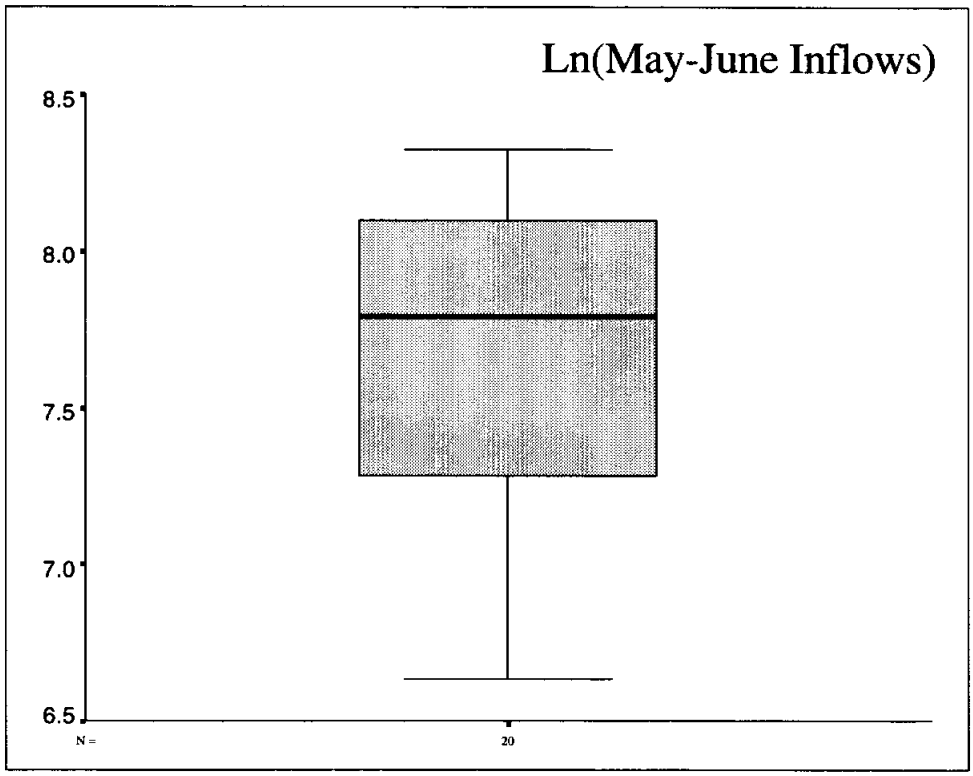
			Case Number	Year	Value
May-June Inflows	Highest	1	*7*	*1968*	*4136.47*
		2	*9*	*1970*	*3968.77*
		3	*14*	*1975*	*3726.31*
		4	*8*	*1969*	*3676.87*
		5	*20*	*1981*	*3516.54*
	Lowest	1	*3*	*1964*	*759.57*
		2	*4*	*1965*	*1192.23*
		3	*2*	*1963*	*1270.07*
		4	*11*	*1972*	*1288.20*
		5	*17*	*1978*	*1315.67*


Normal Q-Q Plot
of May-June
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
4000
5000
Observed Value


Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.5
7.0
7.5
8.0
8.5
9.0
Observed Value


May-June Inflows
5000
4000
3000
2000
1000
0
Thousands of Acre-Feet


May-June Inflows
5
4
3
2
1
0
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

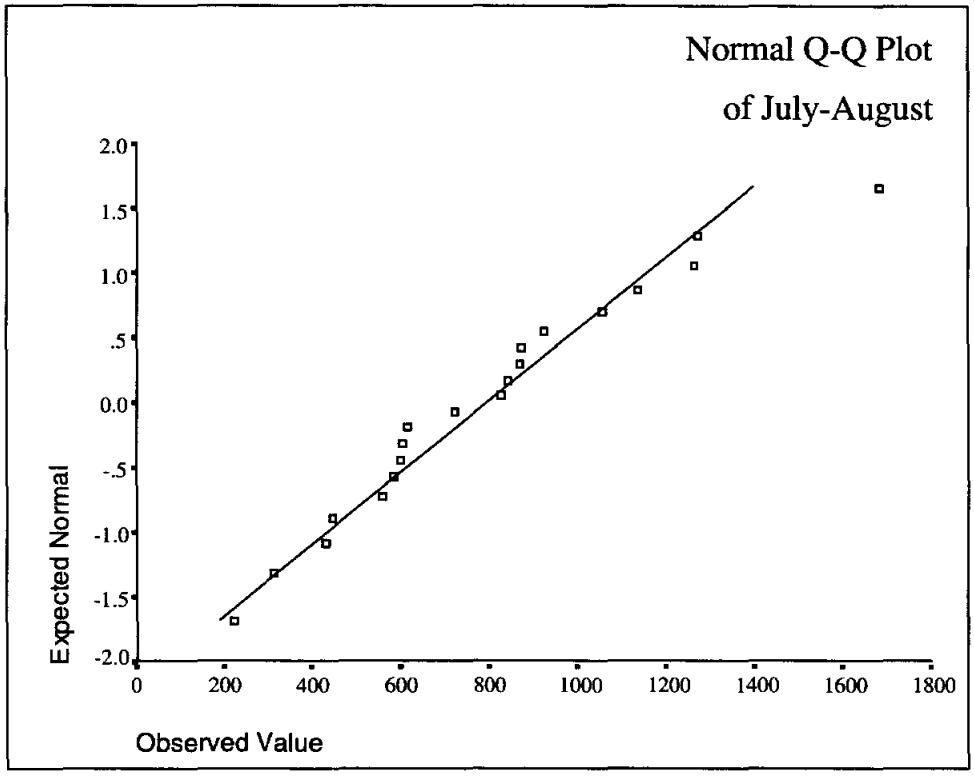

Ln(May-June Inflows)
8.5
8.0
7.5
7.0
6.5
N =
20

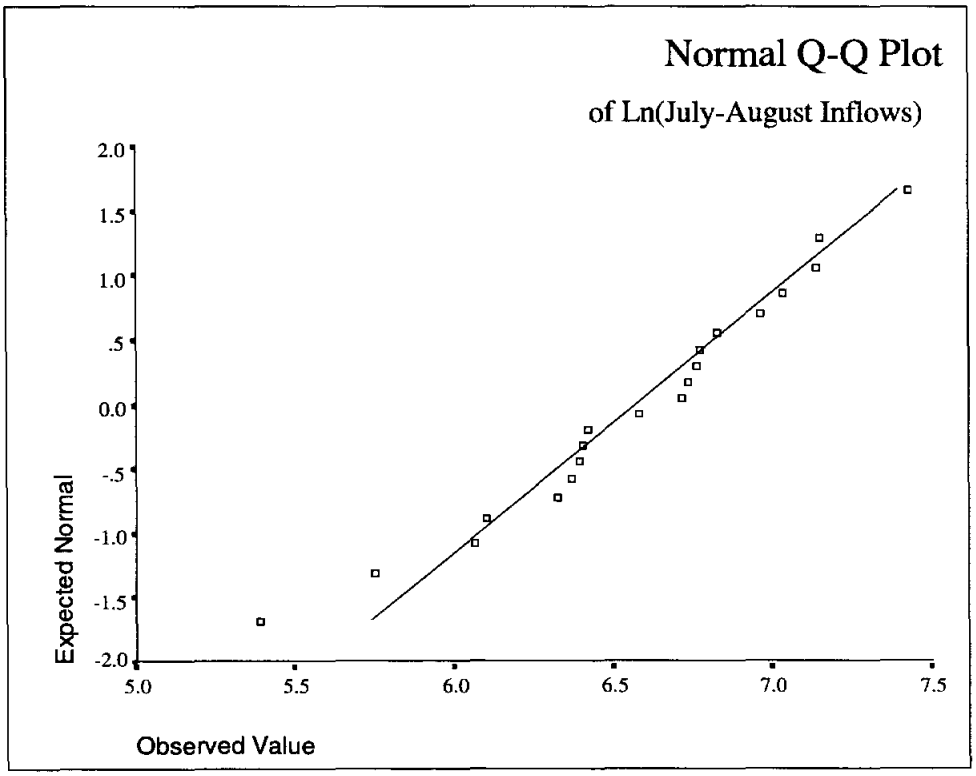
Descriptives

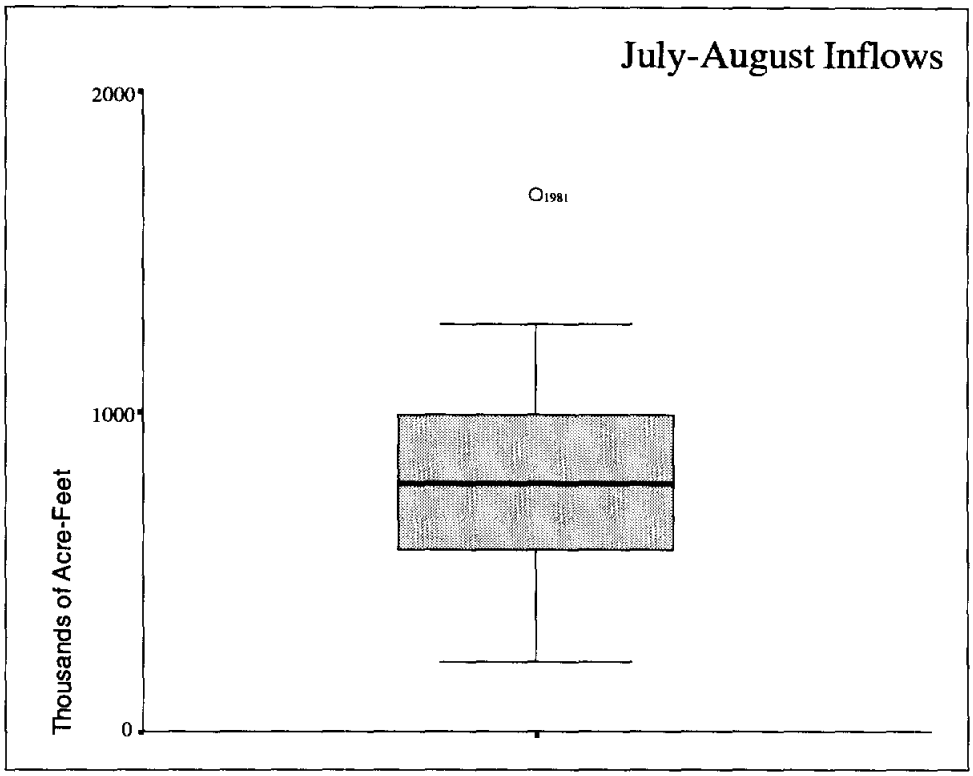
			Statistic	Std. Error
July-August Inflows	Mean		*793.8555*	*80.8806*
	95% Confidence Interval for Mean	Lower Bound	*624.5704*	
		Upper Bound	*963.1406*	
	5% Trimmed Mean		*776.1372*	
	Median		*776.8800*	
	Variance		*130833.488*	
	Std. Deviation		*361.7091*	
	Minimum		*220.39*	
	Maximum		*1686.25*	
	Range		*1465.86*	
	Interquartile Range		*459.2925*	
	Skewness		*.694*	*.512*
	Kurtosis		*.497*	*.992*

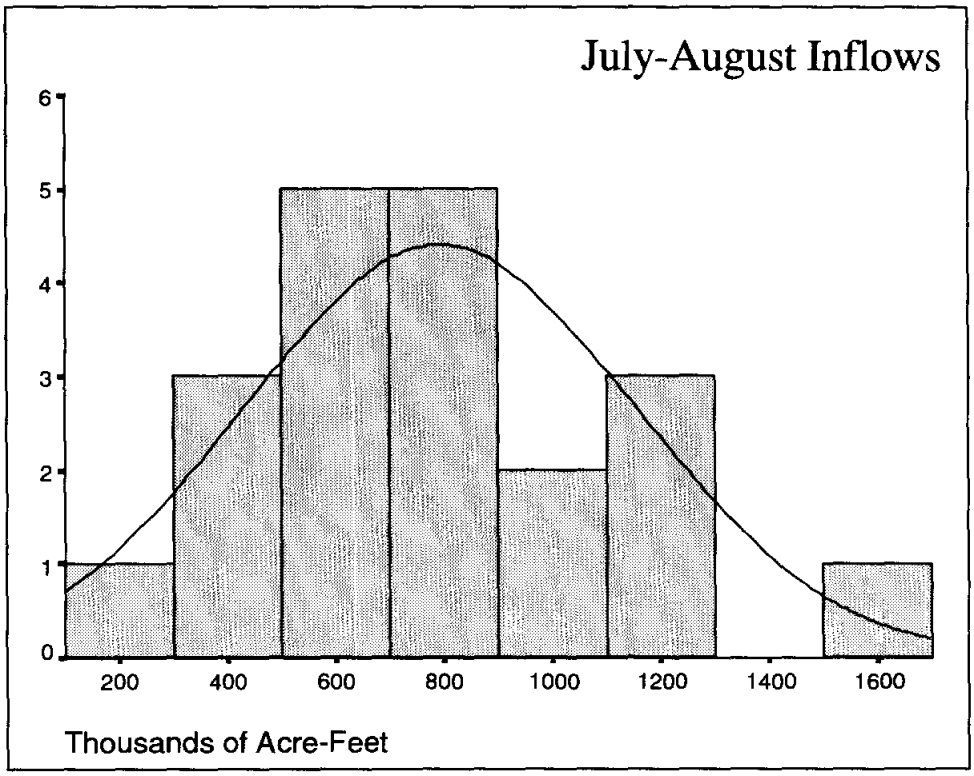
Extreme Values

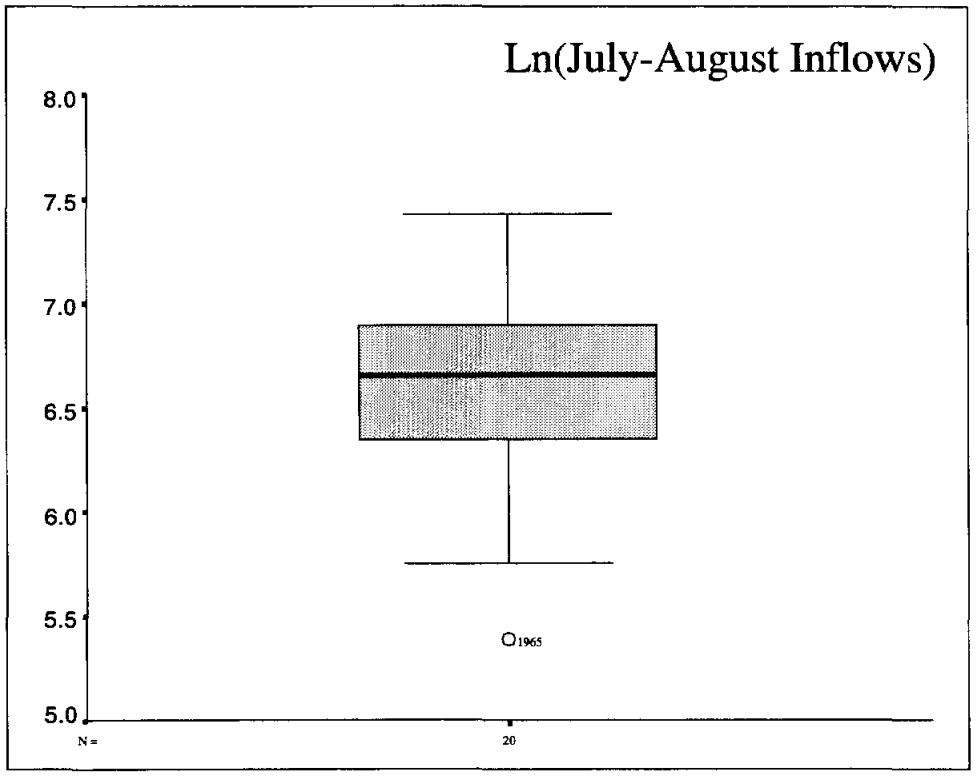
			Case Number	Year	Value
July-August Inflows	Highest	1	*20*	*1981*	*1686.25*
		2	*18*	*1979*	*1274.52*
		3	*19*	*1980*	*1264.55*
		4	*14*	*1975*	*1138.54*
		5	*1*	*1962*	*1059.68*
	Lowest	1	*4*	*1965*	*220.39*
		2	*3*	*1964*	*316.70*
		3	*11*	*1972*	*431.40*
		4	*10*	*1971*	*446.99*
		5	*5*	*1966*	*560.03*


Normal Q-Q Plot
of July-August
Expected Normal
Observed Value
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
200
400
600
800
1000
1200
1400
1600
1800


Normal Q-Q Plot
of Ln(July-August Inflows)
Expected Normal
Observed Value
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.0
5.5
6.0
6.5
7.0
7.5


July-August Inflows
2000
1000
0
Thousands of Acre-Feet
O1981


July-August Inflows
6
5
4
3
2
1
0
200
400
600
800
1000
1200
1400
1600
Thousands of Acre-Feet

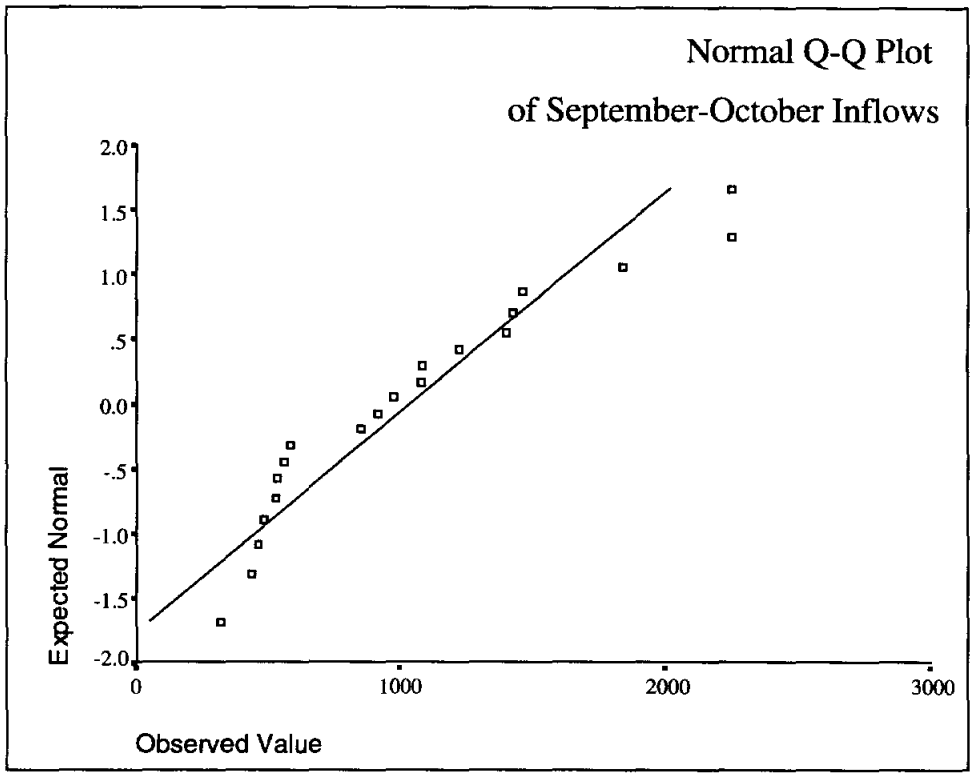

Ln(July-August Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
5.0
O1965
N =
20

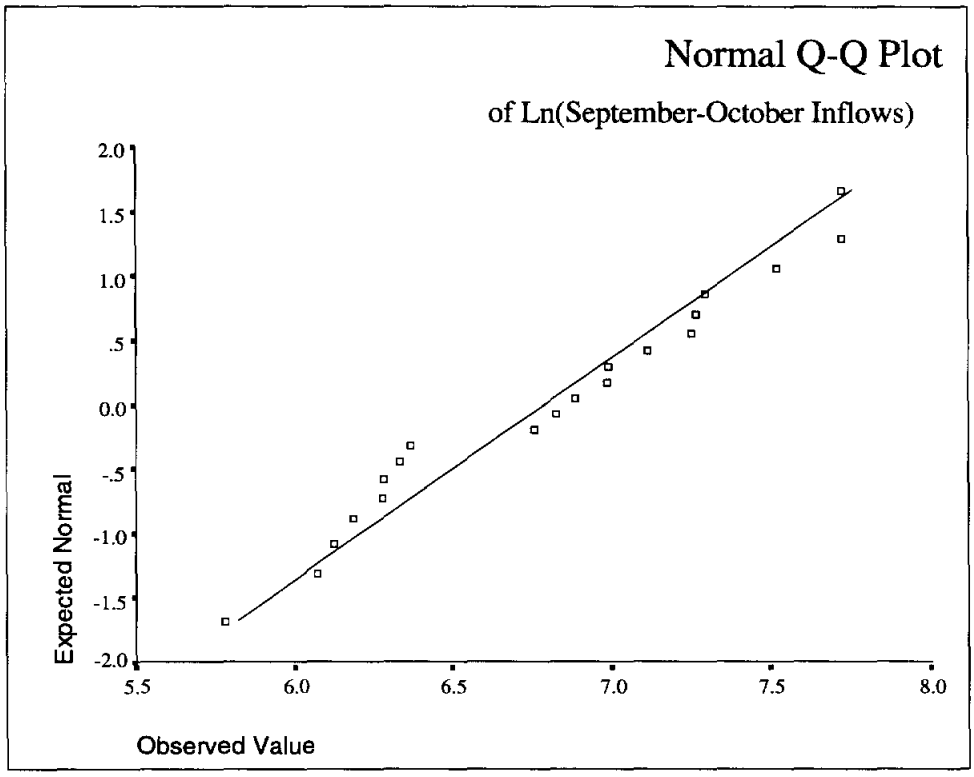
Descriptives

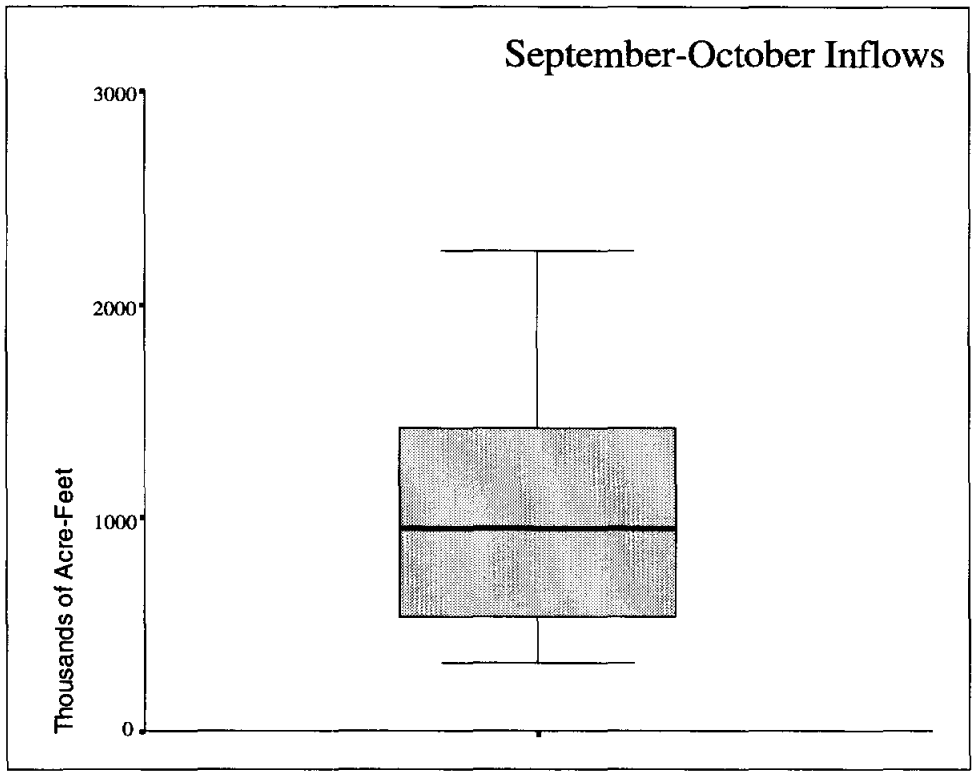
			Statistic	Std. Error
September-October Inflows	Mean		*1038.0385*	*131.9724*
	95% Confidence Interval for Mean	Lower Bound	*761.8171*	
		Upper Bound	*1314.2599*	
	5% Trimmed Mean		*1010.0572*	
	Median		*952.0400*	
	Variance		*348334.255*	
	Std. Deviation		*590.1985*	
	Minimum		*325.37*	
	Maximum		*2254.37*	
	Range		*1929.00*	
	Interquartile Range		*891.6200*	
	Skewness		*.830*	*.512*
	Kurtosis		*-.153*	*.992*

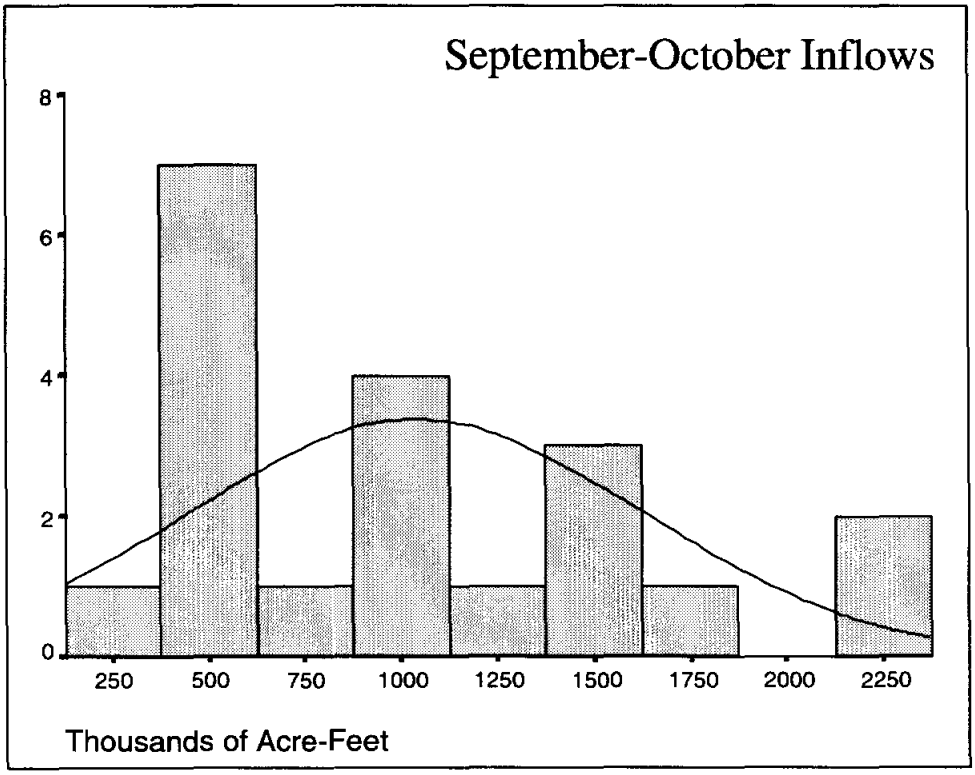
Extreme Values

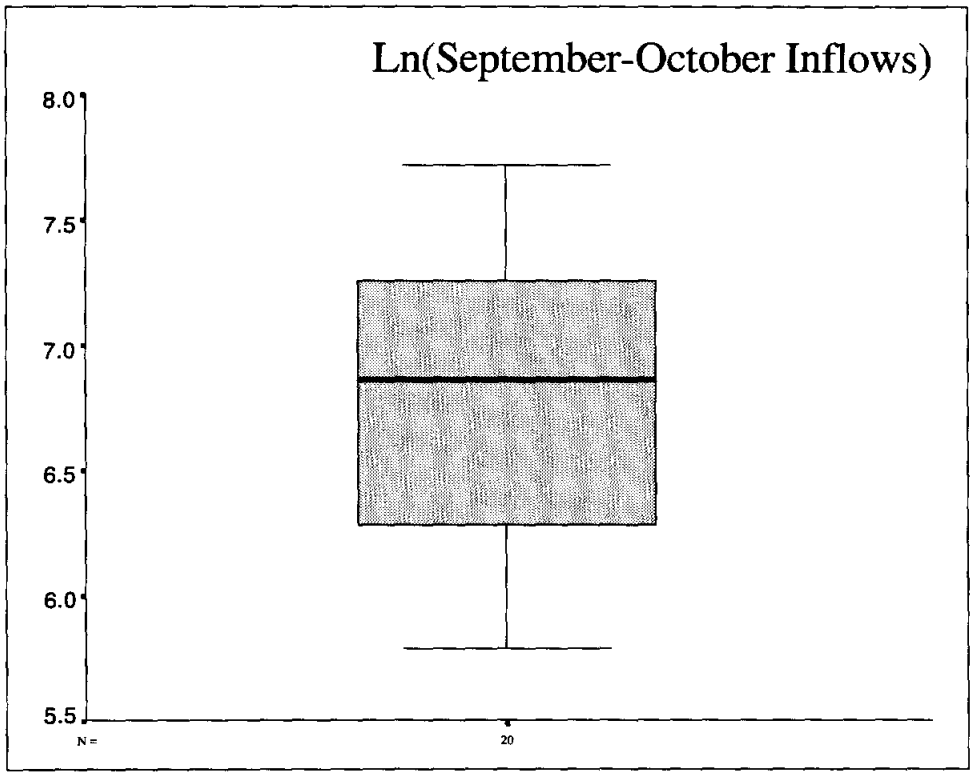
			Case Number	Year	Value
September-October Inflows	Highest	1	*15*	*1976*	*2254.37*
		2	*14*	*1975*	*2253.25*
		3	*13*	*1974*	*1845.28*
		4	*1*	*1962*	*1469.86*
		5	*2*	*1963*	*1432.16*
	Lowest	1	*5*	*1966*	*325.37*
		2	*7*	*1968*	*435.08*
		3	*6*	*1967*	*459.59*
		4	*9*	*1970*	*489.11*
		5	*8*	*1969*	*533.83*


Normal Q-Q Plot
of September-October Inflows
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.5
6.0
6.5
7.0
7.5
8.0
Observed Value


September-October Inflows
3000
2000
1000
0
Thousands of Acre-Feet


September-October Inflows
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
Thousands of Acre-Feet

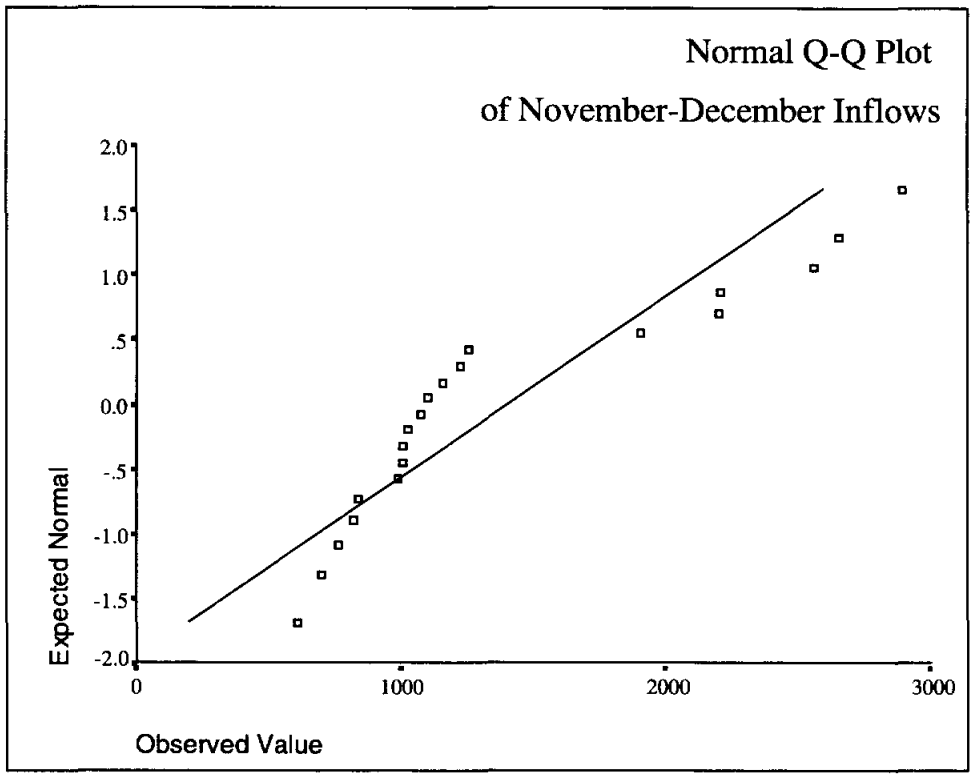

Ln(September-October Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
N =
20

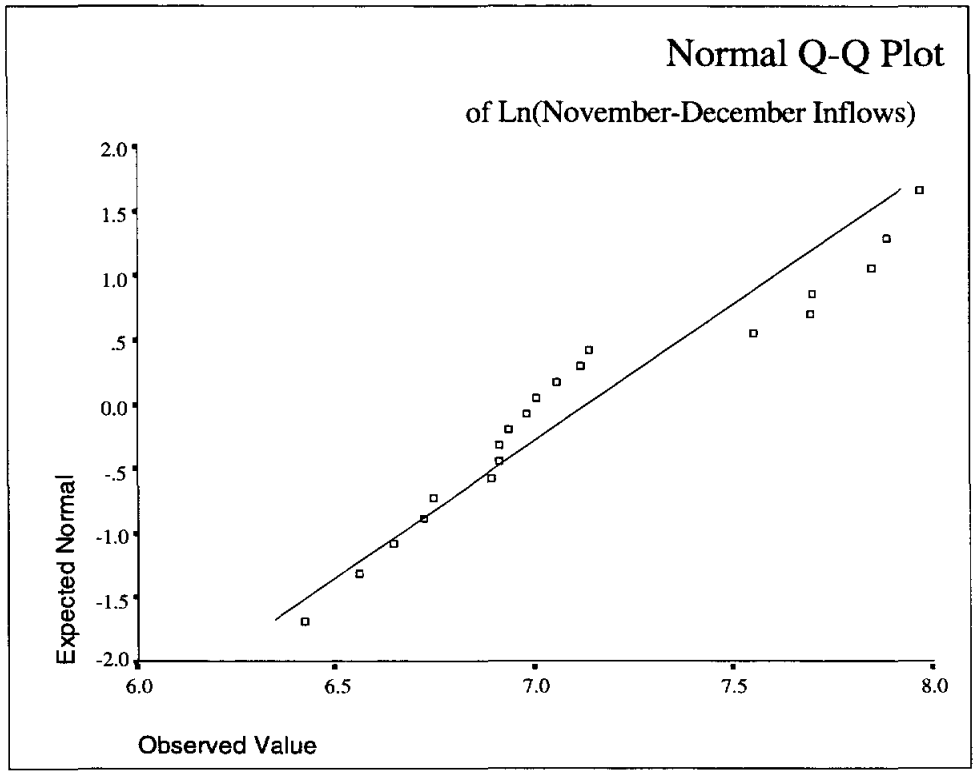
Descriptives

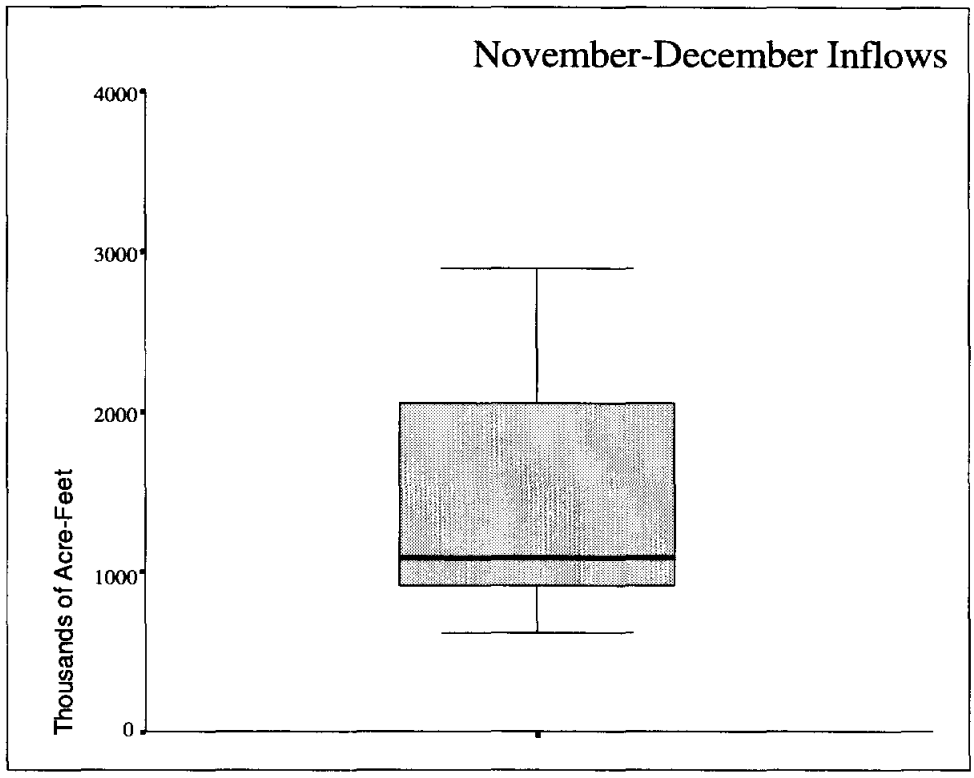
			Statistic	Std. Error
November-December Inflows	Mean		*1403.9630*	*160.4211*
	95% Confidence Interval for Mean	Lower Bound	*1068.1978*	
		Upper Bound	*1739.7282*	
	5% Trimmed Mean		*1364.8089*	
	Median		*1091.4700*	
	Variance		*514698.435*	
	Std. Deviation		*717.4249*	
	Minimum		*615.13*	
	Maximum		*2897.57*	
	Range		*2282.44*	
	Interquartile Range		*1248.1100*	
	Skewness		*.990*	*.512*
	Kurtosis		*-.464*	*.992*

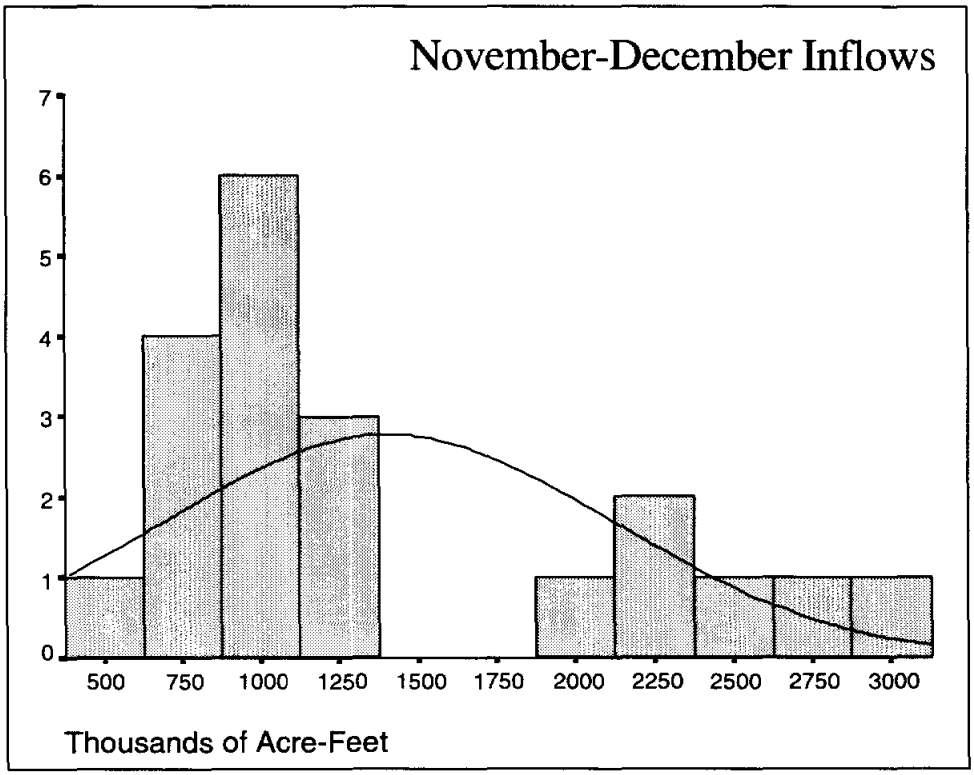
Extreme Values

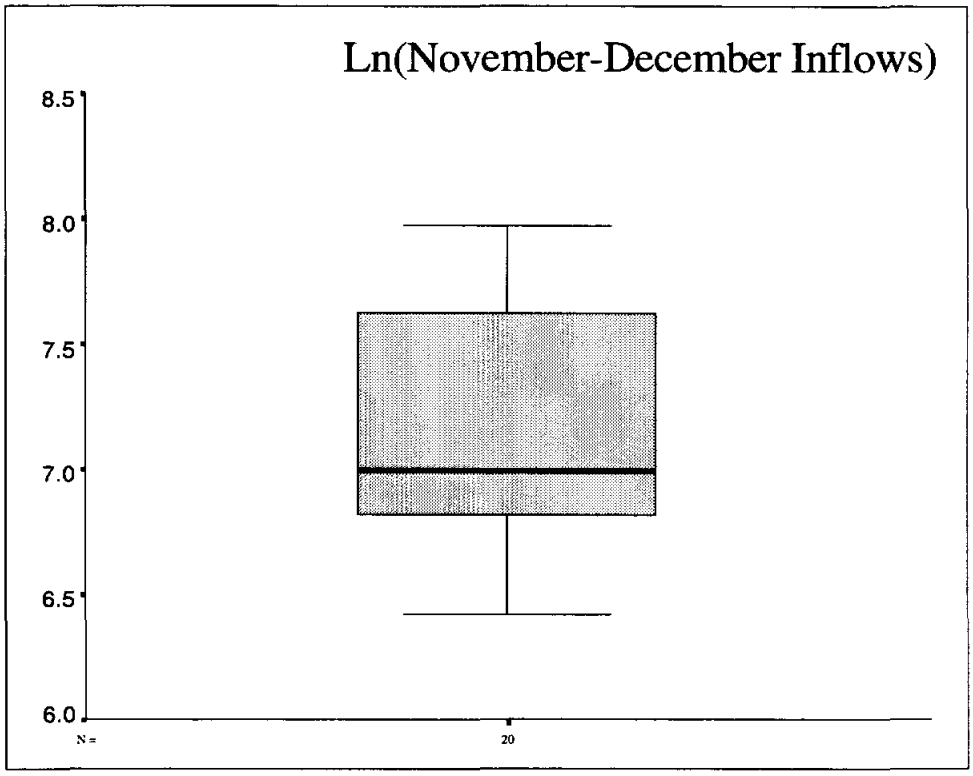
			Case Number	Year	Value
November-December Inflows	Highest	1	*14*	*1975*	*2897.57*
		2	*15*	*1976*	*2659.43*
		3	*16*	*1977*	*2562.96*
		4	*2*	*1963*	*2208.27*
		5	*1*	*1962*	*2205.60*
	Lowest	1	*10*	*1971*	*615.13*
		2	*8*	*1969*	*706.48*
		3	*20*	*1981*	*767.72*
		4	*9*	*1970*	*828.41*
		5	*7*	*1968*	*848.36*


Normal Q-Q Plot
of November-December Inflows
Expected Normal
Observed Value
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
0
1000
2000
3000


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal
Observed Value
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.0
6.5
7.0
7.5
8.0


November-December Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet

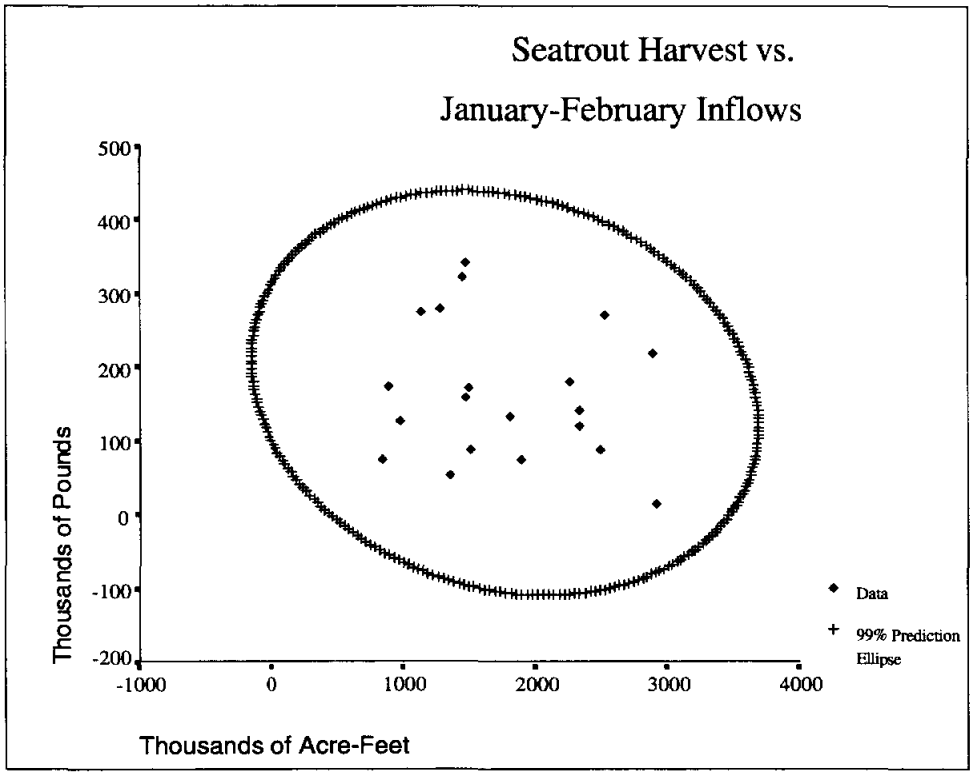

November-December Inflows
7
6
5
4
3
2
1
0
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

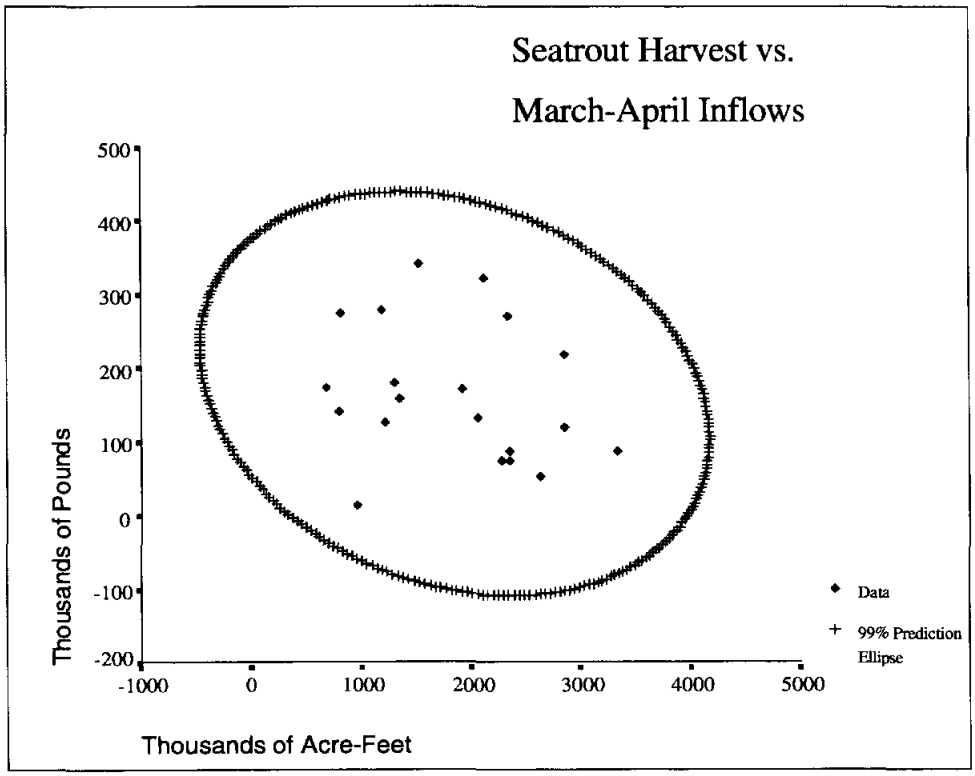

Ln(November-December Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

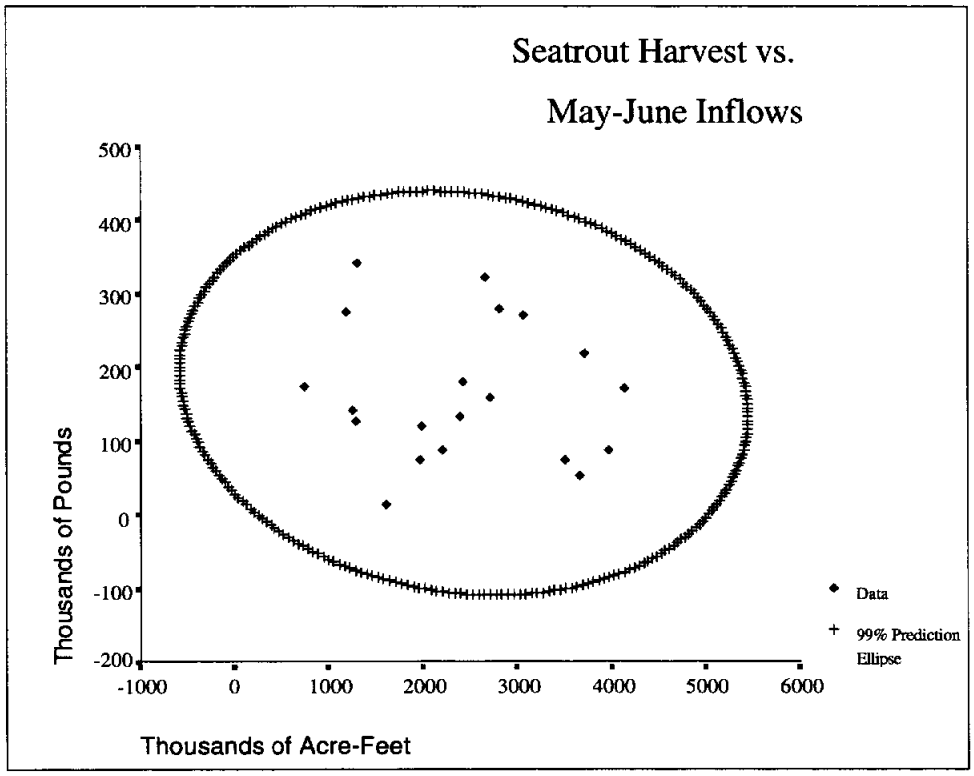
Percentiles

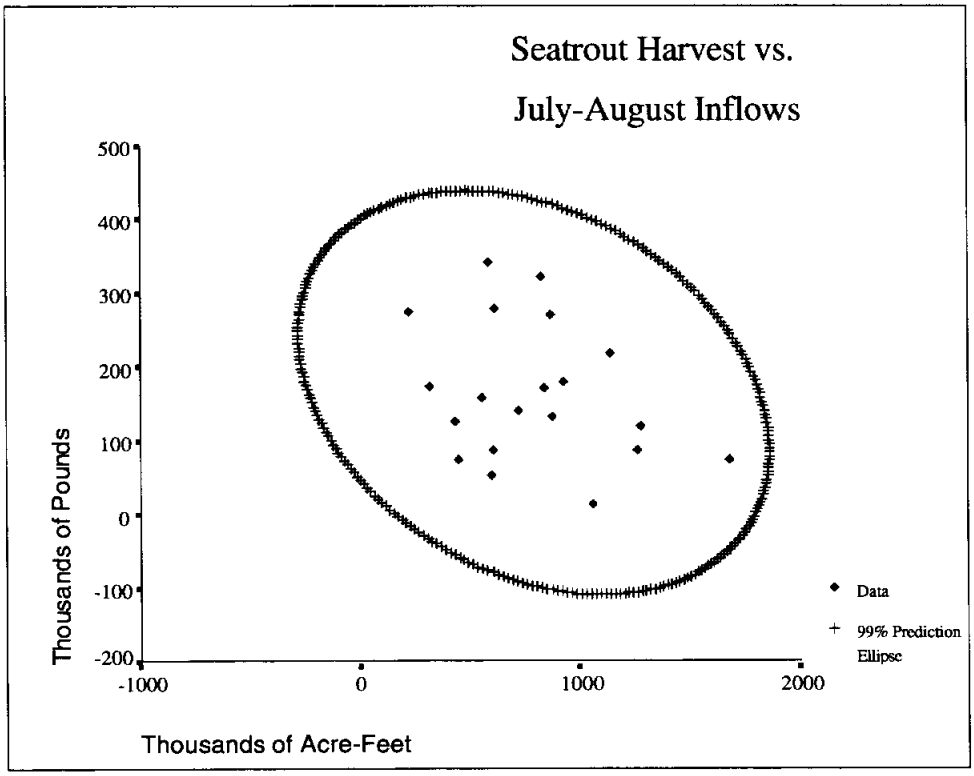
		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Seatrout Harvest	18.9350	57.7200	89.5500	152.3000	259.9250	319.4600	343.1800
	Ln(Seatrout Harvest)	2.8926	4.0509	4.4948	5.0239	5.5564	5.7657	5.8382
	Square Root of Seatrout Harvest	4.2901	7.5881	9.4630	12.3351	16.1063	17.8695	18.5247
	January-February Inflows	852.1125	902.3610	1300.1175	1509.6250	2336.7825	2853.9500	2914.2220
	March-April Inflows	695.7400	815.8740	1207.3925	2004.2900	2359.7550	2857.0540	3313.7135
	May-June Inflows	781.2030	1200.0140	1390.5775	2417.1200	3406.9000	3944.5240	4128.0850
	July-August Inflows	225.2055	328.1700	566.8325	776.8800	1026.1250	1273.5230	1665.6635
	September-October Inflows	330.8555	437.5310	534.3025	952.0400	1425.9225	2212.4530	2254.3140
	November-December Inflows	619.6975	712.6040	883.2375	1091.4700	2131.3475	2649.7830	2885.6630
	Ln(January-February Inflows)	6.7477	6.8047	7.1700	7.3196	7.7565	7.9557	7.9774
	Ln(March-April Inflows)	6.5443	6.7043	7.0961	7.6024	7.7663	7.9575	8.1053
	Ln(May-June Inflows)	6.6553	7.0899	7.2334	7.7903	8.1319	8.2799	8.3255
	Ln(July-August Inflows)	5.4135	5.7889	6.3399	6.6530	6.9319	7.1495	7.4163
	Ln(September-October Inflows)	5.7995	6.0810	6.2810	6.8582	7.2625	7.7002	7.7206
	Ln(November-December Inflows)	6.4288	6.5686	6.7814	6.9952	7.6626	7.8822	7.9673
Tukey's Hinges	Seatrout Harvest			89.9000	152.3000	246.9500		
	Ln(Seatrout Harvest)			4.4987	5.0239	5.5036		
	Square Root of Seatrout Harvest			9.4815	12.3351	15.6929		
	January-February Inflows			1316.7250	1509.6250	2336.7350		
	March-April Inflows			1215.6050	2004.2900	2358.6800		
	May-June Inflows			1465.4850	2417.1200	3297.2600		
	July-August Inflows			573.6350	776.8800	992.5700		
	September-October Inflows			534.7750	952.0400	1419.6850		
	November-December Inflows			918.1150	1091.4700	2057.0950		
	Ln(January-February Inflows)			7.1826	7.3196	7.7565		
	Ln(March-April Inflows)			7.1029	7.6024	7.7659		
	Ln(May-June Inflows)			7.2847	7.7903	8.0986		
	Ln(July-August Inflows)			6.3517	6.6530	6.8980		
	Ln(September-October Inflows)			6.2818	6.8582	7.2582		
	Ln(November-December Inflows)			6.8194	6.9952	7.6264		

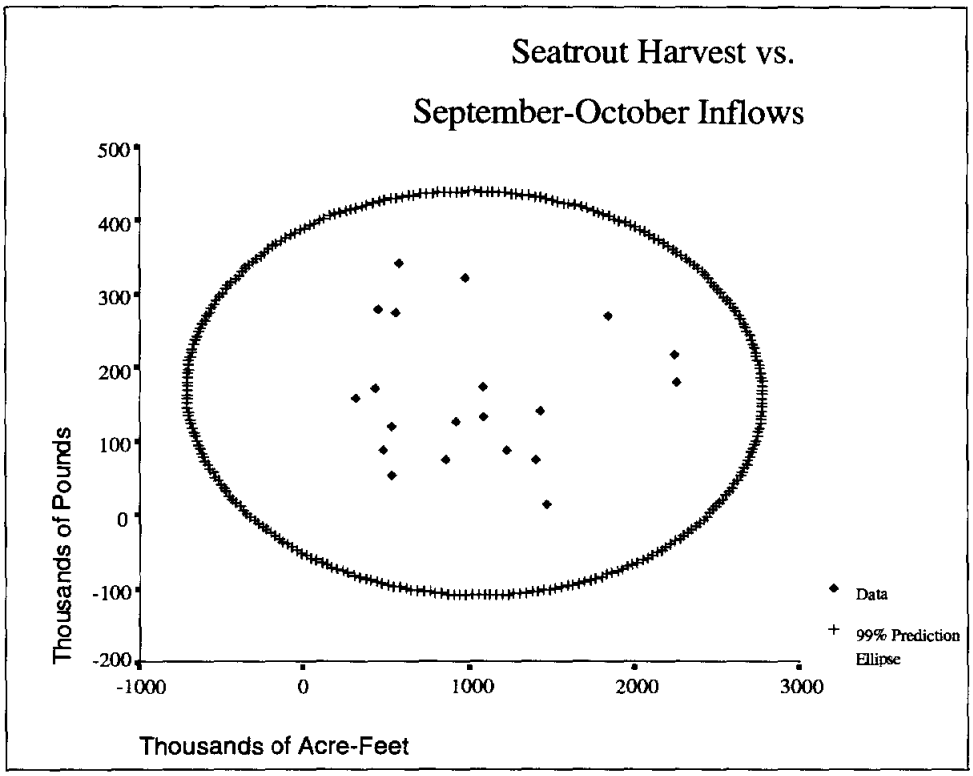
99% Prediction Ellipses

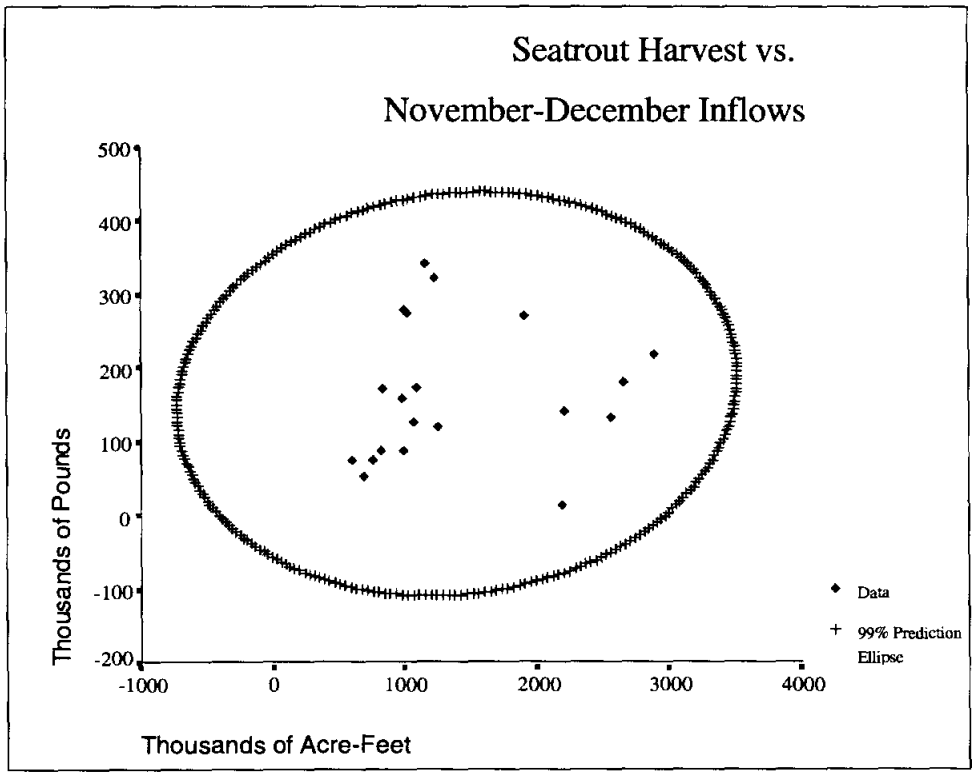


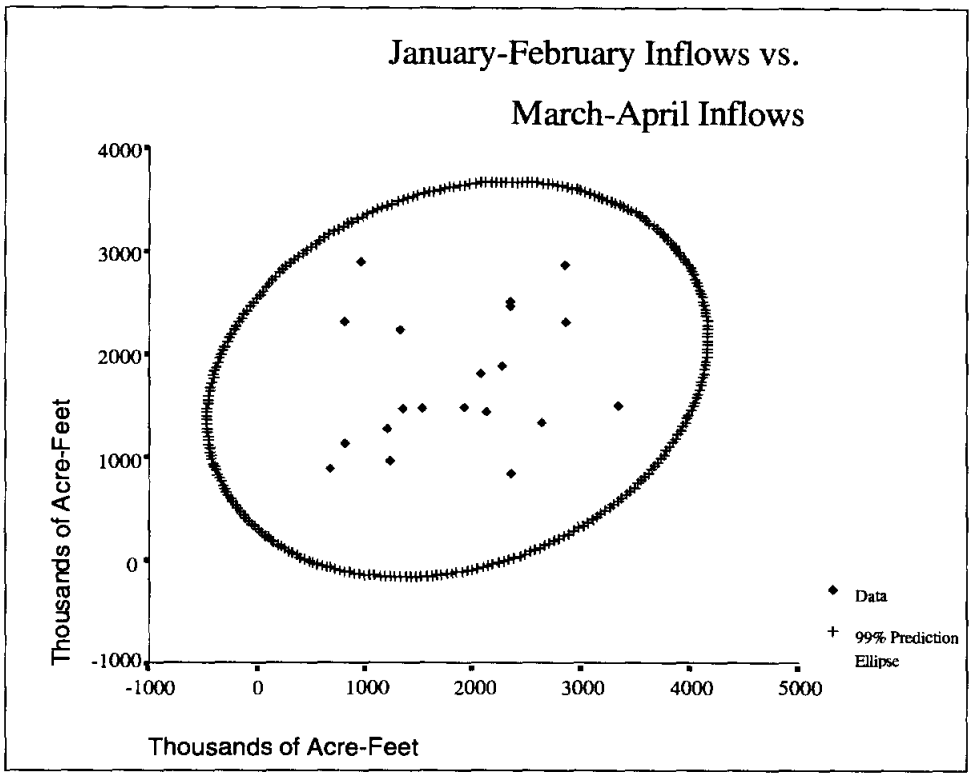


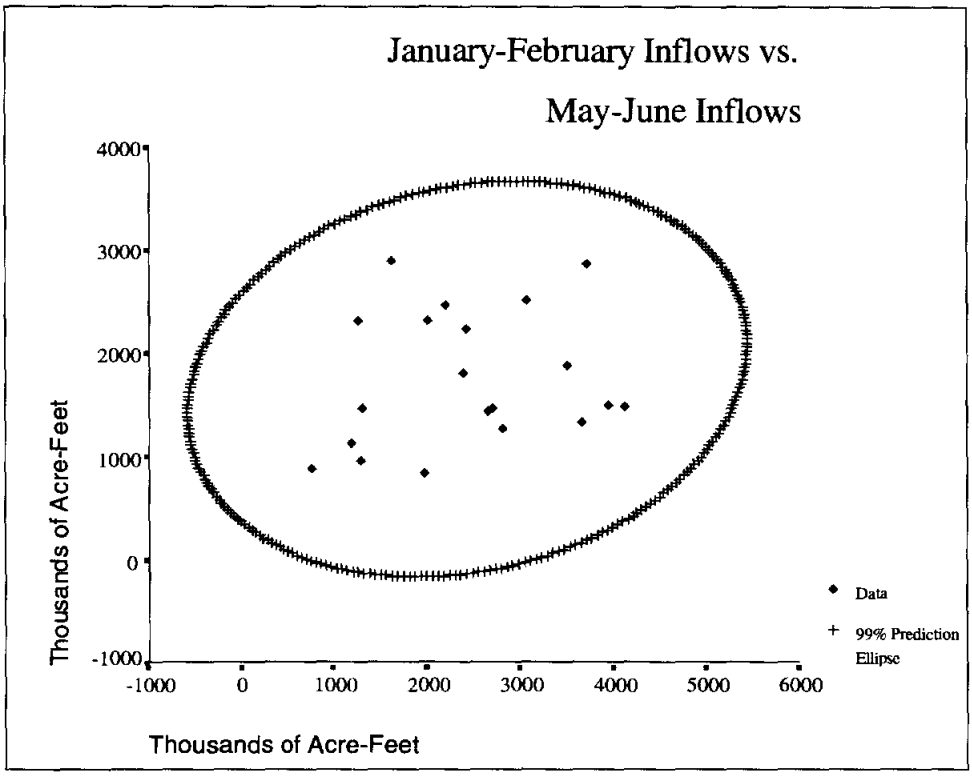

Seatrout Harvest vs.
May-June Inflows
Thousands of Pounds
500
400
300
200
100
0
-100
-200
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

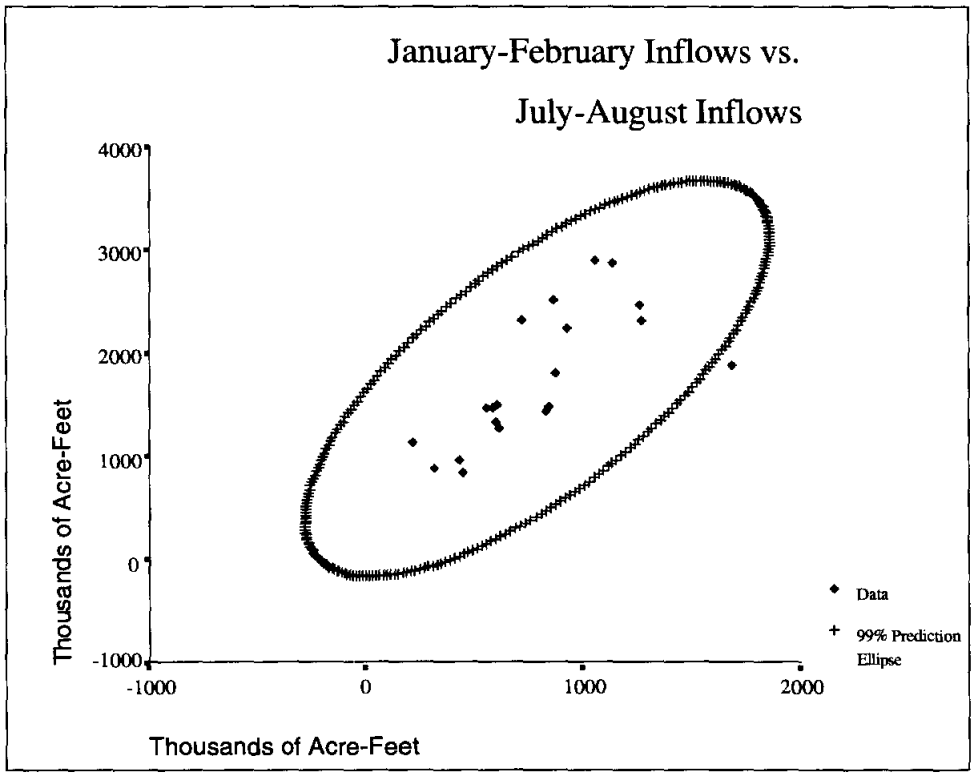

Seatrout Harvest vs.
July-August Inflows
Thousands of Pounds
500
400
300
200
100
0
-100
-200
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


Seatrout Harvest vs.
September-October Inflows
500
400
300
200
100
0
-100
-200
Thousands of Pounds
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

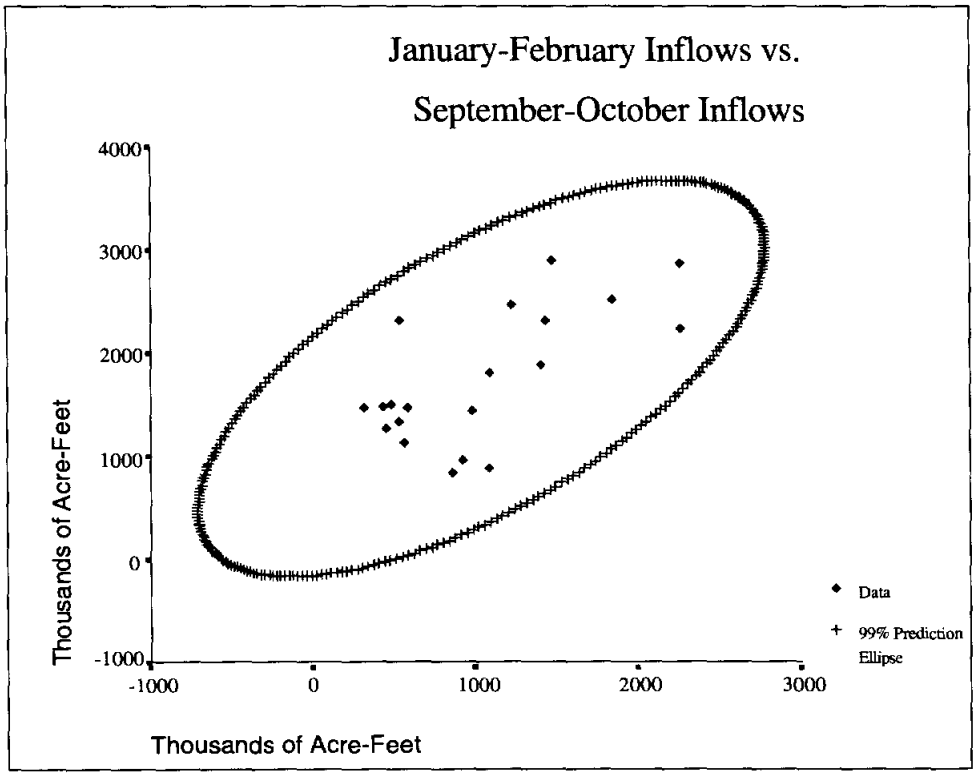

Seatrout Harvest vs.
November-December Inflows
500
400
300
200
100
0
-100
-200
Thousands of Pounds
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

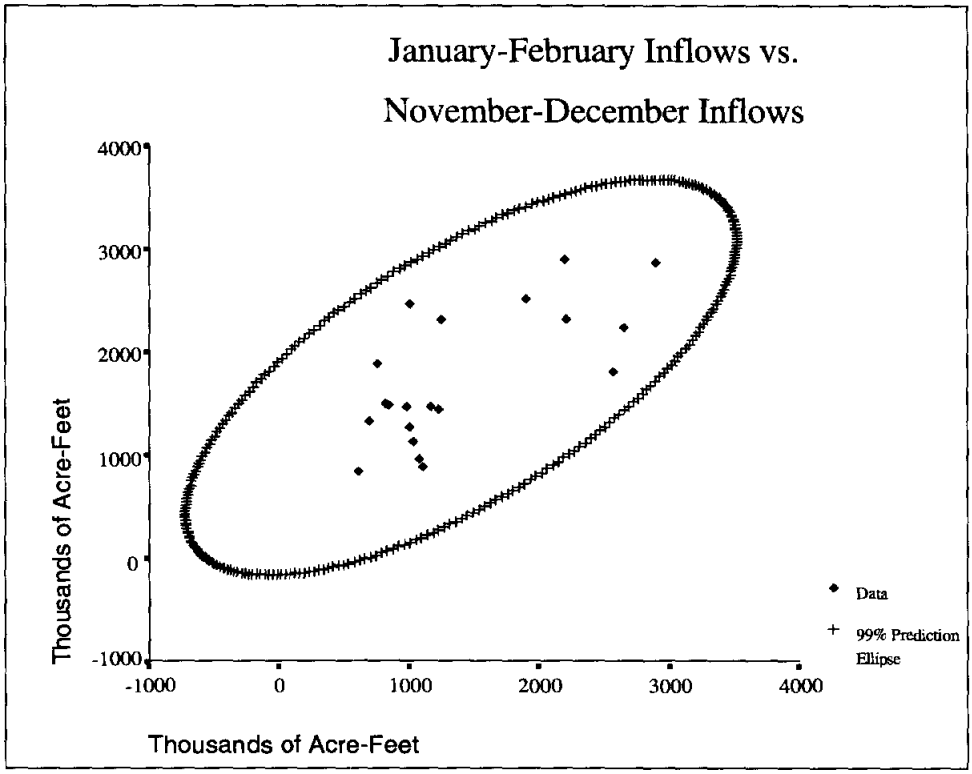

January-February Inflows vs.
March-April Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

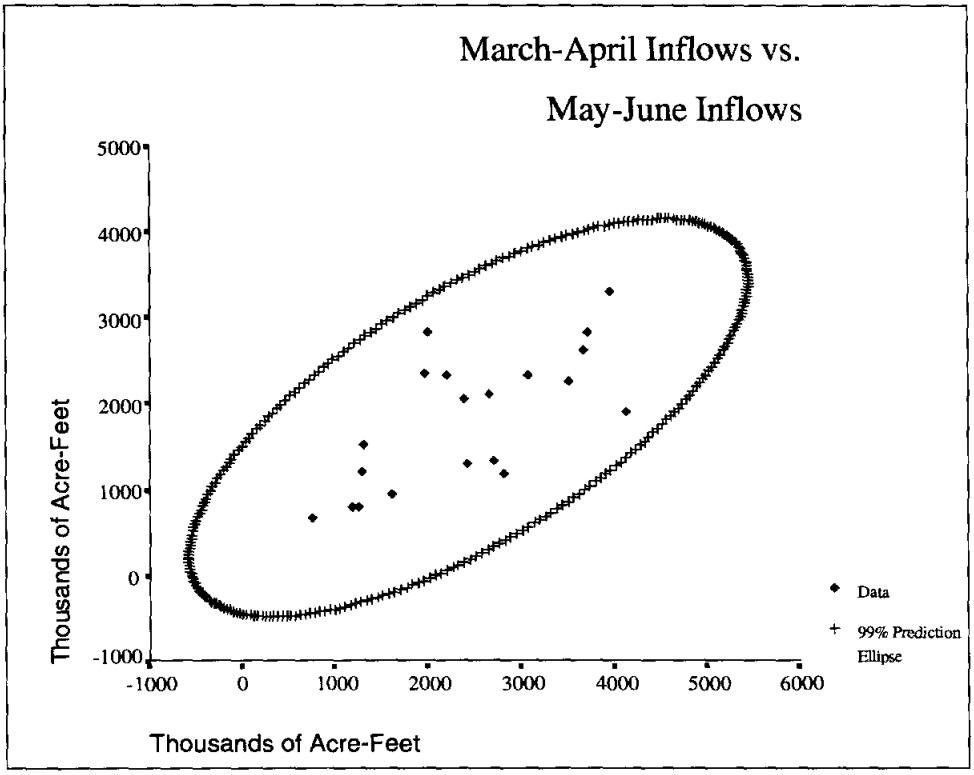

January-February Inflows vs.
May-June Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

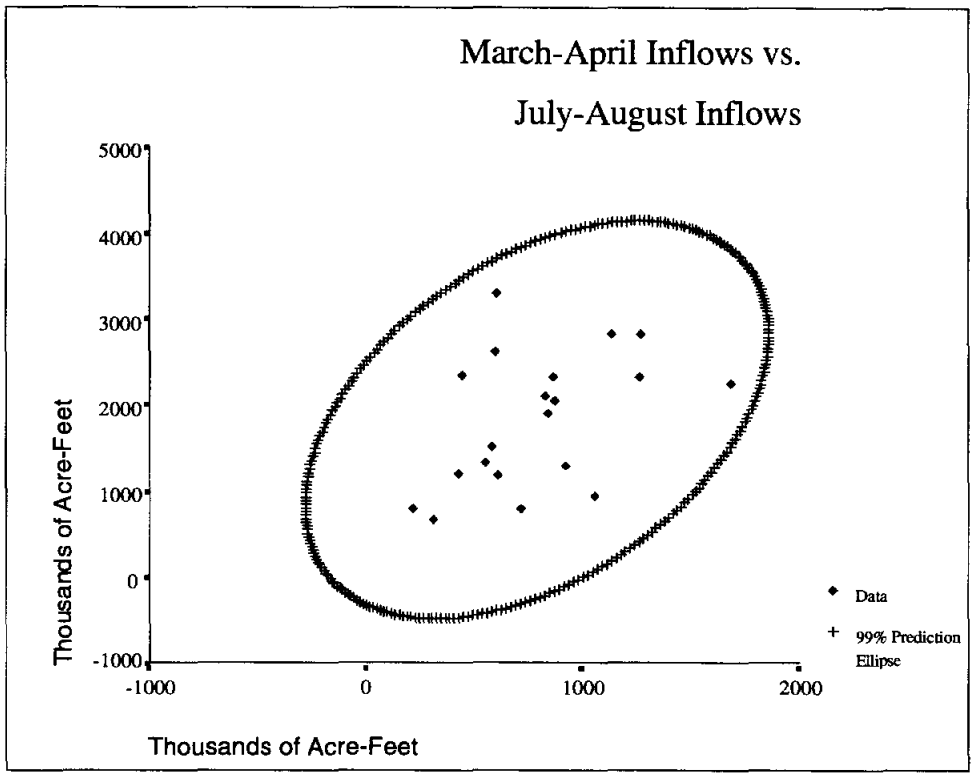


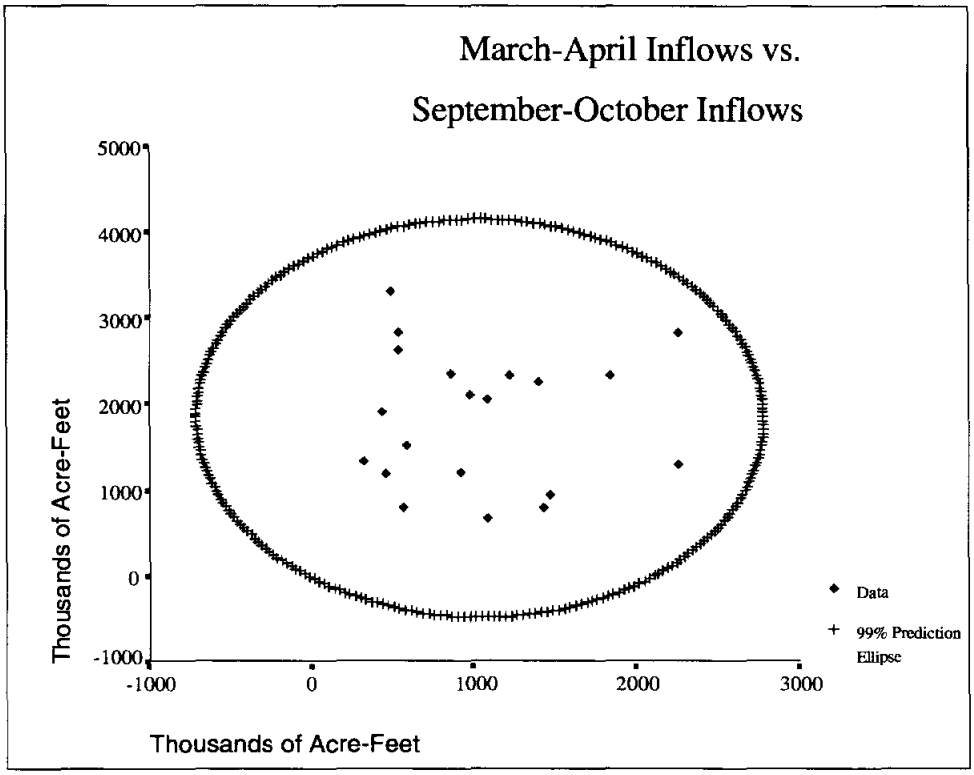
Outside ellipse: 1981.

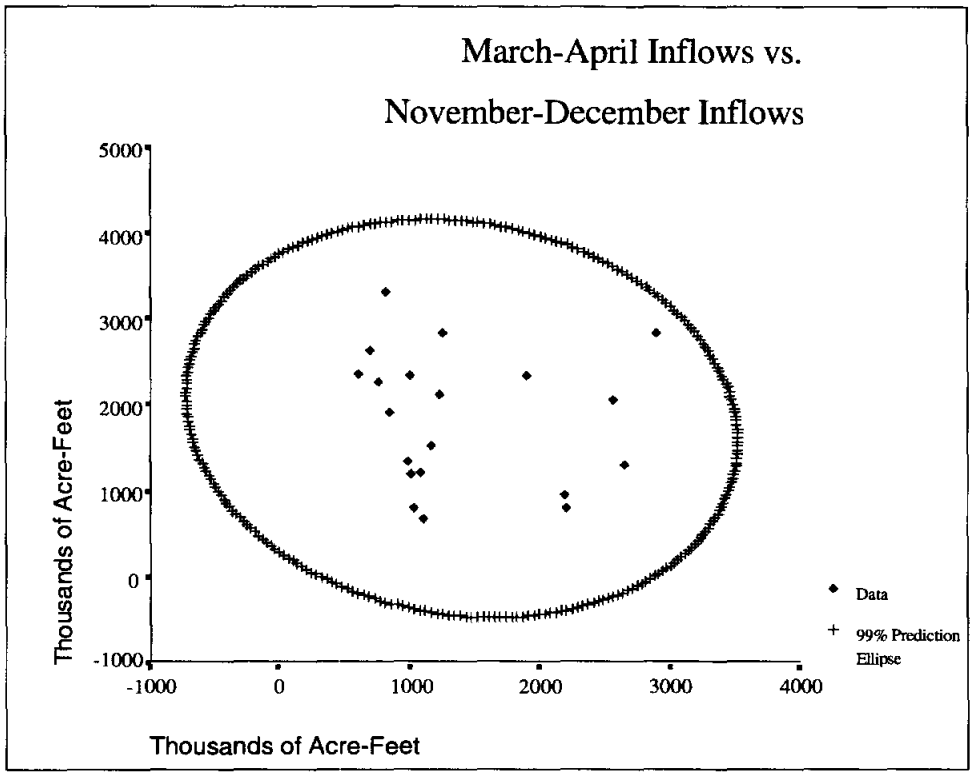


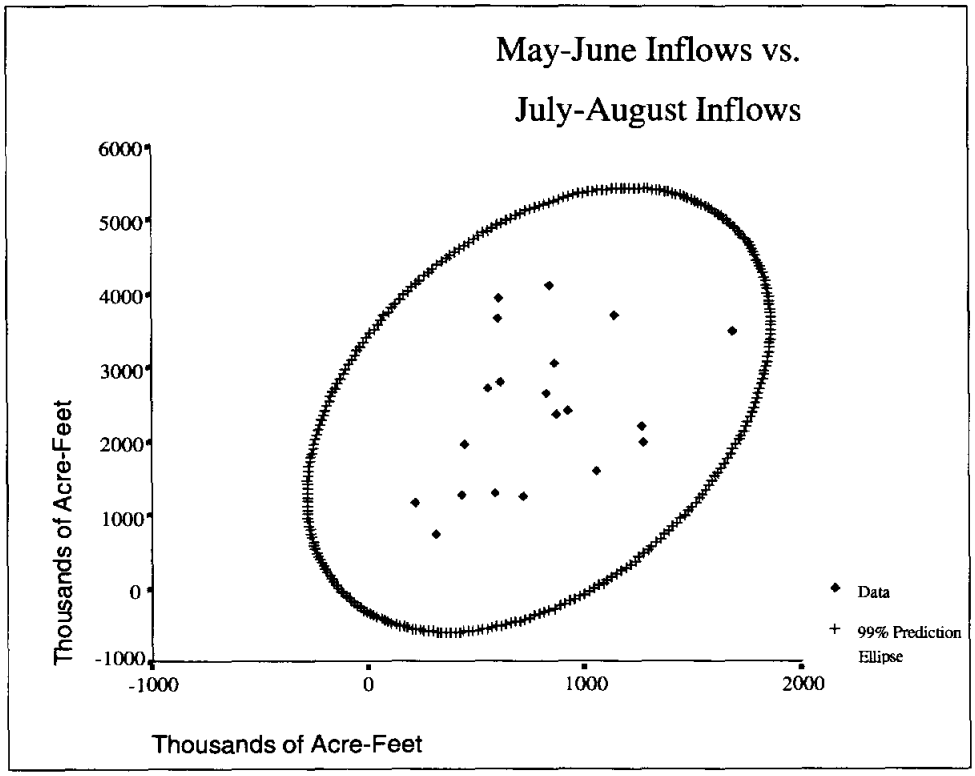

January-February Inflows vs.
November-December Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

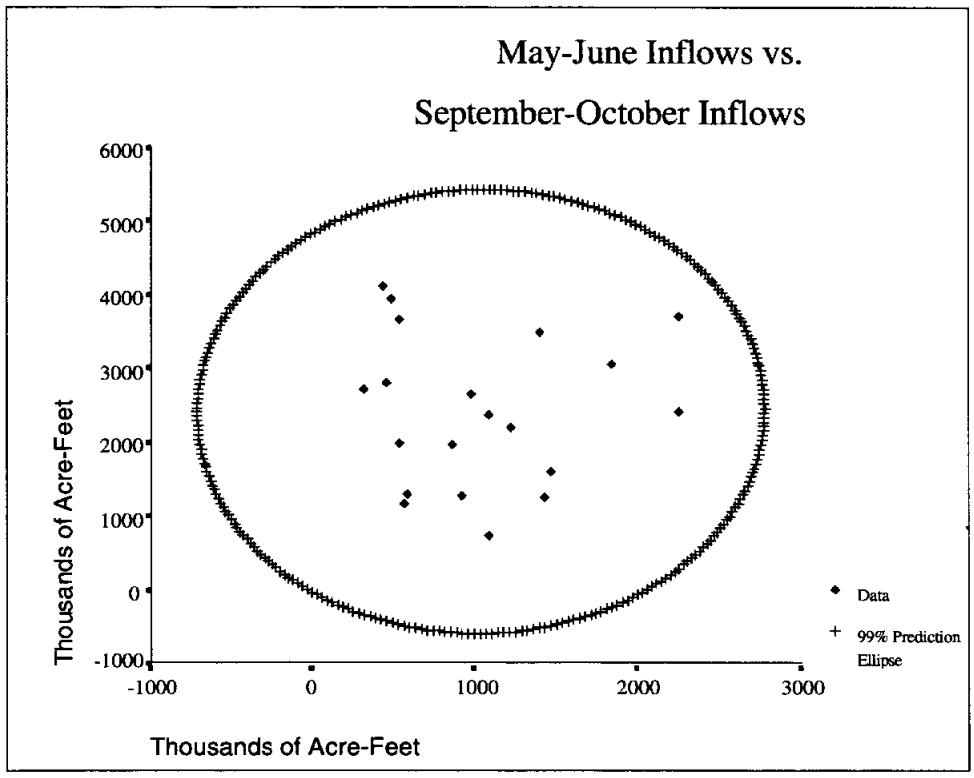

March-April Inflows vs.
May-June Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

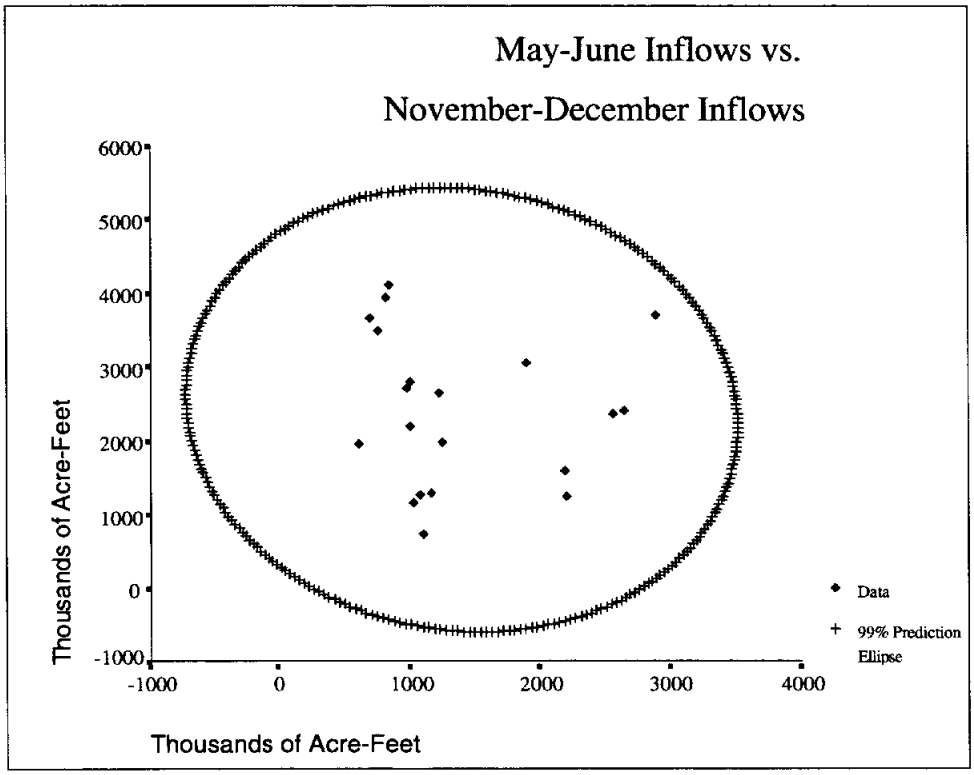

March-April Inflows vs.
July-August Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

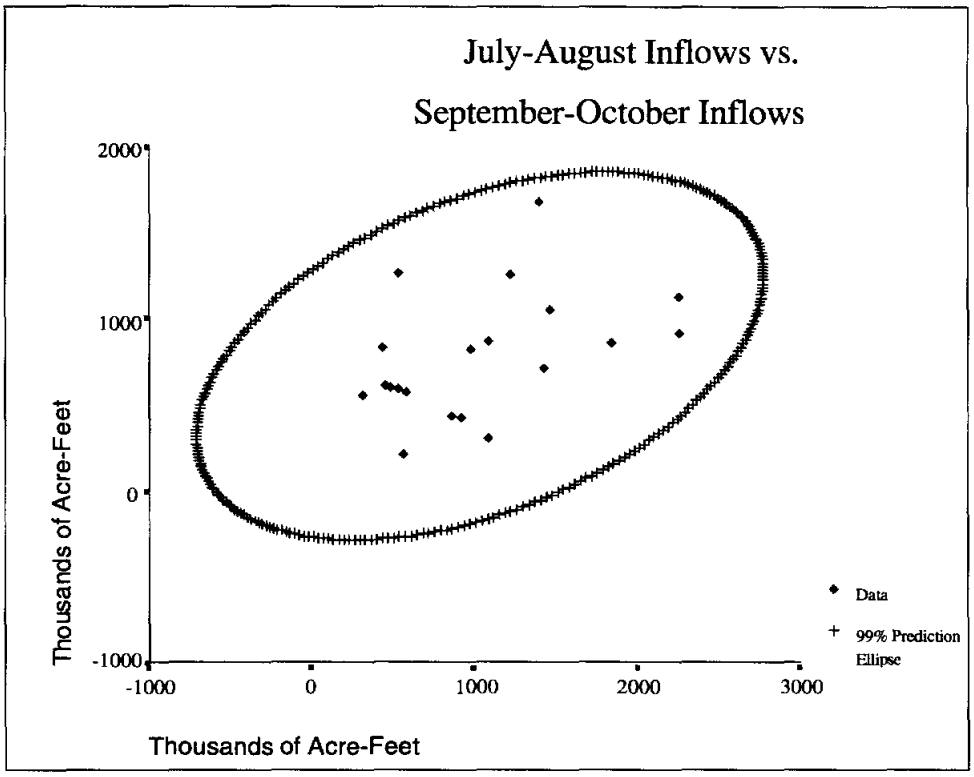

March-April Inflows vs.
September-October Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

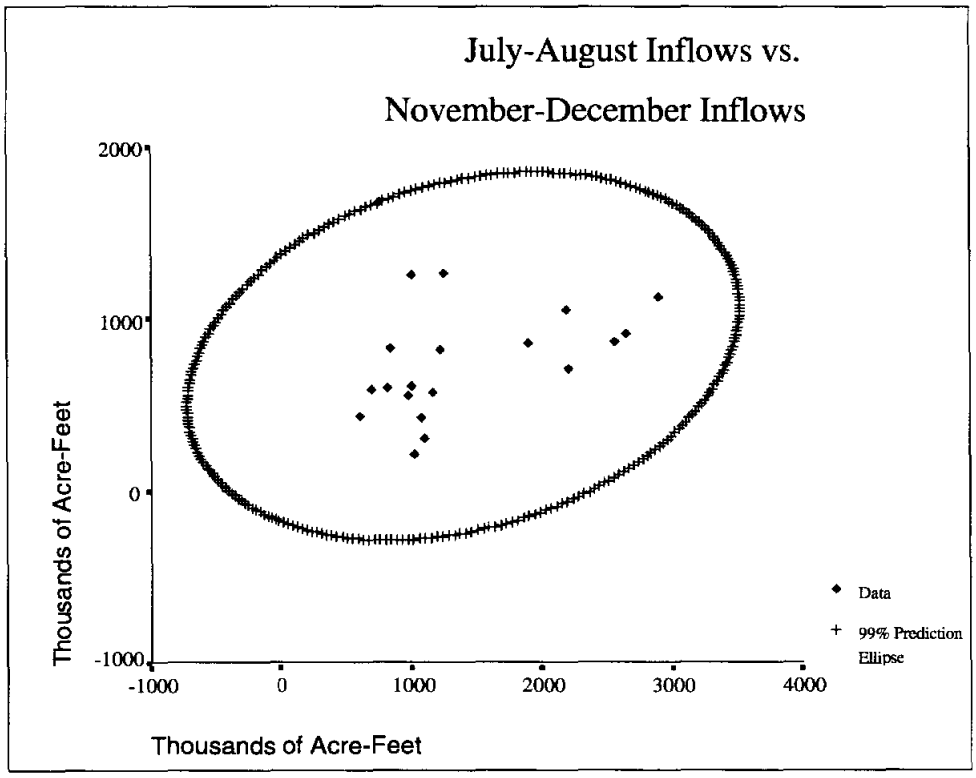

March-April Inflows vs.
November-December Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

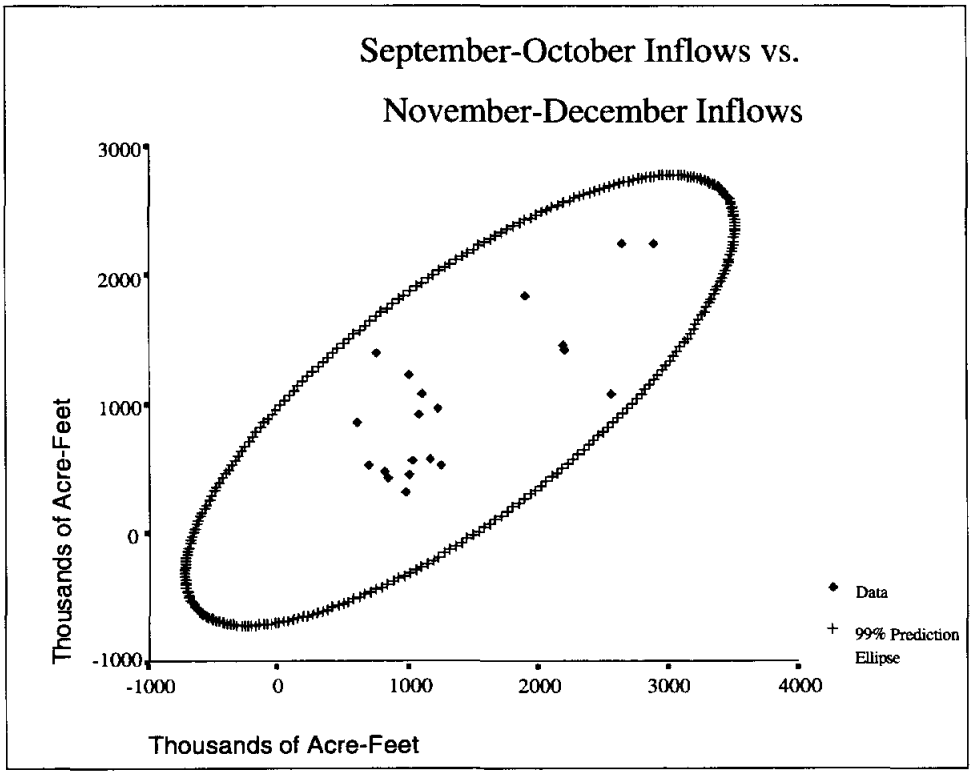

May-June Inflows vs.
July-August Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


May-June Inflows vs.
September-October Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


May-June Inflows vs.
November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


July-August Inflows vs.
September-October Inflows
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


July-August Inflows vs.
November-December Inflows
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

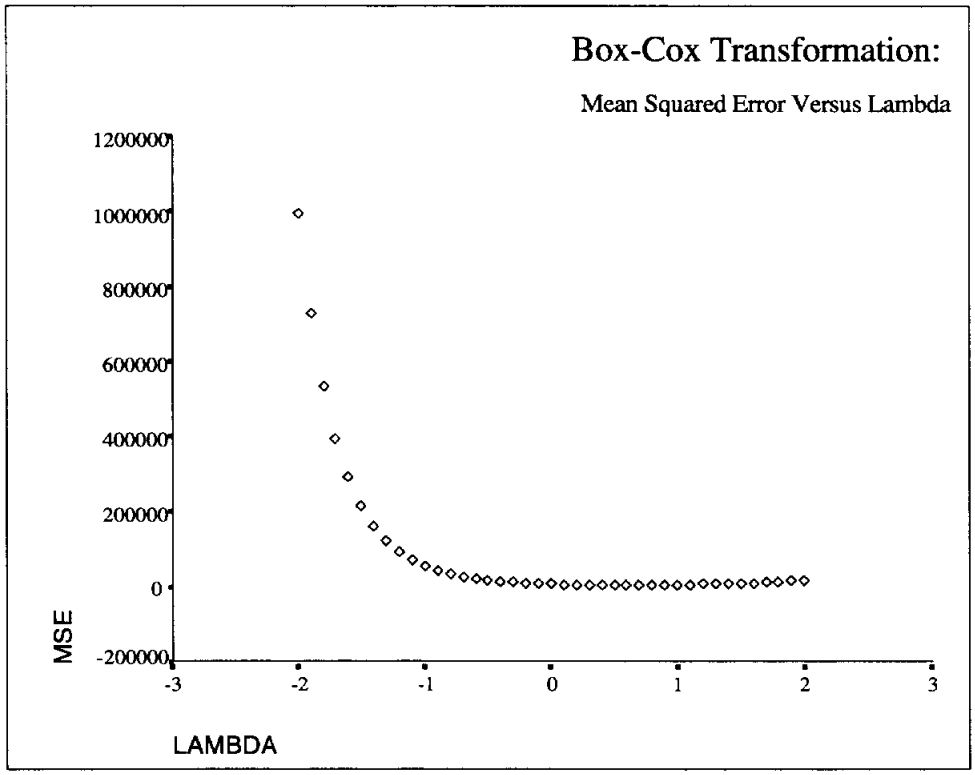

September-October Inflows vs.
November-December Inflows
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

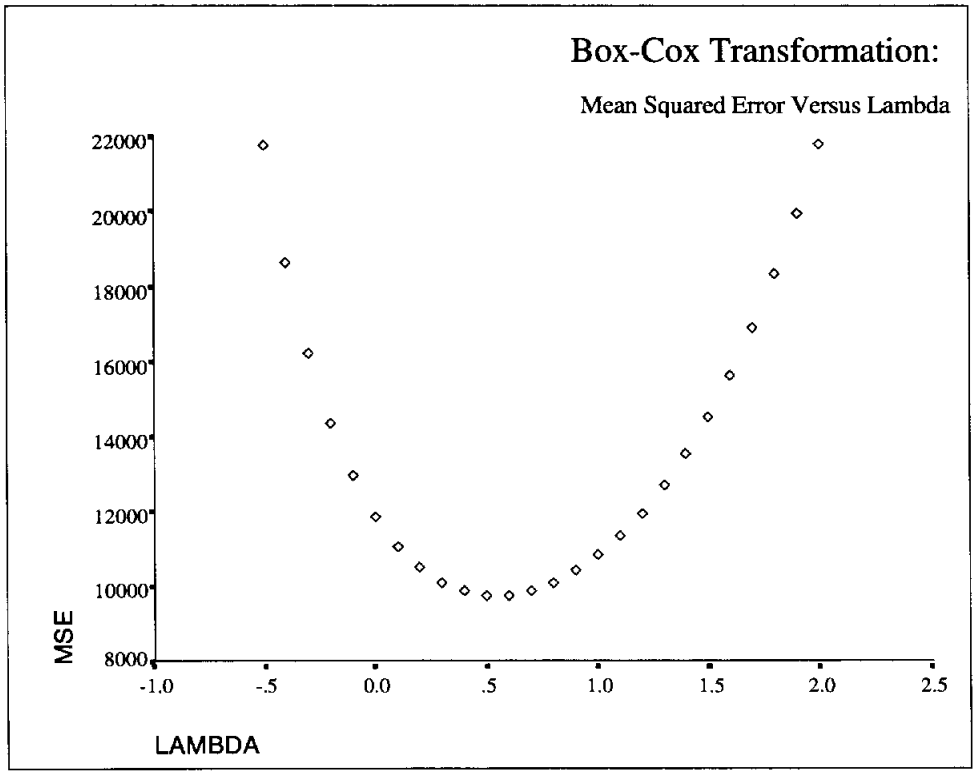
Box–Cox Analysis

Numerical Results

Lambda	Error MS
-2.0	1001168.1210
-1.9	731693.8471
-1.8	537693.9180
-1.7	397500.5854
-1.6	295783.3182
-1.5	221668.4757
-1.4	167423.4363
-1.3	127534.0948
-1.2	98056.9266
-1.1	76163.0012
-1.0	59816.4221
-0.9	47547.0696
-0.8	38289.6280
-0.7	31269.2903
-0.6	25920.4043
-0.5	21828.4133
-0.4	18688.3095
-0.3	16274.8194
-0.2	14420.9447
-0.1	13002.4725
0.0	11926.7582
0.1	11124.5801
0.2	10544.2050
0.3	10147.0546
0.4	9904.5336
0.5	9795.7031
0.6	9805.5760
0.7	9923.8680
0.8	10144.0887
0.9	10462.8866
1.0	10879.5859
1.1	11395.8721
1.2	12015.5929
1.3	12744.6532
1.4	13590.9867
1.5	14564.5950
1.6	15677.6474
1.7	16944.6362
1.8	18382.5897
1.9	20011.3406
2.0	21853.8567

Plots


Box-Cox Transformation:
Mean Squared Error Versus Lambda
MSE
1200000
1000000
800000
600000
400000
200000
0
-200000
-3
-2
-1
0
1
2
3
LAMBDA


Box-Cox Transformation:
Mean Squared Error Versus Lambda
MSE
22000
20000
18000
16000
14000
12000
10000
8000
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
LAMBDA

Model Choice Diagnostics

Untransformed Data

N = 20 Regression Models for Dependent Variable: SEATROUT

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.084351	0.033482	-2.2301	182.4	8322.83	184.4	JA_INFL
1	0.049281	-.003537	-1.7027	183.2	8641.61	185.2	MA_INFL
1	0.025964	-.028149	-1.3520	183.7	8853.55	185.7	JF_INFL
1	0.012554	-.042304	-1.1504	183.9	8975.44	185.9	MJ_INFL
2	0.115099	0.010993	-0.6925	183.7	8516.49	186.7	JA_INFL ND_INFL
2	0.106141	0.000981	-0.5578	183.9	8602.70	186.9	JF_INFL ND_INFL
2	0.099193	-.006785	-0.4533	184.1	8669.57	187.1	JA_INFL SO_INFL
2	0.095524	-.010885	-0.3981	184.2	8704.88	187.2	MA_INFL JA_INFL
3	0.124378	-.039802	1.1680	185.5	8953.89	189.5	JF_INFL JA_INFL ND_INFL
3	0.118785	-.046442	1.2521	185.7	9011.07	189.6	MA_INFL JA_INFL ND_INFL
3	0.116503	-.049153	1.2864	185.7	9034.42	189.7	MJ_INFL JA_INFL ND_INFL
3	0.115378	-.050488	1.3033	185.7	9045.91	189.7	JA_INFL SO_INFL ND_INFL
4	0.127887	-.104676	3.1152	187.5	9512.54	192.4	MA_INFL MJ_INFL JA_INFL ND_INFL
4	0.127354	-.105352	3.1232	187.5	9518.35	192.4	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.125642	-.107521	3.1490	187.5	9537.03	192.5	JF_INFL MJ_INFL JA_INFL ND_INFL
4	0.124743	-.108659	3.1625	187.5	9546.83	192.5	JF_INFL JA_INFL SO_INFL ND_INFL
5	0.135197	-.173661	5.0053	189.3	10106.58	195.3	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.128165	-.183204	5.1110	189.4	10188.75	195.4	MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.127867	-.183609	5.1155	189.5	10192.23	195.4	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.125914	-.186259	5.1449	189.5	10215.06	195.5	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.135548	-.263430	7.0000	191.3	10879.59	198.2	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	SEATROUT	91.230	226.556	.	.	.	-0.074510	.
2	MODEL1	PARMS	SEATROUT	92.960	216.216	.	-0.026305	.	.	.
3	MODEL1	PARMS	SEATROUT	94.093	208.155	-0.023021	.	.	.	.
4	MODEL1	PARMS	SEATROUT	94.739	192.288	.	.	-0.010201	.	.
5	MODEL1	PARMS	SEATROUT	92.285	203.414	.	.	.	-0.086984	.
6	MODEL1	PARMS	SEATROUT	92.751	205.909	-0.062185	.	.	.	.
7	MODEL1	PARMS	SEATROUT	93.111	216.594	.	.	.	-0.089870	0.021342
8	MODEL1	PARMS	SEATROUT	93.300	241.936	.	-0.013925	.	-0.061336	.
9	MODEL1	PARMS	SEATROUT	94.625	211.312	-0.029935	.	.	-0.056186	.
10	MODEL1	PARMS	SEATROUT	94.927	214.828	.	-0.008306	.	-0.077918	.
11	MODEL1	PARMS	SEATROUT	95.050	196.522	.	.	0.003783	-0.091709	.
12	MODEL1	PARMS	SEATROUT	95.110	202.949	.	.	.	-0.085136	-0.004484
13	MODEL1	PARMS	SEATROUT	97.532	206.606	.	-0.018567	0.012256	-0.082020	.
14	MODEL1	PARMS	SEATROUT	97.562	221.298	-0.028828	-0.007479	.	-0.049161	.
15	MODEL1	PARMS	SEATROUT	97.658	204.712	-0.029715	.	0.003591	-0.060896	.
16	MODEL1	PARMS	SEATROUT	97.708	210.819	-0.030082	.	.	-0.053920	-0.005127
17	MODEL1	PARMS	SEATROUT	100.531	213.166	-0.026705	-0.017094	0.011411	-0.055097	.
18	MODEL1	PARMS	SEATROUT	100.939	206.409	.	-0.018641	0.012164	-0.079976	-0.004487
19	MODEL1	PARMS	SEATROUT	100.957	220.979	-0.028973	-0.007678	.	-0.046283	-0.006089
20	MODEL1	PARMS	SEATROUT	101.070	204.515	-0.029850	.	0.003466	-0.058771	-0.004441
21	MODEL1	PARMS	SEATROUT	104.305	212.979	-0.026846	-0.017168	0.011303	-0.052659	-0.005042

OBS	ND_INFL	SEATROUT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	8322.83	0.08435	0.03348	-2.23008	182.428	184.419
2	.	-1	1	2	18	8641.61	0.04928	-0.00354	-1.70267	183.180	185.171
3	.	-1	1	2	18	8853.55	0.02596	-0.02815	-1.35202	183.664	185.656
4	.	-1	1	2	18	8975.44	0.01255	-0.04230	-1.15036	183.938	185.929
5	0.023537	-1	2	3	17	8516.49	0.11510	0.01099	-0.69248	183.745	186.732
6	0.050976	-1	2	3	17	8602.70	0.10614	0.00098	-0.55777	183.946	186.933
7	.	-1	2	3	17	8669.57	0.09919	-0.00678	-0.45327	184.101	187.088
8	.	-1	2	3	17	8704.88	0.09552	-0.01088	-0.39810	184.182	187.170
9	0.038237	-1	3	4	16	8953.89	0.12438	-0.03980	1.16799	185.534	189.517
10	0.021257	-1	3	4	16	9011.07	0.11879	-0.04644	1.25208	185.661	189.644
11	0.024544	-1	3	4	16	9034.42	0.11650	-0.04915	1.28641	185.713	189.696
12	0.026137	-1	3	4	16	9045.91	0.11538	-0.05049	1.30332	185.738	189.721
13	0.021704	-1	4	5	15	9512.54	0.12789	-0.10468	3.11521	187.454	192.432
14	0.035641	-1	4	5	15	9518.35	0.12735	-0.10535	3.12323	187.466	192.445
15	0.039085	-1	4	5	15	9537.03	0.12564	-0.10752	3.14898	187.505	192.484
16	0.041284	-1	4	5	15	9546.83	0.12474	-0.10866	3.16249	187.526	192.504
17	0.034998	-1	5	6	14	10106.58	0.13520	-0.17366	5.00528	189.285	195.260
18	0.024262	-1	5	6	14	10188.75	0.12817	-0.18320	5.11102	189.447	195.422
19	0.039190	-1	5	6	14	10192.23	0.12787	-0.18361	5.11551	189.454	195.429
20	0.041694	-1	5	6	14	10215.06	0.12591	-0.18626	5.14488	189.499	195.473
21	0.037942	-1	6	7	13	10879.59	0.13555	-0.26343	7.00000	191.277	198.247

Square Root of Harvest (Box–Cox Transformation)

N = 20 Regression Models for Dependent Variable: SQRTSTRT

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.087733	0.037051	-2.0034	54.3577	13.7804	56.3491	JA_INFL
1	0.038329	-.015097	-1.2455	55.4125	14.5266	57.4039	MA_INFL
1	0.037364	-.016116	-1.2307	55.4325	14.5412	57.4240	JF_INFL
1	0.008068	-.047039	-0.7812	56.0321	14.9837	58.0236	ND_INFL
2	0.134796	0.033007	-0.7255	55.2983	13.8382	58.2855	JF_INFL ND_INFL
2	0.118478	0.014770	-0.4752	55.6720	14.0992	58.6592	JA_INFL ND_INFL
2	0.103549	-.001915	-0.2461	56.0079	14.3380	58.9951	JA_INFL SO_INFL
2	0.093173	-.013513	-0.0869	56.2380	14.5040	59.2252	MA_INFL JA_INFL
3	0.143214	-.017433	1.1453	57.1028	14.5601	61.0857	JF_INFL JA_INFL ND_INFL
3	0.136704	-.025164	1.2452	57.2542	14.6707	61.2371	JF_INFL MA_INFL ND_INFL
3	0.136330	-.025609	1.2509	57.2628	14.6771	61.2458	JF_INFL SO_INFL ND_INFL
3	0.135879	-.026144	1.2579	57.2733	14.6847	61.2562	JF_INFL MJ_INFL ND_INFL
4	0.147280	-.080112	3.0829	59.0076	15.4570	63.9863	JF_INFL MJ_INFL JA_INFL ND_INFL
4	0.143515	-.084881	3.1407	59.0957	15.5253	64.0744	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.143427	-.084992	3.1421	59.0978	15.5269	64.0765	JF_INFL JA_INFL SO_INFL ND_INFL
4	0.143332	-.085113	3.1435	59.1000	15.5286	64.0787	JF_INFL MA_INFL MJ_INFL ND_INFL
5	0.152553	-.150106	5.0020	60.8836	16.4587	66.8580	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.147378	-.157130	5.0814	61.0053	16.5592	66.9797	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.144794	-.160636	5.1211	61.0658	16.6094	67.0402	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.143763	-.162037	5.1369	61.0900	16.6294	67.0644	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
6	0.152686	-.238382	7.0000	62.8804	17.7220	69.8506	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	SQRTSTRT	3.71219	14.8612	.	.	.	-.0030978	.
2	MODEL1	PARMS	SQRTSTRT	3.81138	14.1569	.	-.00094570	.	.	.
3	MODEL1	PARMS	SQRTSTRT	3.81329	14.3948	-.0011258	.	.	.	.
4	MODEL1	PARMS	SQRTSTRT	3.87088	11.7371	.	.	.	.	.
5	MODEL1	PARMS	SQRTSTRT	3.71998	14.2939	-.0028858	.	.	.	.
6	MODEL1	PARMS	SQRTSTRT	3.75489	13.9178	.	.	.	-.0036063	.
7	MODEL1	PARMS	SQRTSTRT	3.78655	14.4420	.	.	.	-.0037442	0.00089818
8	MODEL1	PARMS	SQRTSTRT	3.80841	15.2987	.	-.00039610	.	-.0027230	.
9	MODEL1	PARMS	SQRTSTRT	3.81576	14.4435	-.0019925	.	.	-.0015563	.
10	MODEL1	PARMS	SQRTSTRT	3.83023	14.6264	-.0027255	-.00023324	.	.	.
11	MODEL1	PARMS	SQRTSTRT	3.83106	14.2718	-.0027932	.	.	.	-.00041187
12	MODEL1	PARMS	SQRTSTRT	3.83206	14.0403	-.0029751	.	.00012914	.	.
13	MODEL1	PARMS	SQRTSTRT	3.93154	13.9610	-.0019764	.	.00026255	-.0019007	.
14	MODEL1	PARMS	SQRTSTRT	3.94021	14.5729	-.0019782	-.00009689	.	-.0014653	.
15	MODEL1	PARMS	SQRTSTRT	3.94041	14.4282	-.0019971	.	.	-.0014858	-.00015952
16	MODEL1	PARMS	SQRTSTRT	3.94063	14.3332	-.0027590	-.00060981	.00042263	.	.
17	MODEL1	PARMS	SQRTSTRT	4.05693	14.2170	-.0018853	-.00051766	.00049935	-.0017251	.
18	MODEL1	PARMS	SQRTSTRT	4.06930	13.9562	-.0019797	.	.00025951	-.0018489	-.00010817
19	MODEL1	PARMS	SQRTSTRT	4.07546	14.3052	-.0026717	-.00060537	.00042271	.	-.00040226
20	MODEL1	PARMS	SQRTSTRT	4.07792	14.5639	-.0019823	-.00010253	.	-.0013838	-.00017237
21	MODEL1	PARMS	SQRTSTRT	4.20975	14.2124	-.0018888	-.00051952	.00049666	-.0016640	-.00012634

OBS	ND_INFL	SQRTSTRT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	13.7804	0.08773	0.03705	-2.00345	54.3577	56.3491
2	.	-1	1	2	18	14.5266	0.03833	-0.01510	-1.24547	55.4125	57.4039
3	.	-1	1	2	18	14.5412	0.03736	-0.01612	-1.23066	55.4325	57.4240
4	.0004736	-1	1	2	18	14.9837	0.00807	-0.04704	-0.78118	56.0321	58.0236
5	.0022908	-1	2	3	17	13.8382	0.13480	0.03301	-0.72552	55.2983	58.2855
6	.0009595	-1	2	3	17	14.0992	0.11848	0.01477	-0.47516	55.6720	58.6592
7	.	-1	2	3	17	14.3380	0.10355	-0.00192	-0.24612	56.0079	58.9951
8	.	-1	2	3	17	14.5040	0.09317	-0.01351	-0.08691	56.2380	59.2252
9	.0019380	-1	3	4	16	14.5601	0.14321	-0.01743	1.14532	57.1028	61.0857
10	.0021602	-1	3	4	16	14.6707	0.13670	-0.02516	1.24520	57.2542	61.2371
11	.0024943	-1	3	4	16	14.6771	0.13633	-0.02561	1.25095	57.2628	61.2458
12	.0023597	-1	3	4	16	14.6847	0.13588	-0.02614	1.25786	57.2733	61.2562
13	.0019999	-1	4	5	15	15.4570	0.14728	-0.08011	3.08294	59.0076	63.9863
14	.0019043	-1	4	5	15	15.5253	0.14352	-0.08488	3.14071	59.0957	64.0744
15	.0020327	-1	4	5	15	15.5269	0.14343	-0.08499	3.14205	59.0978	64.0765
16	.0021747	-1	4	5	15	15.5286	0.14333	-0.08511	3.14352	59.1000	64.0787
17	.0018762	-1	5	6	14	16.4587	0.15255	-0.15011	5.00204	60.8836	66.8580
18	.0020635	-1	5	6	14	16.5592	0.14738	-0.15713	5.08144	61.0053	66.9797
19	.0023760	-1	5	6	14	16.6094	0.14479	-0.16064	5.12108	61.0658	67.0402
20	.0020048	-1	5	6	14	16.6294	0.14376	-0.16204	5.13691	61.0900	67.0644
21	.0019499	-1	6	7	13	17.7220	0.15269	-0.23838	7.00000	62.8804	69.8506

Logged Inflows

N = 20 Regression Models for Dependent Variable: SEATROUT

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.070178	0.018522	-1.0363	182.7	8451.66	184.7	LGJAINFL
1	0.031502	-.022303	-0.4138	183.6	8803.21	185.5	LGMAINFL
1	0.028834	-.025119	-0.3709	183.6	8827.46	185.6	LGNDINFL
1	0.014662	-.040079	-0.1428	183.9	8956.28	185.9	LGJFINFL
2	0.143462	0.042693	-0.2156	183.1	8243.51	186.1	LGJAINFL LGNDINFL
2	0.130274	0.027954	-0.00339	183.4	8370.44	186.4	LGJFINFL LGNDINFL
2	0.091634	-.015233	0.6185	184.3	8742.33	187.3	LGJFINFL LGJAINFL
2	0.091293	-.015614	0.6239	184.3	8745.61	187.3	LGSOINFL LGNDINFL
3	0.174724	0.019984	1.2813	184.3	8439.06	188.3	LGJFINFL LGSOINFL LGNDINFL
3	0.170665	0.015165	1.3466	184.4	8480.56	188.4	LGJAINFL LGSOINFL LGNDINFL
3	0.163982	0.007229	1.4541	184.6	8548.90	188.6	LGMJINFL LGJAINFL LGNDINFL
3	0.151702	-.007354	1.6518	184.9	8674.48	188.9	LGMAINFL LGJAINFL LGNDINFL
4	0.181546	-.036708	3.1715	186.2	8927.25	191.2	LGMJINFL LGJAINFL LGSOINFL LGNDINFL
4	0.180667	-.037822	3.1856	186.2	8936.84	191.2	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
4	0.178772	-.040222	3.2161	186.3	8957.51	191.2	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.176989	-.042481	3.2448	186.3	8976.96	191.3	LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.191983	-.096595	5.0035	187.9	9442.95	193.9	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.186551	-.103967	5.0909	188.1	9506.43	194.0	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.181948	-.110213	5.1650	188.2	9560.21	194.1	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.178917	-.114328	5.2138	188.2	9595.64	194.2	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
6	0.192202	-.180628	7.0000	189.9	10166.57	196.9	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL	LGMJINFL	LGJAINFL	LGSOINFL
1	MODEL1	PARMS	SEATROUT	91.933	493.415	.	.	.	-49.6215	.
2	MODEL1	PARMS	SEATROUT	93.825	425.721	.	-34.7757	.	.	.
3	MODEL1	PARMS	SEATROUT	93.955	-70.868	.	.	.	.	.
4	MODEL1	PARMS	SEATROUT	94.638	386.521	-29.562	.	.	.	.
5	MODEL1	PARMS	SEATROUT	90.794	206.314	.	.	.	-67.0660	.
6	MODEL1	PARMS	SEATROUT	91.490	301.644	-105.186	.	.	.	.
7	MODEL1	PARMS	SEATROUT	93.500	292.897	58.766	.	.	-85.4008	.
8	MODEL1	PARMS	SEATROUT	93.518	-22.507	.	.	.	.	-54.2428
9	MODEL1	PARMS	SEATROUT	91.864	310.910	-96.187	.	.	.	-46.1400
10	MODEL1	PARMS	SEATROUT	92.090	201.745	.	.	.	-57.9426	-37.1673
11	MODEL1	PARMS	SEATROUT	92.460	-4.802	.	.	35.9351	-89.4211	.
12	MODEL1	PARMS	SEATROUT	93.137	61.003	.	23.6404	.	-82.1477	.
13	MODEL1	PARMS	SEATROUT	94.484	43.422	.	.	27.0800	-76.3258	-30.9063
14	MODEL1	PARMS	SEATROUT	94.535	289.743	-58.816	.	.	-28.0016	-41.0361
15	MODEL1	PARMS	SEATROUT	94.644	231.887	-109.963	.	14.9610	.	-44.5134
16	MODEL1	PARMS	SEATROUT	94.747	74.291	.	20.7602	.	-71.4927	-35.9210
17	MODEL1	PARMS	SEATROUT	97.175	130.165	-60.094	.	27.6216	-46.1021	-34.7340
18	MODEL1	PARMS	SEATROUT	97.501	164.828	-57.532	20.0338	.	-41.7311	-39.7490
19	MODEL1	PARMS	SEATROUT	97.776	26.290	.	6.6070	23.0723	-77.9176	-31.4363
20	MODEL1	PARMS	SEATROUT	97.957	239.965	-109.119	-3.8612	17.6110	.	-43.9911
21	MODEL1	PARMS	SEATROUT	100.829	116.856	-59.644	4.8824	24.6560	-47.5047	-35.0969

OBS	LGNDINFL	SEATROUT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	8451.66	0.07018	0.01852	-1.03626	182.735	184.727
2	.	-1	1	2	18	8803.21	0.03150	-0.02230	-0.41384	183.550	185.542
3	33.391	-1	1	2	18	8827.46	0.02883	-0.02512	-0.37091	183.605	185.597
4	.	-1	1	2	18	8956.28	0.01466	-0.04008	-0.14283	183.895	185.886
5	56.295	-1	2	3	17	8243.51	0.14346	0.04269	-0.21563	183.093	186.080
6	90.448	-1	2	3	17	8370.44	0.13027	0.02795	-0.00339	183.399	186.386
7	.	-1	2	3	17	8742.33	0.09163	-0.01523	0.61846	184.268	187.255
8	78.228	-1	2	3	17	8745.61	0.09129	-0.01561	0.62394	184.276	187.263
9	123.705	-1	3	4	16	8439.06	0.17472	0.01998	1.28128	184.350	188.333
10	83.902	-1	3	4	16	8480.56	0.17067	0.01516	1.34659	184.448	188.431
11	67.673	-1	3	4	16	8548.90	0.16398	0.00723	1.45414	184.608	188.591
12	65.936	-1	3	4	16	8674.48	0.15170	-0.00735	1.65177	184.900	188.883
13	87.825	-1	4	5	15	8927.25	0.18155	-0.03671	3.17148	186.184	191.162
14	108.778	-1	4	5	15	8936.84	0.18067	-0.03782	3.18563	186.205	191.184
15	131.392	-1	4	5	15	8957.51	0.17877	-0.04022	3.21613	186.251	191.230
16	91.442	-1	4	5	15	8976.96	0.17699	-0.04248	3.24482	186.295	191.273
17	113.321	-1	5	6	14	9442.95	0.19198	-0.09659	5.00352	187.927	193.901
18	115.512	-1	5	6	14	9506.43	0.18655	-0.10397	5.09094	188.061	194.035
19	89.644	-1	5	6	14	9560.21	0.18195	-0.11021	5.16501	188.174	194.148
20	130.045	-1	5	6	14	9595.64	0.17892	-0.11433	5.21380	188.248	194.222
21	114.474	-1	6	7	13	10166.57	0.19220	-0.18063	7.00000	189.922	196.892

OBS	LGNDINFL	SEATROUT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	8451.66	0.07018	0.01852	-1.03626	182.735	184.727
2	.	-1	1	2	18	8803.21	0.03150	-0.02230	-0.41384	183.550	185.542
3	33.391	-1	1	2	18	8827.46	0.02883	-0.02512	-0.37091	183.605	185.597
4	.	-1	1	2	18	8956.28	0.01466	-0.04008	-0.14283	183.895	185.886
5	56.295	-1	2	3	17	8243.51	0.14346	0.04269	-0.21563	183.093	186.080
6	90.448	-1	2	3	17	8370.44	0.13027	0.02795	-0.00339	183.399	186.386
7	.	-1	2	3	17	8742.33	0.09163	-0.01523	0.61846	184.268	187.255
8	78.228	-1	2	3	17	8745.61	0.09129	-0.01561	0.62394	184.276	187.263
9	123.705	-1	3	4	16	8439.06	0.17472	0.01998	1.28128	184.350	188.333
10	83.902	-1	3	4	16	8480.56	0.17067	0.01516	1.34659	184.448	188.431
11	67.673	-1	3	4	16	8548.90	0.16398	0.00723	1.45414	184.608	188.591
12	65.936	-1	3	4	16	8674.48	0.15170	-0.00735	1.65177	184.900	188.883
13	87.825	-1	4	5	15	8927.25	0.18155	-0.03671	3.17148	186.184	191.162
14	108.778	-1	4	5	15	8936.84	0.18067	-0.03782	3.18563	186.205	191.184
15	131.392	-1	4	5	15	8957.51	0.17877	-0.04022	3.21613	186.251	191.230
16	91.442	-1	4	5	15	8976.96	0.17699	-0.04248	3.24482	186.295	191.273
17	113.321	-1	5	6	14	9442.95	0.19198	-0.09659	5.00352	187.927	193.901
18	115.512	-1	5	6	14	9506.43	0.18655	-0.10397	5.09094	188.061	194.035
19	89.644	-1	5	6	14	9560.21	0.18195	-0.11021	5.16501	188.174	194.148
20	130.045	-1	5	6	14	9595.64	0.17892	-0.11433	5.21380	188.248	194.222
21	114.474	-1	6	7	13	10166.57	0.19220	-0.18063	7.00000	189.922	196.892

Logged Harvest

N = 20 Regression Models for Dependent Variable: LGSTROUT

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.082989	0.032044	-1.7043	-12.1286	0.496054	-10.1372	JA_INFL
1	0.061518	0.009380	-1.3695	-11.6657	0.507669	-9.6743	JF_INFL
1	0.015010	-.039712	-0.6445	-10.6984	0.532827	-8.7069	MA_INFL
1	0.002280	-.053149	-0.4461	-10.4416	0.539713	-8.4501	ND_INFL
2	0.155504	0.056152	-0.8347	-11.7762	0.483699	-8.7890	JF_INFL ND_INFL
2	0.099743	-.006170	0.0346	-10.4974	0.515637	-7.5102	JA_INFL ND_INFL
2	0.093039	-.013662	0.1391	-10.3490	0.519477	-7.3618	JA_INFL SO_INFL
2	0.090844	-.016116	0.1733	-10.3007	0.520735	-7.3135	JF_INFL SO_INFL
3	0.163739	0.006940	1.0369	-9.9722	0.508919	-5.9893	JF_INFL MJ_INFL ND_INFL
3	0.157798	-.000114	1.1295	-9.8306	0.512534	-5.8477	JF_INFL MA_INFL ND_INFL
3	0.155821	-.002463	1.1603	-9.7837	0.513738	-5.8008	JF_INFL JA_INFL ND_INFL
3	0.155556	-.002777	1.1645	-9.7774	0.513899	-5.7945	JF_INFL SO_INFL ND_INFL
4	0.166001	-.056399	3.0016	-8.0264	0.541379	-3.0477	JF_INFL MJ_INFL JA_INFL ND_INFL
4	0.163972	-.058969	3.0333	-7.9778	0.542696	-2.9991	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.163812	-.059171	3.0357	-7.9739	0.542800	-2.9953	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.158917	-.065372	3.1121	-7.8572	0.545977	-2.8785	JF_INFL MA_INFL JA_INFL ND_INFL
5	0.166081	-.131747	5.0004	-6.0283	0.579993	-0.0539	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.166027	-.131820	5.0012	-6.0270	0.580030	-0.0526	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.164041	-.134516	5.0322	-5.9794	0.581412	-0.00502	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.158918	-.141469	5.1120	-5.8572	0.584975	0.1172	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
6	0.166105	-.218770	7.0000	-4.0289	0.624590	2.9413	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL
1	MODEL1	PARMS	LGSTROUT	0.70431	5.38124	.	.	.	-.00057015
2	MODEL1	PARMS	LGSTROUT	0.71251	5.41251	-.00027337	.	.	.
3	MODEL1	PARMS	LGSTROUT	0.72995	5.13644	.	-.00011199	.	.
4	MODEL1	PARMS	LGSTROUT	0.73465	4.86172	.	.	.	.
5	MODEL1	PARMS	LGSTROUT	0.69548	5.39375	-.00060048	.	.	.
6	MODEL1	PARMS	LGSTROUT	0.71808	5.24945	.	.	.	-.00064118
7	MODEL1	PARMS	LGSTROUT	0.72075	5.31800	.	.	.	-.00066765
8	MODEL1	PARMS	LGSTROUT	0.72162	5.42135	-.00044149	.	.	.
9	MODEL1	PARMS	LGSTROUT	0.71339	5.26143	-.00064708	.	.000067375	.
10	MODEL1	PARMS	LGSTROUT	0.71591	5.32477	-.00063373	0.00004839	.	.
11	MODEL1	PARMS	LGSTROUT	0.71676	5.39924	-.00056772	.	.	-.00005708
12	MODEL1	PARMS	LGSTROUT	0.71687	5.39299	-.00059726	.	.	.
13	MODEL1	PARMS	LGSTROUT	0.73578	5.25475	-.00056290	.	.000078620	-.00016021
14	MODEL1	PARMS	LGSTROUT	0.73668	5.27123	-.00063985	-.00002039	.000077188	.
15	MODEL1	PARMS	LGSTROUT	0.73675	5.26034	-.00064332	.	.000067469	.
16	MODEL1	PARMS	LGSTROUT	0.73890	5.32067	-.00057643	0.00005884	.	-.00011235
17	MODEL1	PARMS	LGSTROUT	0.76157	5.26071	-.00056078	-.00001205	.000084132	-.00015612
18	MODEL1	PARMS	LGSTROUT	0.76160	5.25523	-.00056257	.	.000078918	-.00016529
19	MODEL1	PARMS	LGSTROUT	0.76250	5.27008	-.00063627	-.00002021	.000077191	.

OBS	SOIL_INFL	NDIL_INFL	LGSTROUT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	.	-1	1	2	18	0.49605	0.08299	0.03204	-1.70427	-12.1286	-10.1372
2	.	.	-1	1	2	18	0.50767	0.06152	0.00938	-1.36954	-11.6657	-9.6743
3	.	.	-1	1	2	18	0.53283	0.01501	-0.03971	-0.64451	-10.6984	-8.7069
4	.	.00004765	-1	1	2	18	0.53971	0.00228	-0.05315	-0.44606	-10.4416	-8.4501
5	.	.00042577	-1	2	3	17	0.48370	0.15550	0.05615	-0.83474	-11.7762	-8.7890
6	.	.00013403	-1	2	3	17	0.51564	0.09974	-0.00617	0.03455	-10.4974	-7.5102
7	0.00013548	.	-1	2	3	17	0.51948	0.09304	-0.01366	0.13906	-10.3490	-7.3618
8	0.00027816	.	-1	2	3	17	0.52073	0.09084	-0.01612	0.17328	-10.3007	-7.3135
9	.	.00046171	-1	3	4	16	0.50892	0.16374	0.00694	1.03688	-9.9722	-5.9893
10	.	.00045287	-1	3	4	16	0.51253	0.15780	-0.00011	1.12949	-9.8306	-5.8477
11	.	.00041283	-1	3	4	16	0.51374	0.15582	-0.00246	1.16033	-9.7837	-5.8008
12	-.00001432	.00043285	-1	3	4	16	0.51390	0.15556	-0.00278	1.16445	-9.7774	-5.7945
13	.	.00043139	-1	4	5	15	0.54138	0.16600	-0.05640	3.00162	-8.0264	-3.0477
14	.	.00045553	-1	4	5	15	0.54270	0.16397	-0.05897	3.03326	-7.9778	-2.9991
15	-.00001700	.00047016	-1	4	5	15	0.54280	0.16381	-0.05917	3.03575	-7.9739	-2.9953
16	.	.00043326	-1	4	5	15	0.54598	0.15892	-0.06537	3.11206	-7.8572	-2.8785
17	.	.00042851	-1	5	6	14	0.57999	0.16608	-0.13175	5.00038	-6.0283	-0.0539
18	0.00001061	.00042515	-1	5	6	14	0.58003	0.16603	-0.13182	5.00121	-6.0270	-0.0526
19	-.00001651	.00046379	-1	5	6	14	0.58141	0.16404	-0.13452	5.03218	-5.9794	-0.0050

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL
20	MODEL1	PARMS	LGSTROUT	0.76484	5.32079	-.00057637	0.00005892	.	-.00011348
21	MODEL1	PARMS	LGSTROUT	0.79031	5.26109	-.00056049	-.00001190	.000084349	-.00016105

OBS	SOIL_INFL	NDIL_INFL	LGSTROUT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
20	0.00000238	.00043187	-1	5	6	14	0.58497	0.15892	-0.14147	5.11204	-5.8572	0.1172
21	0.00001020	.00042255	-1	6	7	13	0.62459	0.16611	-0.21877	7.00000	-4.0289	2.9413

Logged Harvest and Inflows

N = 20 Regression Models for Dependent Variable: LGSTROUT

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.074724	0.023319	-0.7091	-11.9492	0.500525	-9.9577	LGJAINFL
1	0.038664	-.014743	-0.1132	-11.1845	0.520031	-9.1931	LGJFINFL
1	0.011346	-.043579	0.3382	-10.6241	0.534809	-8.6327	LGNDINFL
1	0.010434	-.044542	0.3533	-10.6057	0.535302	-8.6142	LGSOINFL
2	0.143139	0.042332	0.1603	-11.4855	0.490782	-8.4983	LGJFINFL LGNDINFL
2	0.117442	0.013612	0.5849	-10.8945	0.505500	-7.9073	LGJAINFL LGNDINFL
2	0.086262	-.021237	1.1002	-10.2001	0.523359	-7.2129	LGMJINFL LGJAINFL
2	0.079382	-.028926	1.2139	-10.0501	0.527300	-7.0629	LGMAINFL LGJAINFL
3	0.179425	0.025568	1.5606	-10.3509	0.499373	-6.3680	LGJFINFL LGSOINFL LGNDINFL
3	0.172928	0.017852	1.6680	-10.1932	0.503327	-6.2102	LGJFINFL LGMJINFL LGNDINFL
3	0.162716	0.005725	1.8367	-9.9477	0.509542	-5.9648	LGJFINFL LGMAINFL LGNDINFL
3	0.155050	-.003378	1.9634	-9.7655	0.514207	-5.7825	LGMJINFL LGJAINFL LGNDINFL
4	0.202707	-.009904	3.1759	-8.9266	0.517551	-3.9479	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.202383	-.010315	3.1812	-8.9184	0.517762	-3.9398	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.187423	-.029264	3.4284	-8.5468	0.527473	-3.5681	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.179480	-.039325	3.5597	-8.3523	0.532629	-3.3736	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
5	0.207185	-.075963	5.1019	-7.0392	0.551405	-1.0648	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.206888	-.076366	5.1068	-7.0317	0.551611	-1.0573	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.206325	-.077131	5.1161	-7.0175	0.552003	-1.0431	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.192206	-.096292	5.3494	-6.6649	0.561823	-0.6905	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
6	0.213348	-.149722	7.0000	-5.1953	0.589204	1.7748	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL	LGMJINFL	LGJAINFL	LGSOINFL
1	MODEL1	PARMS	LGSTROUT	0.70748	7.52378	.	.	.	-0.39501	.
2	MODEL1	PARMS	LGSTROUT	0.72113	7.67360	-0.37033	.	.	.	.
3	MODEL1	PARMS	LGSTROUT	0.73131	3.77558	.	.	.	.	.
4	MODEL1	PARMS	LGSTROUT	0.73164	5.78652	.	.	.	.	-0.12635
5	MODEL1	PARMS	LGSTROUT	0.70056	7.05116	-0.92492	.	.	.	.
6	MODEL1	PARMS	LGSTROUT	0.71099	5.83278	.	.	.	-0.49775	.
7	MODEL1	PARMS	LGSTROUT	0.72344	6.69647	.	.	0.19419	-0.49676	.
8	MODEL1	PARMS	LGSTROUT	0.72615	7.02713	.	0.12212	.	-0.45748	.
9	MODEL1	PARMS	LGSTROUT	0.70666	7.11575	-0.86220	.	.	.	-0.32161
10	MODEL1	PARMS	LGSTROUT	0.70946	5.41547	-1.20467	.	0.31096	.	.
11	MODEL1	PARMS	LGSTROUT	0.71382	5.60542	-1.14254	0.25234	.	.	.
12	MODEL1	PARMS	LGSTROUT	0.71708	3.62794	.	.	0.37530	-0.73122	.
13	MODEL1	PARMS	LGSTROUT	0.71941	5.53919	-1.09674	0.27576	.	.	-0.33833
14	MODEL1	PARMS	LGSTROUT	0.71956	5.66405	-1.11528	.	0.27484	.	-0.29172
15	MODEL1	PARMS	LGSTROUT	0.72627	4.71147	-0.80615	.	0.39728	-0.34753	.
16	MODEL1	PARMS	LGSTROUT	0.72981	7.13146	-0.88994	.	.	0.02079	-0.32539
17	MODEL1	PARMS	LGSTROUT	0.74257	5.04046	-0.86845	0.33536	.	-0.20904	-0.30385
18	MODEL1	PARMS	LGSTROUT	0.74271	5.31623	-1.15162	0.16625	0.16074	.	-0.31421
19	MODEL1	PARMS	LGSTROUT	0.74297	5.23537	-0.90512	.	0.32820	-0.19428	-0.25051
20	MODEL1	PARMS	LGSTROUT	0.74955	4.20703	-0.78487	0.17507	0.29452	-0.40578	.
21	MODEL1	PARMS	LGSTROUT	0.76760	4.65396	-0.88546	0.21329	0.19864	-0.25555	-0.26637

OBS	LGNDINFL	LGSTROUT	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	0.50053	0.07472	0.02332	-0.70913	-11.9492	-9.95770
2	.	-1	1	2	18	0.52003	0.03866	-0.01474	-0.11322	-11.1845	-9.19307
3	0.16159	-1	1	2	18	0.53481	0.01135	-0.04358	0.33824	-10.6241	-8.63266
4	.	-1	1	2	18	0.53530	0.01043	-0.04454	0.35331	-10.6057	-8.61422
5	0.66330	-1	2	3	17	0.49078	0.14314	0.04233	0.16026	-11.4855	-8.49830
6	0.33157	-1	2	3	17	0.50550	0.11744	0.01361	0.58492	-10.8945	-7.90733
7	.	-1	2	3	17	0.52336	0.08626	-0.02124	1.10019	-10.2001	-7.21294
8	.	-1	2	3	17	0.52730	0.07938	-0.02893	1.21390	-10.0501	-7.06290
9	0.89511	-1	3	4	16	0.49937	0.17943	0.02557	1.56060	-10.3509	-6.36799
10	0.84744	-1	3	4	16	0.50333	0.17293	0.01785	1.66798	-10.1932	-6.21024
11	0.82927	-1	3	4	16	0.50954	0.16272	0.00573	1.83673	-9.9477	-5.96482
12	0.45040	-1	3	4	16	0.51421	0.15505	-0.00338	1.96342	-9.7655	-5.78253
13	1.08854	-1	4	5	15	0.51755	0.20271	-0.00990	3.17585	-8.9266	-3.94791
14	1.03632	-1	4	5	15	0.51776	0.20238	-0.01032	3.18122	-8.9184	-3.93977
15	0.75894	-1	4	5	15	0.52747	0.18742	-0.02926	3.42844	-8.5468	-3.56813
16	0.90619	-1	4	5	15	0.53263	0.17948	-0.03932	3.55969	-8.3523	-3.37360
17	1.01891	-1	5	6	14	0.55140	0.20719	-0.07596	5.10185	-7.0392	-1.06482
18	1.09431	-1	5	6	14	0.55161	0.20689	-0.07637	5.10676	-7.0317	-1.05733
19	0.96017	-1	5	6	14	0.55200	0.20632	-0.07713	5.11607	-7.0175	-1.04313
20	0.78984	-1	5	6	14	0.56182	0.19221	-0.09629	5.34940	-6.6649	-0.69047
21	1.01055	-1	6	7	13	0.58920	0.21335	-0.14972	7.00000	-5.1953	1.77483

Regression—Logged Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.438*	*.192*	*-.181*	*100.8294*	*1.709*

a. Dependent Variable: Seatrout Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*31446.484*	*6*	*5241.081*	*.516*	*.787*[b]
	Residual	*132165.405*	*13*	*10166.570*		
	Total	*163611.889*	*19*			

a. Dependent Variable: Seatrout Harvest

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*116.856*	*634.627*		*.184*	*.857*	*-1254.172*	*1487.883*
	Ln(January-February Inflows)	*-59.644*	*146.830*	*-.244*	*-.406*	*.691*	*-376.850*	*257.562*
	Ln(March-April Inflows)	*4.882*	*82.236*	*.025*	*.059*	*.954*	*-172.778*	*182.542*
	Ln(May-June Inflows)	*24.656*	*81.760*	*.126*	*.302*	*.768*	*-151.976*	*201.288*
	Ln(July-August Inflows)	*-47.505*	*102.738*	*-.254*	*-.462*	*.651*	*-269.458*	*174.448*
	Ln(September-October Inflows)	*-35.097*	*59.194*	*-.219*	*-.593*	*.563*	*-162.978*	*92.784*
	Ln(November-December Inflows)	*114.474*	*93.614*	*.582*	*1.223*	*.243*	*-87.766*	*316.715*

a. Dependent Variable: Seatrout Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.172*	*5.821*
	Ln(March-April Inflows)	*.353*	*2.835*
	Ln(May-June Inflows)	*.357*	*2.801*
	Ln(July-August Inflows)	*.207*	*4.841*
	Ln(September-October Inflows)	*.456*	*2.193*
	Ln(November-December Inflows)	*.274*	*3.647*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	*6.984*	*1.000*	*.00*	*.00*	*.00*
	2	*9.020E-03*	*27.826*	*.00*	*.00*	*.03*
	3	*2.966E-03*	*48.524*	*.14*	*.00*	*.00*
	4	*2.173E-03*	*56.697*	*.00*	*.03*	*.09*
	5	*9.164E-04*	*87.299*	*.53*	*.01*	*.00*
	6	*7.542E-04*	*96.232*	*.16*	*.00*	*.87*
	7	*2.920E-04*	*154.662*	*.17*	*.96*	*.01*

a. Dependent Variable: Seatrout Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	*.00*	*.00*	*.00*	*.00*
	2	*.03*	*.00*	*.12*	*.02*
	3	*.00*	*.19*	*.04*	*.03*
	4	*.00*	*.04*	*.63*	*.09*
	5	*.52*	*.08*	*.01*	*.19*
	6	*.45*	*.01*	*.10*	*.19*
	7	*.00*	*.67*	*.10*	*.47*

a. Dependent Variable: Seatrout Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*58.8819*	*229.7141*	*167.4050*	*40.6827*	*20*
Std. Predicted Value	*-2.668*	*1.532*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*38.0616*	*76.8184*	*58.8688*	*9.8814*	*20*
Adjusted Predicted Value	*33.2190*	*308.7792*	*170.0063*	*57.7205*	*20*
Residual	*-134.1600*	*168.3340*	*7.141E-14*	*83.4031*	*20*
Std. Residual	*-1.331*	*1.669*	*.000*	*.827*	*20*
Stud. Residual	*-1.620*	*1.917*	*-.011*	*.984*	*20*
Deleted Residual	*-198.9370*	*222.0210*	*-2.6013*	*119.2813*	*20*
Stud. Deleted Residual	*-1.743*	*2.175*	*.003*	*1.038*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.001*	*.193*	*.059*	*.063*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Seatrout Harvest

Case Values for Residuals Diagnostics

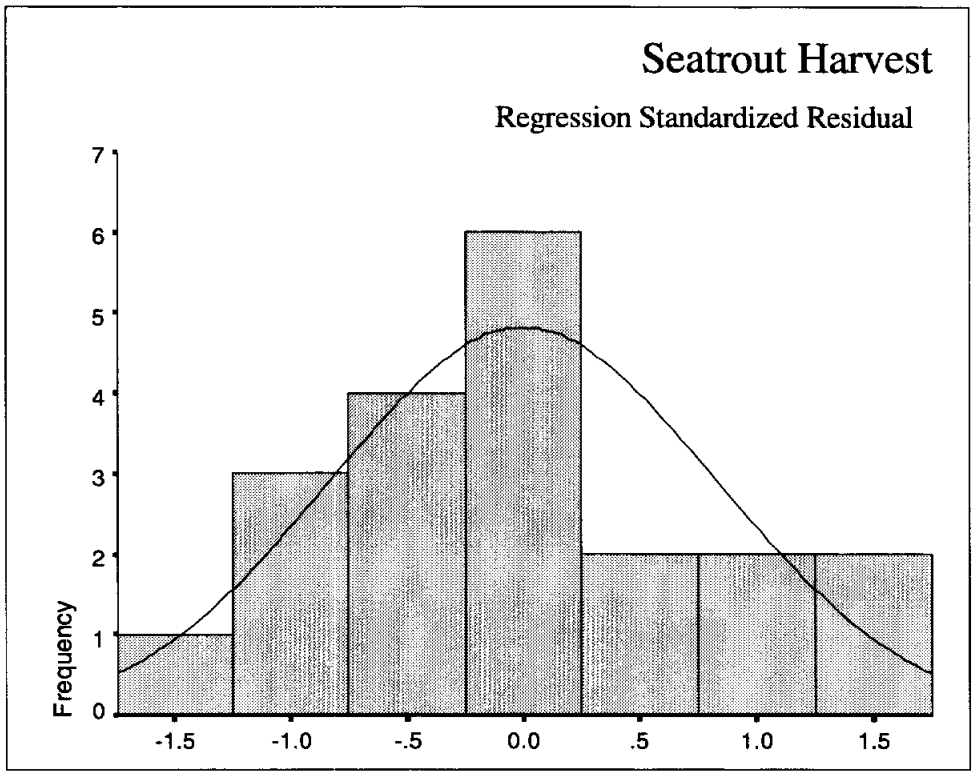
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	151.16003	-134.16003	-198.93698	215.93698	-.39931	-1.33056	-1.62025	-1.74254
1963	176.74720	-33.84720	-46.62496	189.52496	.22964	-.33569	-.39399	-.38081
1964	190.18106	-13.28106	-22.73931	199.63931	.55985	-.13172	-.17235	-.16578
1965	219.98205	57.01795	118.68368	158.31632	1.29237	.56549	.81586	.80472
1966	197.40096	-35.70096	-51.57221	213.27221	.73732	-.35407	-.42556	-.41174
1967	191.88331	88.51669	130.91061	149.48939	.60169	.87789	1.06761	1.07388
1968	161.33742	12.86258	18.23383	155.96617	-.14914	.12757	.15189	.14606
1969	154.47079	-98.77079	-127.11500	182.81500	-.31793	-.97958	-1.11128	-1.12233
1970	171.42418	-82.22418	-119.18225	208.38225	.09879	-.81548	-.98179	-.98032
1971	147.64685	-71.74685	-120.37705	196.27705	-.48567	-.71157	-.92169	-.91597
1972	189.06561	-60.66561	-79.57496	207.97496	.53243	-.60167	-.68908	-.67448
1973	168.01836	155.78164	181.66845	142.13155	.01508	1.54500	1.66844	1.80823
1974	164.88541	108.01459	154.68040	118.21960	-.06193	1.07126	1.28195	1.31777
1975	190.42491	30.57509	50.97169	170.02831	.56584	.30324	.39153	.37840
1976	190.88381	-9.38381	-13.18919	194.68919	.57712	-.09307	-.11033	-.10606
1977	229.71406	-94.81406	-173.87921	308.77921	1.53159	-.94034	-1.27342	-1.30775
1978	175.86601	168.33399	222.02098	122.17902	.20798	1.66949	1.91732	2.17515
1979	137.40651	-15.30651	-36.48210	158.58210	-.73738	-.15181	-.23436	-.22565
1980	80.71953	9.88047	15.89730	74.70270	-2.13077	.09799	.12430	.11949
1981	58.88193	18.91807	44.58101	33.21899	-2.66755	.18762	.28802	.27761

PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

[1]Values greater than 3 are flagged.

[2]This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

Graphics


Seatrout Harvest
Regression Standardized Residual
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6
5
4
3
2
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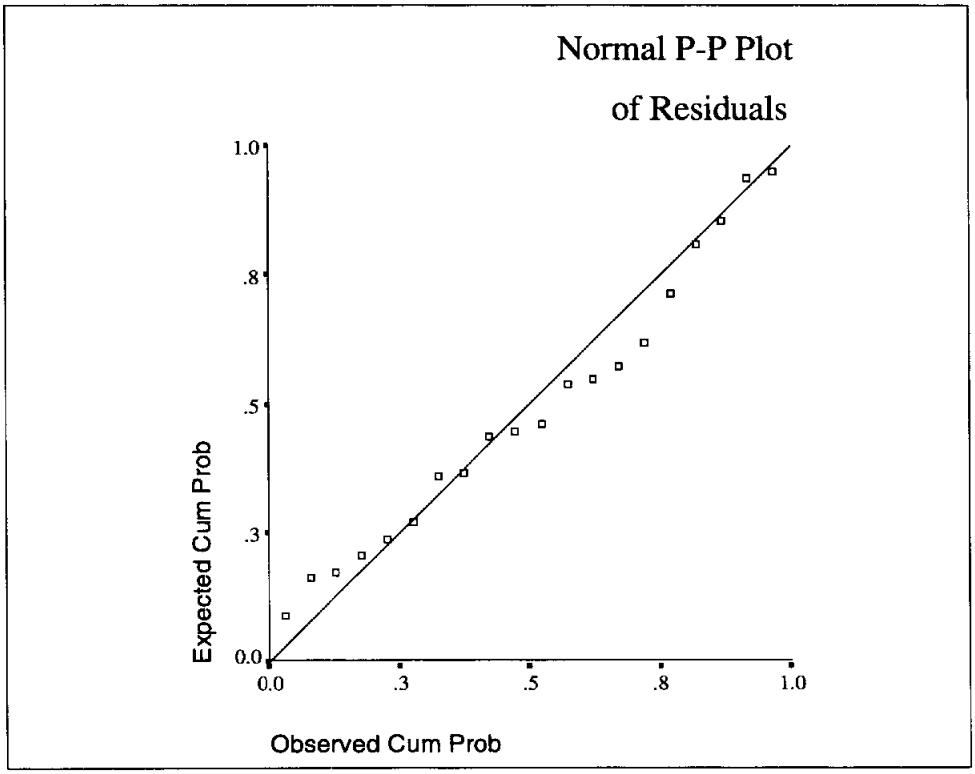
-1.0
-.5
0.0
.5
1.0
1.5


Normal P-P Plot
of Residuals
Expected Cum Prob
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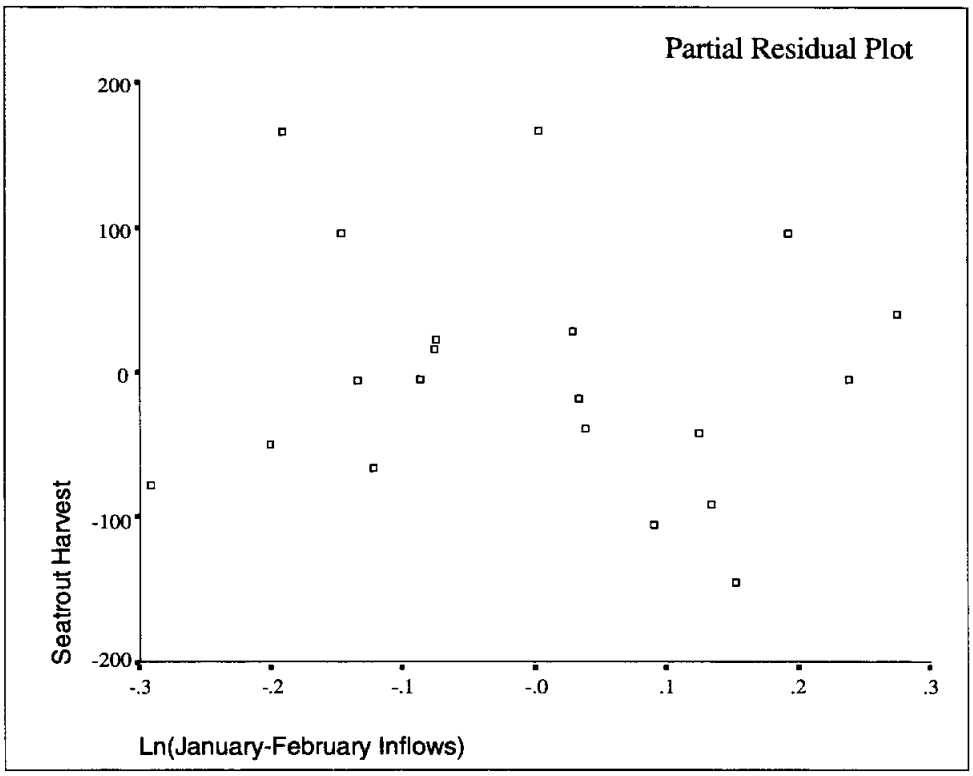
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob


Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
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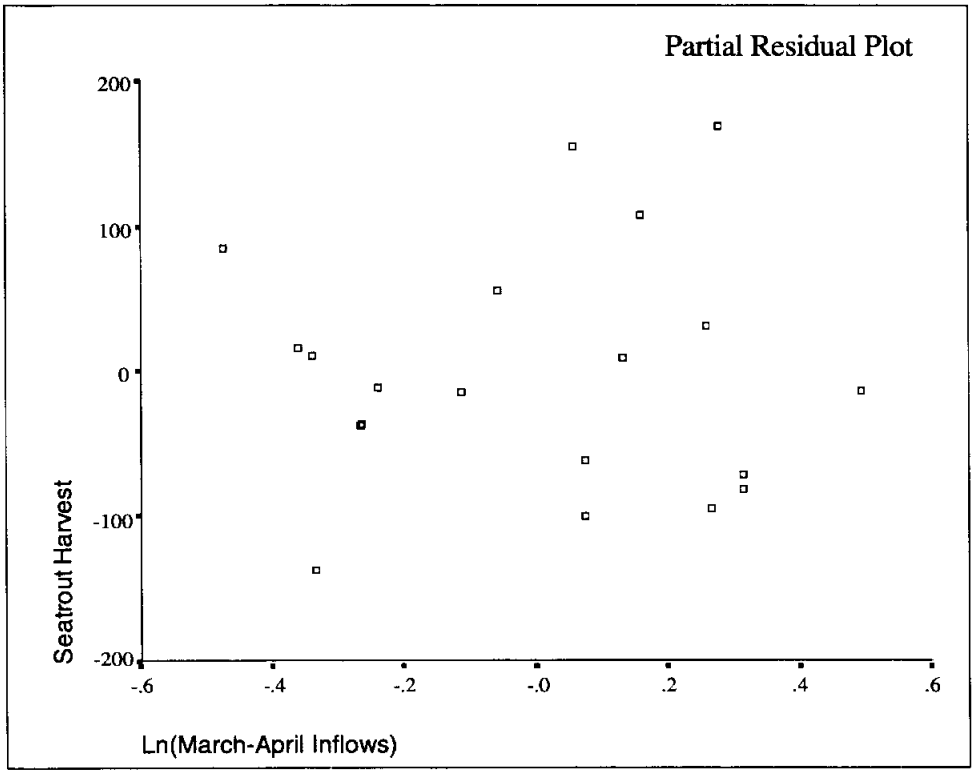
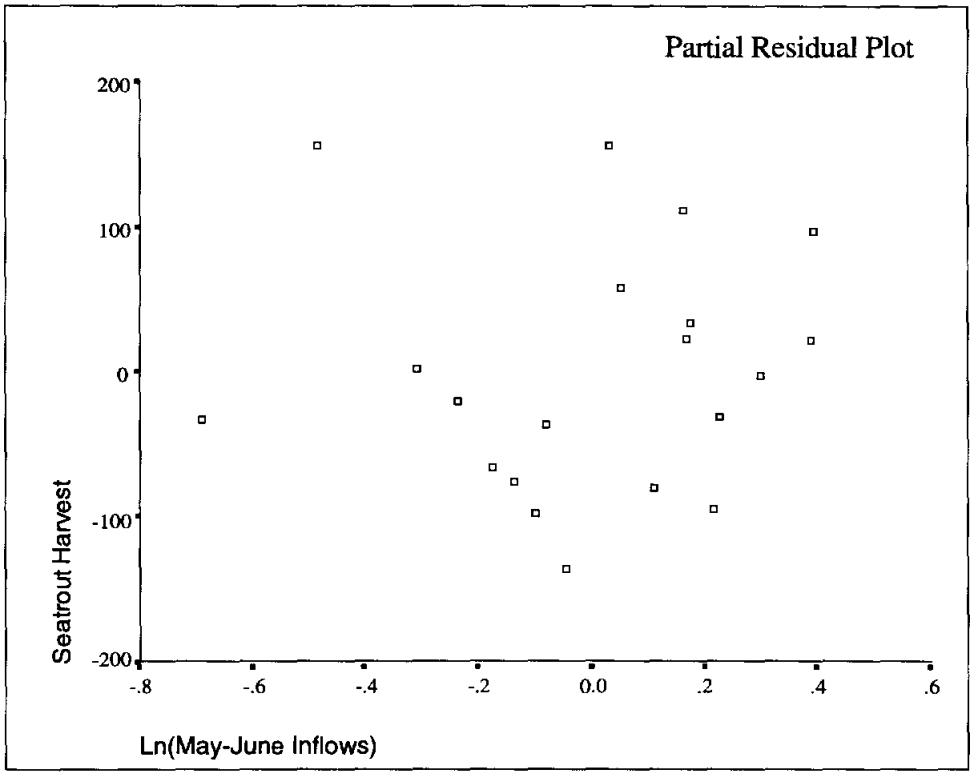
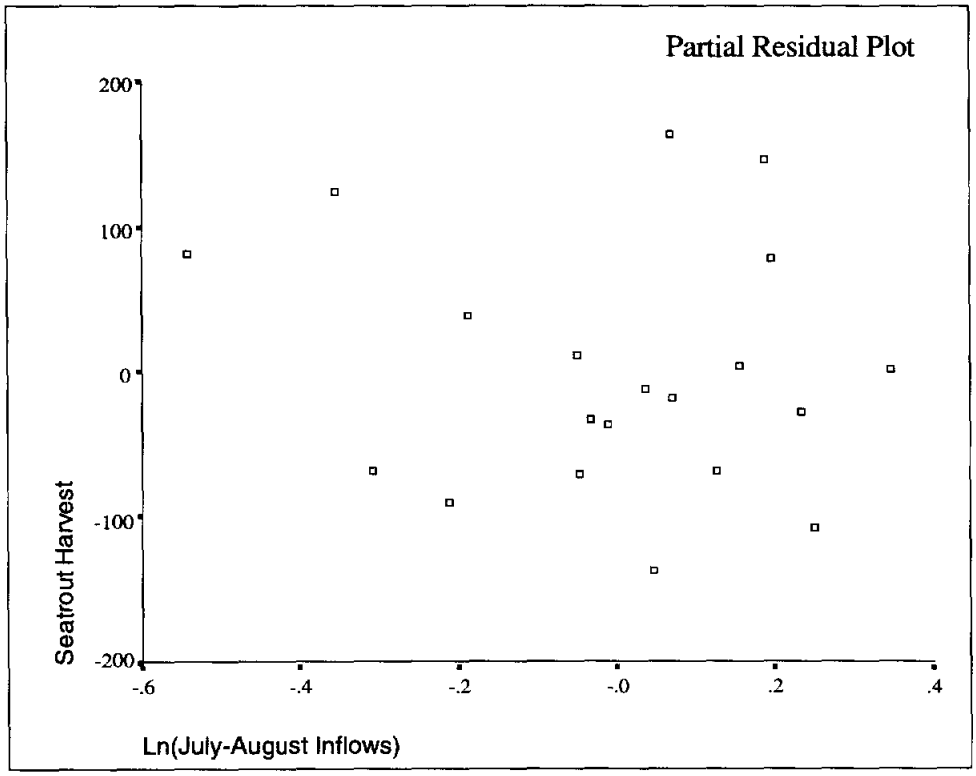
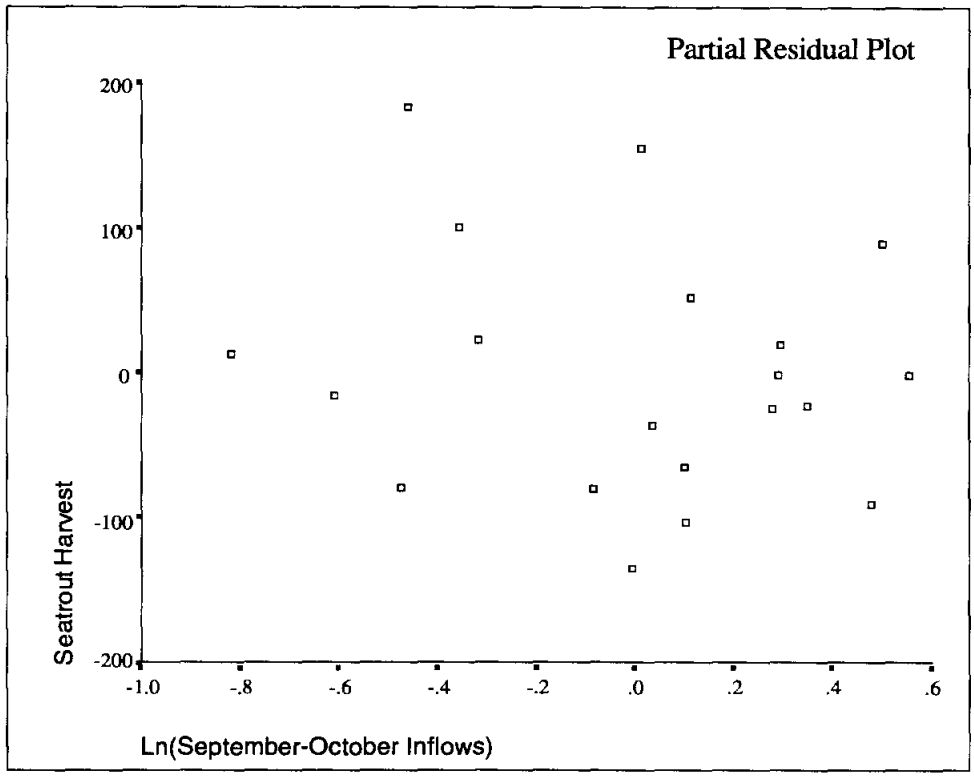
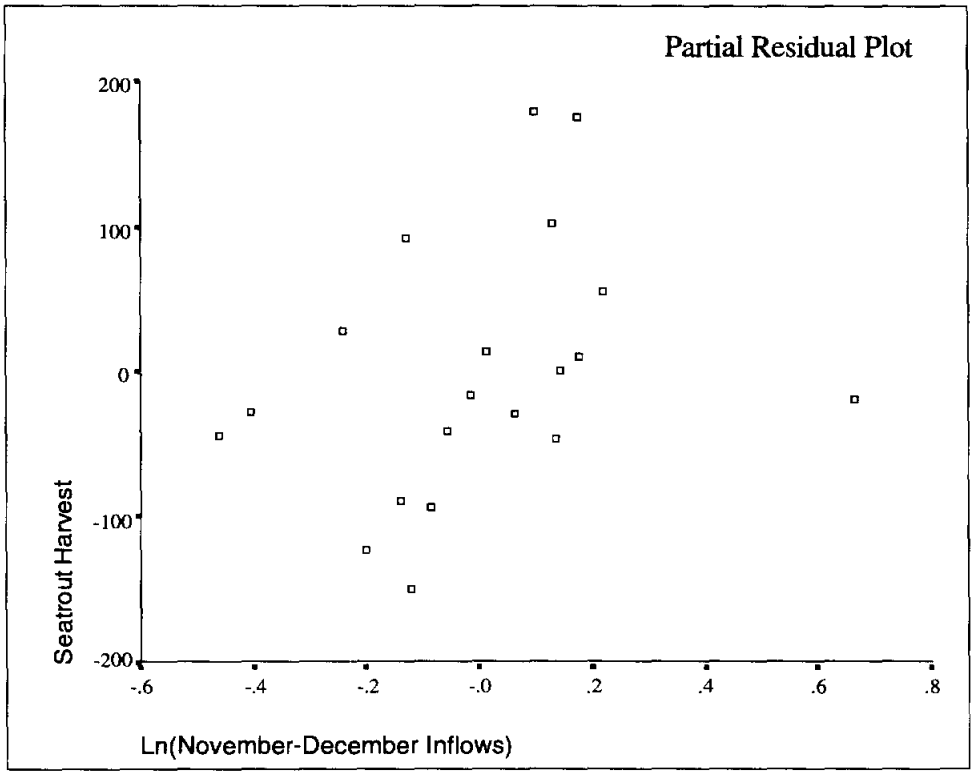
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

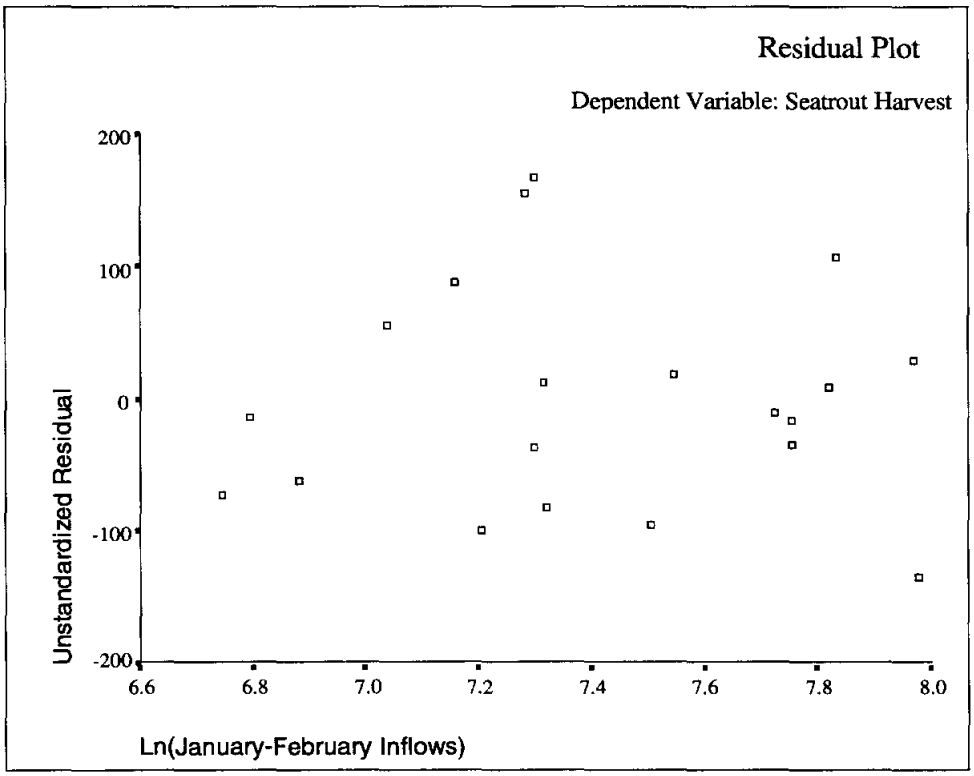

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

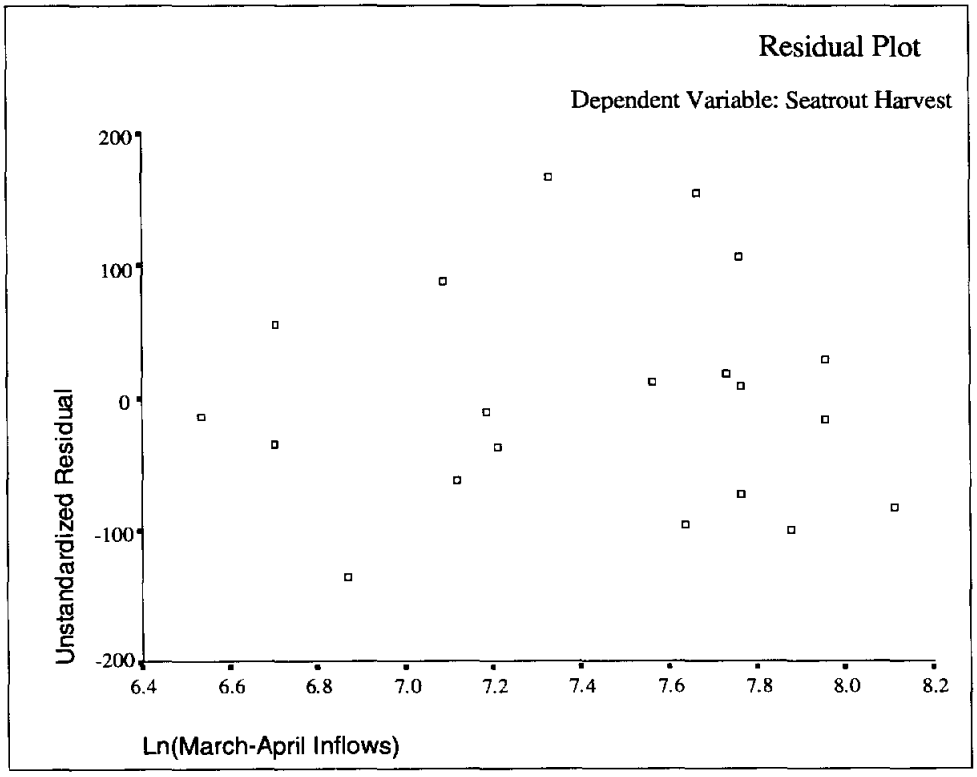

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(May-June Inflows)

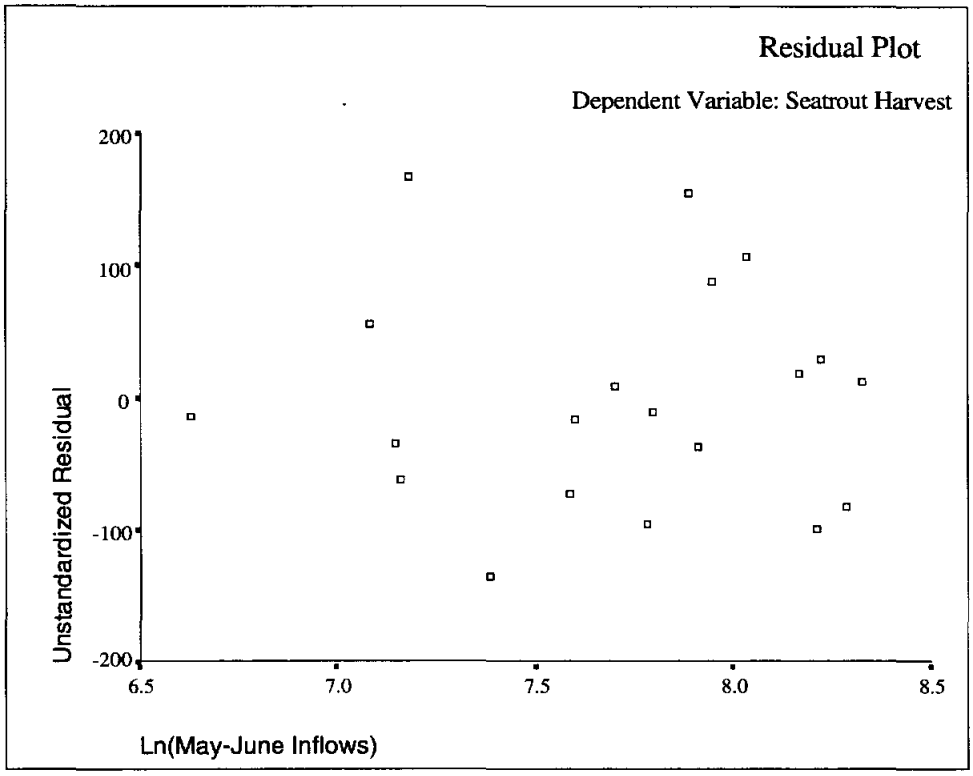

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.6
-.4
-.2
-.0
.2
.4
Ln(July-August Inflows)

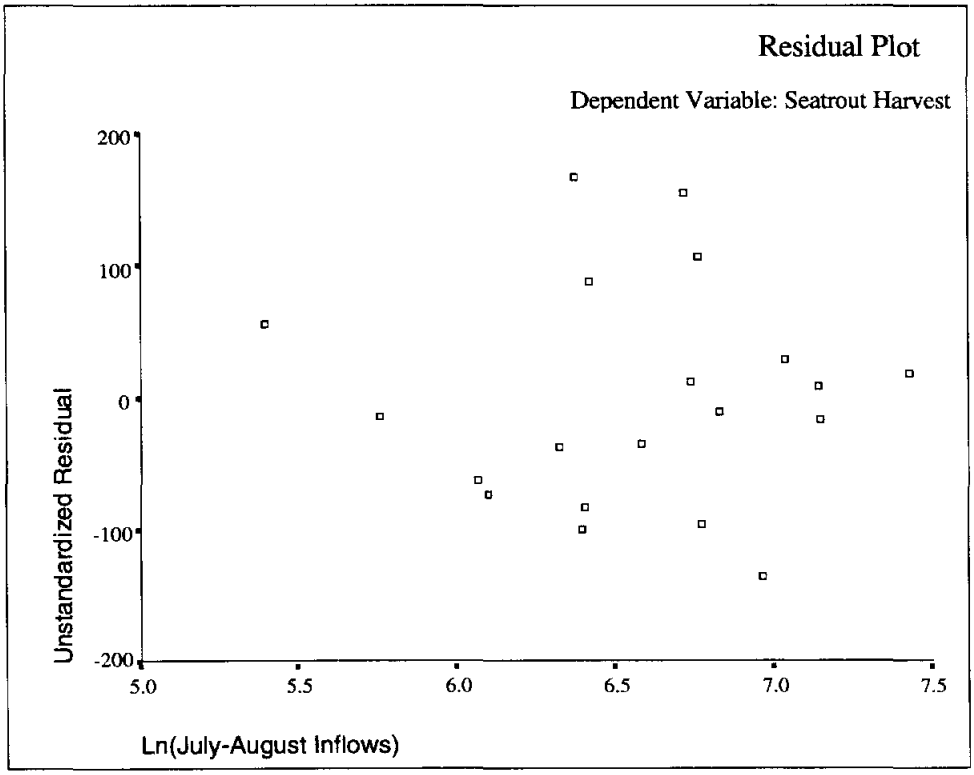

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

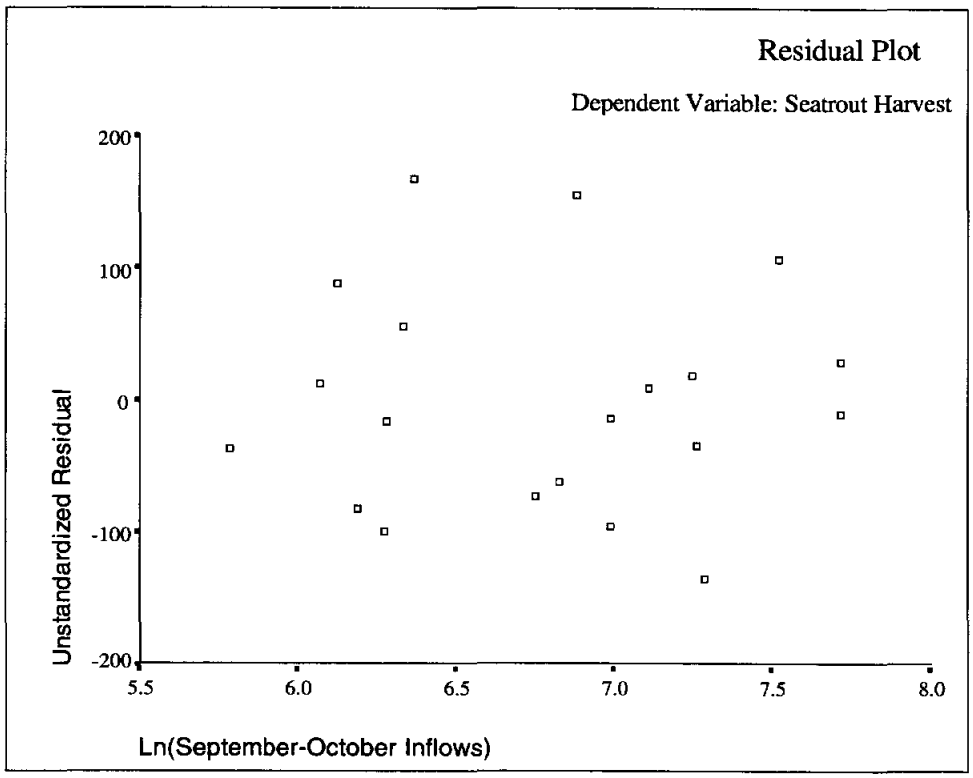

Partial Residual Plot
200
100
0
-100
-200
Seatrout Harvest
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
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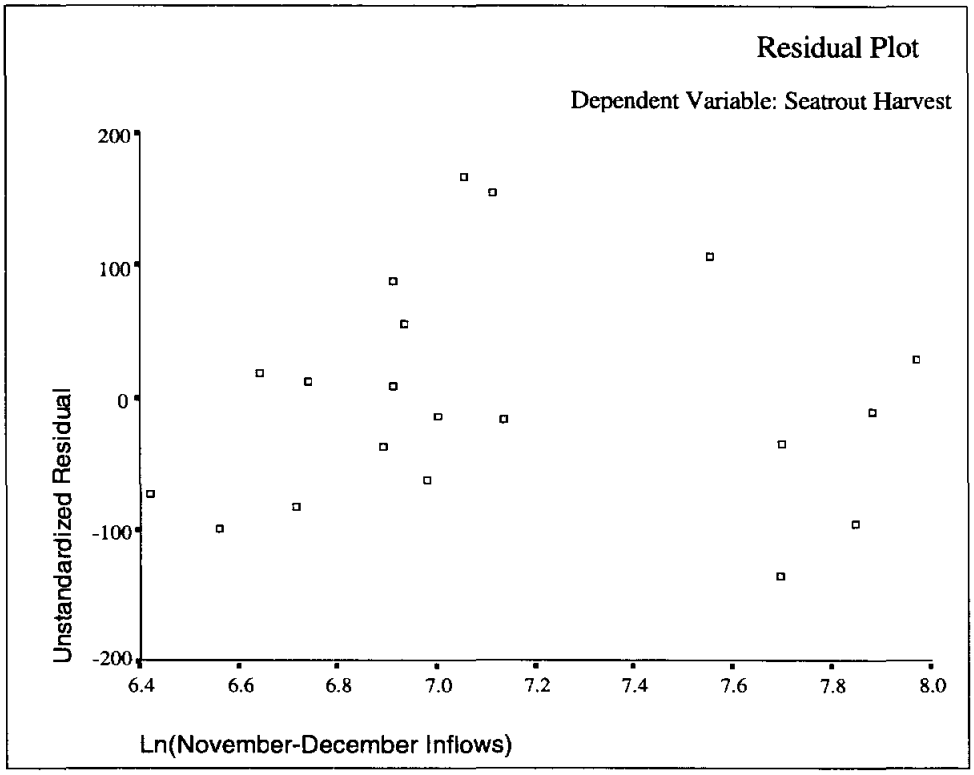
100
0
-100
-200
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Seatrout Harvest
Unstandardized Residual
200
100
0
-100
-200
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for Seatrout Harvest

YEAR	SEATROUT	LICI_1	UICI_1
1962	17.00	-198.53602	500.85609
1963	142.90	-166.08047	519.57488
1964	176.90	-171.23280	551.59492
1965	277.00	-154.42483	594.38894
1966	161.70	-149.93043	544.73234
1967	280.40	-157.57831	541.34493
1968	174.20	-184.24033	506.91518
1969	55.70	-181.41512	490.35670
1970	89.20	-176.21900	519.06735
1971	75.90	-212.23734	507.53105
1972	128.40	-148.82590	526.95711
1973	323.80	-156.62690	492.66363
1974	272.90	-181.64077	511.41159
1975	221.00	-168.96848	549.81829
1976	181.50	-153.88497	535.65259
1977	134.90	-136.61437	596.04249
1978	344.20	-162.59575	514.32777
1979	122.10	-244.42402	519.23704
1980	90.60	-275.88135	437.32042
1981	77.80	-322.36948	440.13334

SEATROUT	Seatrout harvest
LICI_1	Lower limit for 99% prediction interval for seatrout harvest
UICI_1	Upper limit for 99% prediction interval for seatrout harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.18108	.27562	.6311	.0153
1963	4.25703	.00837	.22405	.7497	.0000
1964	6.95291	.00302	.36594	.4338	.0000
1965	8.92203	.10284	.46958	.2583	.0029
1966	4.89722	.01150	.25775	.6725	.0000
1967	5.20293	.07798	.27384	.6352	.0012
1968	4.64695	.00138	.24458	.7030	.0000
1969	3.28664	.05063	.17298	.8573	.0003
1970	4.94185	.06189	.26010	.6671	.0006
1971	6.72566	.08226	.35398	.4580	.0014
1972	3.56496	.02114	.18763	.8283	.0000
1973	1.75740	.06608	.09249	.9720	.0007
1974	4.78215	.10143	.25169	.6865	.0027
1975	6.65295	.01461	.35016	.4659	.0000
1976	4.53192	.00071	.23852	.7169	.0000
1977	7.68955	.19318	.40471	.3608	.0184
1978	3.64440	.16749	.19181	.8197	.0123
1979	10.07832	.01086	*.53044	.1842	.0000
1980	6.24115	.00134	.32848	.5119	.0000
1981	9.98730	.01608	*.52565	.1893	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	*-1.21083	.02213	-.47139	.57473
1963	-.23398	-.01746	-.08128	.09523
1964	-.13990	-.09748	.04227	.01968
1965	.83688	.11493	.46612	-.05204
1966	-.27453	-.05236	-.02790	.10633
1967	.74318	.27969	-.27631	-.50256
1968	.09438	.01417	-.01905	-.04792
1969	-.60123	.08727	-.16882	-.07815
1970	-.65724	.25933	-.23049	-.30299
1971	-.75410	-.20834	.20852	-.30498
1972	-.37656	-.21670	.22561	-.04672
1973	.73712	.05049	-.54016	.09347
1974	.86616	-.64774	.44290	.20603
1975	.30907	-.26138	.02079	.10312
1976	-.06754	.02235	.01580	.02447
1977	*-1.19421	.25721	.74896	-.38444
1978	*1.22839	.41077	.01475	.56977
1979	-.26540	.00182	-.01735	-.14042
1980	.09325	-.00803	.05265	.01655
1981	.32333	.06358	-.04573	-.12503

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

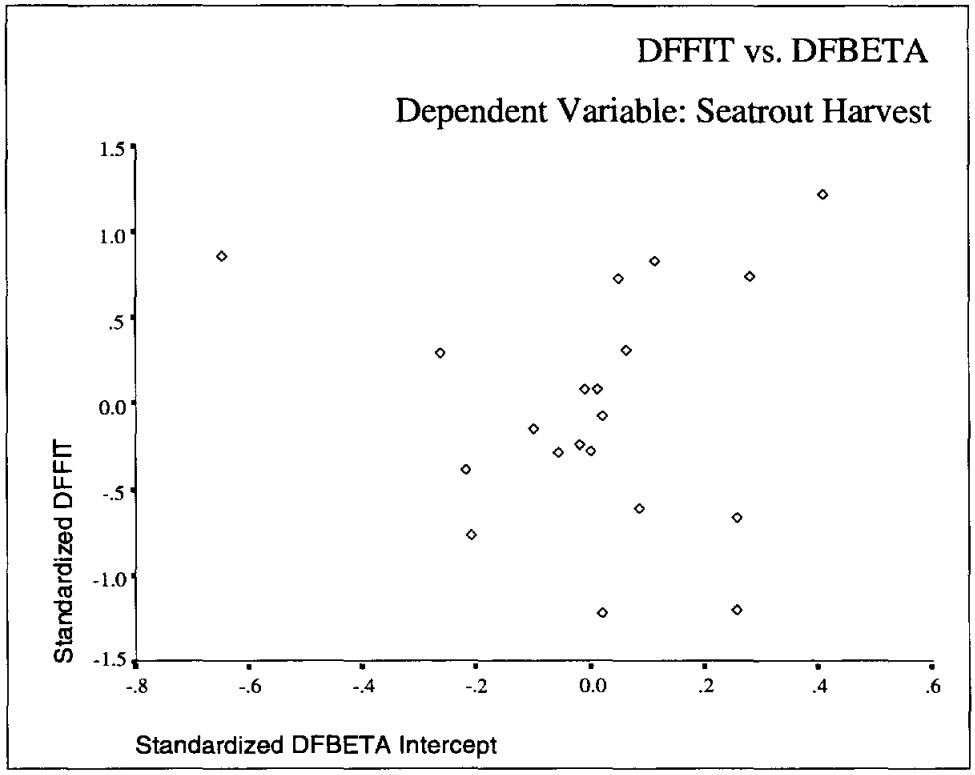
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

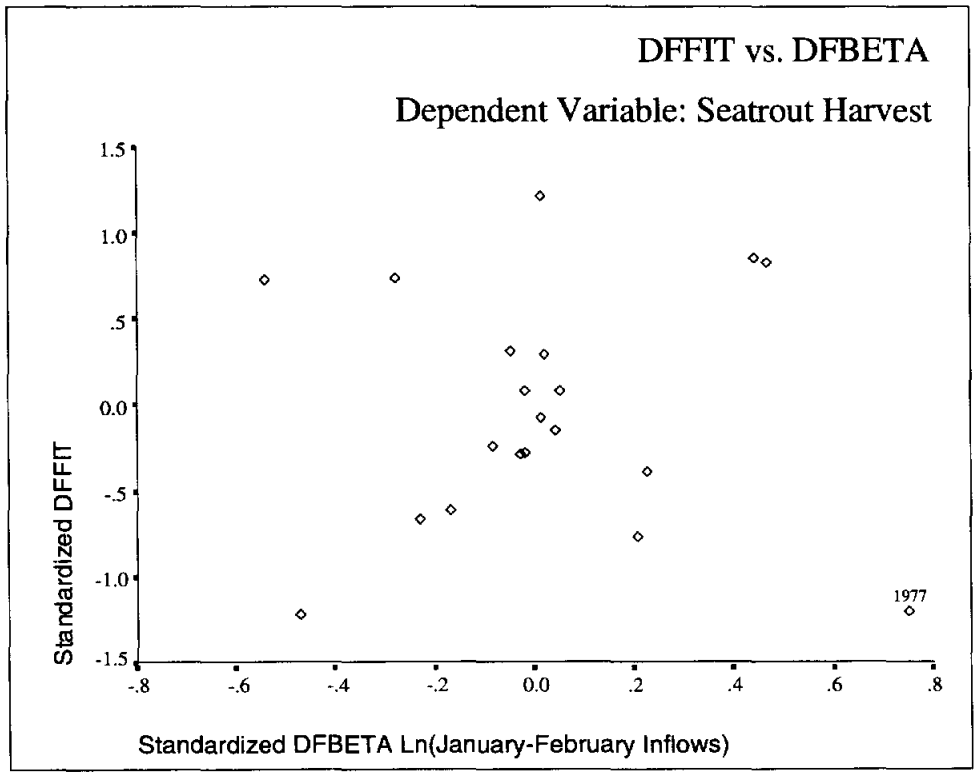
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.07333	-.10053	.00825	.23288
1963	.02816	.01466	-.00914	.02270
1964	.04133	-.01605	-.03541	.00268
1965	.05055	-.64015	.07640	-.25905
1966	-.09096	.00413	.17598	-.03006
1967	.41712	.26130	-.27148	.15994
1968	.05500	.02762	-.03223	.00234
1969	-.22279	.27274	-.07811	.23545
1970	-.10793	.36767	.05775	.09280
1971	.12774	.05534	-.33443	.15301
1972	.10867	-.10059	-.04494	-.09858
1973	.05326	.37679	.01424	.32183
1974	.20760	-.56568	.46534	-.18682
1975	.07058	-.09330	.08480	.10054
1976	-.03076	-.00488	-.02579	-.02086
1977	.14152	-.45403	.49070	*-1.09628
1978	-.97745	.17902	-.67398	.22970
1979	.19456	-.08359	.16743	-.04738
1980	-.03760	-.00747	.02591	-.06474
1981	.05827	.15071	.13905	-.15922

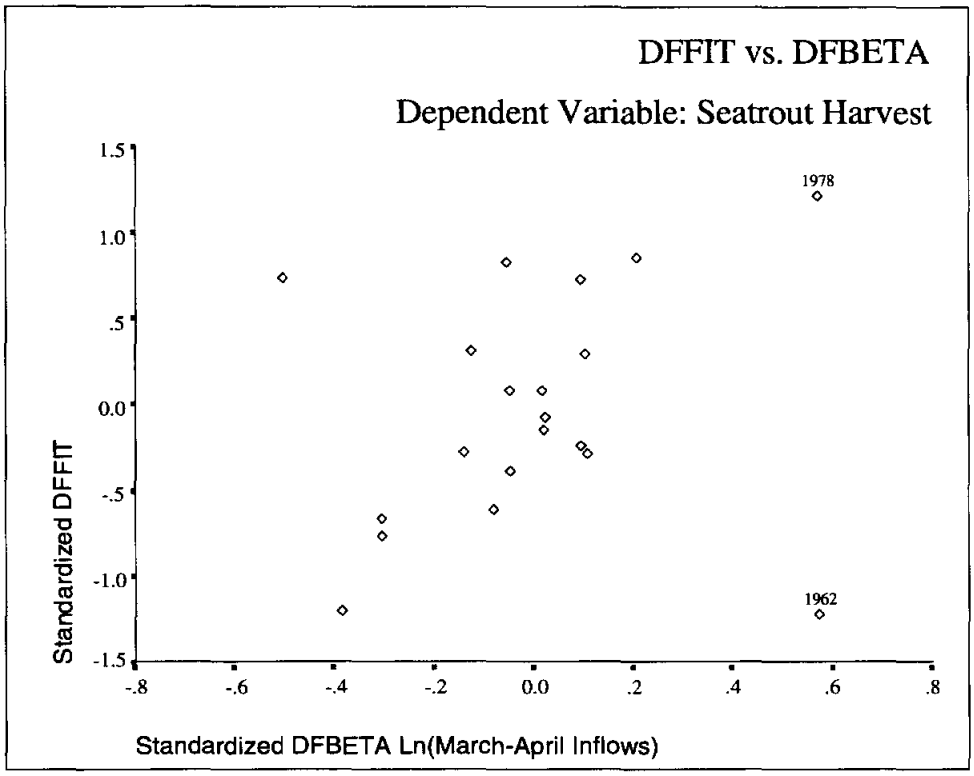
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

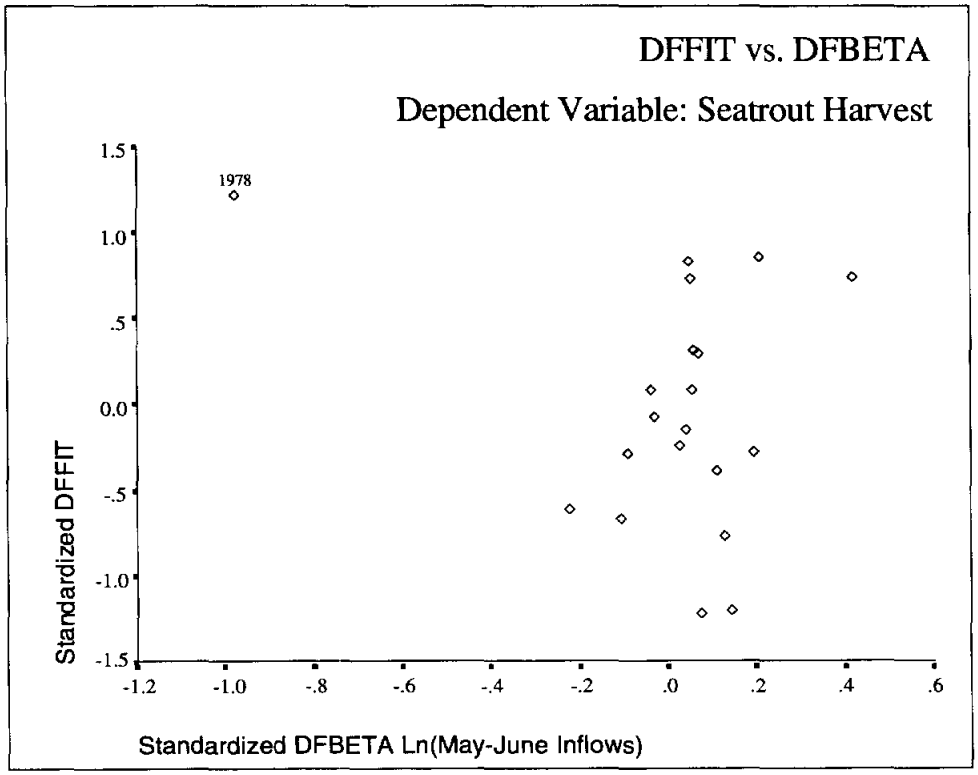
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

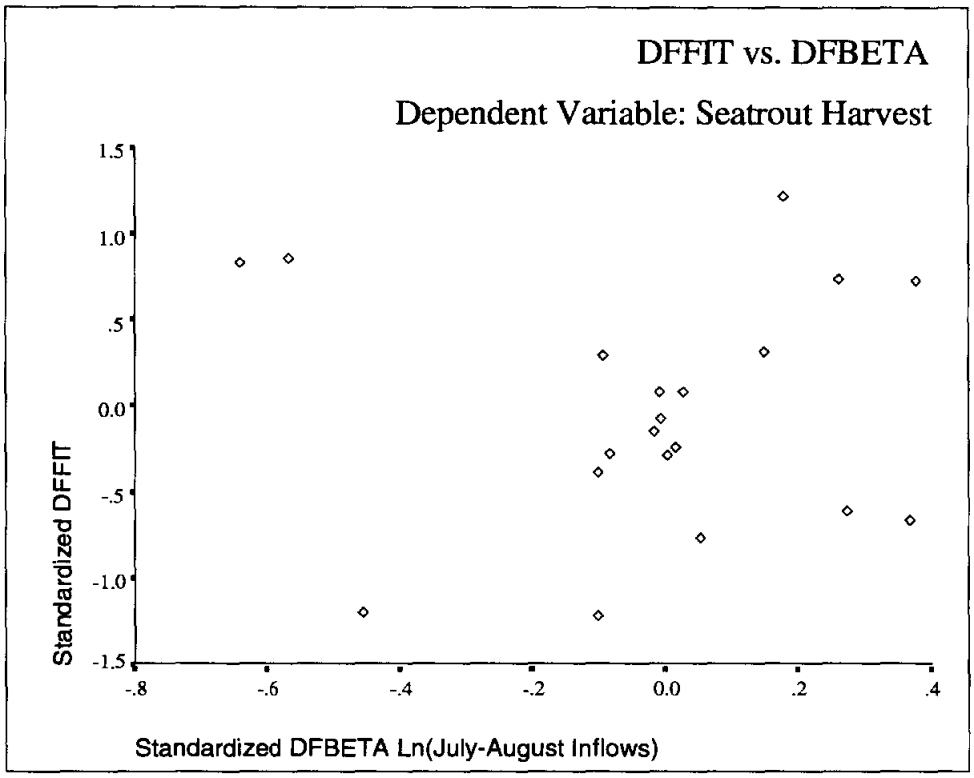
Graphics

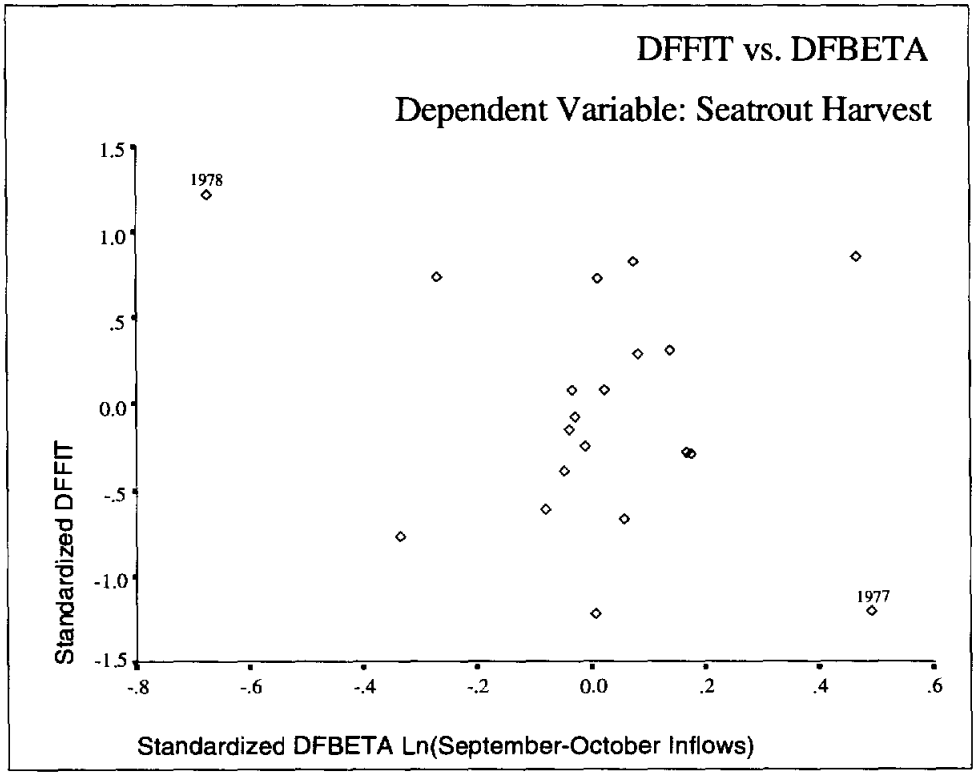

DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Intercept

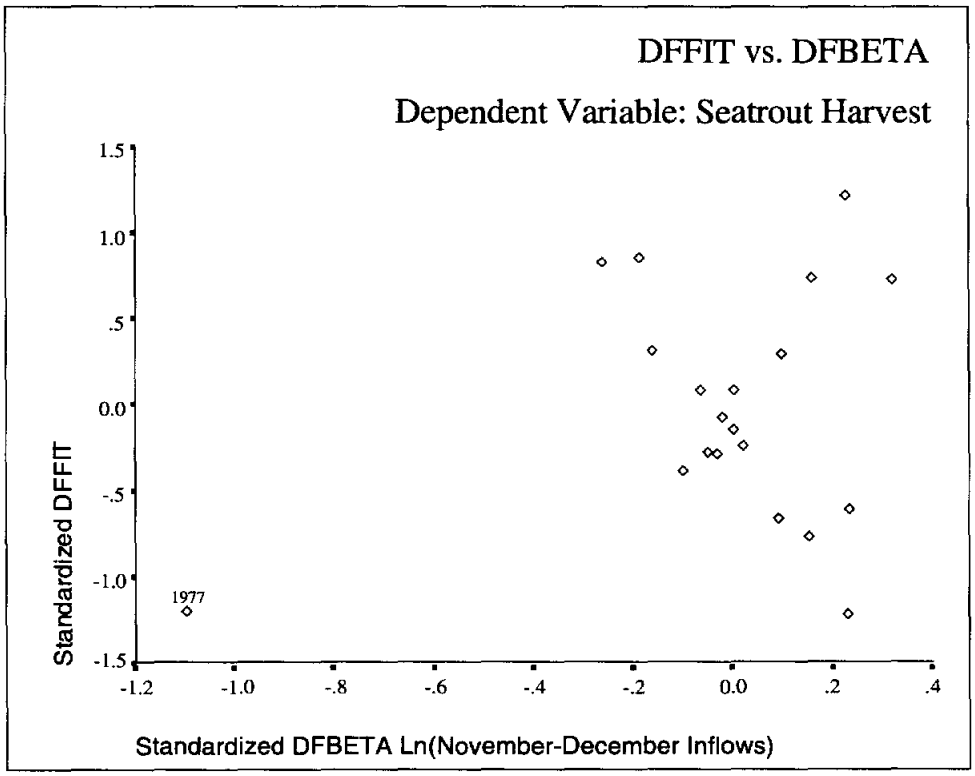

DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1977
Standardized DFBETA Ln(January-February Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
1978
1962
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFBETA Ln(March-April Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
1978
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-1.2
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA Ln(May-June Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
1978
1977
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Seatrout Harvest
Standardized DFFIT
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1977
-1.2
-1.0
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(November-December Inflows)

Regression—Logged Harvest

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.408*	*.166*	*-.219*	*.7903*	*1.234*

a. Dependent Variable: Ln(Seatrout Harvest)

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*1.617*	*6*	*.270*	*.432*	*.845*[b]
	Residual	*8.120*	*13*	*.625*		
	Total	*9.737*	*19*			

a. Dependent Variable: Ln(Seatrout Harvest)

b. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*5.261*	*.665*		*7.912*	*.000*	*3.824*	*6.698*
	January-February Inflows	*-5.605E-04*	*.001*	*-.509*	*-.918*	*.375*	*-.002*	*.001*
	March-April Inflows	*-1.190E-05*	*.000*	*-.013*	*-.035*	*.973*	*-.001*	*.001*
	May-June Inflows	*8.435E-05*	*.000*	*.120*	*.335*	*.743*	*.000*	*.001*
	July-August Inflows	*-1.611E-04*	*.001*	*-.081*	*-.179*	*.860*	*-.002*	*.002*
	September-October Inflows	*1.020E-05*	*.001*	*.008*	*.019*	*.985*	*-.001*	*.001*
	November-December Inflows	*4.226E-04*	*.001*	*.423*	*.827*	*.423*	*-.001*	*.002*

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	*.209*	*4.782*
	March-April Inflows	*.459*	*2.179*
	May-June Inflows	*.498*	*2.007*
	July-August Inflows	*.312*	*3.208*
	September-October Inflows	*.342*	*2.928*
	November-December Inflows	*.245*	*4.083*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	*6.382*	*1.000*	*.00*	*.00*	*.00*
	2	*.345*	*4.299*	*.00*	*.00*	*.05*
	3	*.102*	*7.901*	*.13*	*.01*	*.00*
	4	*6.710E-02*	*9.752*	*.35*	*.04*	*.06*
	5	*4.552E-02*	*11.841*	*.42*	*.04*	*.02*
	6	*4.212E-02*	*12.310*	*.07*	*.01*	*.86*
	7	*1.550E-02*	*20.292*	*.02*	*.90*	*.01*

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	*.00*	*.00*	*.00*	*.00*
	2	*.04*	*.00*	*.06*	*.04*
	3	*.03*	*.30*	*.00*	*.06*
	4	*.15*	*.03*	*.39*	*.00*
	5	*.20*	*.00*	*.44*	*.28*
	6	*.55*	*.03*	*.02*	*.04*
	7	*.03*	*.64*	*.08*	*.58*

a. Dependent Variable: Ln(Seatrout Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*4.2573*	*5.3721*	*4.9286*	*.2918*	*20*
Std. Predicted Value	*-2.301*	*1.520*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*.2544*	*.6851*	*.4561*	*.1055*	*20*
Adjusted Predicted Value	*3.9024*	*6.2179*	*5.0007*	*.5261*	*20*
Residual	*-1.6949*	*.9138*	*-6.2172E-16*	*.6537*	*20*
Std. Residual	*-2.145*	*1.156*	*.000*	*.827*	*20*
Stud. Residual	*-2.760*	*1.318*	*-.034*	*1.025*	*20*
Deleted Residual	*-2.8069*	*1.2821*	*-7.2062E-02*	*1.0276*	*20*
Stud. Deleted Residual	*-4.120*	*1.360*	*-.105*	*1.244*	*20*
Mahal. Distance	*1.019*	*13.328*	*5.700*	*3.071*	*20*
Cook's Distance	*.000*	*.714*	*.088*	*.160*	*20*
Centered Leverage Value	*.054*	*.701*	*.300*	*.162*	*20*

a. Dependent Variable: Ln(Seatrout Harvest)

Case Values for Residuals Diagnostics

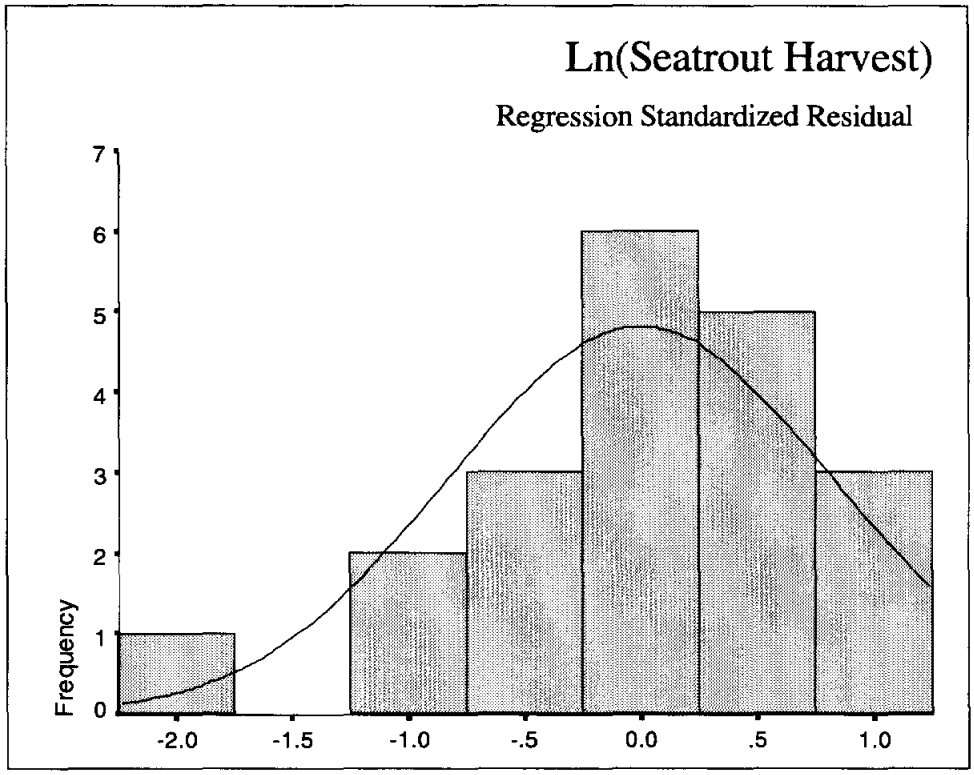
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	4.52809	-1.69488	-2.80688	5.64009	-1.37280	-2.14457	-2.75984	*-4.12050
1963	4.87982	.08232	.10839	4.85376	-.16725	.10417	.11952	.11490
1964	5.24285	-.06727	-.10040	5.27598	1.07702	-.08512	-.10398	-.09995
1965	5.11872	.50529	.65744	4.96658	.65157	.63936	.72929	.71547
1966	4.97510	.11064	.14489	4.94086	.15931	.14000	.16020	.15407
1967	5.09735	.53887	.71258	4.92363	.57831	.68185	.78408	.77179
1968	4.97070	.18951	.30573	4.85447	.14422	.23979	.30457	.29367
1969	4.99039	-.97041	-1.25250	5.27248	.21172	-1.22789	-1.39499	-1.45345
1970	4.96433	-.47345	-.77649	5.26737	.12240	-.59907	-.76720	-.75438
1971	5.11983	-.79041	-1.23928	5.56869	.65537	-1.00013	-1.25232	-1.28307
1972	5.20330	-.34815	-.43702	5.29217	.94147	-.44053	-.49356	-.47870
1973	5.04163	.73850	.82389	4.95623	.38734	.93444	.98699	.98593
1974	4.76297	.84614	1.28214	4.32696	-.56776	1.07064	1.31792	1.36036
1975	4.98529	.41288	.75411	4.64405	.19422	.52242	.70604	.69174
1976	5.18184	.01942	.03027	5.17098	.86790	.02457	.03068	.02947
1977	5.37209	-.46756	-1.31333	6.21787	1.51999	-.59162	-.99154	-.99084
1978	4.92740	.91383	1.09154	4.74968	-.00420	1.15629	1.26373	1.29639
1979	4.41832	.38652	.90247	3.90237	-1.74904	.48908	.74732	.73394
1980	4.25729	.24917	.39923	4.10722	-2.30097	.31528	.39908	.38580
1981	4.53509	-.18095	-.72802	5.08217	-1.34882	-.22896	-.45925	-.44486

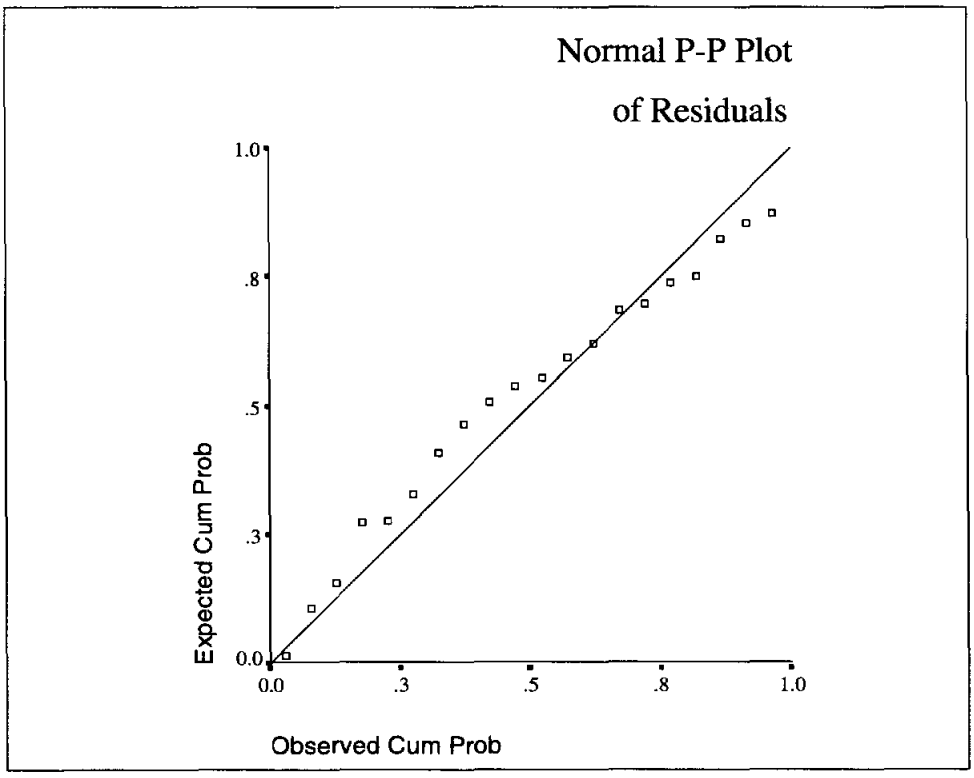
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed logged harvest minus predicted logged harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of logged harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of logged harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

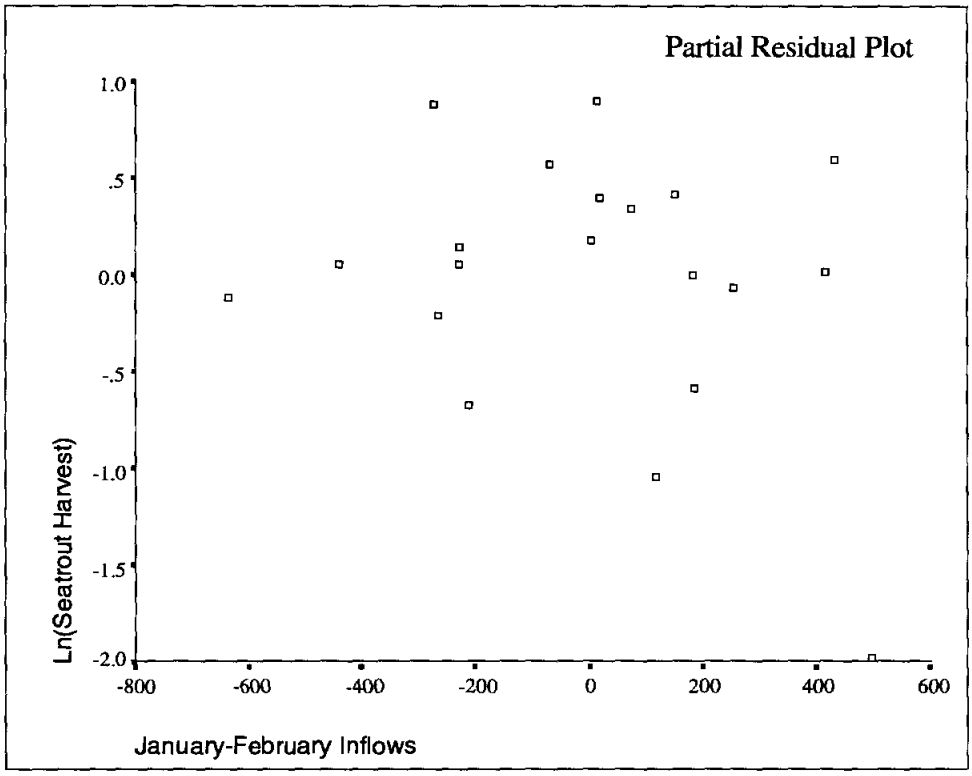
[1]Values greater than 3 are flagged.

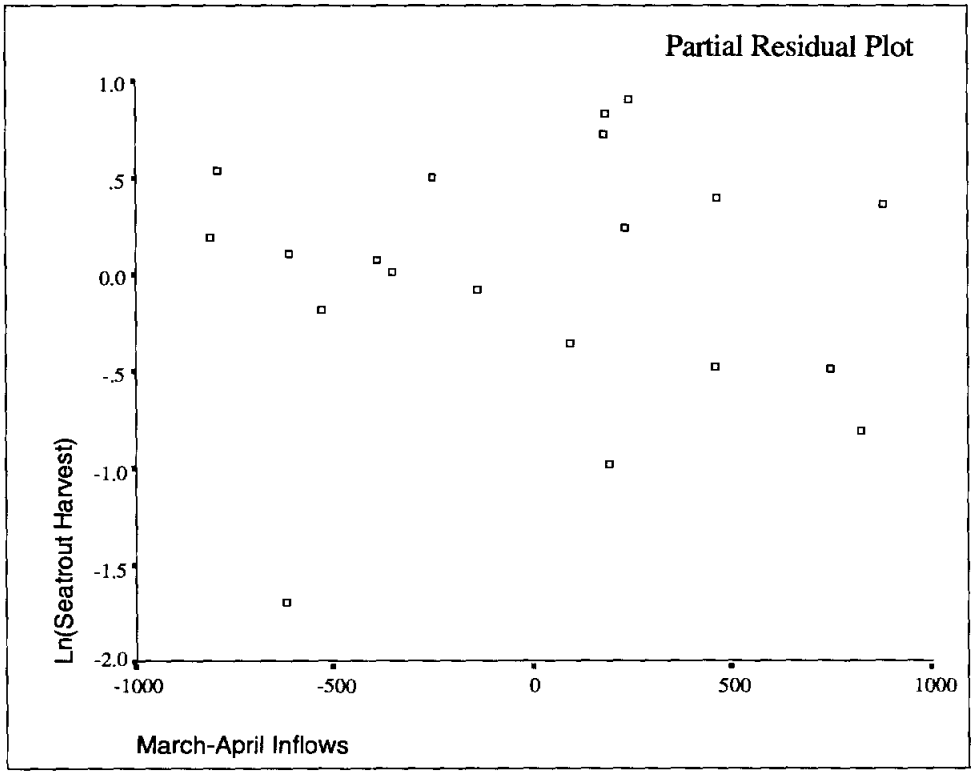
[2]This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

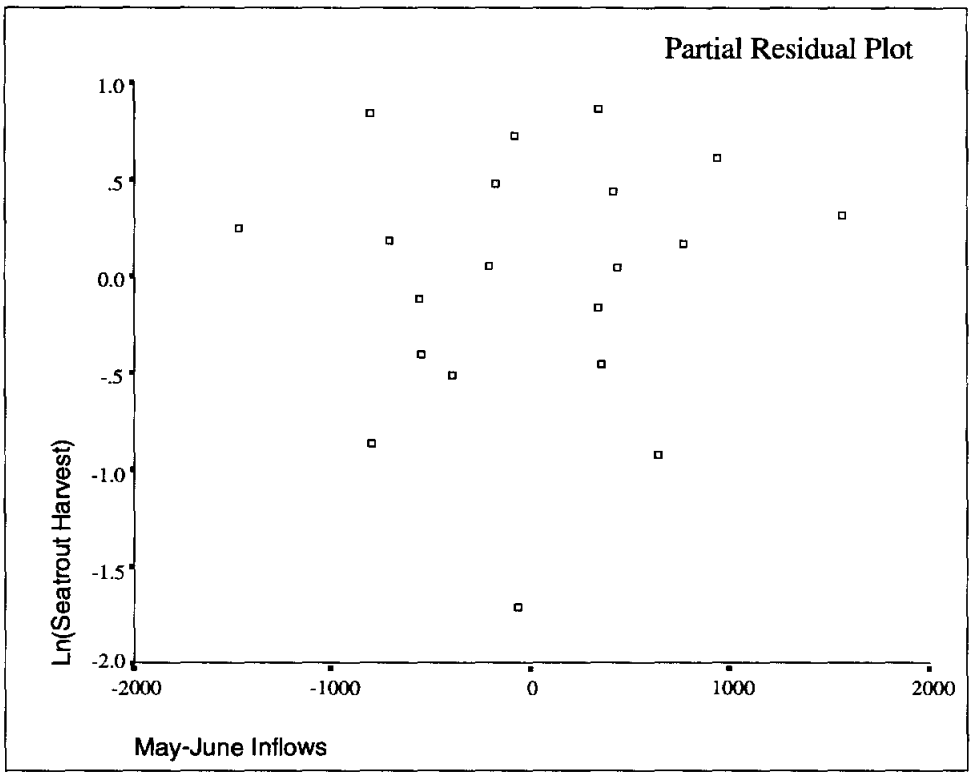
Graphics

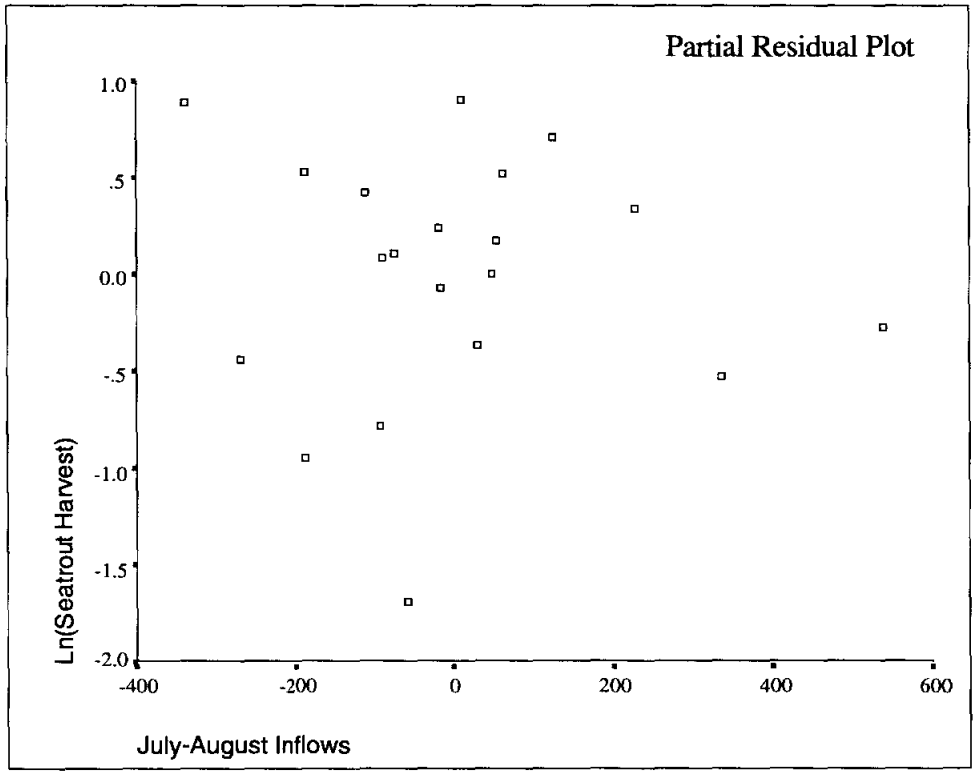

Ln(Seatrout Harvest)
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

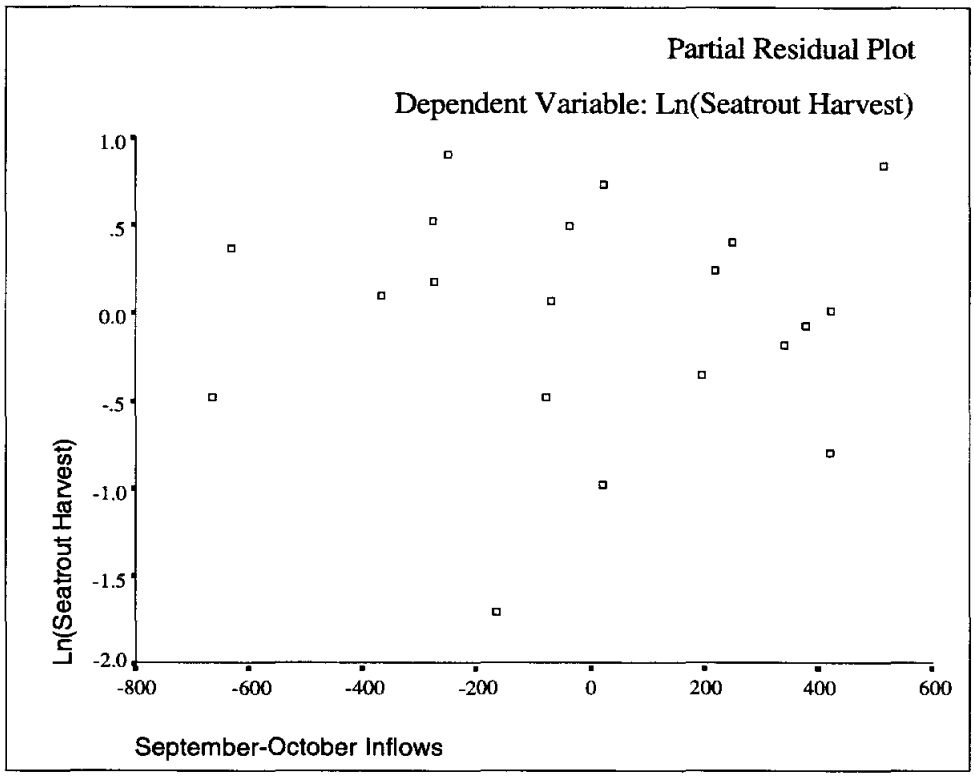

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob

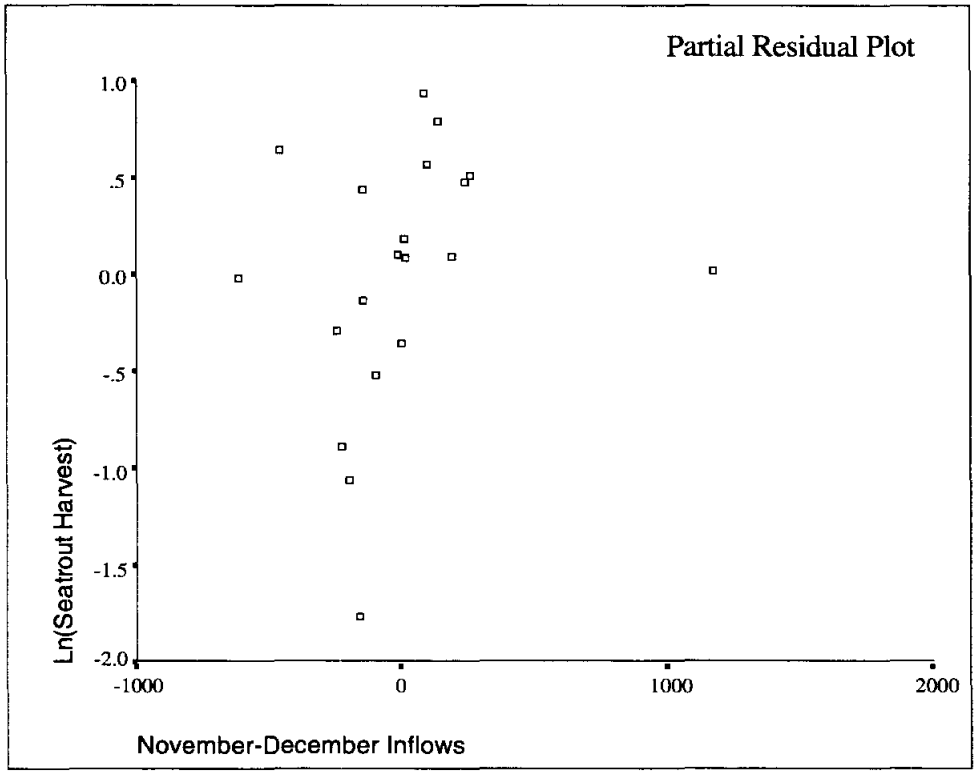

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
-800
-600
-400
-200
0
200
400
600
January-February Inflows


Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
-1000
-500
0
500
1000
March-April Inflows


Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
-2000
-1000
0
1000
2000
May-June Inflows


Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
-400
-200
0
200
400
600
July-August Inflows


Partial Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-800
-600
-400
-200
0
200
400
600
September-October Inflows


Partial Residual Plot
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1000
0
1000
2000
November-December Inflows

Prediction Intervals for the Natural Log of Seatrout Harvest

YEAR	LGSTROUT	LICI_1	UICI_1
1962	2.83	1.71514	7.34104
1963	4.96	2.22836	7.53128
1964	5.18	2.49738	7.98832
1965	5.62	2.47696	7.76049
1966	5.09	2.32805	7.62215
1967	5.64	2.44235	7.75234
1968	5.16	2.17394	7.76746
1969	4.02	2.35528	7.62551
1970	4.49	2.15734	7.77133
1971	4.33	2.34132	7.89834
1972	4.86	2.59182	7.81479
1973	5.78	2.54066	7.54260
1974	5.61	2.00713	7.51881
1975	5.40	2.11616	7.85441
1976	5.20	2.40701	7.95666
1977	4.90	2.31969	8.42450
1978	5.84	2.36027	7.49452
1979	4.80	1.43378	7.40286
1980	4.51	1.46485	7.04972
1981	4.35	1.38450	7.68568

LGSTROUT Natural log of seatrout harvest

LICI_1 Lower limit for 99% prediction interval for the natural log of seatrout harvest

UICI_1 Upper limit for 99% prediction interval for the natural log ofseatrout harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.57724	.71390	.34617	.4742	.3376
1963	3.61888	.00065	.19047	.8225	.0000
1964	5.31987	.00076	.27999	.6210	.0000
1965	3.44693	.02288	.18142	.8408	.0000
1966	3.54060	.00113	.18635	.8309	.0000
1967	3.68182	.02831	.19378	.8156	.0000
1968	6.27283	.00813	.33015	.5083	.0000
1969	3.32923	.08081	.17522	.8530	.0013
1970	6.46508	.05382	.34027	.4866	.0004
1971	5.93173	.12723	.31220	.5477	.0055
1972	2.91360	.00888	.15335	.8929	.0000
1973	1.01937	.01609	.05365	.9945	.0000
1974	5.51117	.12786	.29006	.5978	.0056
1975	7.64748	.05886	.40250	.3647	.0005
1976	5.86311	.00008	.30858	.5558	.0000
1977	11.28581	.25406	*.59399	.1266	.0384
1978	2.14343	.04437	.11281	.9515	.0002
1979	9.91239	.10650	*.52170	.1936	.0032
1980	6.19176	.01370	.32588	.5175	.0000
1981	13.32768	.09110	*.70146	.0645	.0020

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	*-3.33759	.13900	*-2.03905	*1.42401
1963	.06465	.01189	.02601	-.02230
1964	-.07014	-.05802	.02140	.00739
1965	.39259	.30269	.09512	-.08896
1966	.08571	.02647	.02497	-.04659
1967	.43820	.17627	-.04620	-.30423
1968	.22998	.00159	.00102	-.13091
1969	-.78364	.01795	-.15046	-.13746
1970	-.60353	.14903	-.13774	-.31334
1971	-.96689	-.41015	.26255	-.57212
1972	-.24185	-.19619	.10933	-.02191
1973	.33527	.08805	-.21922	.08072
1974	.97652	-.35559	.55831	.13108
1975	.62886	-.43226	.01445	.18775
1976	.02204	-.00247	-.00651	-.00557
1977	*-1.33264	.14335	.81567	-.32892
1978	.57170	.34150	.01636	.14916
1979	.84796	-.07138	.06222	.42700
1980	.29940	-.00715	.15638	.04857
1981	-.77352	-.04494	.30292	.20356

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for January-February inflows
SDFBETA_2 Standardized dfbeta for March-April inflows

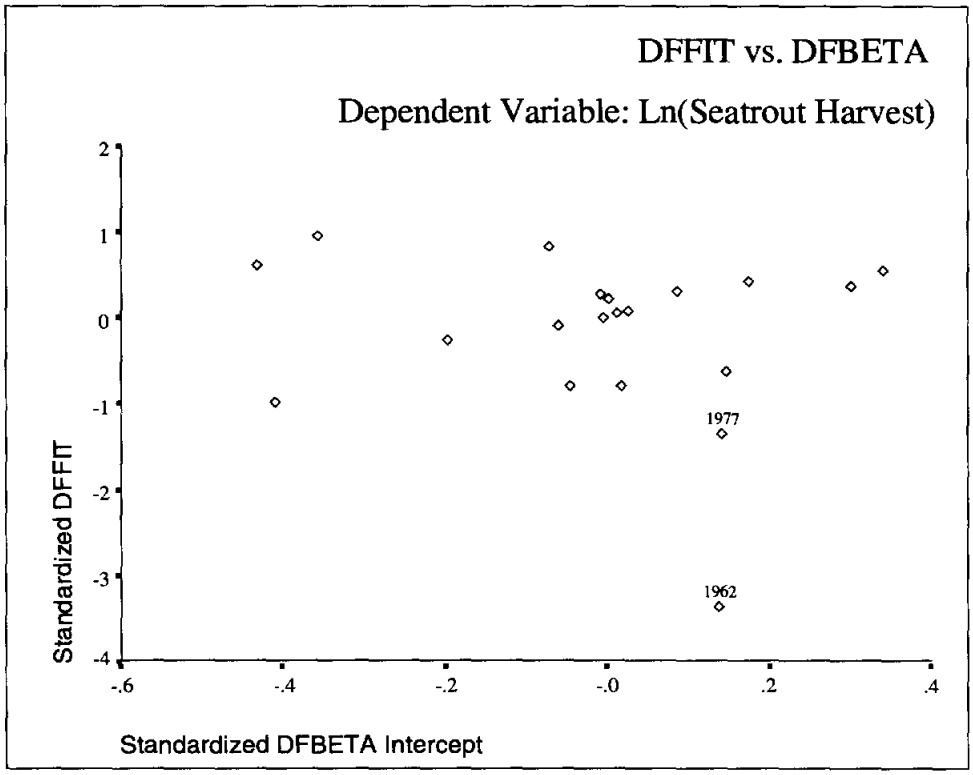
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

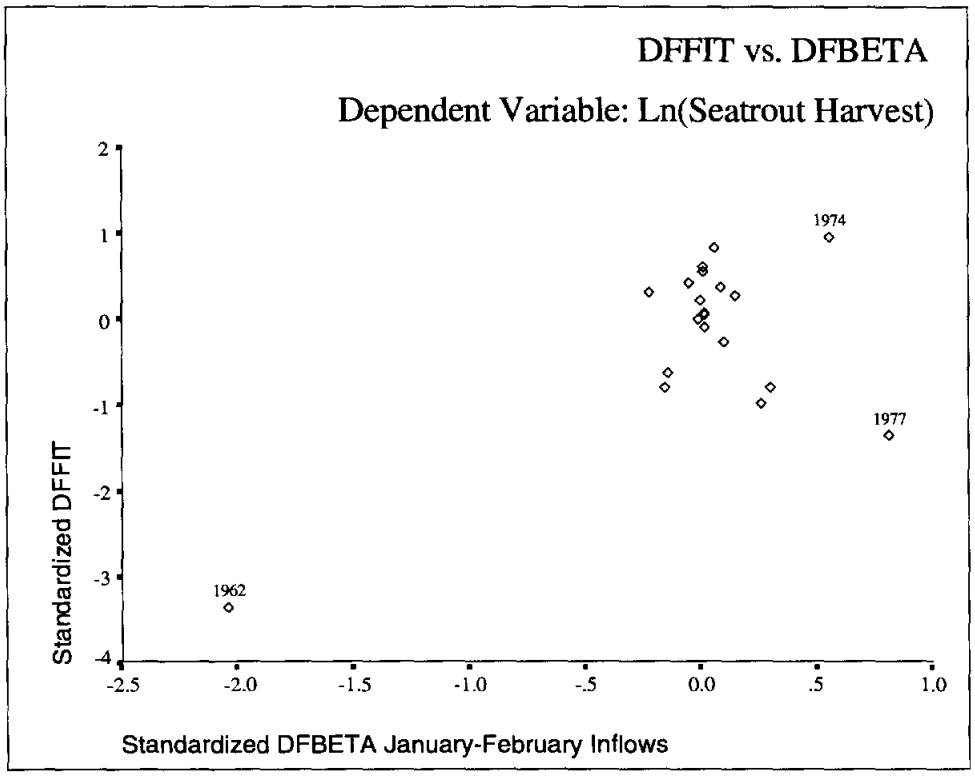
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.09720	.34217	.57747	.52942
1963	-.00850	-.01350	-.00582	.00189
1964	.02174	.00212	-.03083	.01101
1965	-.04517	-.17166	-.02042	-.07553
1966	.04292	-.01475	-.04290	-.00074
1967	.26585	.06285	-.16303	.05784
1968	.18545	.02291	-.06777	.00315
1969	-.33615	.34866	-.02500	.20134
1970	-.10942	.29354	.04825	.05859
1971	.40804	.16737	-.45117	.22942
1972	.09354	-.01818	-.06977	-.00201
1973	-.02493	.14767	.01763	.09590
1974	.18367	-.64440	.57723	-.49152
1975	.12228	-.11732	.15525	.15822
1976	.00517	.00201	.01041	.00470
1977	.20576	-.63525	.73382	*-1.26632
1978	-.36315	.01624	-.23396	.07800
1979	-.52738	.29108	-.46936	.17655
1980	-.11124	-.01015	.07115	-.19381
1981	-.09704	-.54637	-.20294	.13666

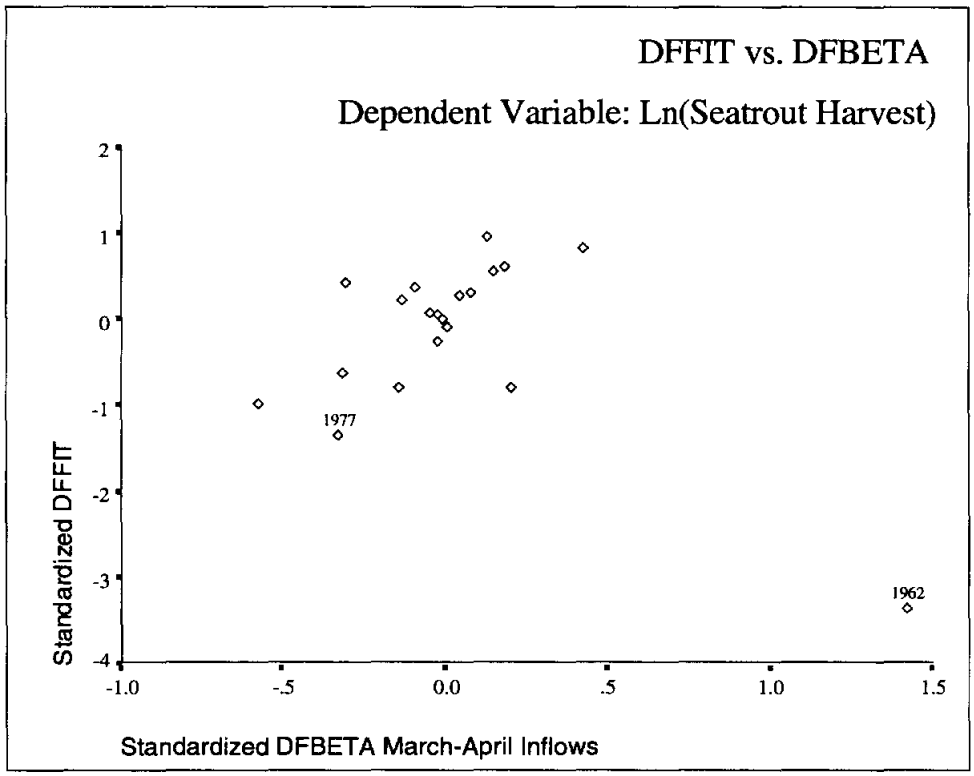
SDFBETA_3 Standardized dfbeta for May-June inflows
SDFBETA_4 Standardized dfbeta for July-August inflows
SDFBETA_5 Standardized dfbeta for September-October inflows
SDFBETA_6 Standardized dfbeta for November-December inflows

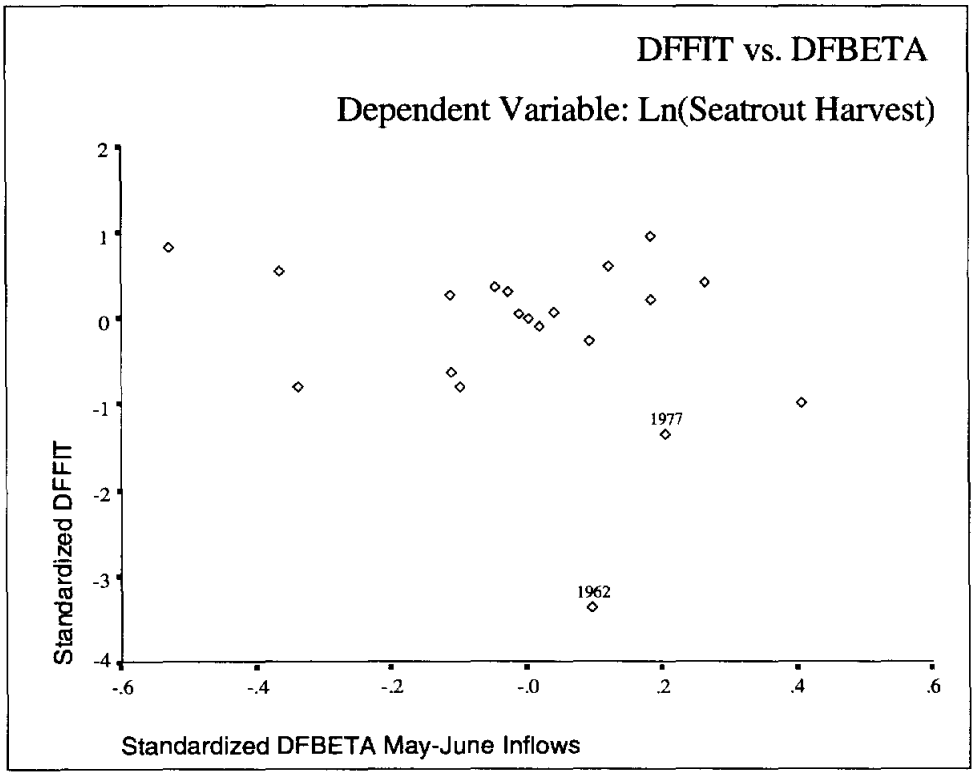
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

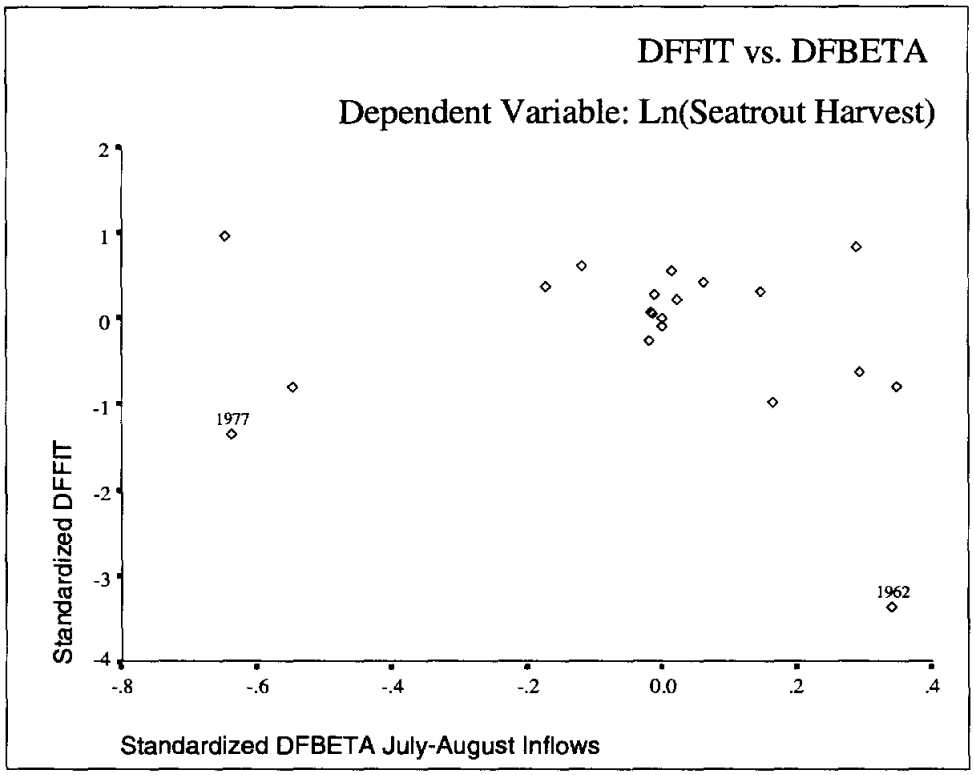
Graphics

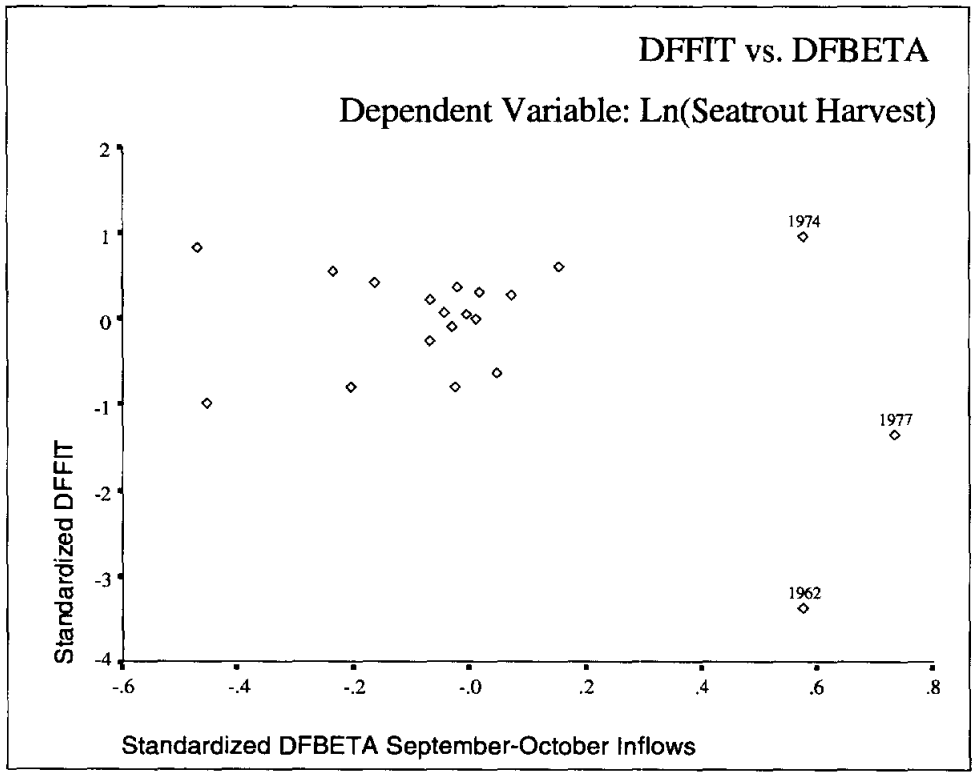

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Intercept

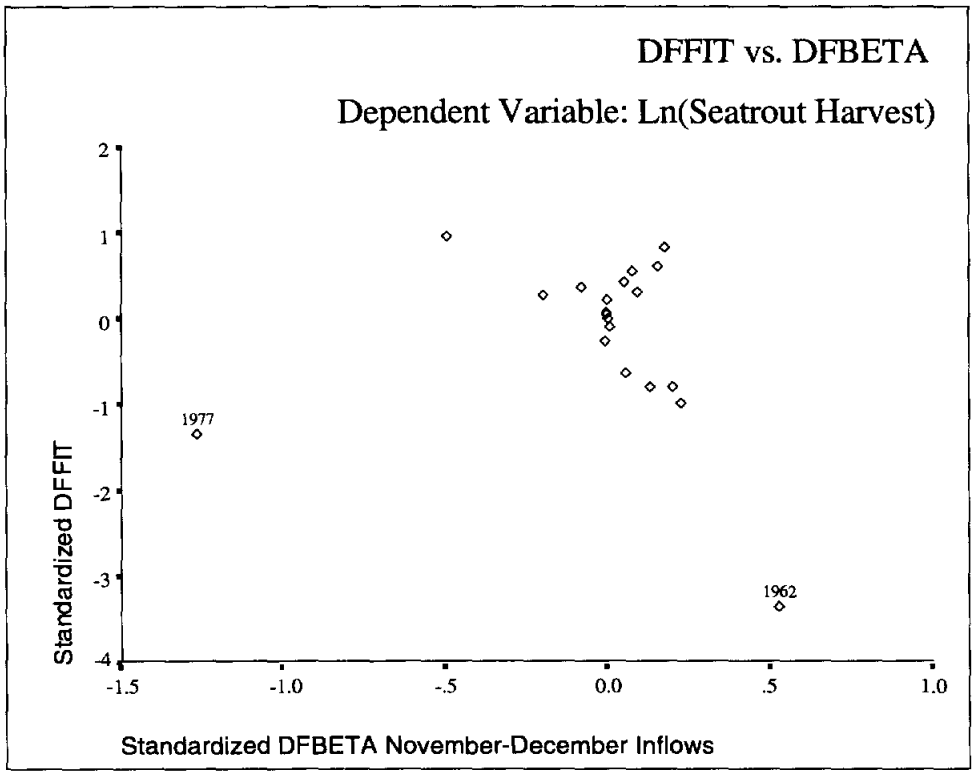

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1974
1977
1962
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA January-February Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA March-April Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA May-June Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA July-August Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1974
1977
1962
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Standardized DFBETA September-October Inflows


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
-4
1977
1962
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA November-December Inflows

Regression—Logged Harvest and Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.462*	*.213*	*-.150*	*.7676*	*1.377*

a. Dependent Variable: Ln(Seatrout Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*2.077*	*6*	*.346*	*.588*	*.735*[b]
	Residual	*7.660*	*13*	*.589*		
	Total	*9.737*	*19*			

a. Dependent Variable: Ln(Seatrout Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*4.654*	*4.831*		*.963*	*.353*	*-5.783*	*15.091*
	Ln(January-February Inflows)	*-.885*	*1.118*	*-.470*	*-.792*	*.442*	*-3.300*	*1.529*
	Ln(March-April Inflows)	*.213*	*.626*	*.141*	*.341*	*.739*	*-1.139*	*1.566*
	Ln(May-June Inflows)	*.199*	*.622*	*.131*	*.319*	*.755*	*-1.146*	*1.543*
	Ln(July-August Inflows)	*-.256*	*.782*	*-.177*	*-.327*	*.749*	*-1.945*	*1.434*
	Ln(September-October Inflows)	*-.266*	*.451*	*-.215*	*-.591*	*.565*	*-1.240*	*.707*
	Ln(November-December Inflows)	*1.011*	*.713*	*.666*	*1.418*	*.180*	*-.529*	*2.550*

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.172*	*5.821*
	Ln(March-April Inflows)	*.353*	*2.835*
	Ln(May-June Inflows)	*.357*	*2.801*
	Ln(July-August Inflows)	*.207*	*4.841*
	Ln(September-October Inflows)	*.456*	*2.193*
	Ln(November-December Inflows)	*.274*	*3.647*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	*6.984*	*1.000*	*.00*	*.00*	*.00*
	2	*9.020E-03*	*27.826*	*.00*	*.00*	*.03*
	3	*2.966E-03*	*48.524*	*.14*	*.00*	*.00*
	4	*2.173E-03*	*56.697*	*.00*	*.03*	*.09*
	5	*9.164E-04*	*87.299*	*.53*	*.01*	*.00*
	6	*7.542E-04*	*96.232*	*.16*	*.00*	*.87*
	7	*2.920E-04*	*154.662*	*.17*	*.96*	*.01*

a. Dependent Variable: Ln(Seatrout Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	*.00*	*.00*	*.00*	*.00*
	2	*.03*	*.00*	*.12*	*.02*
	3	*.00*	*.19*	*.04*	*.03*
	4	*.00*	*.04*	*.63*	*.09*
	5	*.52*	*.08*	*.01*	*.19*
	6	*.45*	*.01*	*.10*	*.19*
	7	*.00*	*.67*	*.10*	*.47*

a. Dependent Variable: Ln(Seatrout Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*4.1263*	*5.5212*	*4.9286*	*.3307*	*20*
Std. Predicted Value	*-2.426*	*1.792*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*.2898*	*.5848*	*.4482*	*7.523E-02*	*20*
Adjusted Predicted Value	*3.8172*	*6.0355*	*4.9236*	*.4927*	*20*
Residual	*-1.7467*	*.8537*	*2.354E-15*	*.6349*	*20*
Std. Residual	*-2.276*	*1.112*	*.000*	*.827*	*20*
Stud. Residual	*-2.771*	*1.277*	*.001*	*1.003*	*20*
Deleted Residual	*-2.5901*	*1.1259*	*5.043E-03*	*.9407*	*20*
Stud. Deleted Residual	*-4.161*	*1.312*	*-.073*	*1.231*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.000*	*.530*	*.067*	*.116*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Ln(Seatrout Harvest)

Case Values for Residuals Diagnostics

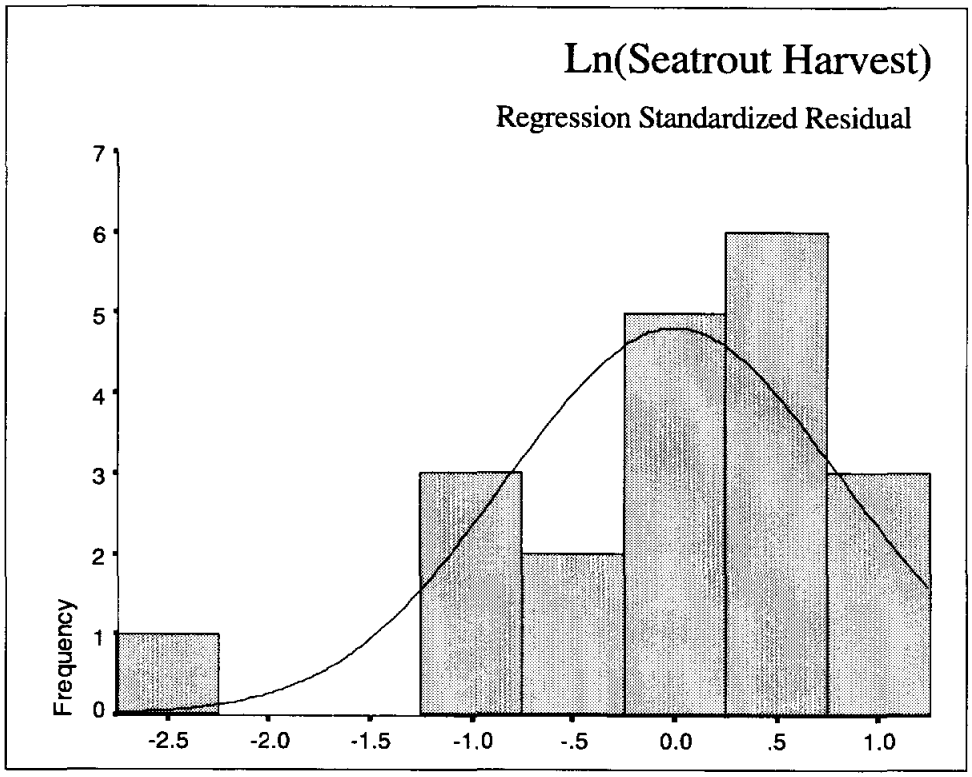
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	4.57996	-1.74675	-2.59013	5.42335	-1.05444	-2.27560	-2.77104	*-4.16125
1963	4.79802	.16412	.22608	4.73607	-.39495	.21381	.25094	.24169
1964	5.09525	.08034	.13755	5.03804	.50393	.10466	.13695	.13167
1965	5.20364	.42037	.87501	4.74901	.83175	.54765	.79012	.77803
1966	5.10966	-.02391	-.03455	5.12029	.54751	-.03116	-.03745	-.03598
1967	5.12124	.51498	.76162	4.87460	.58253	.67090	.81589	.80475
1968	4.91788	.24233	.34352	4.81668	-.03249	.31570	.37588	.36311
1969	4.90459	-.88461	-1.13847	5.15845	-.07267	-1.15244	-1.30738	-1.34782
1970	5.04918	-.55830	-.80924	5.30012	.36460	-.72733	-.87566	-.86728
1971	4.97546	-.64604	-1.08393	5.41335	.14166	-.84164	-1.09018	-1.09885
1972	5.18607	-.33092	-.43407	5.28922	.77860	-.43111	-.49375	-.47889
1973	5.04630	.73382	.85577	4.92436	.35590	.95600	1.03238	1.03522
1974	4.86949	.73961	1.05915	4.54996	-.17882	.96354	1.15305	1.16922
1975	5.12915	.26902	.44848	4.94968	.60644	.35047	.45251	.43822
1976	5.06430	.13695	.19249	5.00877	.41035	.17842	.21152	.20357
1977	5.52122	-.61668	-1.13093	6.03547	1.79217	-.80340	-1.08797	-1.09639
1978	4.98757	.85365	1.12591	4.71531	.17828	1.11211	1.27720	1.31218
1979	4.70517	.09967	.23756	4.56728	-.67577	.12985	.20047	.19290
1980	4.18195	.32450	.52211	3.98434	-2.25812	.42275	.53624	.52100
1981	4.12630	.22784	.53692	3.81722	-2.42643	.29683	.45566	.44132

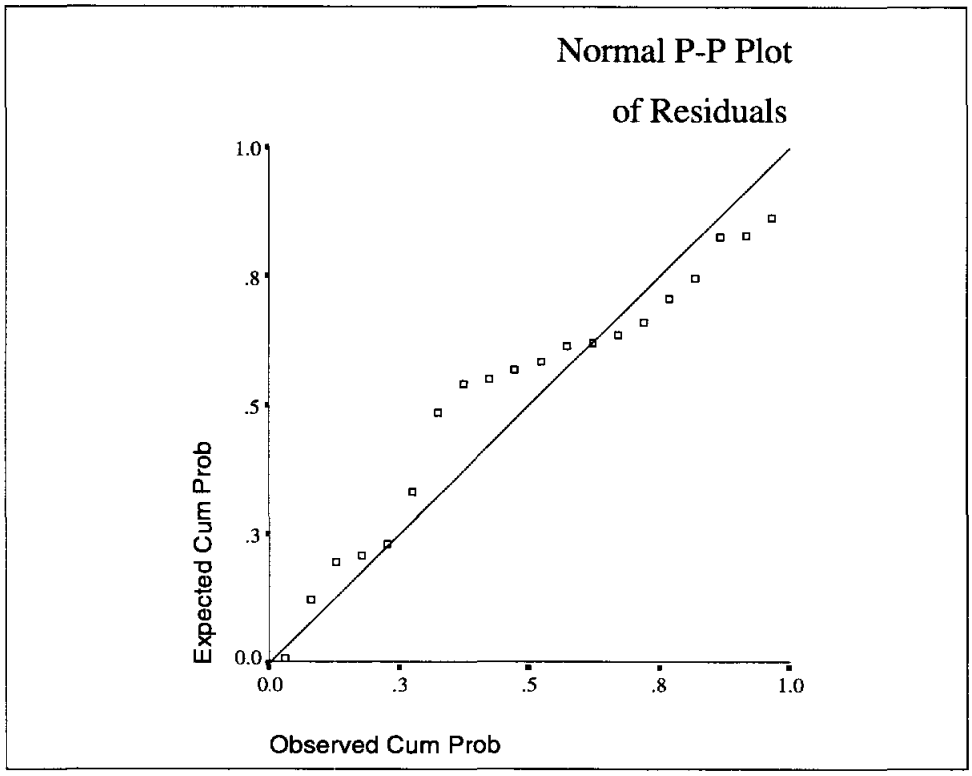
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

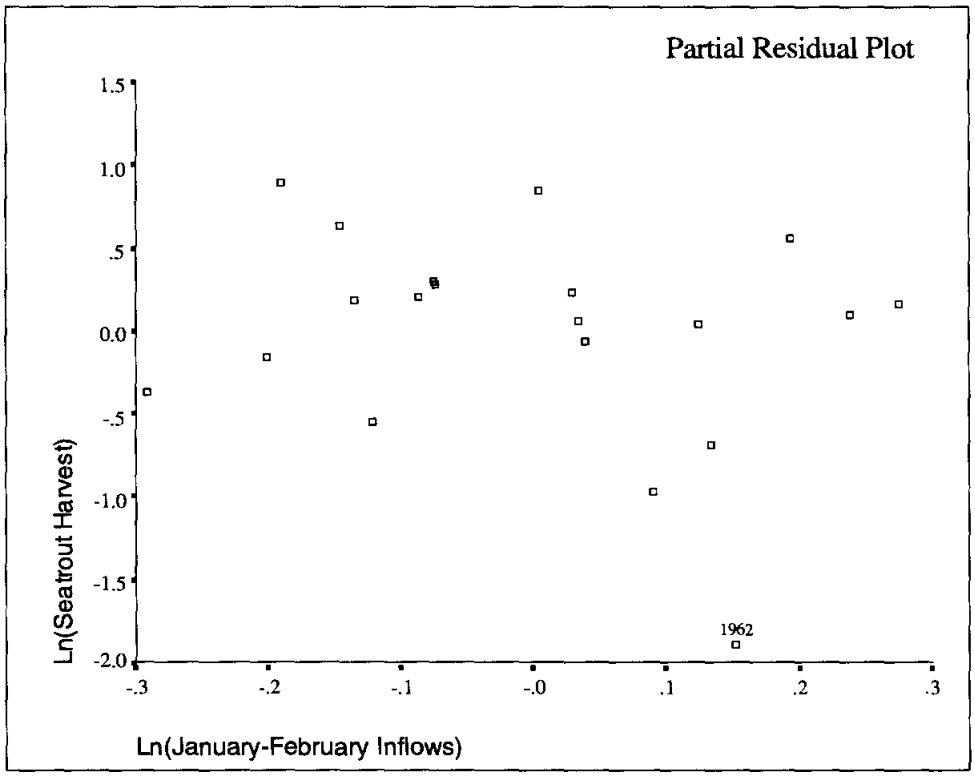
[1]Values greater than 3 are flagged.

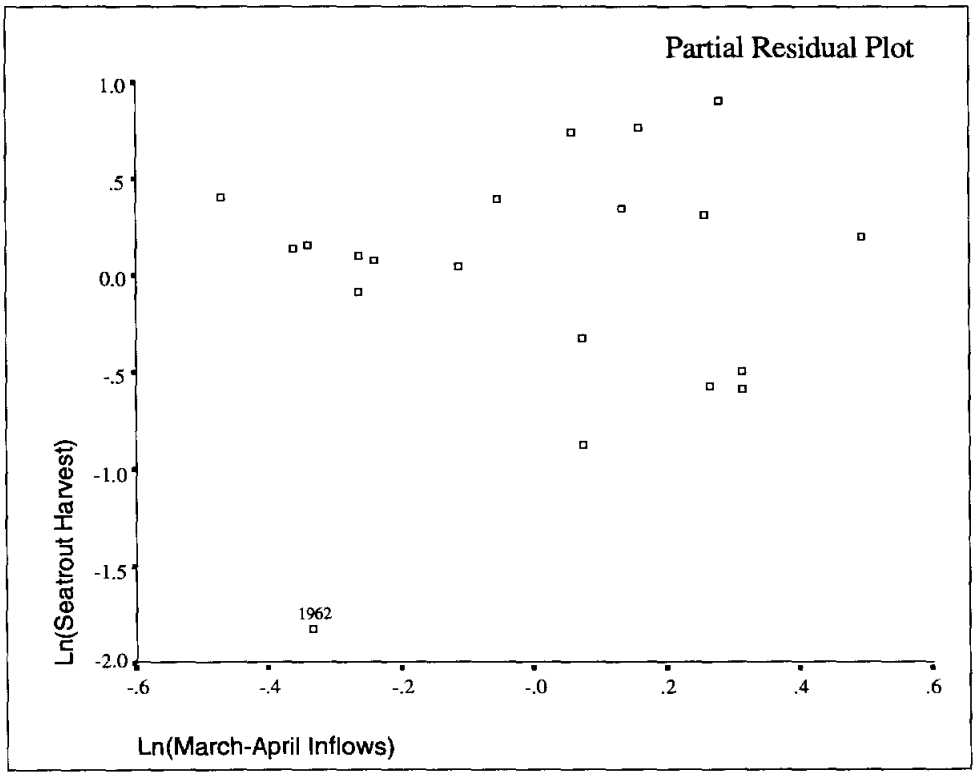
[2]This is flagged if it exceeds $t_{n-p-2,a} = t_{12,0.01} = 2.681$.

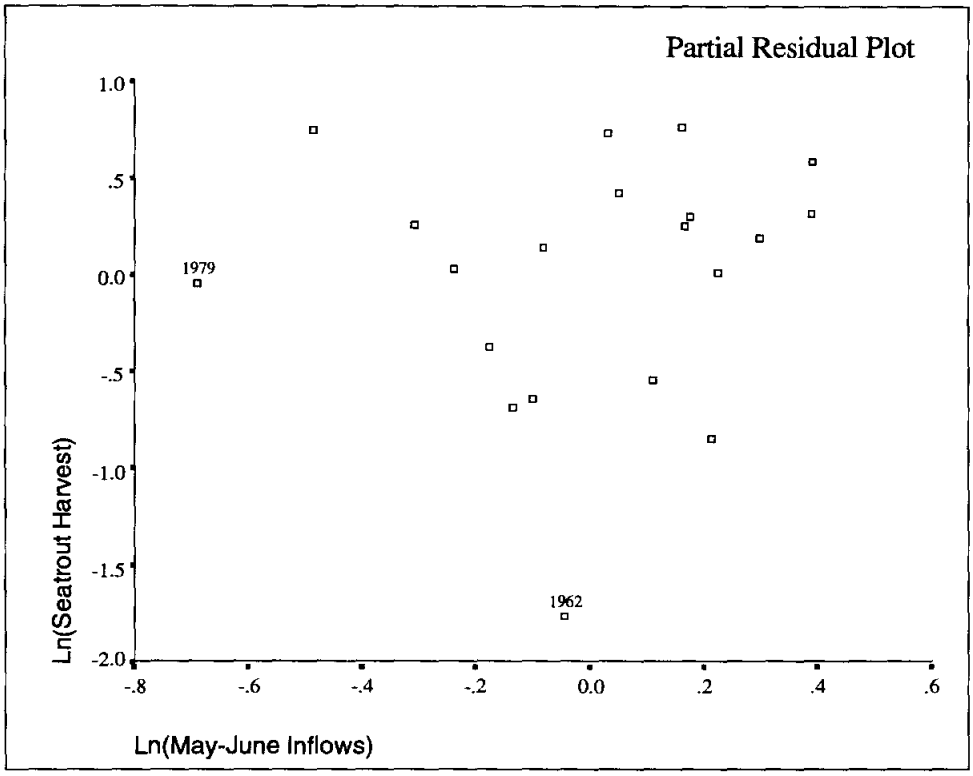
Graphics

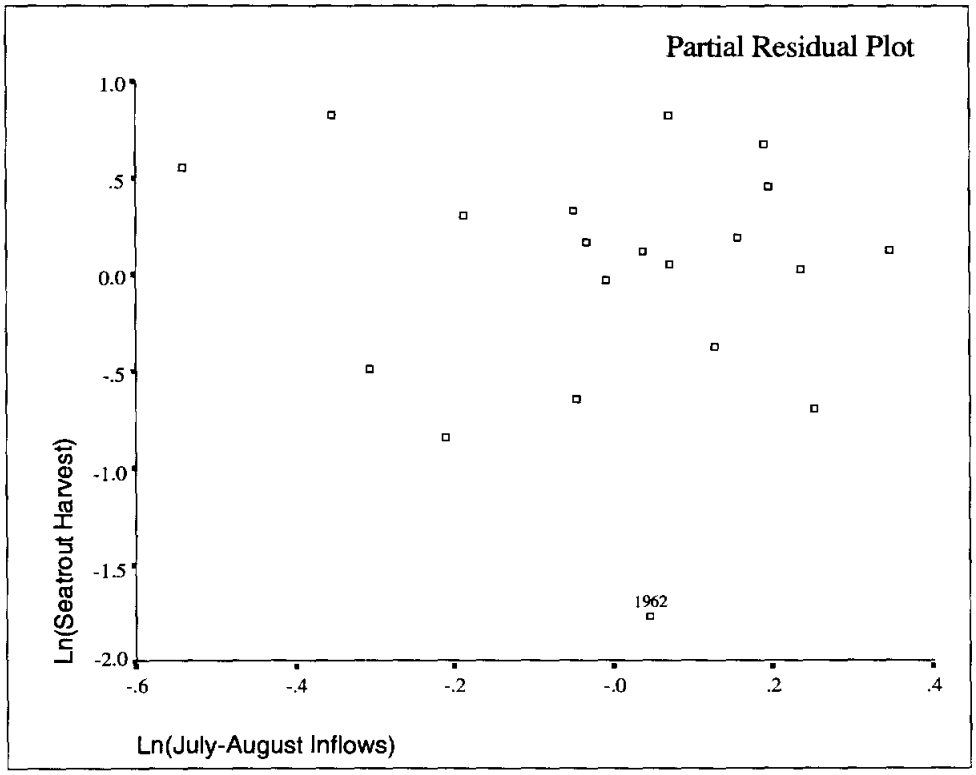

Ln(Seatrout Harvest)
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

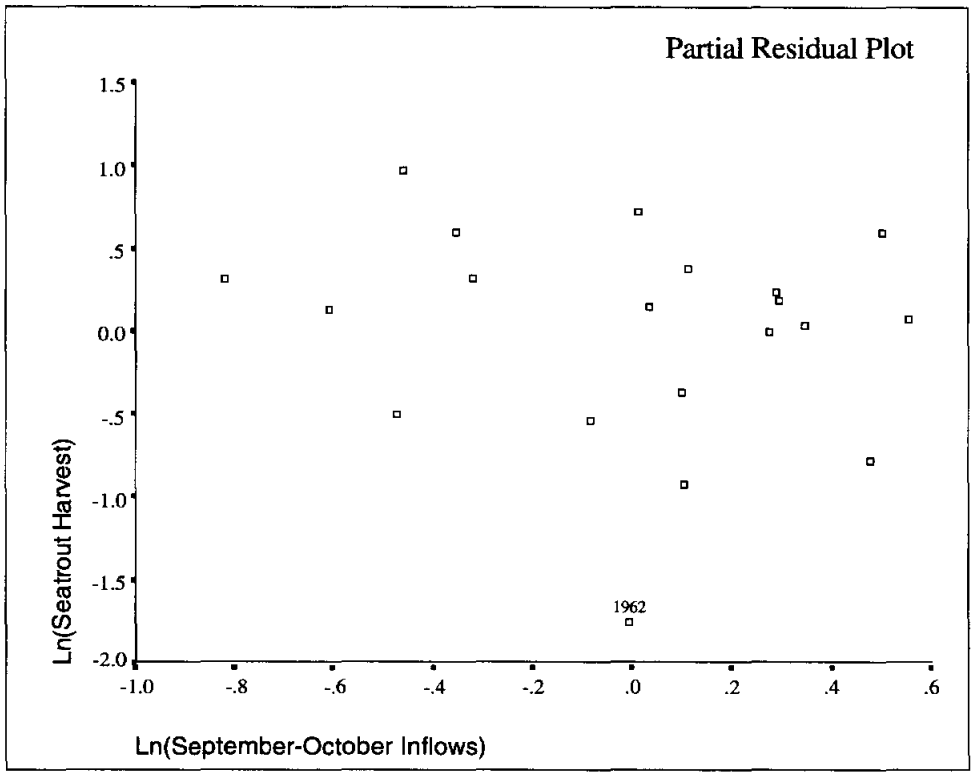

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob

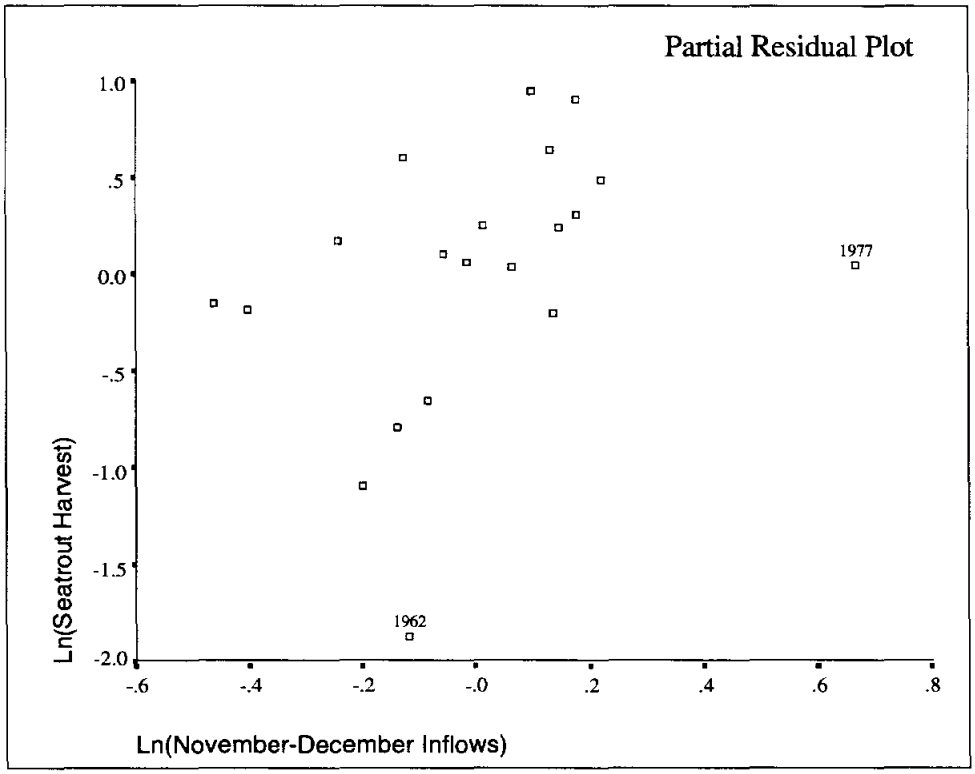

Partial Residual Plot
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
1962
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

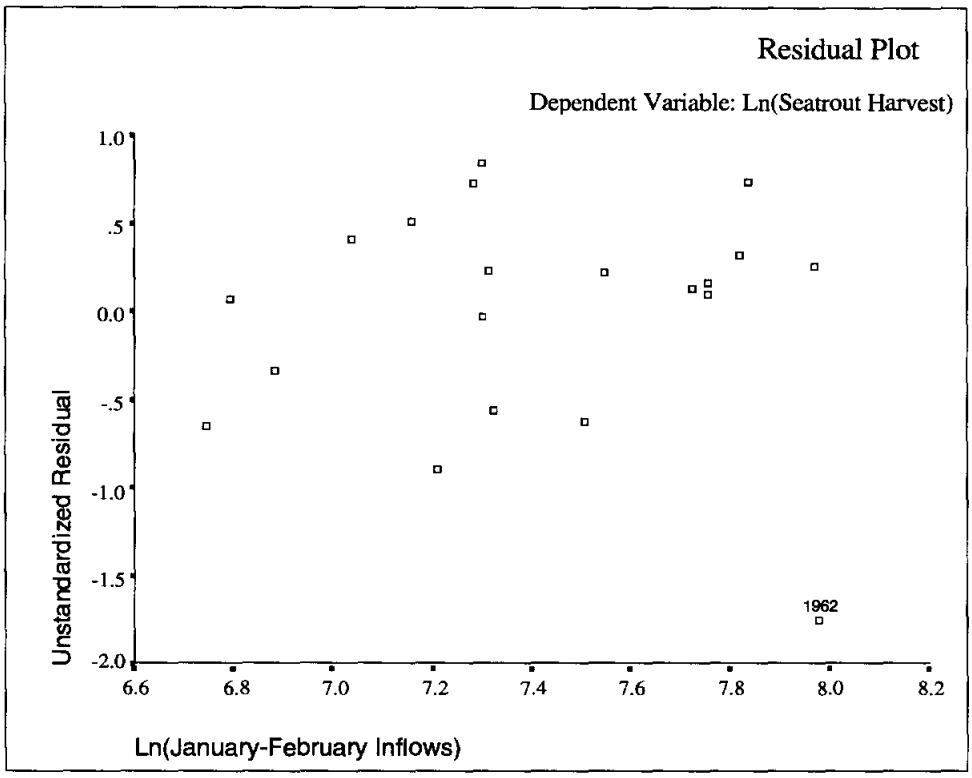

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
Ln(Seatrout Harvest)
1962
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

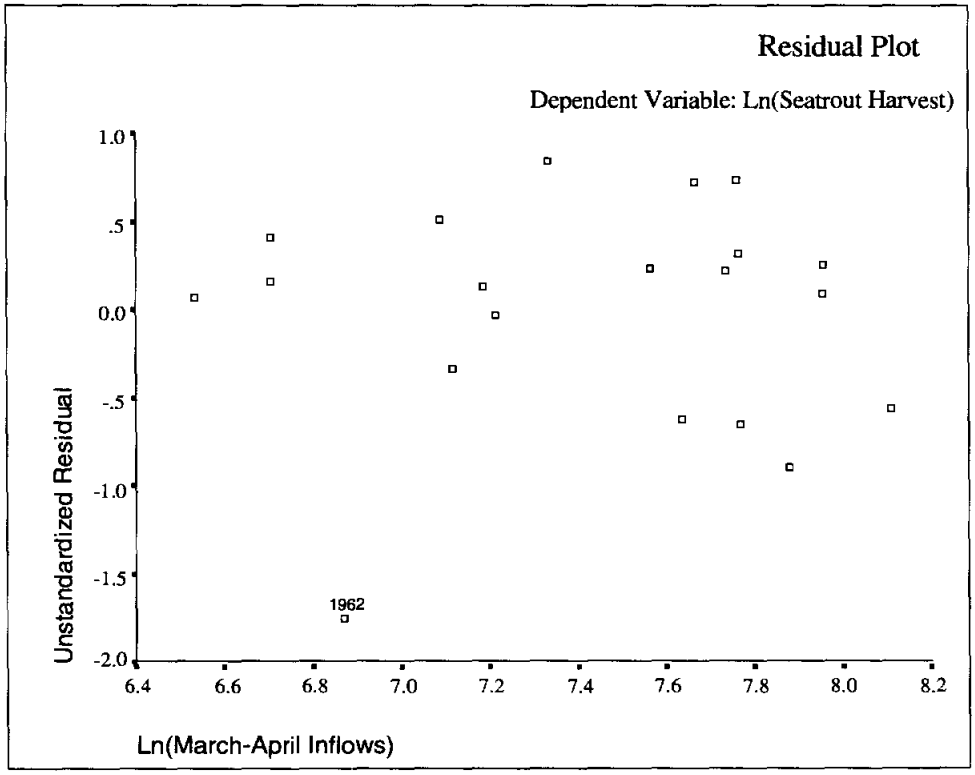

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1979
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(Seatrout Harvest)
Ln(May-June Inflows)

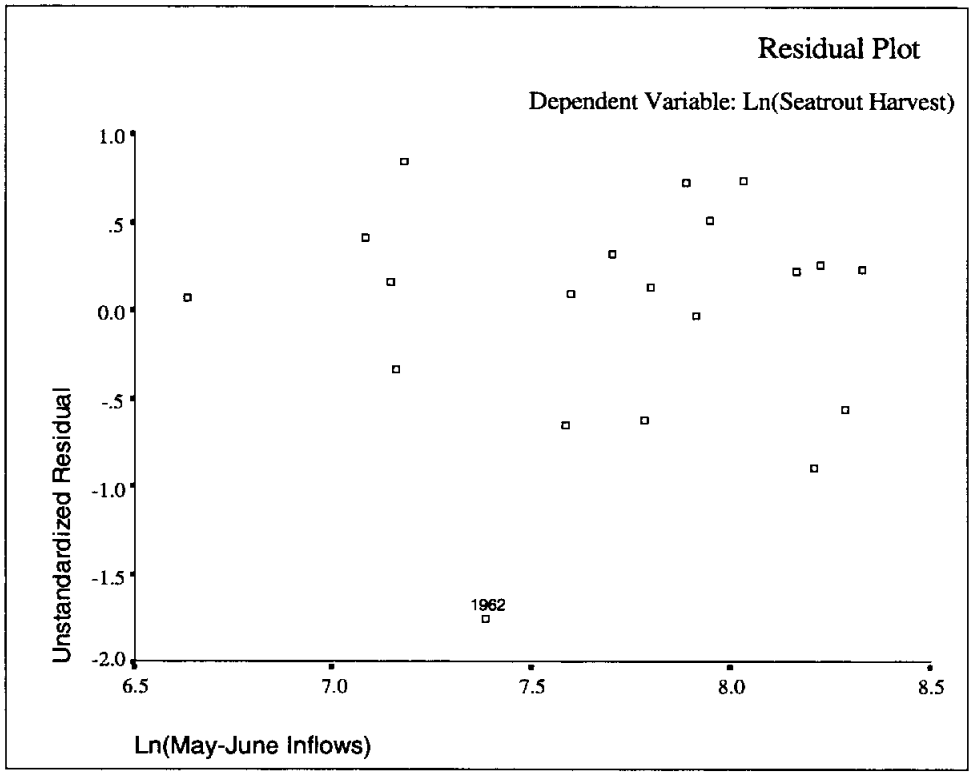

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
-.6
-.4
-.2
-.0
.2
.4
Ln(Seatrout Harvest)
Ln(July-August Inflows)

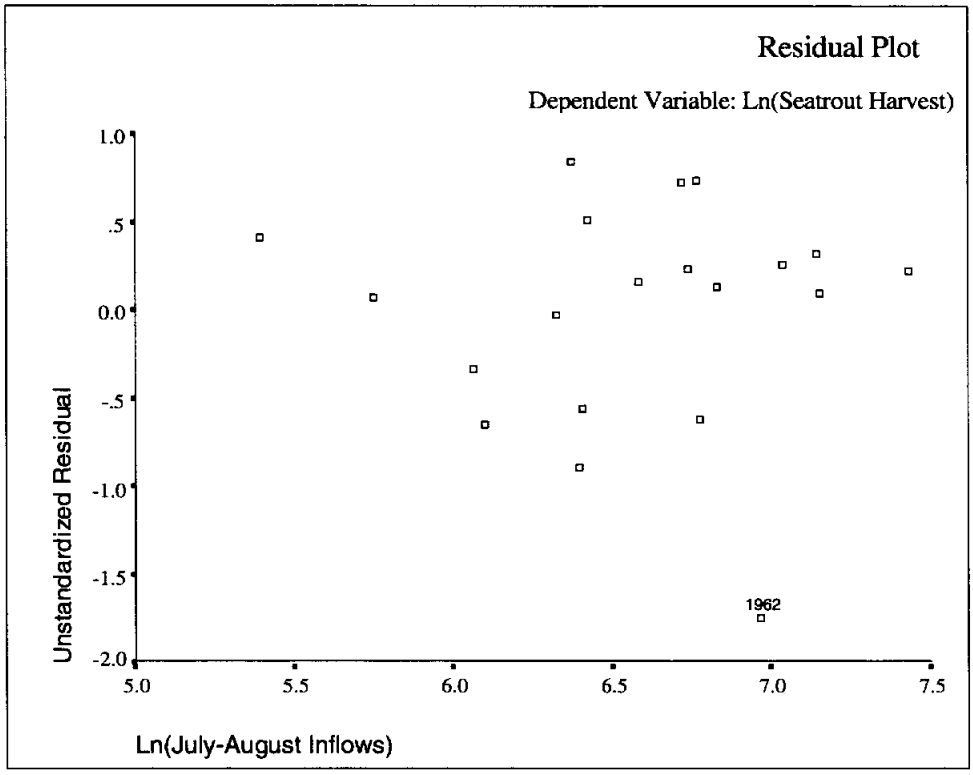

Partial Residual Plot
Ln(Seatrout Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

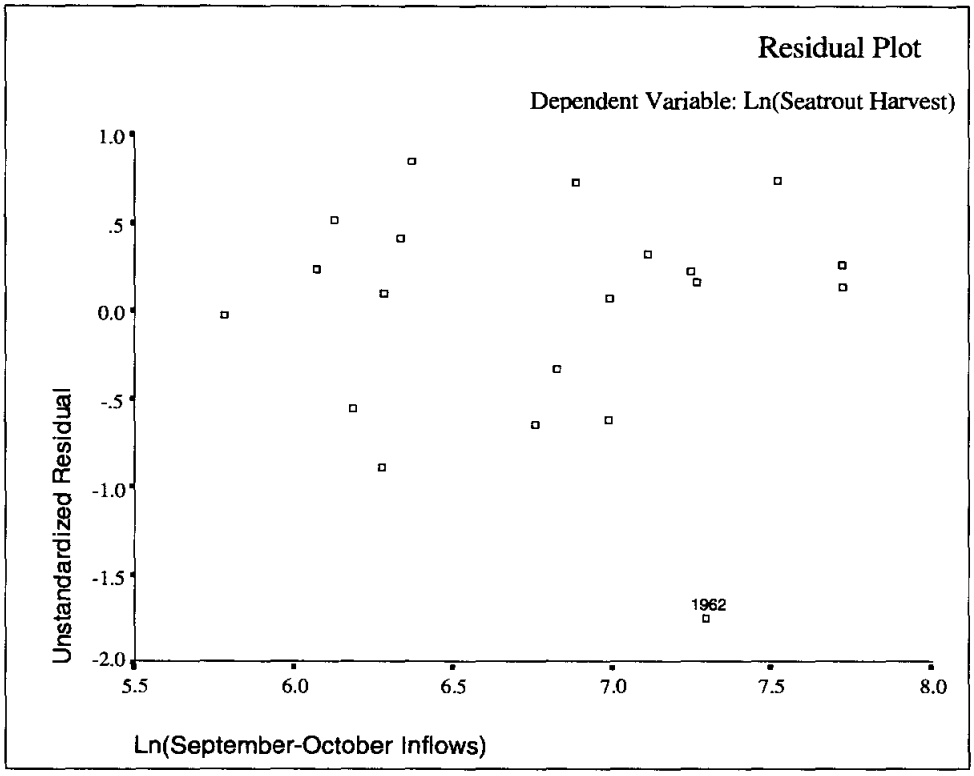

Partial Residual Plot
Ln(Seatrout Harvest)
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1977
1962
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

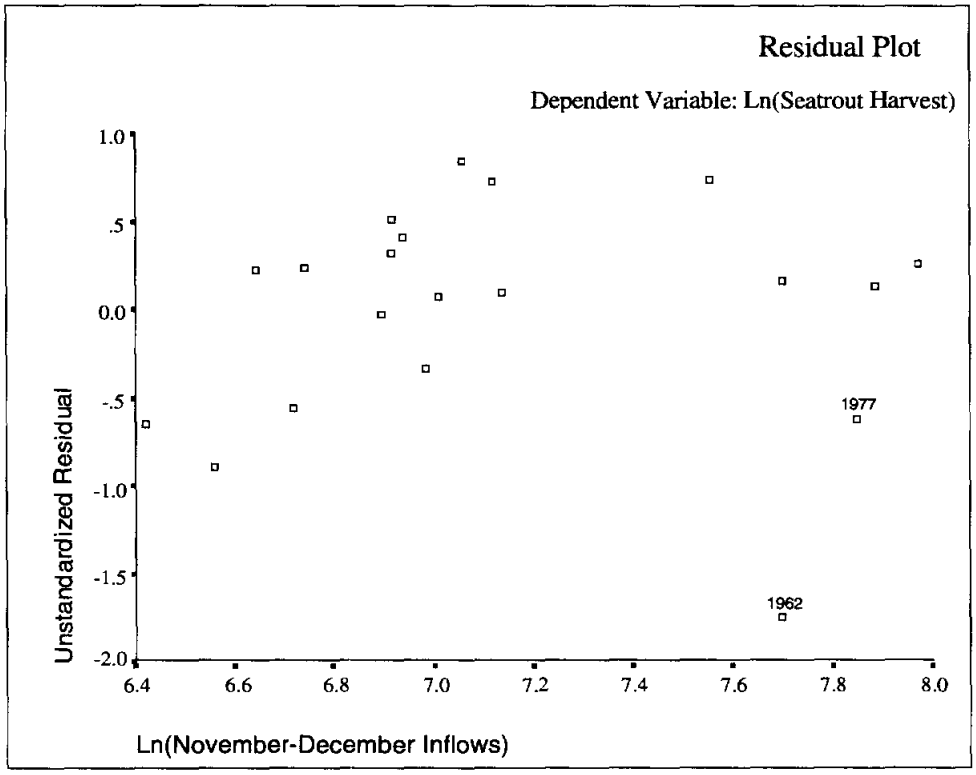

Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1962
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Seatrout Harvest)
Unstandardized Residual
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1977
1962
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Seatrout Harvest

YEAR	LGSTROUT	LICI_1	UICI_1
1962	2.83	1.91779	7.24213
1963	4.96	2.18814	7.40791
1964	5.18	2.34387	7.84663
1965	5.62	2.35335	8.05394
1966	5.09	2.46548	7.75383
1967	5.64	2.46085	7.78163
1968	5.16	2.28705	7.54870
1969	4.02	2.34755	7.46163
1970	4.49	2.40263	7.69572
1971	4.33	2.23573	7.71520
1972	4.86	2.61376	7.75838
1973	5.78	2.57483	7.51777
1974	5.61	2.23145	7.50753
1975	5.40	2.39315	7.86514
1976	5.20	2.43964	7.68897
1977	4.90	2.73242	8.31001
1978	5.84	2.41092	7.56422
1979	4.80	1.79836	7.61198
1980	4.51	1.46721	6.89669
1981	4.35	1.22390	7.02870

LGSTROUT Natural log of seatrout harvest

LICI_1 Lower limit for 99% prediction interval for the natural log of seatrout harvest

UICI_1 Upper limit for 99% prediction interval for the natural log of seatrout harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.52965	.27562	.6311	.2026
1963	4.25703	.00340	.22405	.7497	.0000
1964	6.95291	.00191	.36594	.4338	.0000
1965	8.92203	.09645	.46958	.2583	.0023
1966	4.89722	.00009	.25775	.6725	.0000
1967	5.20293	.04555	.27384	.6352	.0002
1968	4.64695	.00843	.24458	.7030	.0000
1969	3.28664	.07007	.17298	.8573	.0008
1970	4.94185	.04924	.26010	.6671	.0003
1971	6.72566	.11508	.35398	.4580	.0040
1972	3.56496	.01086	.18763	.8283	.0000
1973	1.75740	.02530	.09249	.9720	.0000
1974	4.78215	.08206	.25169	.6865	.0014
1975	6.65295	.01951	.35016	.4659	.0000
1976	4.53192	.00259	.23852	.7169	.0000
1977	7.68955	.14101	.40471	.3608	.0074
1978	3.64440	.07432	.19181	.8197	.0010
1979	10.07832	.00794	*.53044	.1842	.0000
1980	6.24115	.02502	.32848	.5119	.0000
1981	9.98730	.04024	*.52565	.1893	.0001

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	*-2.89149	.05285	*-1.12569	*1.37247
1963	.14850	.01108	.05159	-.06044
1964	.11111	.07742	-.03357	-.01563
1965	.80912	.11112	.45066	-.05032
1966	-.02399	-.00458	-.00244	.00929
1967	.55693	.20959	-.20707	-.37661
1968	.23465	.03522	-.04735	-.11912
1969	-.72202	.10480	-.20274	-.09385
1970	-.58145	.22942	-.20391	-.26805
1971	-.90467	-.24994	.25015	-.36587
1972	-.26736	-.15386	.16019	-.03317
1973	.42200	.02890	-.30924	.05351
1974	.76852	-.57473	.39297	.18281
1975	.35792	-.30270	.02408	.11942
1976	.12964	-.04290	-.03033	-.04697
1977	*-1.00120	.21564	.62791	-.32231
1978	.74104	.24780	.00890	.34372
1979	.22689	-.00155	.01484	.12004
1980	.40657	-.03500	.22958	.07218
1981	.51401	.10107	-.07271	-.19876

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

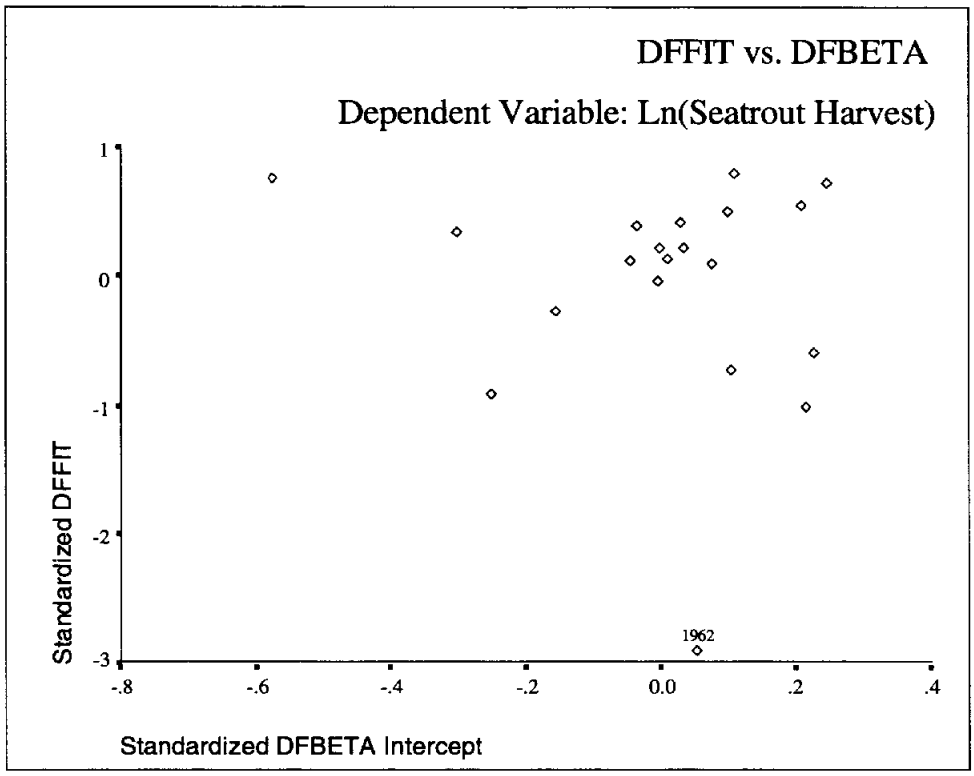
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

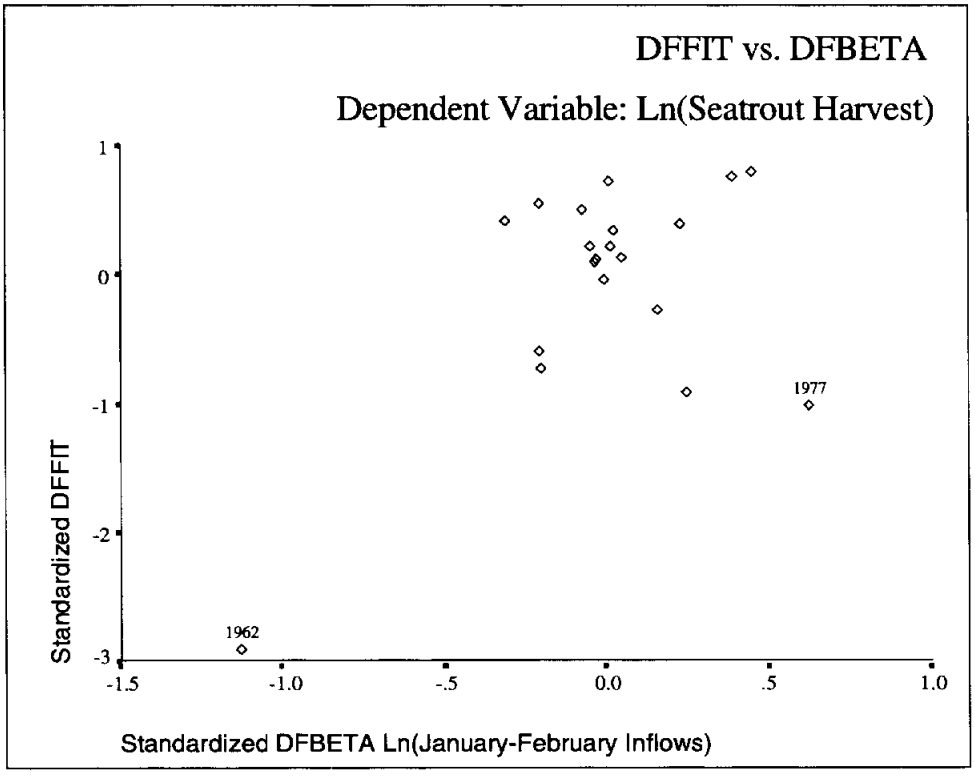
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.17511	-.24007	.01970	.55614
1963	-.01787	-.00930	.00580	-.01441
1964	-.03282	.01275	.02812	-.00213
1965	.04888	-.61891	.07386	-.25046
1966	-.00795	.00036	.01538	-.00263
1967	.31259	.19581	-.20344	.11986
1968	.13673	.06866	-.08013	.00581
1969	-.26755	.32754	-.09381	.28275
1970	-.09549	.32527	.05109	.08210
1971	.15325	.06639	-.40120	.18356
1972	.07716	-.07142	-.03191	-.06999
1973	.03049	.21571	.00815	.18425
1974	.18420	-.50191	.41289	-.16576
1975	.08174	-.10805	.09820	.11644
1976	.05905	.00936	.04950	.04004
1977	.11865	-.38065	.41139	-.91910
1978	-.58966	.10800	-.40659	.13857
1979	-.16632	.07145	-.14314	.04051
1980	-.16395	-.03258	.11297	-.28228
1981	.09263	.23959	.22104	-.25312

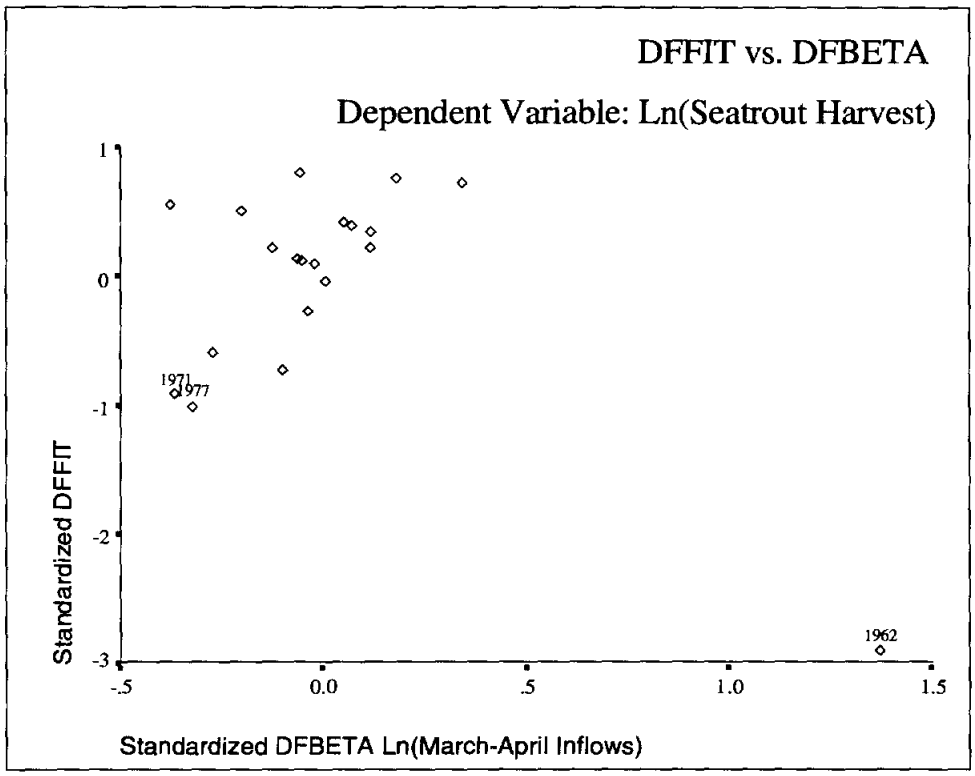
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

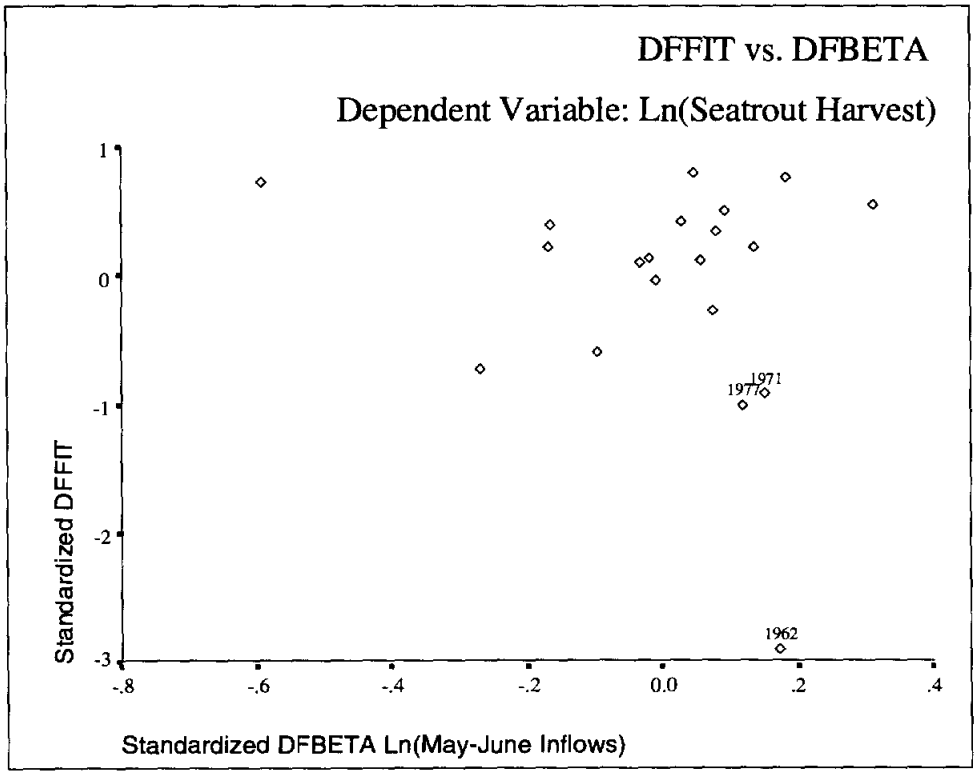
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

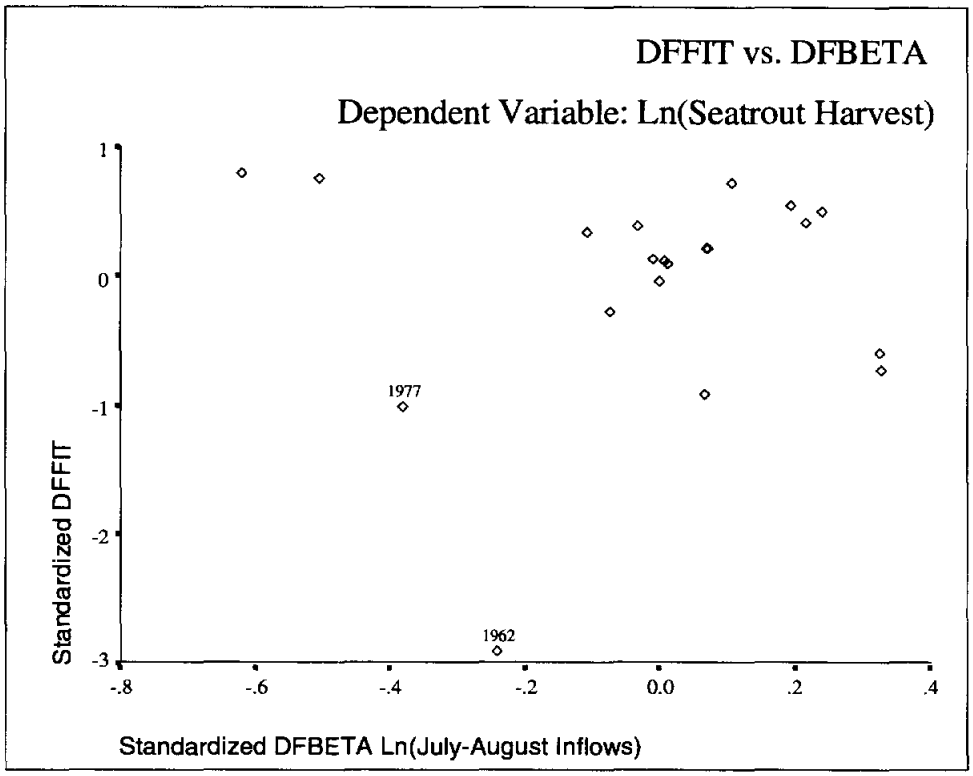
Graphics

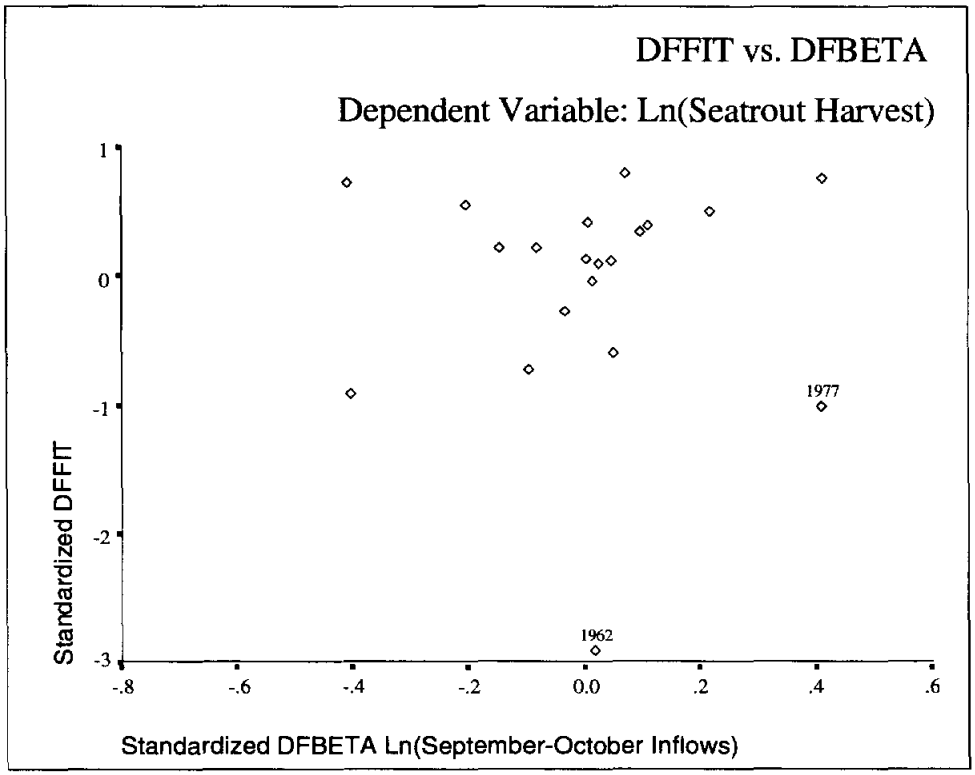

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Intercept

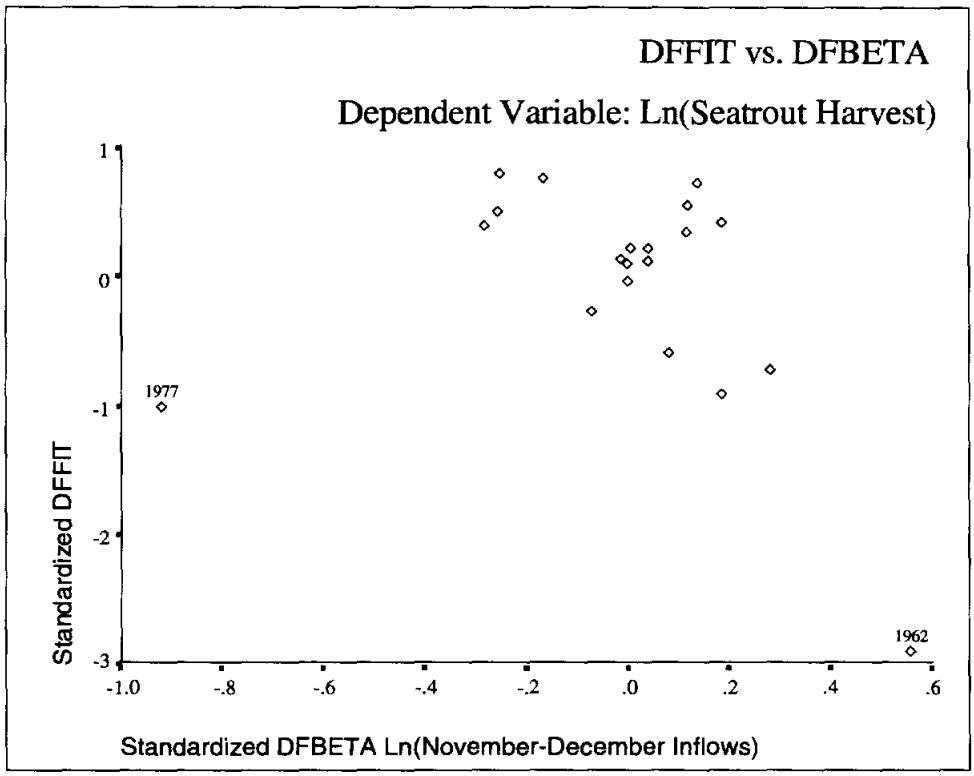

DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1977
1962
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA Ln(January-February Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1971
1977
1962
-.5
0.0
.5
1.0
1.5
Standardized DFBETA Ln(March-April Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1971
1977
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(May-June Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1977
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1977
1962
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Seatrout Harvest)
Standardized DFFIT
1
0
-1
-2
-3
1977
1962
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Standardized DFBETA Ln(November-December Inflows)

Examining Subsets of the Data

Logged Inflows: 1977 Omitted

N = 19 Regression Models for Dependent Variable: SEATROUT

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0670	0.0121	0.748	174.7	8918	176.6	LGJAINFL
1	0.0465	-.0096	1.094	175.1	9114	177.0	LGNDINFL
1	0.0287	-.0285	1.395	175.5	9285	177.4	LGMAINFL
1	0.0142	-.0438	1.639	175.8	9423	177.6	LGJFINFL
2	0.1875	0.0860	0.714	174.1	8252	176.9	LGJFINFL LGNDINFL
2	0.1646	0.0601	1.101	174.6	8485	177.4	LGJAINFL LGNDINFL
2	0.1318	0.0233	1.654	175.3	8817	178.2	LGSOINFL LGNDINFL
2	0.0875	-.0265	2.402	176.3	9267	179.1	LGJFINFL LGJAINFL
3	0.2575	0.1090	1.533	174.4	8044	178.1	LGJFINFL LGSOINFL LGNDINFL
3	0.2132	0.0558	2.281	175.5	8524	179.2	LGJFINFL LGMJINFL LGNDINFL
3	0.2073	0.0487	2.381	175.6	8588	179.4	LGJAINFL LGSOINFL LGNDINFL
3	0.2041	0.0450	2.433	175.7	8622	179.5	LGJFINFL LGMAINFL LGNDINFL
4	0.2875	0.0839	3.027	175.6	8271	180.3	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.2781	0.0719	3.184	175.8	8379	180.6	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.2612	0.0501	3.470	176.3	8576	181.0	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
4	0.2263	0.0053	4.059	177.2	8980	181.9	LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2890	0.0156	5.000	177.5	8887	183.2	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.2875	0.0134	5.027	177.6	8906	183.3	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2782	0.0006	5.183	177.8	9022	183.5	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2281	-.0687	6.028	179.1	9648	184.8	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.2891	-.0664	7.000	179.5	9627	186.2	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	SEATROUT	94.4362	488.117	.	.
2	MODEL1	PARMS	SEATROUT	95.4683	-151.575	.	.
3	MODEL1	PARMS	SEATROUT	96.3569	415.939	.	-33.2764
4	MODEL1	PARMS	SEATROUT	97.0726	384.514	-29.077	.
5	MODEL1	PARMS	SEATROUT	90.8385	252.424	-127.732	.
6	MODEL1	PARMS	SEATROUT	92.1132	125.916	.	.
7	MODEL1	PARMS	SEATROUT	93.9006	-126.659	.	.
8	MODEL1	PARMS	SEATROUT	96.2674	292.627	57.647	.
9	MODEL1	PARMS	SEATROUT	89.6873	253.513	-120.922	.
10	MODEL1	PARMS	SEATROUT	92.3253	39.531	-166.294	.
11	MODEL1	PARMS	SEATROUT	92.6711	97.197	.	.
12	MODEL1	PARMS	SEATROUT	92.8531	53.451	-160.231	32.5266
13	MODEL1	PARMS	SEATROUT	90.9426	-16.987	-164.406	44.2380
14	MODEL1	PARMS	SEATROUT	91.5357	62.079	-155.826	.
15	MODEL1	PARMS	SEATROUT	92.6043	266.575	-156.109	.
16	MODEL1	PARMS	SEATROUT	94.7643	-149.667	.	37.0709

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	SEATROUT	_IN_	_P_	_EDF_
1	.	-48.6243	.	.	-1	1	2	17
2	.	.	.	45.178	-1	1	2	17
3	.	.	.	.	-1	1	2	17
4	.	.	.	.	-1	1	2	17
5	.	.	.	121.565	-1	2	3	16
6	.	-67.9461	.	68.883	-1	2	3	16
7	.	.	-64.6004	103.361	-1	2	3	16
8	.	-83.9192	.	.	-1	2	3	16
9	.	.	-58.6664	170.331	-1	3	4	15
10	38.5935	.	.	149.941	-1	3	4	15
11	.	-56.4299	-47.4811	107.630	-1	3	4	15
12	.	.	.	149.523	-1	3	4	15
13	.	.	-64.8409	213.488	-1	4	5	14
14	34.6967	.	-56.6450	194.162	-1	4	5	14
15	.	24.5938	-64.4008	187.958	-1	4	5	14
16	.	-80.2196	-47.2263	125.414	-1	4	5	14

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	8918.20	0.06702	0.01214	0.74778	174.708	176.597
2	9114.19	0.04651	-0.00957	1.09387	175.121	177.010
3	9284.65	0.02868	-0.02846	1.39486	175.473	177.362
4	9423.09	0.01420	-0.04379	1.63932	175.754	177.643
5	8251.63	0.18753	0.08597	0.71365	174.080	176.913
6	8484.84	0.16457	0.06014	1.10123	174.610	177.443
7	8817.33	0.13183	0.02331	1.65380	175.340	178.173
8	9267.42	0.08751	-0.02655	2.40182	176.286	179.119
9	8043.81	0.25749	0.10899	1.53275	174.369	178.147
10	8523.95	0.21317	0.05581	2.28084	175.471	179.248
11	8587.93	0.20727	0.04872	2.38052	175.613	179.391
12	8621.70	0.20415	0.04498	2.43314	175.687	179.465
13	8270.55	0.28746	0.08388	3.02696	175.586	180.309
14	8378.78	0.27813	0.07189	3.18434	175.833	180.556
15	8575.56	0.26118	0.05009	3.47049	176.275	180.997
16	8980.27	0.22631	0.00526	4.05903	177.151	181.873

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	SEATROUT	94.2705	-33.176	-168.526	35.3830
18	MODEL1	PARMS	SEATROUT	94.3738	-13.053	-167.132	43.7871
19	MODEL1	PARMS	SEATROUT	94.9855	68.960	-160.660	.
20	MODEL1	PARMS	SEATROUT	98.2255	-174.190	.	28.1731
21	MODEL1	PARMS	SEATROUT	98.1191	-36.075	-166.797	35.5197

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	SEATROUT	_IN_	_P_	_EDF_
17	12.7479	.	-62.8623	213.605	-1	5	6	13
18	.	2.2155	-65.2945	214.636	-1	5	6	13
19	33.8333	3.9858	-57.6246	196.425	-1	5	6	13
20	13.9935	-84.0098	-44.2808	123.679	-1	5	6	13
21	12.9807	-1.4659	-62.5260	212.848	-1	6	7	12

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	8886.92	0.28904	0.01560	5.00019	177.544	183.211
18	8906.41	0.28749	0.01344	5.02650	177.586	183.252
19	9022.25	0.27822	0.00061	5.18292	177.831	183.498
20	9648.25	0.22814	-0.06873	6.02822	179.106	184.772
21	9627.35	0.28906	-0.06642	7.00000	179.544	186.155

Logged Harvest : 1962 and 1977 Omitted

N = 18 Regression Models for Dependent Variable: LGSTROUT

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1930	0.1426	0.930	-22.56	0.2572	-20.78	MA_INFL
1	0.1493	0.0962	1.737	-21.61	0.2712	-19.83	ND_INFL
1	0.0598	0.0010	3.395	-19.81	0.2997	-18.03	MJ_INFL
1	0.0554	-.0036	3.474	-19.73	0.3011	-17.95	JA_INFL
2	0.3175	0.2266	0.625	-23.58	0.2320	-20.91	MA_INFL ND_INFL
2	0.2793	0.1832	1.333	-22.60	0.2450	-19.92	SO_INFL ND_INFL
2	0.2598	0.1611	1.693	-22.12	0.2517	-19.44	JA_INFL ND_INFL
2	0.2495	0.1494	1.884	-21.87	0.2552	-19.19	JF_INFL MA_INFL
3	0.4003	0.2718	1.094	-23.90	0.2185	-20.34	MA_INFL SO_INFL ND_INFL
3	0.3402	0.1988	2.207	-22.18	0.2404	-18.62	JF_INFL SO_INFL ND_INFL
3	0.3347	0.1922	2.307	-22.04	0.2424	-18.47	MA_INFL JA_INFL ND_INFL
3	0.3232	0.1782	2.521	-21.73	0.2466	-18.16	JF_INFL MA_INFL ND_INFL
4	0.4028	0.2191	3.048	-21.98	0.2343	-17.53	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.4025	0.2187	3.054	-21.97	0.2344	-17.52	MA_INFL MJ_INFL SO_INFL ND_INFL
4	0.4007	0.2163	3.087	-21.92	0.2351	-17.46	MA_INFL JA_INFL SO_INFL ND_INFL
4	0.3526	0.1533	3.978	-20.52	0.2540	-16.07	JF_INFL MJ_INFL SO_INFL ND_INFL
5	0.4051	0.1572	5.006	-20.05	0.2528	-14.71	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.4036	0.1552	5.033	-20.00	0.2535	-14.66	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.4033	0.1546	5.039	-19.99	0.2536	-14.65	MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.3542	0.0851	5.948	-18.57	0.2745	-13.23	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.4054	0.0811	7.000	-18.06	0.2757	-11.82	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	LGSTROUT	0.50719	5.61859	.	-.00030213
2	MODEL1	PARMS	LGSTROUT	0.52073	4.63616	.	.
3	MODEL1	PARMS	LGSTROUT	0.54746	5.36160	.	.
4	MODEL1	PARMS	LGSTROUT	0.54871	5.31245	.	.
5	MODEL1	PARMS	LGSTROUT	0.48171	5.20620	.	-.00028295
6	MODEL1	PARMS	LGSTROUT	0.49502	4.65154	.	.
7	MODEL1	PARMS	LGSTROUT	0.50167	4.93877	.	.
8	MODEL1	PARMS	LGSTROUT	0.50515	5.35894	0.00022443	-.00036696
9	MODEL1	PARMS	LGSTROUT	0.46739	5.14119	.	-.00024447
10	MODEL1	PARMS	LGSTROUT	0.49027	4.91373	-.00031433	.
11	MODEL1	PARMS	LGSTROUT	0.49229	5.23076	.	-.00022465
12	MODEL1	PARMS	LGSTROUT	0.49655	5.22581	-.00011844	-.00024328
13	MODEL1	PARMS	LGSTROUT	0.48403	5.15528	-.00007909	-.00021857
14	MODEL1	PARMS	LGSTROUT	0.48416	5.11943	.	-.00027519
15	MODEL1	PARMS	LGSTROUT	0.48488	5.14705	.	-.00023615
16	MODEL1	PARMS	LGSTROUT	0.50399	5.01898	-.00024909	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LGSTROUT	_IN_	_P_
1	.	.	.	.	-1	1	2
2	.	.	.	.00031699	-1	1	2
3	-.00012661	.	.	.	-1	1	2
4	.	-.00034312	.	.	-1	1	2
5	.	.	.	.00029041	-1	2	3
6	.	.	-.00057048	.00075064	-1	2	3
7	.	-.00049748	.	.00038088	-1	2	3
8	.	.	.	.	-1	2	3
9	.	.	-.00046378	.00064657	-1	3	4
10	.	.	-.00049725	.00090452	-1	3	4
11	.	-.00023348	.	.00032587	-1	3	4
12	.	.	.	.00037309	-1	3	4
13	.	.	-.00045666	.00069631	-1	4	5
14	0.00003324	.	-.00046064	.00064196	-1	4	5
15	.	-.00003779	-.00045032	.00064197	-1	4	5
16	-.00006374	.	-.00049277	.00085635	-1	4	5

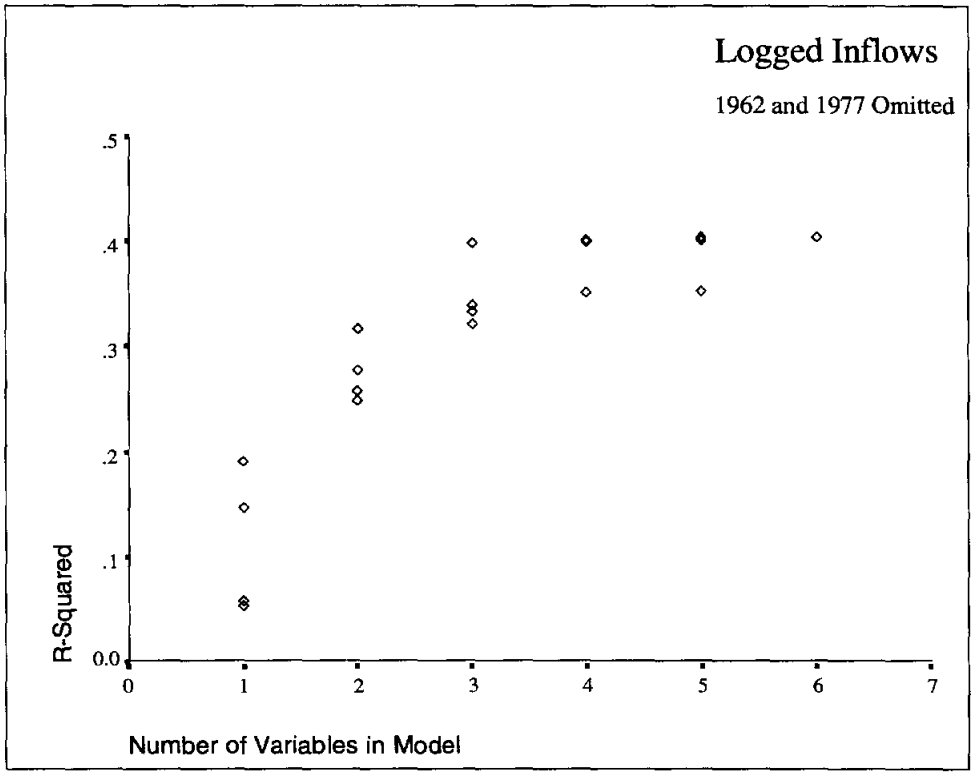
OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	16	0.25724	0.19299	0.14255	0.92982	-22.5592	-20.7784
2	16	0.27116	0.14933	0.09617	1.73745	-21.6109	-19.8301
3	16	0.29971	0.05976	0.00100	3.39452	-19.8089	-18.0281
4	16	0.30109	0.05545	-0.00359	3.47435	-19.7264	-17.9457
5	15	0.23204	0.31755	0.22655	0.62544	-23.5768	-20.9057
6	15	0.24504	0.27931	0.18322	1.33288	-22.5955	-19.9243
7	15	0.25167	0.25982	0.16113	1.69334	-22.1153	-19.4442
8	15	0.25518	0.24950	0.14943	1.88435	-21.8659	-19.1948
9	14	0.21846	0.40034	0.27184	1.09378	-23.9047	-20.3432
10	14	0.24037	0.34019	0.19880	2.20656	-22.1841	-18.6227
11	14	0.24235	0.33474	0.19219	2.30731	-22.0362	-18.4747
12	14	0.24656	0.32319	0.17816	2.52108	-21.7262	-18.1647
13	13	0.23428	0.40284	0.21909	3.04761	-21.9798	-17.5279
14	13	0.23441	0.40251	0.21866	3.05370	-21.9699	-17.5180
15	13	0.23511	0.40072	0.21633	3.08674	-21.9162	-17.4643
16	13	0.25401	0.35256	0.15334	3.97779	-20.5247	-16.0728

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	LGSTROUT	0.50283	5.13332	-.00008061	-.00024947
18	MODEL1	PARMS	LGSTROUT	0.50345	5.15152	-.00013181	-.00021998
19	MODEL1	PARMS	LGSTROUT	0.50360	5.12567	.	-.00026631
20	MODEL1	PARMS	LGSTROUT	0.52391	5.02004	-.00032224	.
21	MODEL1	PARMS	LGSTROUT	0.52506	5.13291	-.00011412	-.00024756

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LGSTROUT	_IN_	_P_
17	0.00003398	.	-.00045331	.00069256	-1	5	6
18	.	0.00008482	-.00048212	.00073978	-1	5	6
19	0.00003667	-.00005469	-.00044083	.00063483	-1	5	6
20	-.00006905	0.00012289	-.00052967	.00091727	-1	5	6
21	0.00003089	0.00005413	-.00046986	.00072064	-1	6	7

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	12	0.25284	0.40510	0.15722	5.00575	-20.0481	-14.7059
18	12	0.25346	0.40365	0.15516	5.03264	-20.0042	-14.6620
19	12	0.25362	0.40328	0.15465	5.03937	-19.9932	-14.6510
20	12	0.27449	0.35417	0.08508	5.94785	-18.5697	-13.2275
21	11	0.27568	0.40541	0.08109	7.00000	-18.0575	-11.8249

Scree Plots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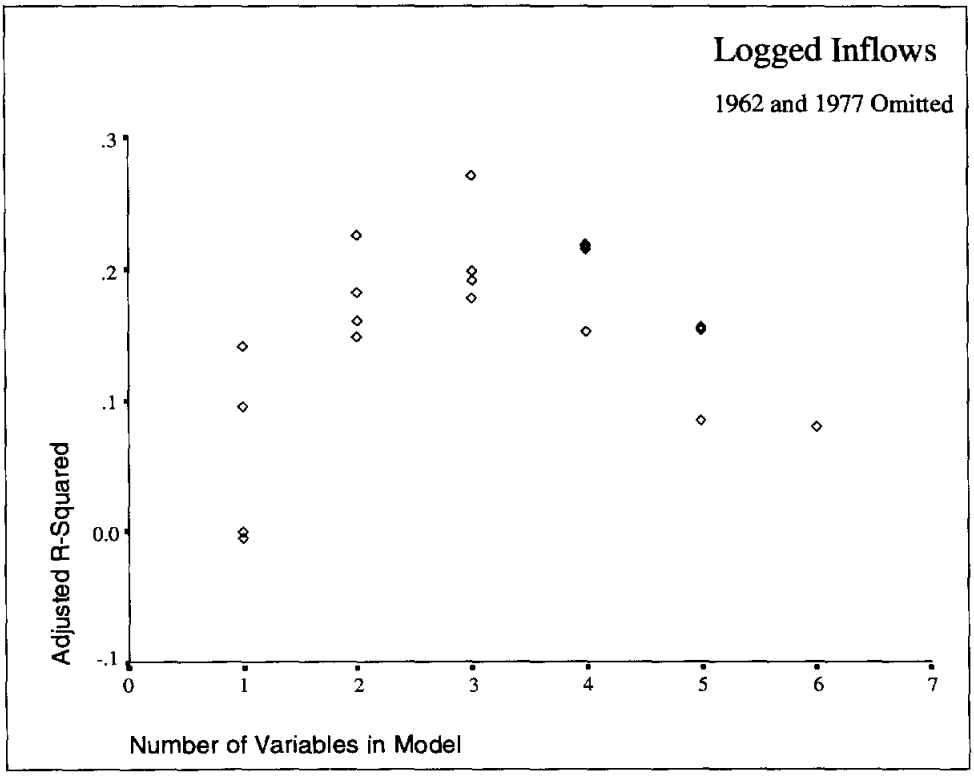
6
7
Number of Variables in Model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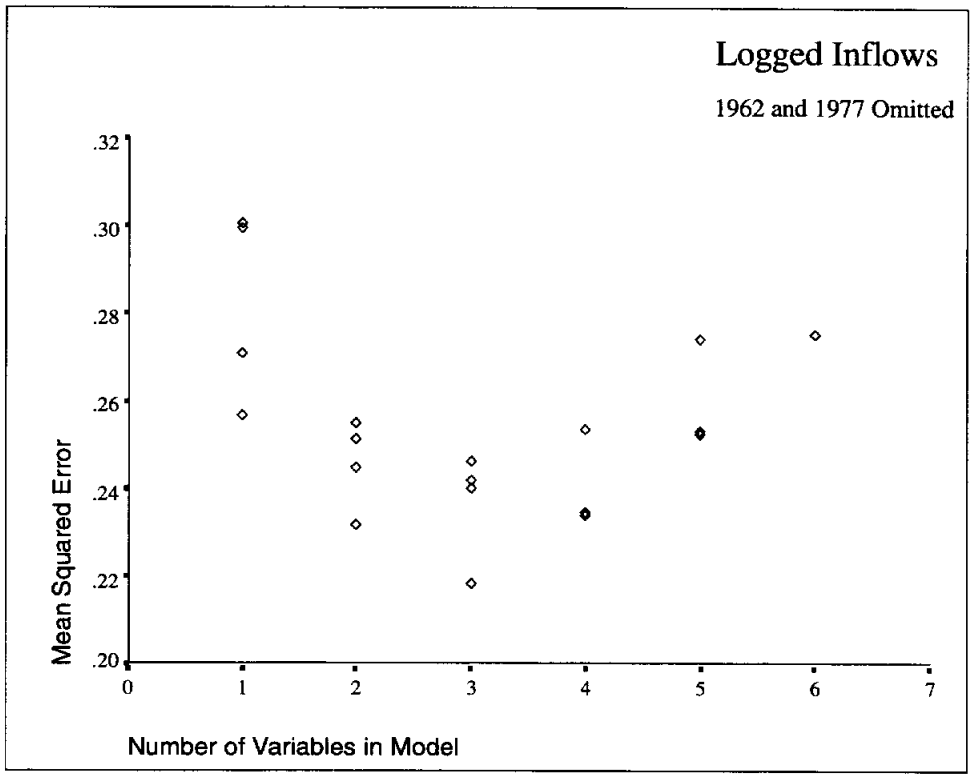
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
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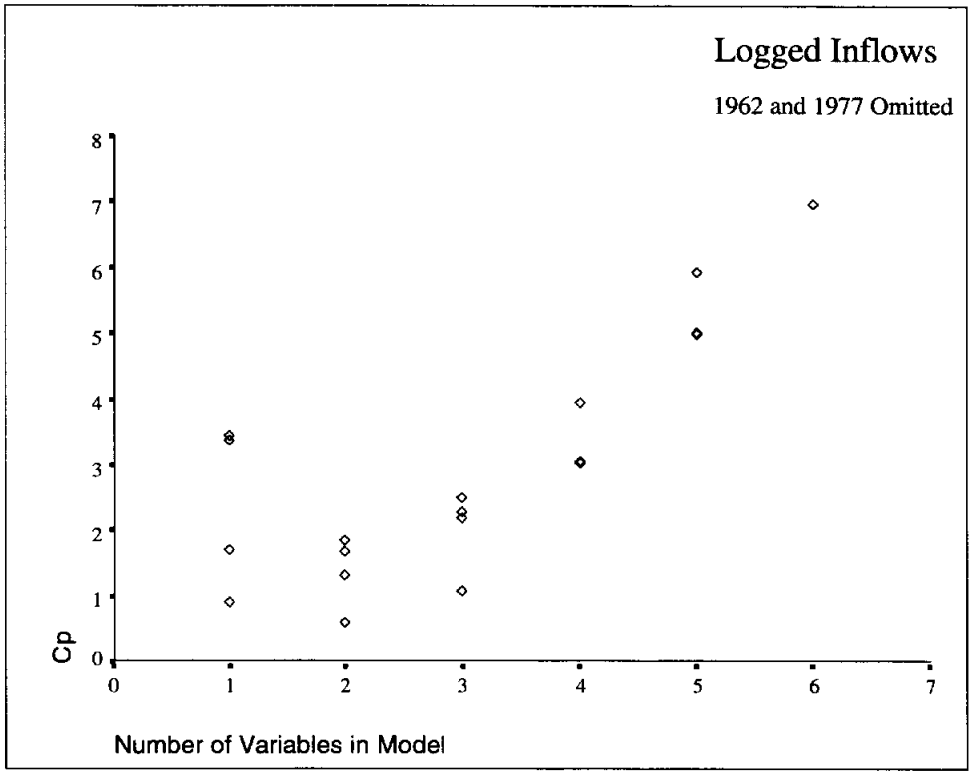
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
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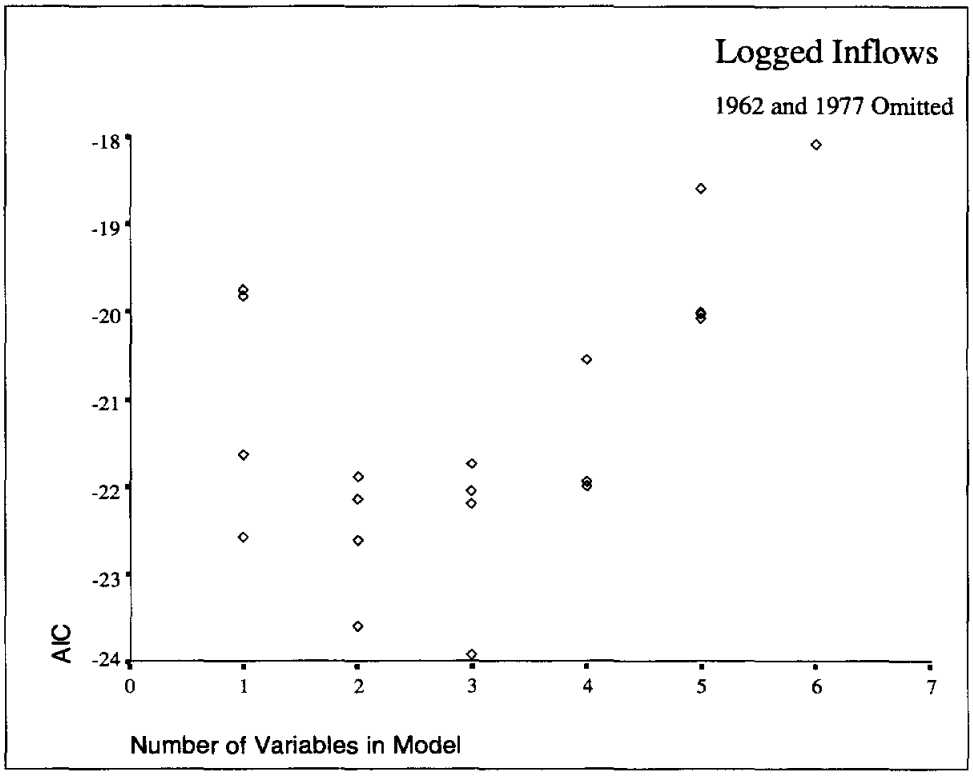
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
AIC
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-21
-22
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3
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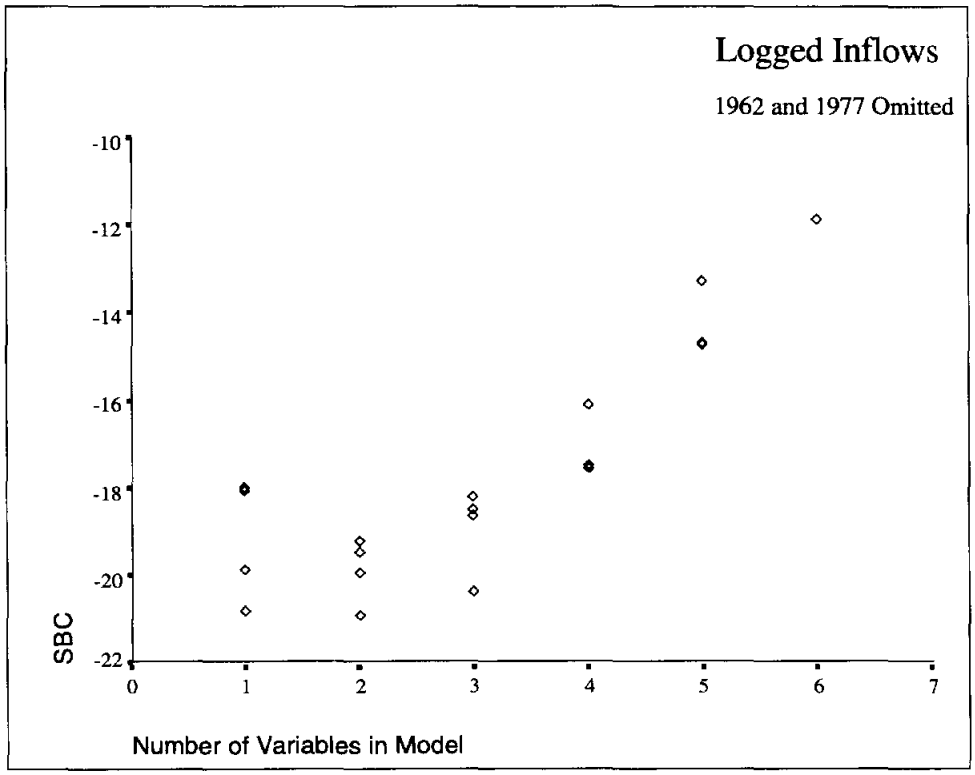
6
7
Number of Variables in Model


Logged Inflows
1962 and 1977 Omitted
SBC
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-12
-14
-16
-18
-20
-22
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1962 Omitted

N = 19 Regression Models for Dependent Variable: LGSTROUT

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1867	0.1389	0.911	-24.84	0.2450	-22.95	LGNDINFL
1	0.1612	0.1118	1.410	-24.25	0.2527	-22.36	LGMAINFL
1	0.0560	0.0005	3.468	-22.01	0.2843	-20.12	LGMJINFL
1	0.0410	-.0155	3.762	-21.71	0.2889	-19.82	LGJAINFL
2	0.3100	0.2238	0.499	-25.96	0.2208	-23.13	LGMAINFL LGNDINFL
2	0.3032	0.2161	0.632	-25.78	0.2230	-22.94	LGJAINFL LGNDINFL
2	0.2770	0.1866	1.145	-25.07	0.2314	-22.24	LGSOINFL LGNDINFL
2	0.2634	0.1713	1.411	-24.72	0.2358	-21.89	LGJFINFL LGNDINFL
3	0.3759	0.2511	1.209	-25.87	0.2130	-22.09	LGMAINFL LGSOINFL LGNDINFL
3	0.3501	0.2201	1.714	-25.10	0.2218	-21.32	LGJAINFL LGSOINFL LGNDINFL
3	0.3347	0.2017	2.015	-24.66	0.2271	-20.88	LGJFINFL LGSOINFL LGNDINFL
3	0.3288	0.1945	2.131	-24.49	0.2291	-20.71	LGMAINFL LGJAINFL LGNDINFL
4	0.3816	0.2050	3.097	-24.05	0.2262	-19.32	LGMAINFL LGJAINFL LGSOINFL LGNDINFL
4	0.3802	0.2032	3.125	-24.00	0.2267	-19.28	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.3776	0.1997	3.177	-23.92	0.2277	-19.20	LGMAINFL LGMJINFL LGSOINFL LGNDINFL
4	0.3522	0.1671	3.674	-23.16	0.2369	-18.44	LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.3862	0.1501	5.008	-22.19	0.2418	-16.52	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.3838	0.1468	5.055	-22.11	0.2427	-16.44	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.3819	0.1442	5.092	-22.05	0.2435	-16.39	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.3528	0.1039	5.662	-21.18	0.2549	-15.51	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.3866	0.0799	7.000	-20.20	0.2617	-13.59	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LGSTROUT	0.49495	1.52290	.	.
2	MODEL1	PARMS	LGSTROUT	0.50266	8.45760	.	-0.45839
3	MODEL1	PARMS	LGSTROUT	0.53324	7.06248	.	.
4	MODEL1	PARMS	LGSTROUT	0.53747	6.45620	.	.
5	MODEL1	PARMS	LGSTROUT	0.46992	4.88878	.	-0.40401
6	MODEL1	PARMS	LGSTROUT	0.47224	3.18330	.	.
7	MODEL1	PARMS	LGSTROUT	0.48104	1.87175	.	.
8	MODEL1	PARMS	LGSTROUT	0.48555	3.53408	-0.52471	.
9	MODEL1	PARMS	LGSTROUT	0.46156	4.86526	.	-0.36509
10	MODEL1	PARMS	LGSTROUT	0.47101	3.15029	.	.
11	MODEL1	PARMS	LGSTROUT	0.47655	3.59614	-0.45930	.
12	MODEL1	PARMS	LGSTROUT	0.47868	4.55949	.	-0.25408
13	MODEL1	PARMS	LGSTROUT	0.47557	4.67979	.	-0.28277
14	MODEL1	PARMS	LGSTROUT	0.47611	4.98736	-0.15604	-0.30854
15	MODEL1	PARMS	LGSTROUT	0.47714	4.75034	.	-0.42088
16	MODEL1	PARMS	LGSTROUT	0.48677	3.51445	.	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LGSTROUT	_IN_	_P_	_EDF_
1	.	.	.	0.49478	-1	1	2	17
2	.	.	.	.	-1	1	2	17
3	-0.26213	.	.	.	-1	1	2	17
4	.	-0.21637	.	.	-1	1	2	17
5	.	.	.	0.44513	-1	2	3	16
6	.	-0.38102	.	0.61232	-1	2	3	16
7	.	.	-0.36337	0.79151	-1	2	3	16
8	.	.	.	0.75692	-1	2	3	16
9	.	.	-0.31324	0.70571	-1	3	4	15
10	.	-0.31351	-0.27206	0.81367	-1	3	4	15
11	.	.	-0.32581	0.99030	-1	3	4	15
12	.	-0.21108	.	0.52868	-1	3	4	15
13	.	-0.12003	-0.28959	0.73354	-1	4	5	14
14	.	.	-0.30825	0.78654	-1	4	5	14
15	0.06955	.	-0.30379	0.69588	-1	4	5	14
16	-0.06796	-0.26568	-0.28775	0.80708	-1	4	5	14

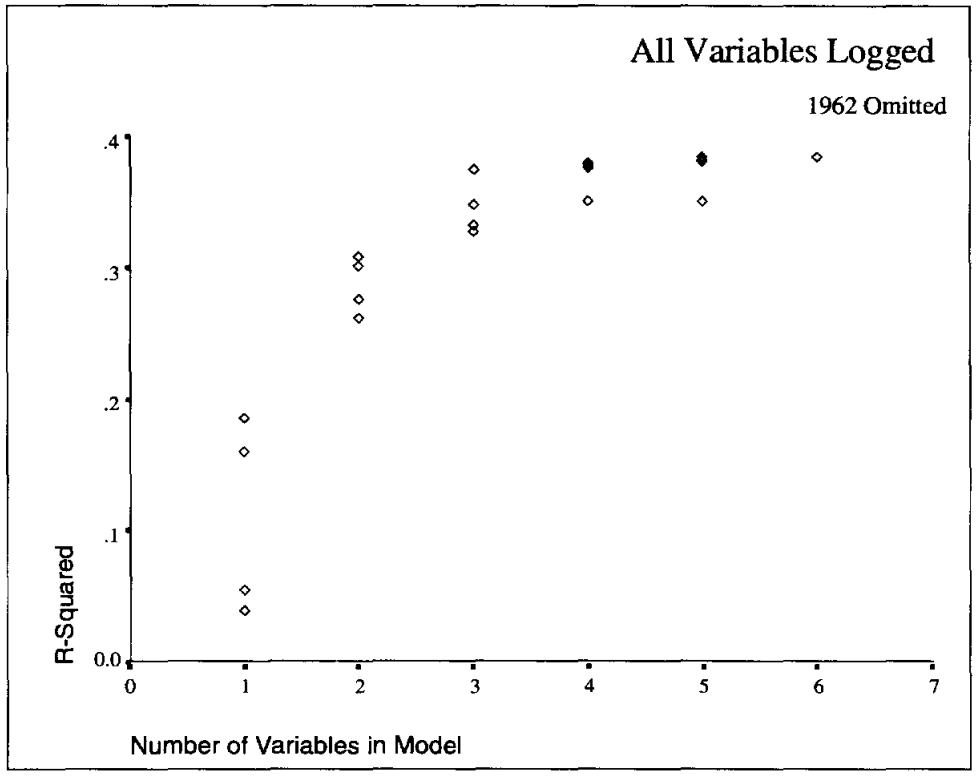
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.24498	0.18669	0.13885	0.91113	-24.8385	-22.9496
2	0.25266	0.16118	0.11183	1.41033	-24.2516	-22.3627
3	0.28434	0.05600	0.00047	3.46793	-22.0072	-20.1183
4	0.28887	0.04096	-0.01545	3.76211	-21.7069	-19.8181
5	0.22082	0.31001	0.22377	0.49852	-25.9629	-23.1296
6	0.22301	0.30318	0.21608	0.63226	-25.7756	-22.9422
7	0.23140	0.27696	0.18658	1.14519	-25.0738	-22.2405
8	0.23575	0.26335	0.17127	1.41141	-24.7195	-21.8862
9	0.21303	0.37595	0.25114	1.20862	-25.8712	-22.0934
10	0.22185	0.35012	0.22015	1.71383	-25.1008	-21.3230
11	0.22710	0.33473	0.20168	2.01495	-24.6560	-20.8783
12	0.22914	0.32878	0.19454	2.13141	-24.4868	-20.7090
13	0.22617	0.38164	0.20497	3.09726	-24.0453	-19.3231
14	0.22668	0.38024	0.20317	3.12464	-24.0023	-19.2801
15	0.22766	0.37756	0.19972	3.17709	-23.9203	-19.1981
16	0.23695	0.35217	0.16707	3.67388	-23.1606	-18.4384

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LGSTROUT	0.49169	4.41977	.	-0.35716
18	MODEL1	PARMS	LGSTROUT	0.49267	4.84096	-0.19491	-0.38028
19	MODEL1	PARMS	LGSTROUT	0.49342	4.76452	-0.05557	-0.28094
20	MODEL1	PARMS	LGSTROUT	0.50490	3.64355	-0.08584	.
21	MODEL1	PARMS	LGSTROUT	0.51161	4.51974	-0.06828	-0.35609

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LGSTROUT	_IN_	_P_	_EDF_
17	0.12361	-0.15613	-0.26567	0.72444	-1	5	6	13
18	0.10701	.	-0.29246	0.79155	-1	5	6	13
19	.	-0.09334	-0.29307	0.75614	-1	5	6	13
20	-0.06476	-0.22476	-0.29256	0.84149	-1	5	6	13
21	0.12557	-0.12390	-0.26957	0.75206	-1	6	7	12

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.24176	0.38622	0.15015	5.00774	-22.1864	-16.5198
18	0.24272	0.38379	0.14679	5.05521	-22.1115	-16.4448
19	0.24346	0.38190	0.14417	5.09212	-22.0534	-16.3867
20	0.25493	0.35279	0.10387	5.66163	-21.1789	-15.5123
21	0.26174	0.38661	0.07992	7.00000	-20.1987	-13.5876

Scree Plots


All Variables Logged
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R-Squared
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4
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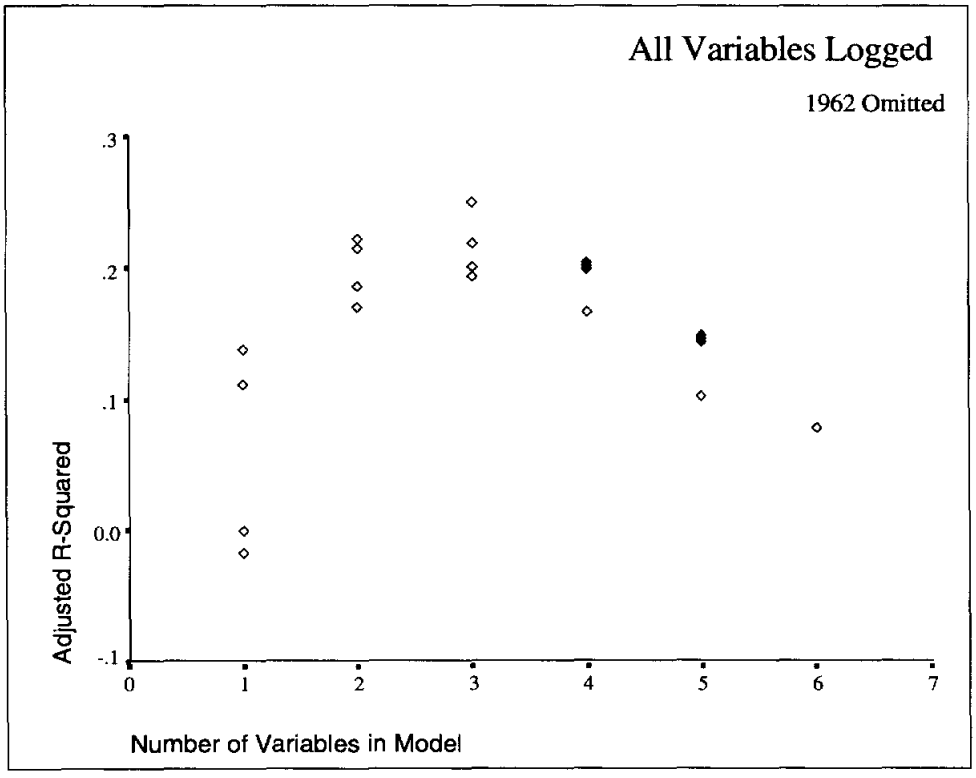
Number of Variables in Model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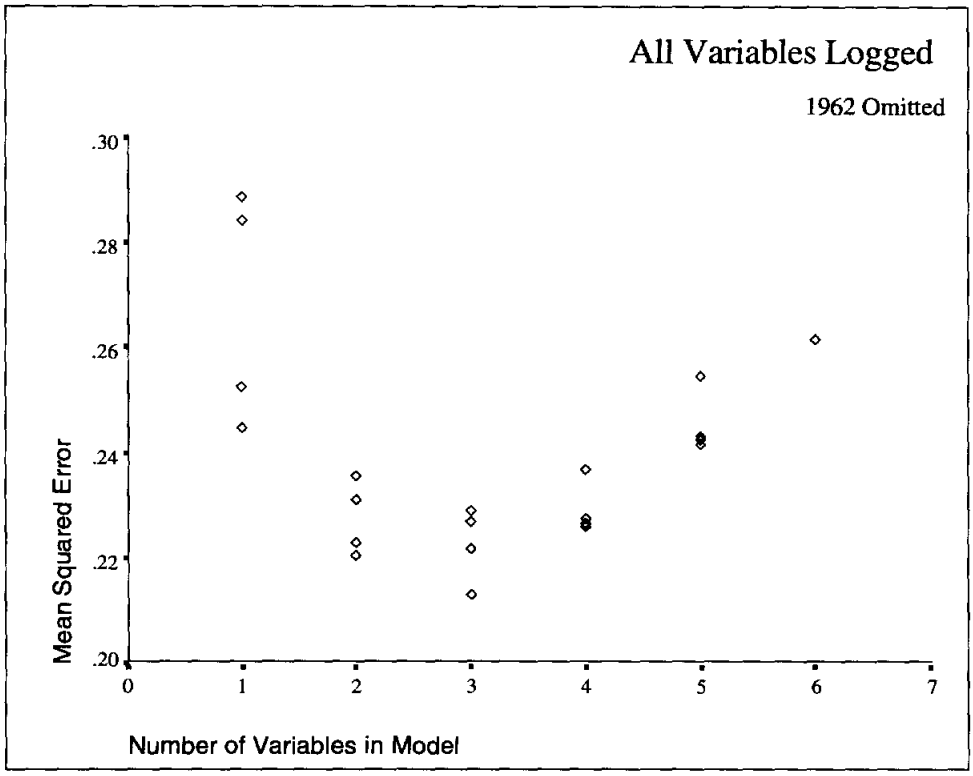
Number of Variables in Model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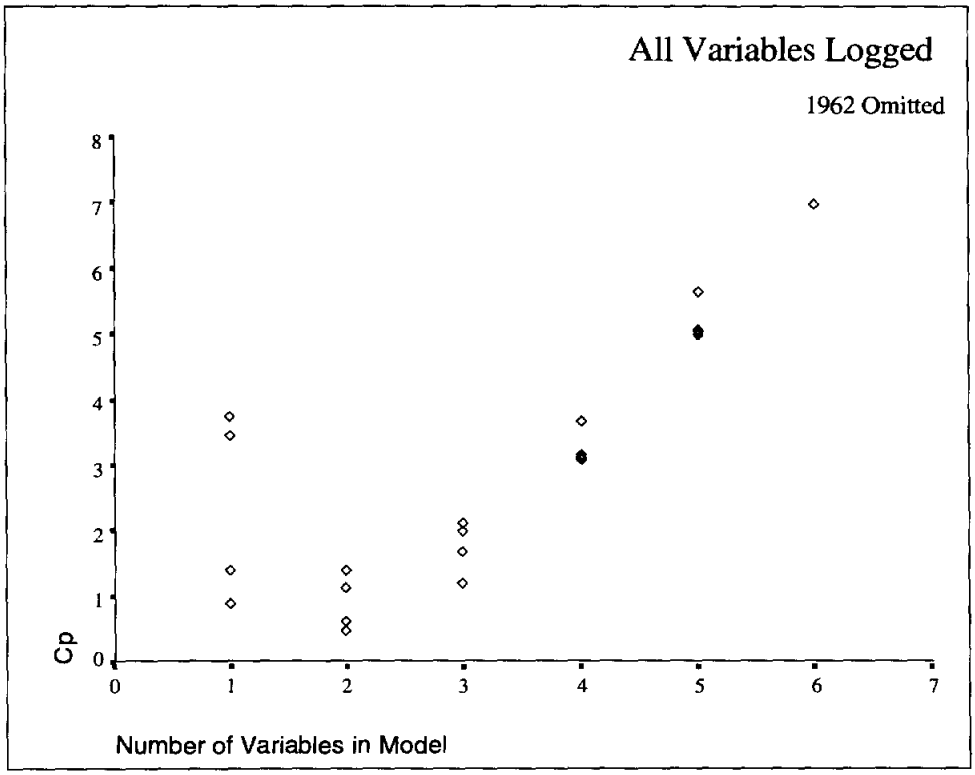
Number of Variables in Model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Cp
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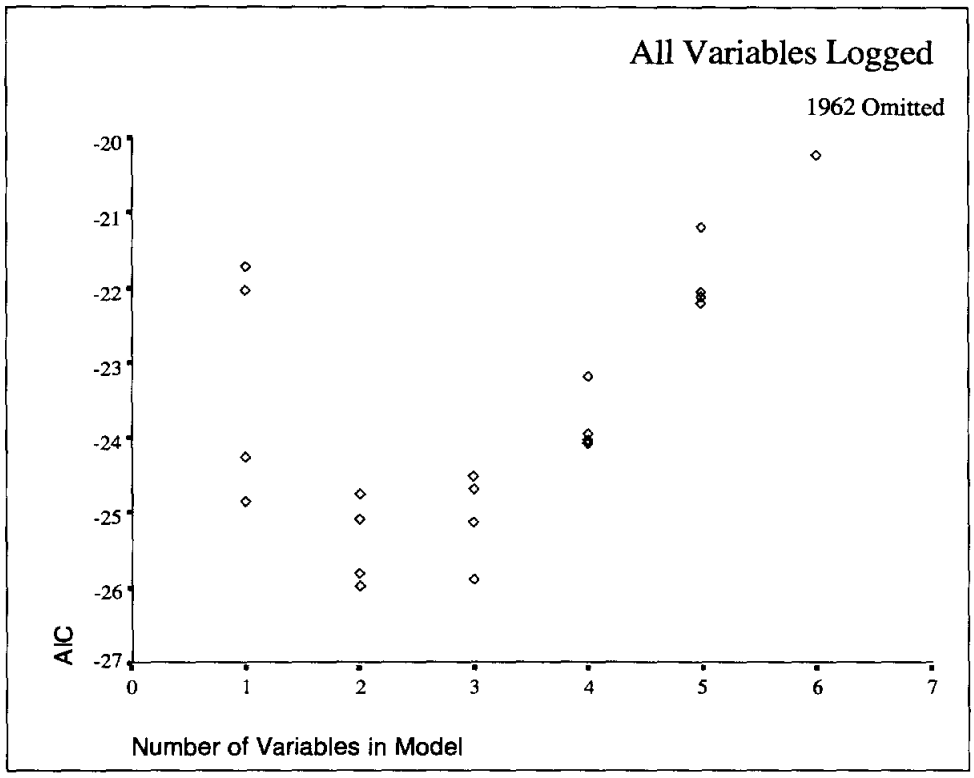
Number of Variables in Model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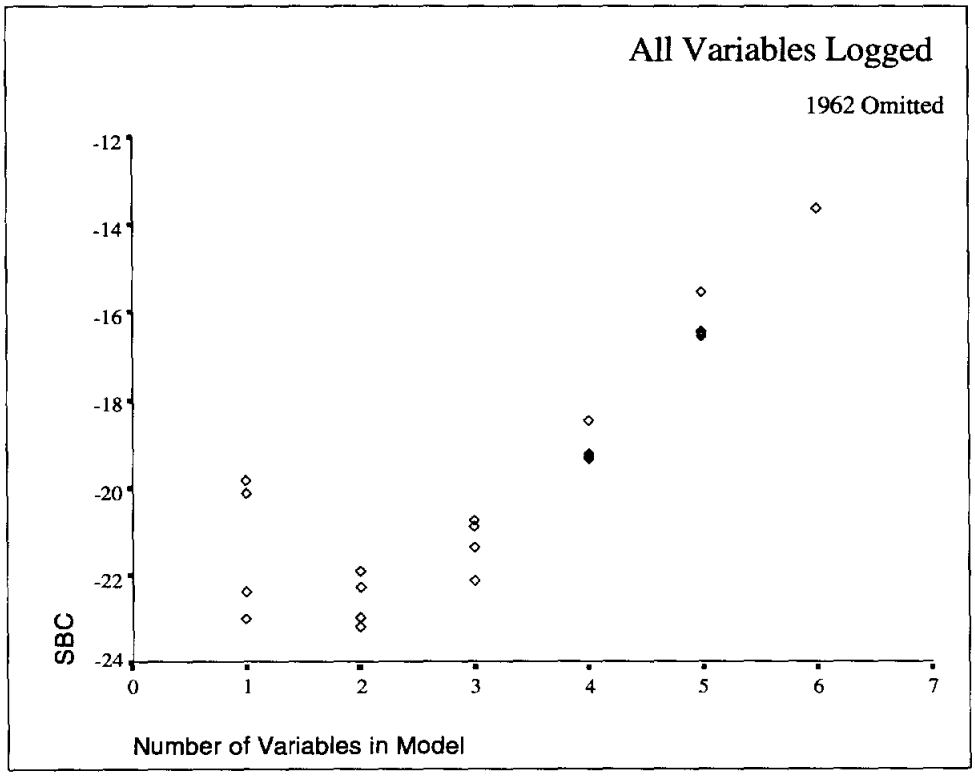
7
Number of Variables in Model


All Variables Logged
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SBC
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1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1962 and 1977 Omitted

N = 18 Regression Models for Dependent Variable: LGSTROUT

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.2460	0.1988	2.239	-23.78	0.2404	-22.00	LGNDINFL
1	0.1585	0.1059	4.124	-21.81	0.2682	-20.02	LGMAINFL
1	0.0554	-.0037	6.344	-19.72	0.3011	-17.94	LGMJINFL
1	0.0389	-.0212	6.699	-19.41	0.3064	-17.63	LGJAINFL
2	0.3808	0.2983	1.335	-25.33	0.2105	-22.66	LGSOINFL LGNDINFL
2	0.3640	0.2792	1.697	-24.85	0.2162	-22.18	LGJFINFL LGNDINFL
2	0.3638	0.2790	1.701	-24.84	0.2163	-22.17	LGJAINFL LGNDINFL
2	0.3464	0.2593	2.076	-24.36	0.2222	-21.68	LGMAINFL LGNDINFL
3	0.4801	0.3687	1.198	-26.47	0.1894	-22.91	LGJFINFL LGSOINFL LGNDINFL
3	0.4472	0.3287	1.906	-25.37	0.2014	-21.81	LGMAINFL LGSOINFL LGNDINFL
3	0.4444	0.3253	1.966	-25.28	0.2024	-21.72	LGJAINFL LGSOINFL LGNDINFL
3	0.4200	0.2957	2.491	-24.50	0.2113	-20.94	LGMJINFL LGSOINFL LGNDINFL
4	0.4843	0.3257	3.106	-24.62	0.2023	-20.17	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
4	0.4815	0.3220	3.166	-24.52	0.2034	-20.07	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
4	0.4801	0.3201	3.197	-24.47	0.2040	-20.02	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.4578	0.2910	3.676	-23.72	0.2127	-19.27	LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4881	0.2747	5.026	-22.75	0.2176	-17.41	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4865	0.2726	5.059	-22.70	0.2182	-17.35	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.4818	0.2659	5.160	-22.53	0.2202	-17.19	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4591	0.2337	5.650	-21.76	0.2299	-16.42	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.4892	0.2106	7.000	-20.79	0.2368	-14.56	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LGSTROUT	0.49026	0.70460	.	.
2	MODEL1	PARMS	LGSTROUT	0.51793	8.44028	.	-0.45566
3	MODEL1	PARMS	LGSTROUT	0.54874	7.05477	.	.
4	MODEL1	PARMS	LGSTROUT	0.55351	6.42996	.	.
5	MODEL1	PARMS	LGSTROUT	0.45883	0.86200	.	.
6	MODEL1	PARMS	LGSTROUT	0.46502	2.99931	-0.66747	.
7	MODEL1	PARMS	LGSTROUT	0.46509	2.36551	.	.
8	MODEL1	PARMS	LGSTROUT	0.47140	3.93624	.	-0.36838
9	MODEL1	PARMS	LGSTROUT	0.43521	2.96186	-0.61397	.
10	MODEL1	PARMS	LGSTROUT	0.44877	3.50861	.	-0.30389
11	MODEL1	PARMS	LGSTROUT	0.44991	2.09954	.	.
12	MODEL1	PARMS	LGSTROUT	0.45967	2.70467	.	.
13	MODEL1	PARMS	LGSTROUT	0.44979	3.47225	-0.50150	-0.10277
14	MODEL1	PARMS	LGSTROUT	0.45101	3.02422	-0.73971	.
15	MODEL1	PARMS	LGSTROUT	0.45164	2.98347	-0.60893	.
16	MODEL1	PARMS	LGSTROUT	0.46120	3.20218	.	-0.18855

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LGSTROUT	_IN_	_P_	_EDF_
1	.	.	.	0.61459	-1	1	2	16
2	.	.	.	.	-1	1	2	16
3	-0.26025	.	.	.	-1	1	2	16
4	.	-0.21158	.	.	-1	1	2	16
5	.	.	-0.45510	1.02715	-1	2	3	15
6	.	.	.	0.98666	-1	2	3	15
7	.	-0.38248	.	0.73343	-1	2	3	15
8	.	.	.	0.54551	-1	2	3	15
9	.	.	-0.42354	1.34079	-1	3	4	14
10	.	.	-0.39930	0.91958	-1	3	4	14
11	.	-0.29209	-0.36582	1.03698	-1	3	4	14
12	-0.21969	.	-0.45760	1.00866	-1	3	4	14
13	.	.	-0.41045	1.24696	-1	4	5	13
14	.	0.08678	-0.44360	1.40210	-1	4	5	13
15	-0.00463	.	-0.42385	1.33782	-1	4	5	13
16	.	-0.16477	-0.37011	0.96596	-1	4	5	13

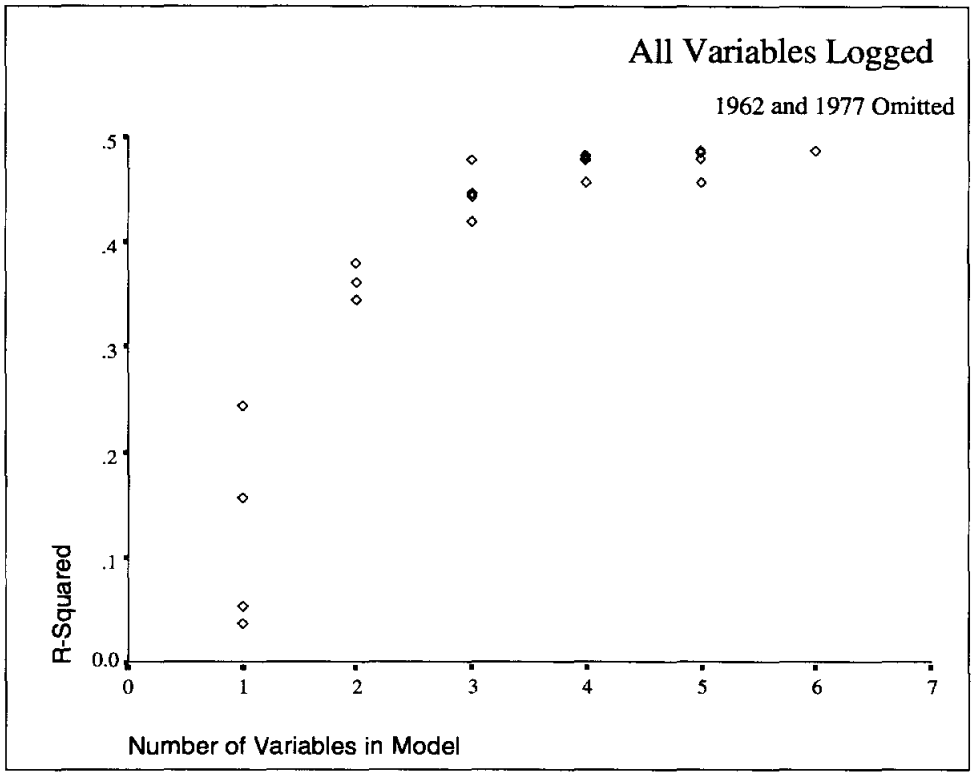
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.24036	0.24597	0.19884	2.23932	-23.7815	-22.0007
2	0.26825	0.15847	0.10587	4.12386	-21.8052	-20.0244
3	0.30111	0.05537	-0.00367	6.34430	-19.7249	-17.9442
4	0.30637	0.03888	-0.02119	6.69941	-19.4134	-17.6327
5	0.21052	0.38083	0.29828	1.33478	-25.3285	-22.6574
6	0.21624	0.36402	0.27923	1.69684	-24.8463	-22.1752
7	0.21631	0.36381	0.27899	1.70137	-24.8404	-22.1693
8	0.22222	0.34644	0.25930	2.07559	-24.3554	-21.6842
9	0.18941	0.48007	0.36866	1.19752	-26.4728	-22.9114
10	0.20139	0.44718	0.32872	1.90596	-25.3686	-21.8071
11	0.20241	0.44437	0.32531	1.96637	-25.2775	-21.7160
12	0.21129	0.42000	0.29572	2.49122	-24.5048	-20.9434
13	0.20231	0.48433	0.32566	3.10582	-24.6209	-20.1690
14	0.20341	0.48152	0.32199	3.16637	-24.5230	-20.0711
15	0.20398	0.48008	0.32011	3.19729	-24.4732	-20.0214
16	0.21270	0.45784	0.29102	3.67635	-23.7191	-19.2673

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LGSTROUT	0.46646	3.73145	-0.67955	-0.13379
18	MODEL1	PARMS	LGSTROUT	0.46716	3.36622	-0.52998	-0.16014
19	MODEL1	PARMS	LGSTROUT	0.46929	3.15931	-0.73242	.
20	MODEL1	PARMS	LGSTROUT	0.47948	3.08851	.	-0.22871
21	MODEL1	PARMS	LGSTROUT	0.48664	3.61932	-0.67910	-0.17333

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LGSTROUT	_IN_	_P_	_EDF_
17	.	0.14631	-0.44032	1.32201	-1	5	6	12
18	0.08382	.	-0.39750	1.24825	-1	5	6	12
19	-0.02665	0.10177	-0.44886	1.39562	-1	5	6	12
20	0.06442	-0.18292	-0.35646	0.95777	-1	5	6	12
21	0.06335	0.12826	-0.42685	1.31372	-1	6	7	11

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.21759	0.48805	0.27474	5.02563	-22.7513	-17.4091
18	0.21824	0.48651	0.27256	5.05882	-22.6972	-17.3550
19	0.22023	0.48183	0.26593	5.15966	-22.5338	-17.1916
20	0.22990	0.45907	0.23368	5.64985	-21.7600	-16.4178
21	0.23681	0.48924	0.21065	7.00000	-20.7932	-14.5606

Scree Plots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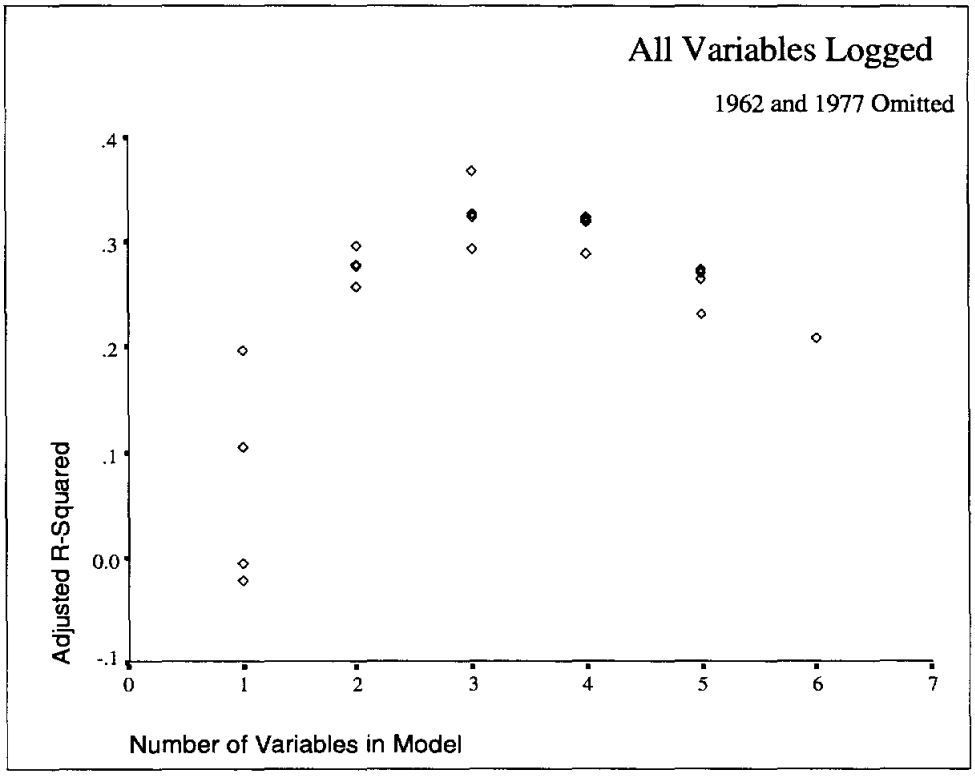
Number of Variables in Model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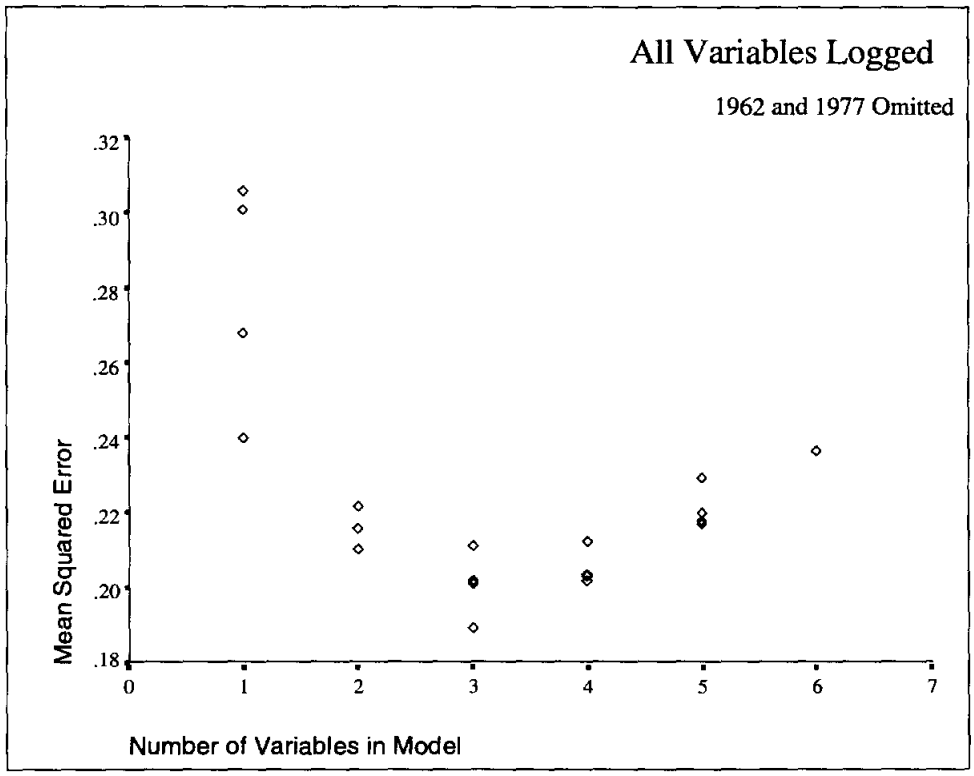
Number of Variables in Model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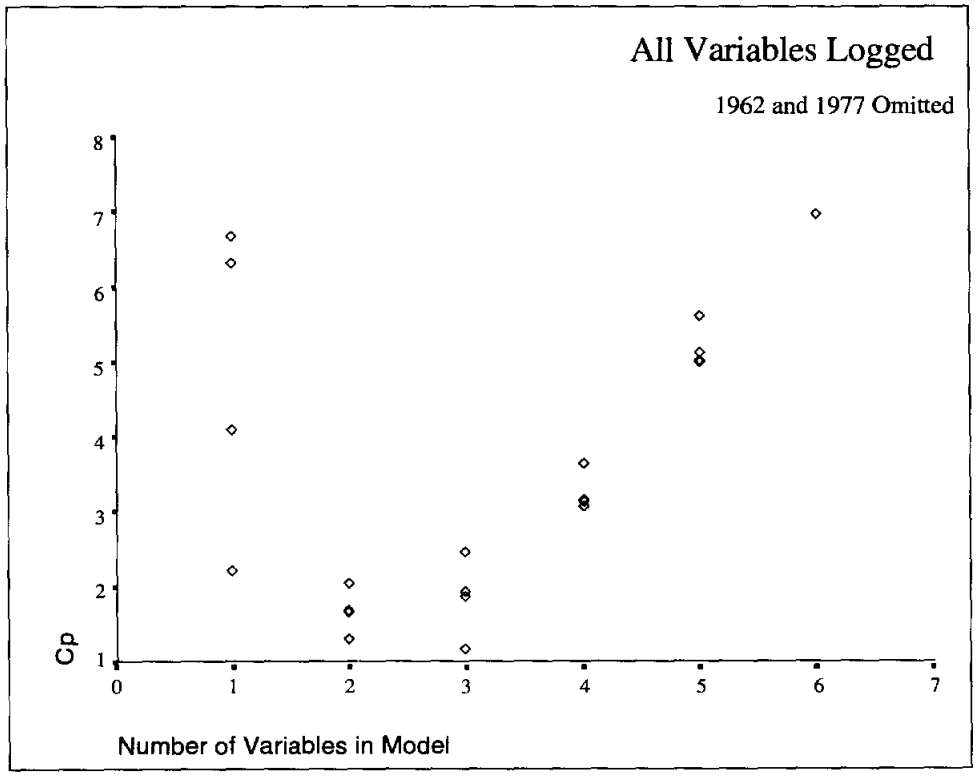
Number of Variables in Model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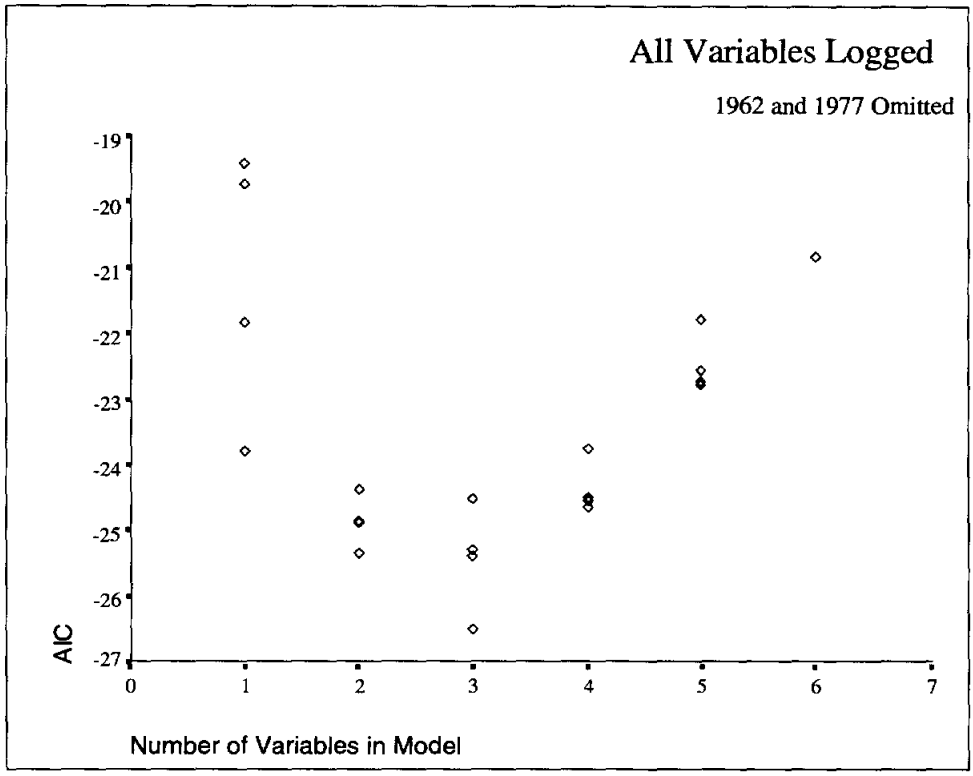
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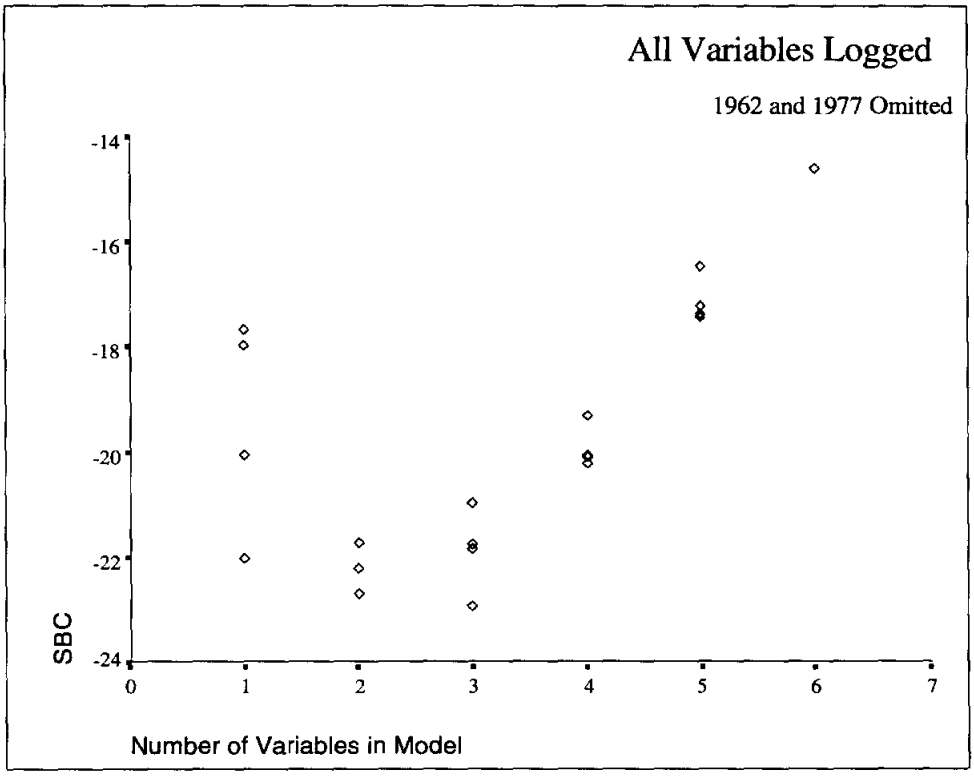
All Variables Logged
1962 and 1977 Omitted
SBC
-14
-16
-18
-20
-22
-24
0
1
2
3
4
5
6
7
Number of Variables in Model

Black Drum Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Table of Contents

Summary Report 3

Description of the Problem 3

Constructing Models—General Discussion 3
Detecting Influential Points and Outliers 3
Variable Selection 4
Multicollinearity 4
Other Procedures 4

How the Final Model Was Chosen 4
Model—Incomplete Principal Components 7
Model—Ordinary Least Squares 11

Exploring the Data 14

Listing of Data 14

Summary Information for Individual Variables 15

99% Prediction Ellipses 45

Box–Cox Analysis 56

Numerical Results 56

Plots 57

Model Choice Diagnostics 58

Untransformed Data 58

Logged Inflows 60

Logged Harvest 62

All Variables Logged 64

Regression—Logged Harvest and Inflows 66

ANOVA and Parameter Estimates 66

Collinearity Diagnostics 67

Residuals Diagnostics 69
Summary Information 69
Case Values for Residuals Diagnostics 70
Graphics 71

Prediction Intervals for Natural Log of Black Drum Harvest 78

Outlier and Influential Point Detection 79
Calculated Quantities 79
Graphics 82

Examining Subsets of the Data 86

All Variables Logged: 1971 Omitted 86

All Variables Logged: 1967 and 1971 Omitted ____ **88**

All Variables Logged: 1967, 1971, and 1983 Omitted ____ **90**

Scree Plots ____ 92

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of black drum.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The log transform was suggested; this was already one of our choices for transformed data sets, so it involved adding no additional analyses. At this point, there were four data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Natural log of inflow variables; harvest untransformed
3. Natural log of harvest; inflows untransformed
4. Natural log of all variables

Selecting the Points to be Omitted. The maximum R^2 for models from these four data sets were 0.34, 0.46, 0.41, and 0.56, respectively. Thus, there was no real competitor to the data set with all variables logged. Therefore, the full regression with all diagnostics was performed only for the model containing all the variables from the fourth data set, that is, natural log of black drum harvest regressed against all the logged inflow variables.

The observations flagged as potentially influential are given in the summary table below. Only 1971 garnered multiple flags. Therefore, the regression diagnostics were run for the fourth data set with 1971 alone omitted, and 1971 in conjunction with each of the other five points. Deleting 1971 alone raised the maximum R^2 to 0.73 (from 0.56), but deleting both 1971 and 1967 raised it to 0.81. If 1983 is removed as well, the R^2 jumps to 0.86. No other combination of removals of the same number of points produced as much improvement in fit, and removing additional points resulted in fit that was either only marginally better or actually worse. Raw fit, however, is only one concern. The other is the danger which comes with hand-selecting data. Therefore, we removed only the three points 1967, 1971, and 1983 before continuing.

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	Total
Data Set 4									
1963							1		1
***1967**							1		1
***1971**							1	2	3
1981			1						1
***1983**							1		1
1984	1								1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SRE	Studentized residual
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Selecting the Final Model. This analysis was unique in two regards. First, it was immediately apparent that no other transformation of the data had as much to offer in the way of a model as that in which all variables were logged; no other set even came close in terms of performance. Second, in choosing among the possible models for that data set, no model came close to that containing all the variables. So we came straight to our final candidate model. However, there was a fly in the ointment—multicollinearity. The condition index for the model was 119.625, and this time it was *not* an artifact of the data.

Thus, it was decided to do an incomplete principal components analysis (IPC), and compare the abilities of the two models (ordinary least squares, or OLS, and IPC) when it came to prediction. The procedure used was as follows: First, the three suspect years 1967, 1971, and 1983 were deleted. Then the remaining 23 data points were divided into two subsets nonrandomly by simply allocating every other observation to each set. Therefore, subset 1 had 12 points and subset 2 had 11 points. For *each* subset, OLS and IPC coefficients were calculated separately, producing two separate models. Then the models for subset 1 were used to make predictions for the observed harvest for subset 2, and vice versa. Therefore, each model was tested on a data set that was not used to develop it. These predicted values were transformed back to the original units (from the log scale), and the squared residuals calculated.

The results showed that IPC analysis was better at prediction for both data subsets. Therefore, it is our final choice for a model. However, we present the results from both IPC regression and OLS regression, in order that the researcher may choose. Because the output format of the program used to run the former analysis is less user-friendly than that used to obtain the results for the latter, some of the IPC results are presented twice—first in a format similar to that for the OLS model for the convenience of the reader, then in native format with full output information. The OLS model results follow that, with a comparison of the results for the two models in tabular form afterward.

Descriptive Statistics for Subset 1 Using Models Developed from Subset 2

	N	Minimum	Maximum	Mean	Std. Deviation
Residuals for IPC	*12*	*3.9177*	*3448.5200*	*936.241064*	*1140.903194*
Residuals for OLS	*12*	*.0038*	*6649.5108*	*1384.226361*	*2090.403362*

Descriptive Statistics for Subset 2 Using Models Developed from Subset 1

	N	Minimum	Maximum	Mean	Std. Deviation
Residuals for IPC	*11*	*22.2857*	*10644.6022*	*1251.021551*	*3126.069940*
Residuals for OLS	*11*	*14.0331*	*11126.0740*	*1309.219817*	*3283.266992*

Model—Incomplete Principal Components

Ln(Black Drum Harvest) = 9.1197 – 2.55030*Ln(January-February Inflows)
+ 1.64765*Ln(March-April Inflows)
– 1.35222*Ln(May-June Inflows)
+ 1.79922*Ln(July-August Inflows)
– 0.97541*Ln(September-October Inflows)
+ 0.93640*Ln(November-December Inflows)

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	*Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)[c,d]*	.	*.924*	*.854*	*.811*	*.347000*

a. Dependent Variable: Ln(Black Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*11.305*	*6*	*1.884*	*15.653*	*.000[b]*
	Residual	*1.926*	*16*	*.120*		
	Total	*13.231*	*22*			

a. Dependent Variable: Ln(Black Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

Coefficients[a]

Model		Coefficients B
1	(Constant)	9.120
	Ln(January-February Inflows)	-2.550
	Ln(March-April Inflows)	1.648
	Ln(May-June Inflows)	-1.352
	Ln(July-August Inflows)	1.799
	Ln(September-October Inflows)	-.975
	Ln(November-December Inflows)	.936

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions					
				Ln(January-February Inflows)	Ln(March-April Inflows)	Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	1.449	1.000	-.17	.55	.51	.01	-.30	-.56
	2	.553	2.620	-.53	.08	.46	-.35	.06	.62
	3	.341	4.249	-.62	.23	-.36	.23	.58	-.22
	4	.272	5.327	.31	.58	-.35	-.65	.16	.06
	5	.126	11.500	-.14	.41	-.39	.41	-.57	.40

a. Dependent Variable: Ln(Black Drum Harvest)

```
BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION
VARIABLES TO BE USED
     1 year        2 lblkdrum    3 lgjfinfl    4 lgmainfl    5 lgmjinfl
     6 lgjainfl    7 lgsoinfl    8 lgndinfl

  DEPENDENT VARIABLE. . . . .   2
INDEPENDENT VARIABLE(S) . . .   3   4   5   6   7   8
    MODEL SPECIFICATION . . . WITH INTERCEPT

  COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
  PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
  MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

  MAXIMUM NUMBER OF COMPONENTS TO ENTER . . . .        6
  NUMBER OF COMPONENTS TO ENTER LIMITED BY
  MAGNITUDE OF CORRELATION GREATER THAN . . . .  0.0100

NUMBER OF CASES READ. . . . . .      23
```

CORRELATION MATRIX

		lblkdrum 2	lgjfinfl 3	lgmainfl 4	lgmjinfl 5	lgjainfl 6	lgsoinfl 7
lblkdrum	2	1.0000					
lgjfinfl	3	-0.2691	1.0000				
lgmainfl	4	0.3257	0.3570	1.0000			
lgmjinfl	5	0.0642	0.3105	0.7420	1.0000		
lgjainfl	6	0.2869	0.6991	0.5037	0.4960	1.0000	
lgsoinfl	7	0.0329	0.6332	0.3530	0.2751	0.7142	1.0000
lgndinfl	8	0.0091	0.4358	-0.0573	0.0870	0.3439	0.6495

		lgndinfl 8
lgndinfl	8	1.0000

EIGENVALUES

3.25872	1.44860	0.55348	0.34104	0.27195	0.12622

*** NOTE *** THE LAST 1 OF THE ABOVE EIGENVALUES IS (ARE) SMALLER THAN THE LOWER LIMIT, 0.20E+00. RESULTS FOR THIS (THOSE) COMPONENT(S) MAY NOT BE MEANINGFUL.

CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

0.54312	0.78455	0.87680	0.93364	0.97896	1.00000

EIGENVECTORS

	1	2	3	4	5	6
3 lgjfinfl	0.4453	-0.1696	-0.5279	-0.6164	0.3078	-0.1400
4 lgmainfl	0.3613	0.5511	0.0822	0.2335	0.5775	0.4135
5 lgmjinfl	0.3555	0.5088	0.4591	-0.3608	-0.3471	-0.3915
6 lgjainfl	0.4890	0.0072	-0.3475	0.2328	-0.6486	0.4065
7 lgsoinfl	0.4652	-0.2996	0.0605	0.5784	0.1630	-0.5737
8 lgndinfl	0.2987	-0.5647	0.6159	-0.2160	0.0635	0.4023

DEPENDENT VARIABLE 2 lblkdrum

TOTAL SUM OF SQUARES 13.230783
DEGREES OF FREEDOM 22
MEAN SQUARE 0.601399

CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE

0.09916	0.20344	0.14279	0.51818	-0.18635	0.69959

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS

CONSTANT (MEAN OF Y)	COMPONENTS					
3.93444	0.04260	0.13108	0.14884	0.68812	-0.27711	1.52709

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

INDEX OF COMPONENTS ENTERING	RESIDUAL SUM OF SQUARES	F-VALUES REGRESSION MODEL	F-VALUES COMPONENT TO ENTER	R2	CONSTANT	VARIABLES 3 lgjfinfl
6	6.75536	20.13	20.13	0.4894	1.7716	-0.6617
4	3.20274	31.31	22.18	0.7579	8.2407	-1.9744
2	2.65517	25.23	3.92	0.7993	7.9394	-2.0431
5	2.19573	22.62	3.77	0.8340	9.4384	-2.3071
3*	1.92597	19.96	2.38	0.8544	9.1197	-2.5503
1	0.00000	0.00	0.00	1.0000	7.4572	-2.4916

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION
(CONTINUED)

	4 lgmainfl	5 lgmjinfl	6 lgjainfl	7 lgsoinfl	8 lgndinfl
6	1.45188	-1.31480	1.22749	-1.54387	1.23514
4	1.82140	-1.86072	1.54423	-0.84244	0.93629
2	1.98750	-1.71405	1.54610	-0.91166	0.78749
5	1.61950	-1.50250	1.90149	-0.99128	0.75210
3*	1.64765	-1.35222	1.79922	-0.97541	0.93640
1	1.68304	-1.31892	1.84041	-0.94049	0.96198

---

* PREDICTED AND RESIDUAL VALUES ARE CALCULATED USING THE
COEFFICIENTS BASED ON THESE 5 COMPONENTS, SINCE
THOSE LISTED BELOW DO NOT PASS THE ENTRANCE LIMITS.

Model—Ordinary Least Squares

Ln(Black Drum Harvest) = 7.457 – 2.492*Ln(January-February Inflows)
+ 1.683*Ln(March-April Inflows)
– 1.319*Ln(May-June Inflows)
+ 1.840*Ln(July-August Inflows)
– 0.940*Ln(September-October Inflows)
+ 0.962*Ln(November-December Inflows)

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows)[c,d]*	.	*.930*	*.864*	*.813*	*.335022*	*2.437*

a. Dependent Variable: Ln(Black Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*11.435*	*6*	*1.906*	*16.980*	*.000[b]*
	Residual	*1.796*	*16*	*.112*		
	Total	*13.231*	*22*			

a. Dependent Variable: Ln(Black Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows)

Coefficients[a]

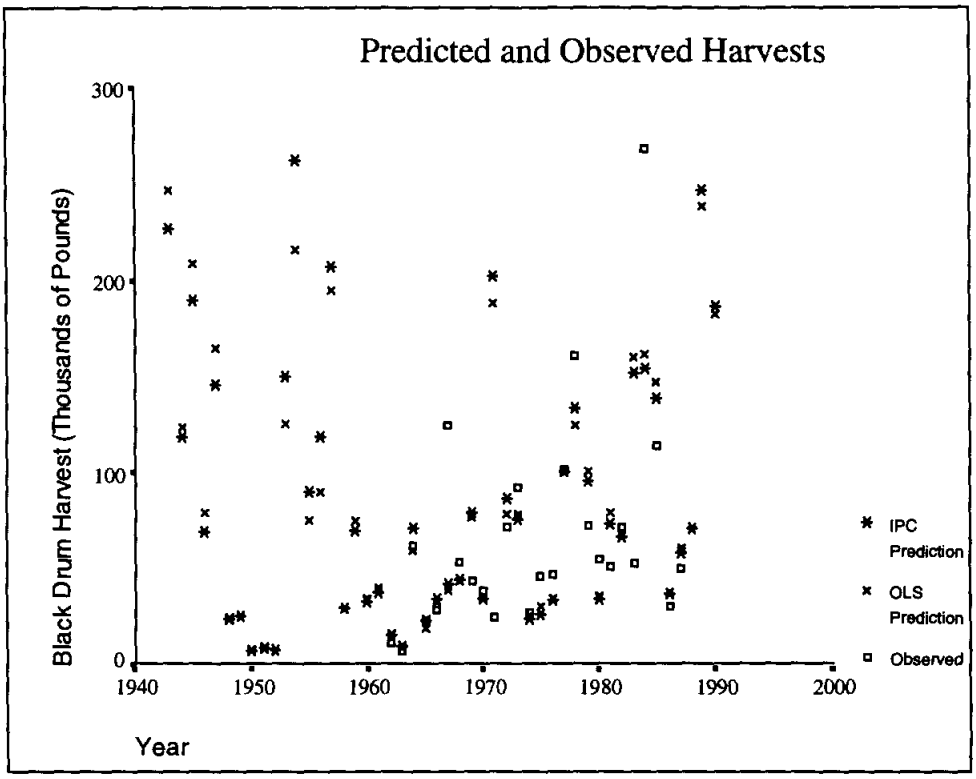
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	7.457	2.098		3.554	.003	3.009	11.905		
	Ln(January-February Inflows)	-2.492	.328	-1.038	-7.596	.000	-3.187	-1.796	.454	2.202
	Ln(March-April Inflows)	1.683	.285	.944	5.914	.000	1.080	2.286	.333	3.003
	Ln(May-June Inflows)	-1.319	.255	-.773	-5.170	.000	-1.860	-.778	.379	2.638
	Ln(July-August Inflows	1.840	.257	1.200	7.166	.000	1.296	2.385	.302	3.306
	Ln(September-October Inflows)	-.940	.246	-.688	-3.822	.002	-1.462	-.419	.262	3.821
	Ln(November-December Inflows)	.962	.221	.617	4.354	.000	.494	1.430	.422	2.367

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions						
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)	Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	6.986	1.000	.00	.00	.00	.00	.00	.00	.00
	2	5.952E-03	34.260	.01	.00	.04	.04	.00	.07	.09
	3	3.692E-03	43.499	.07	.00	.00	.00	.16	.06	.12
	4	1.663E-03	64.821	.09	.13	.05	.14	.16	.10	.09
	5	1.251E-03	74.729	.06	.01	.15	.21	.26	.30	.17
	6	5.554E-04	112.156	.75	.51	.24	.05	.06	.19	.16
	7	5.127E-04	116.737	.02	.35	.51	.55	.36	.29	.37

a. Dependent Variable: Ln(Black Drum Harvest)



	OLS	IPC	Difference
R	0.930	0.924	-0.006
R^2	0.864	0.854	-0.010
Adjusted R^2	0.813	0.811	-0.002
Coefficients:			
Intercept	7.457	9.120	1.663
Ln(January-February Inflows)	-2.492	-2.550	-0.058
Ln(March-April Inflows)	1.683	1.648	-0.035
Ln(May-June Inflows)	-1.319	-1.352	-0.033
Ln(July-August Inflows)	1.840	1.799	-0.041
Ln(September-October Inflows)	-0.940	-0.975	-0.035
Ln(November-December Inflows)	0.962	0.936	-0.026

Exploring the Data

Listing of Data

YEAR	BLK_DRUM	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1962	11.90	2915.47	963.27	1615.30	1059.68	1432.16	2208.27
1963	7.90	2336.83	815.63	1270.07	724.21	1089.76	1105.07
1964	62.40	894.15	689.43	759.57	316.70	564.65	1030.93
1965	23.90	1140.22	818.07	1192.23	220.39	325.37	987.87
1966	29.10	1481.65	1358.37	2727.63	560.03	459.59	1007.86
1967	124.90	1283.51	1199.18	2828.73	616.20	435.08	848.36
1968	54.40	1504.38	1932.88	4136.47	844.60	533.83	706.48
1969	44.60	1349.94	2640.94	3676.87	600.78	489.11	828.41
1970	39.00	1514.87	3337.73	3968.77	607.07	859.88	615.13
1971	25.20	849.90	2360.83	1973.78	446.99	923.73	1077.87
1972	72.60	976.26	1232.03	1288.20	431.40	980.35	1232.31
1973	93.00	1455.68	2134.83	2664.22	829.55	1845.28	1908.59
1974	27.70	2524.91	2348.44	3077.98	868.72	2253.25	2897.57
1975	46.40	2890.51	2857.40	3726.31	1138.54	2254.37	2659.43
1976	47.60	2260.46	1321.18	2439.21	925.46	1085.72	2562.96
1977	102.20	1819.08	2075.70	2395.03	874.23	585.86	1162.82
1978	161.90	1479.44	1530.34	1315.67	587.24	535.72	1259.39
1979	73.10	2336.64	2853.94	1997.58	1274.52	1229.99	1006.62
1980	56.00	2491.90	2356.53	2213.29	1264.55	1407.21	767.72
1981	51.90	1895.84	2285.70	3516.54	1686.25	2043.34	1412.12
1982	72.50	1398.82	1233.03	3387.94	1176.05	1223.45	1853.22
1983	53.50	1459.79	1289.26	3551.73	2087.11	1559.15	2092.08
1984	269.00	1768.99	1585.85	2297.95	1709.83	1458.87	1825.24
1985	114.60	2131.44	1947.16	1701.05	1422.37	1797.78	2158.85
1986	31.30	1793.04	1575.27	2366.30	664.29	1657.75	3115.37
1987	50.90	2008.42	1799.30	3115.69	914.48	1131.20	2930.13

BLK_DRUM	Black drum harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Black Drum Harvest	.226	26	.001	.785	26	.010**
Ln(Black Drum Harvest)	.117	26	.200*	.977	26	.774
January-February Inflows	.168	26	.056	.955	26	.373
March-April Inflows	.115	26	.200*	.965	26	.503
May-June Inflows	.091	26	.200*	.965	26	.505
July-August Inflows	.147	26	.156	.946	26	.260
September-October Inflows	.145	26	.167	.941	26	.194
November-December Inflows	.203	26	.008	.895	26	.013
Ln(January-February Inflows)	.116	26	.200*	.963	26	.476
Ln(March-April Inflows)	.107	26	.200*	.964	26	.488
Ln(May-June Inflows)	.116	26	.200*	.936	26	.135
Ln(July-August Inflows)	.095	26	.200*	.979	26	.833
Ln(September-October Inflows)	.139	26	.200*	.937	26	.150
Ln(November-December Inflows)	.134	26	.200*	.941	26	.199

**. This is an upper bound of the true significance.

*. This is a lower bound of the true significance.

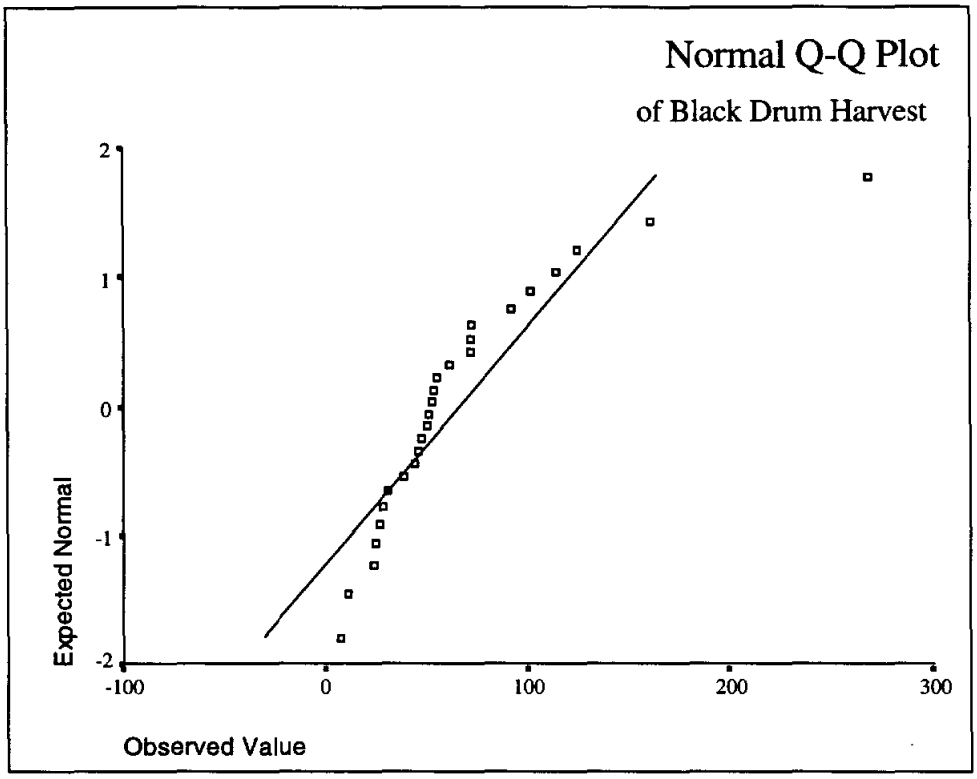
a. Lilliefors Significance Correction

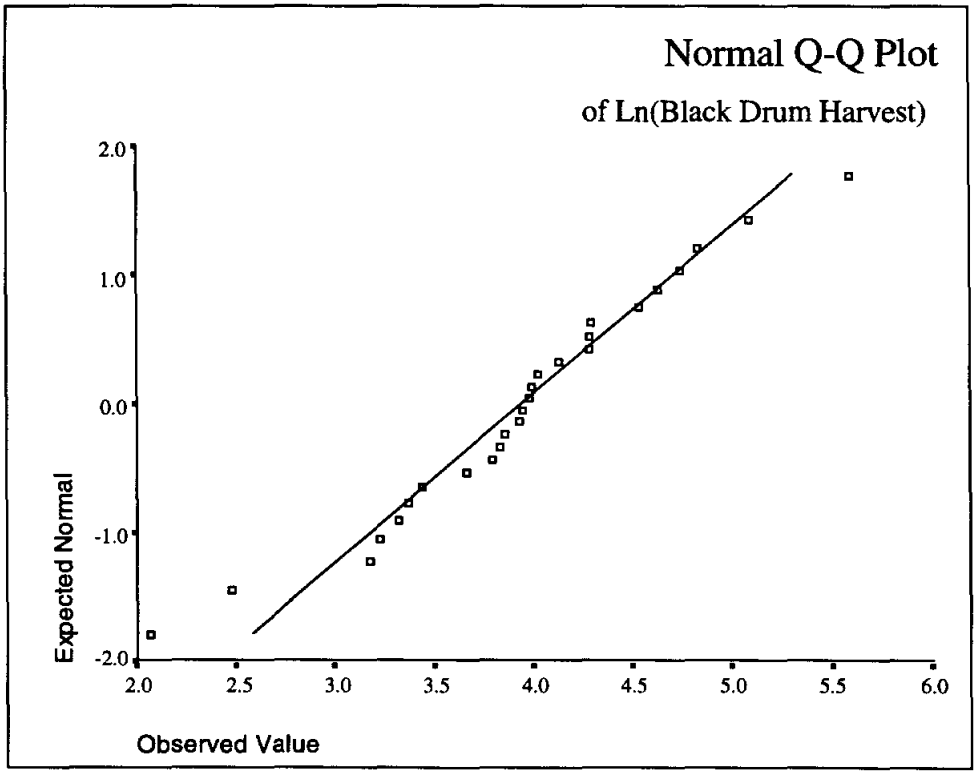
Descriptives

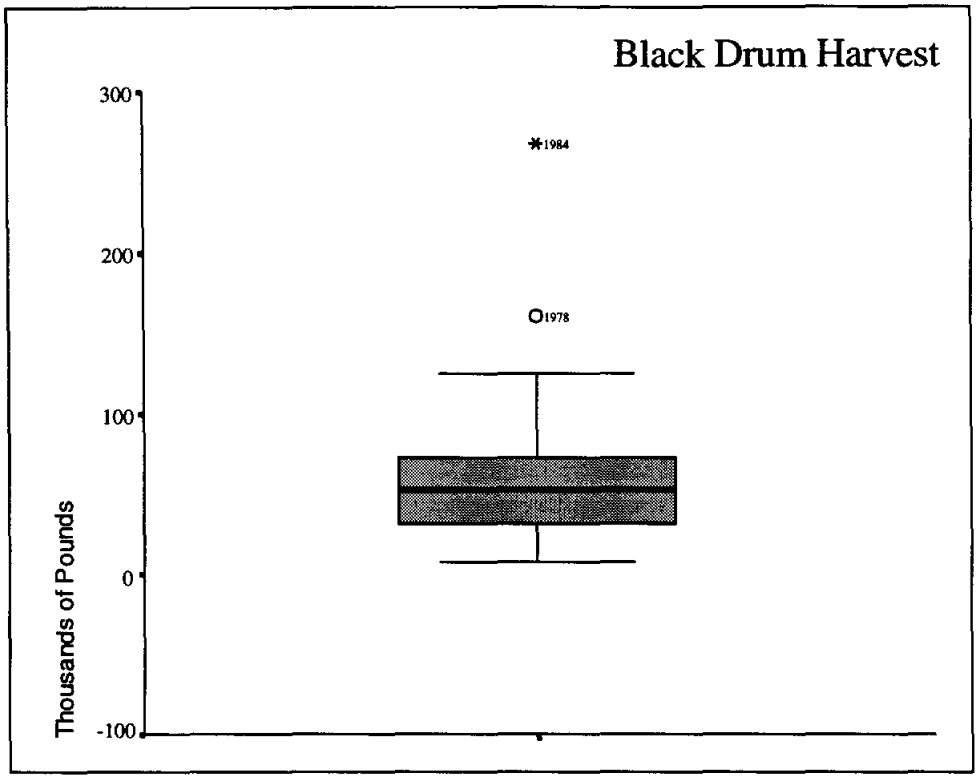
			Statistic	Std. Error
Black Drum Harvest	Mean		*67.2115*	*10.7336*
	95% Confidence Interval for Mean	Lower Bound	*45.1052*	
		Upper Bound	*89.3178*	
	5% Trimmed Mean		*60.6179*	
	Median		*52.7000*	
	Variance		*2995.472*	
	Std. Deviation		*54.7309*	
	Minimum		*7.90*	
	Maximum		*269.00*	
	Range		*261.10*	
	Interquartile Range		*47.3250*	
	Skewness		*2.290*	*.456*
	Kurtosis		*6.765*	*.887*

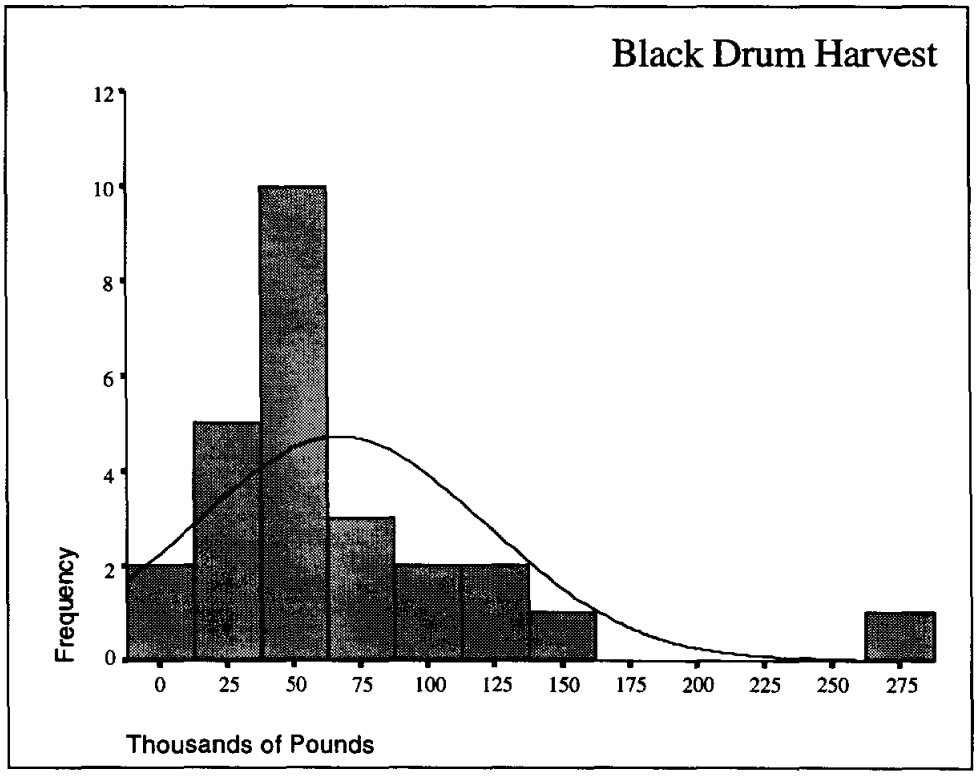
Extreme Values

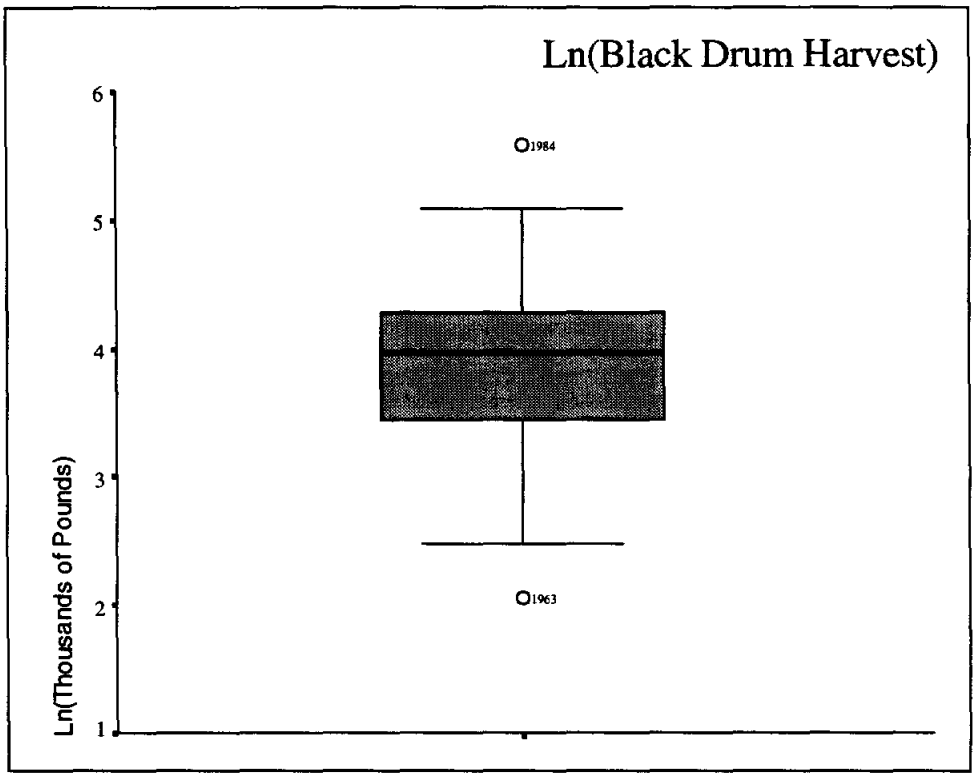
			Case Number	Year	Value
Black Drum Harvest	Highest	1	*23*	*1984*	*269.00*
		2	*17*	*1978*	*161.90*
		3	*6*	*1967*	*124.90*
		4	*24*	*1985*	*114.60*
		5	*16*	*1977*	*102.20*
	Lowest	1	*2*	*1963*	*7.90*
		2	*1*	*1962*	*11.90*
		3	*4*	*1965*	*23.90*
		4	*10*	*1971*	*25.20*
		5	*13*	*1974*	*27.70*


Normal Q-Q Plot
of Black Drum Harvest
Expected Normal
2
1
0
-1
-2
-100
0
100
200
300
Observed Value


Normal Q-Q Plot
of Ln(Black Drum Harvest)
Expected Normal
2.0
1.0
0.0
-1.0
-2.0
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
Observed Value


Black Drum Harvest
300
200
100
0
-100
Thousands of Pounds
*1984
O1978


Black Drum Harvest
12
10
8
6
4
2
0
Frequency
0
25
50
75
100
125
150
175
200
225
250
275
Thousands of Pounds

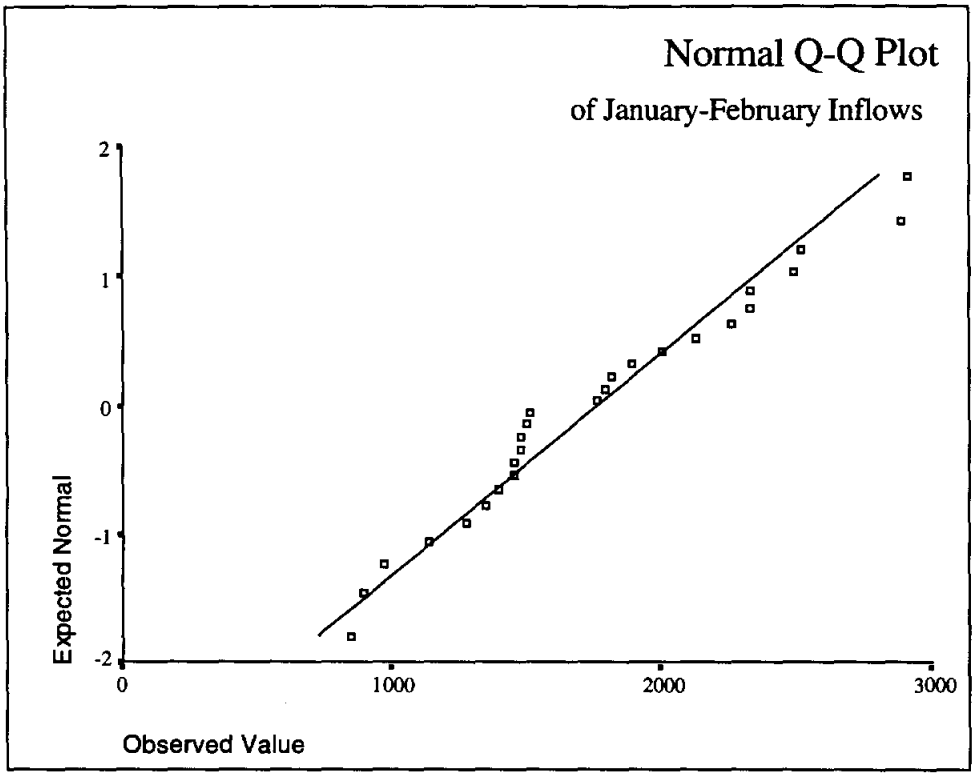

Ln(Black Drum Harvest)
Ln(Thousands of Pounds)
6
5
4
3
2
1
1984
1963

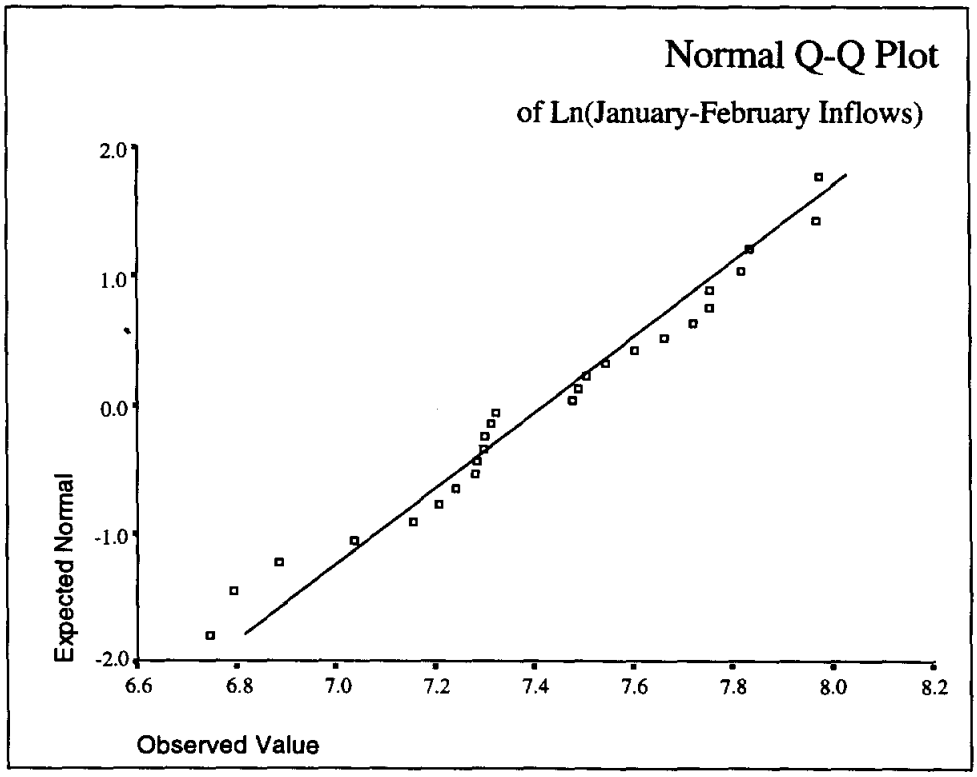
Descriptives

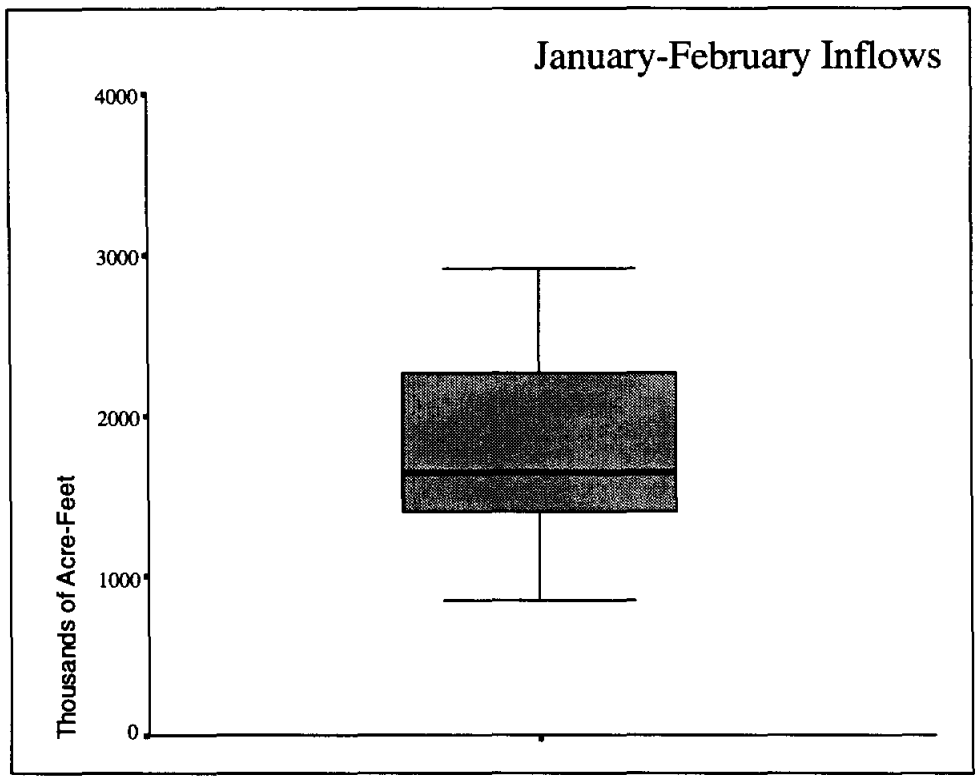
			Statistic	Std. Error
January-February Inflows	Mean		*1767.7746*	*113.9313*
	95% Confidence Interval for Mean	Lower Bound	*1533.1288*	
		Upper Bound	*2002.4204*	
	5% Trimmed Mean		*1754.7595*	
	Median		*1641.9300*	
	Variance		*337488.636*	
	Std. Deviation		*580.9377*	
	Minimum		*849.90*	
	Maximum		*2915.47*	
	Range		*2065.57*	
	Interquartile Range		*892.9050*	
	Skewness		*.383*	*.456*
	Kurtosis		*-.627*	*.887*

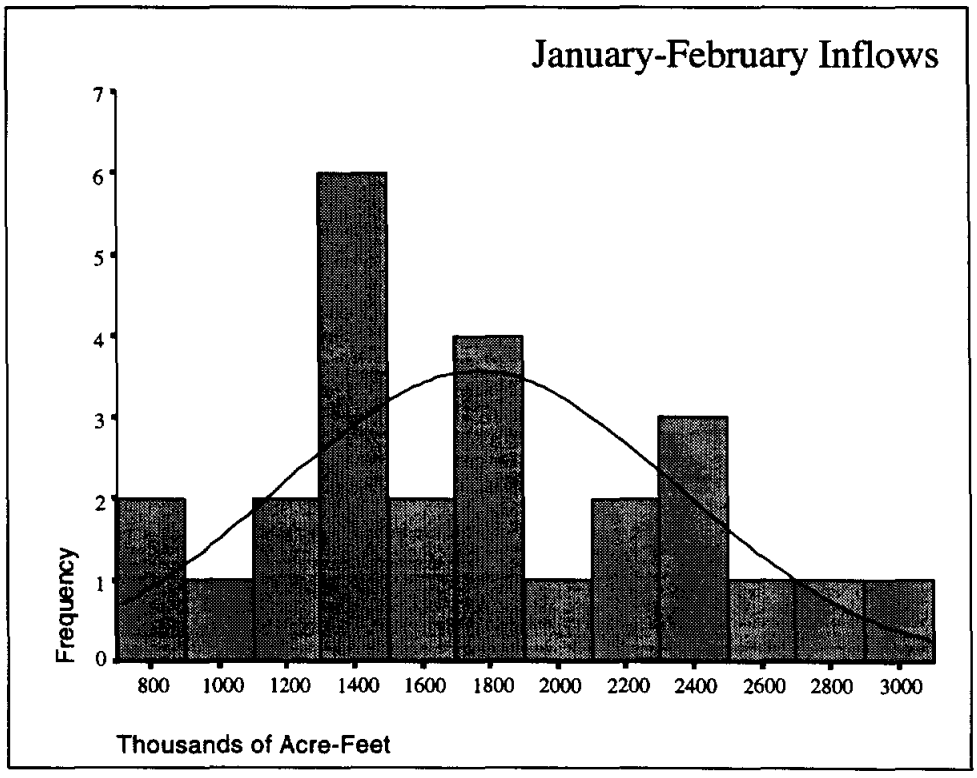
Extreme Values

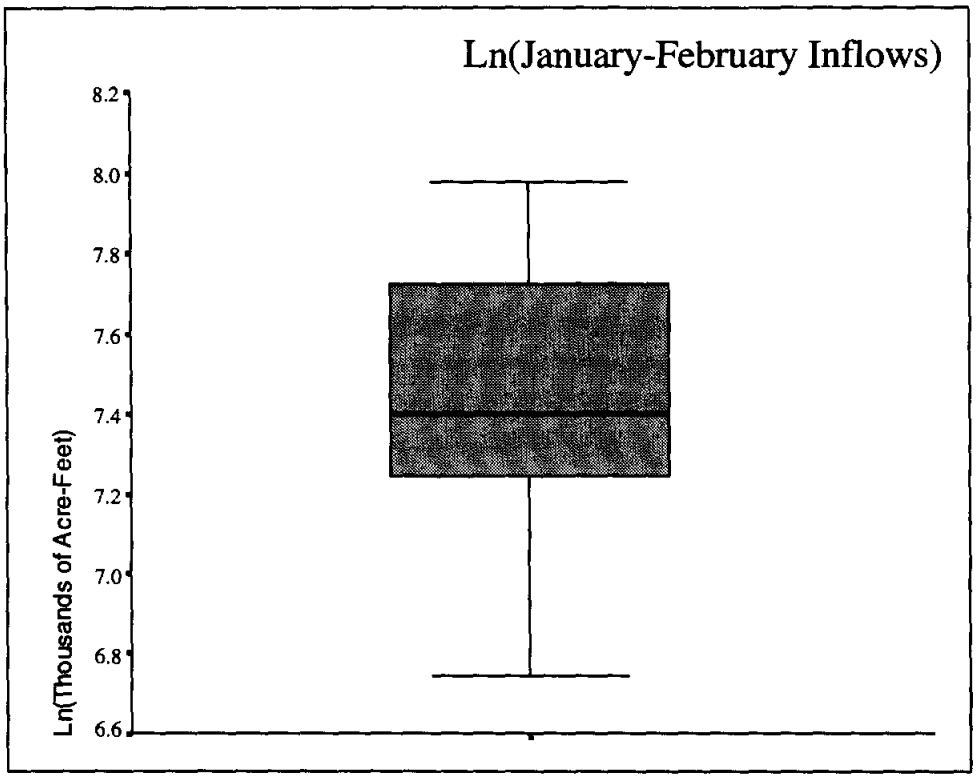
			Case Number	Year	Value
January-February Inflows	Highest	1	*1*	*1962*	*2915.47*
		2	*14*	*1975*	*2890.51*
		3	*13*	*1974*	*2524.91*
		4	*19*	*1980*	*2491.90*
		5	*2*	*1963*	*2336.83*
	Lowest	1	*10*	*1971*	*849.90*
		2	*3*	*1964*	*894.15*
		3	*11*	*1972*	*976.26*
		4	*4*	*1965*	*1140.22*
		5	*6*	*1967*	*1283.51*


Normal Q-Q Plot
of January-February Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(January-February Inflows)
Expected Normal
2.0
1.0
0.0
-1.0
-2.0
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Observed Value


January-February Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


January-February Inflows
7
6
5
4
3
2
1
0
Frequency
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
Thousands of Acre-Feet

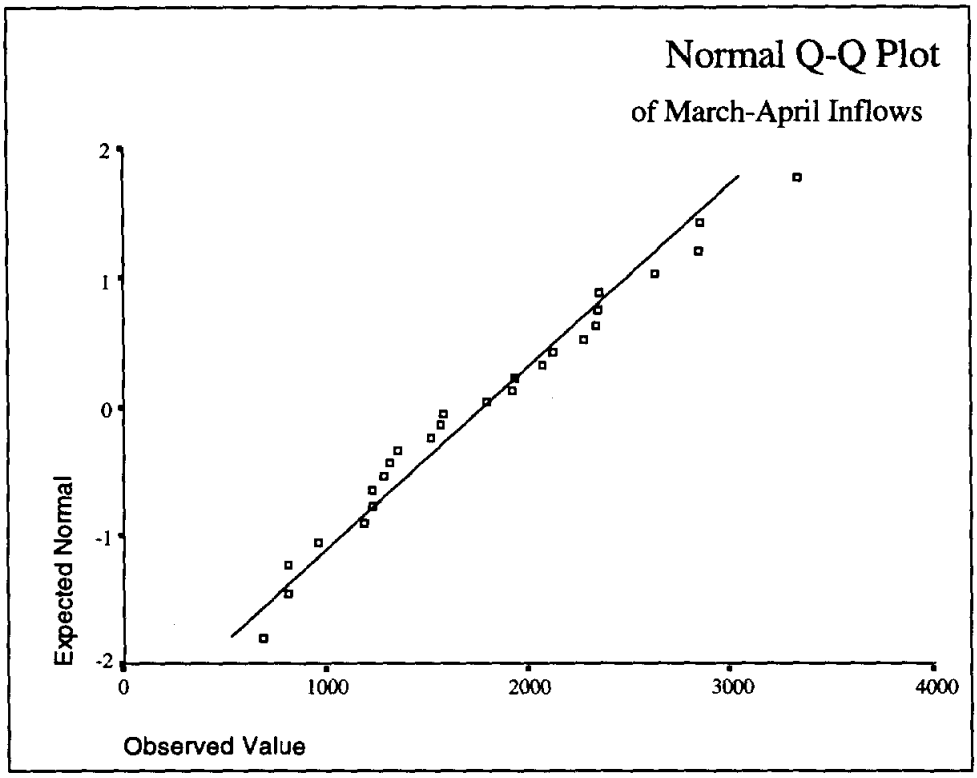

Ln(January-February Inflows)
Ln(Thousands of Acre-Feet)
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6

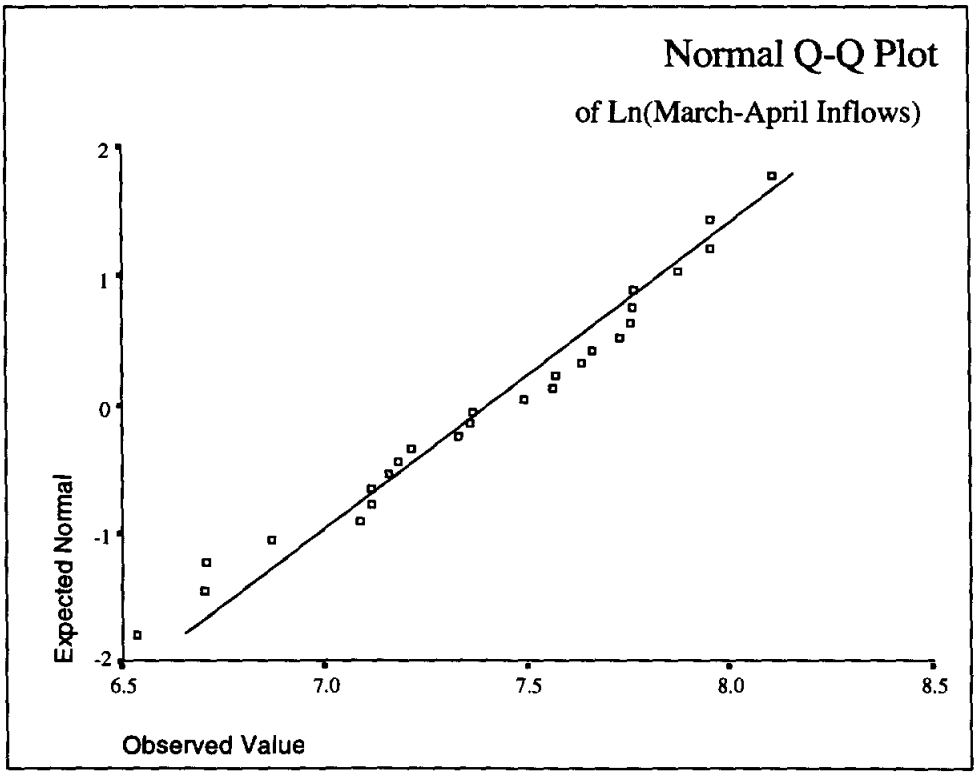
Descriptives

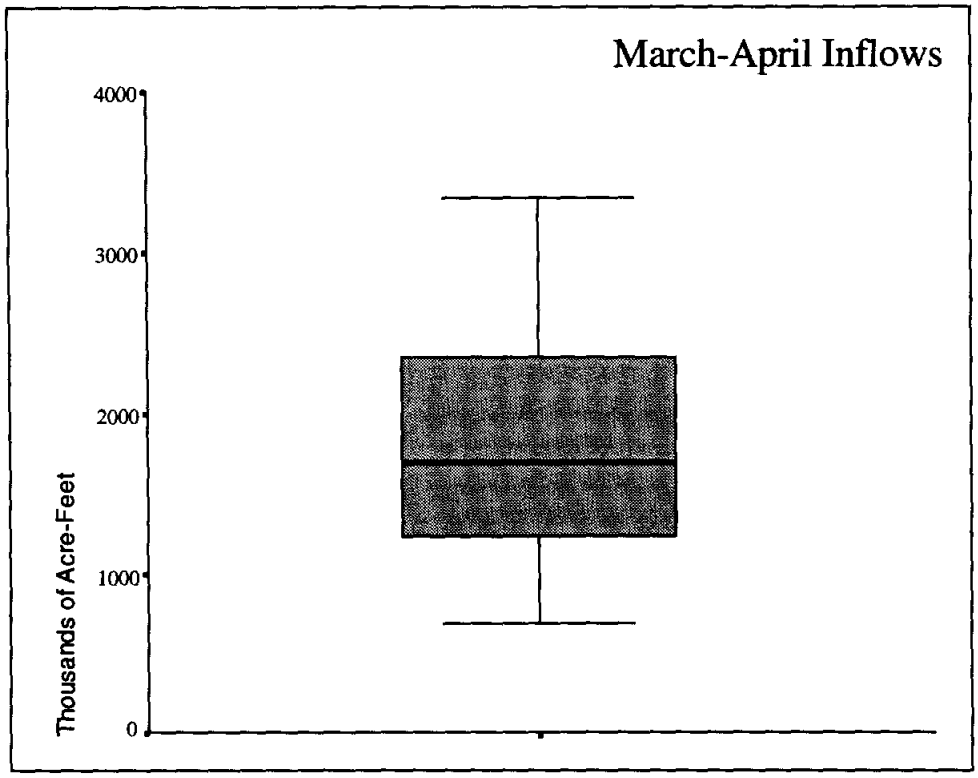
			Statistic	Std. Error
March-April Inflows	Mean		*1790.0881*	*138.1884*
	95% Confidence Interval for Mean	Lower Bound	*1505.4836*	
		Upper Bound	*2074.6925*	
	5% Trimmed Mean		*1769.7958*	
	Median		*1692.5750*	
	Variance		*496497.206*	
	Std. Deviation		*704.6256*	
	Minimum		*689.43*	
	Maximum		*3337.73*	
	Range		*2648.30*	
	Interquartile Range		*1117.6825*	
	Skewness		*.351*	*.456*
	Kurtosis		*-.626*	*.887*

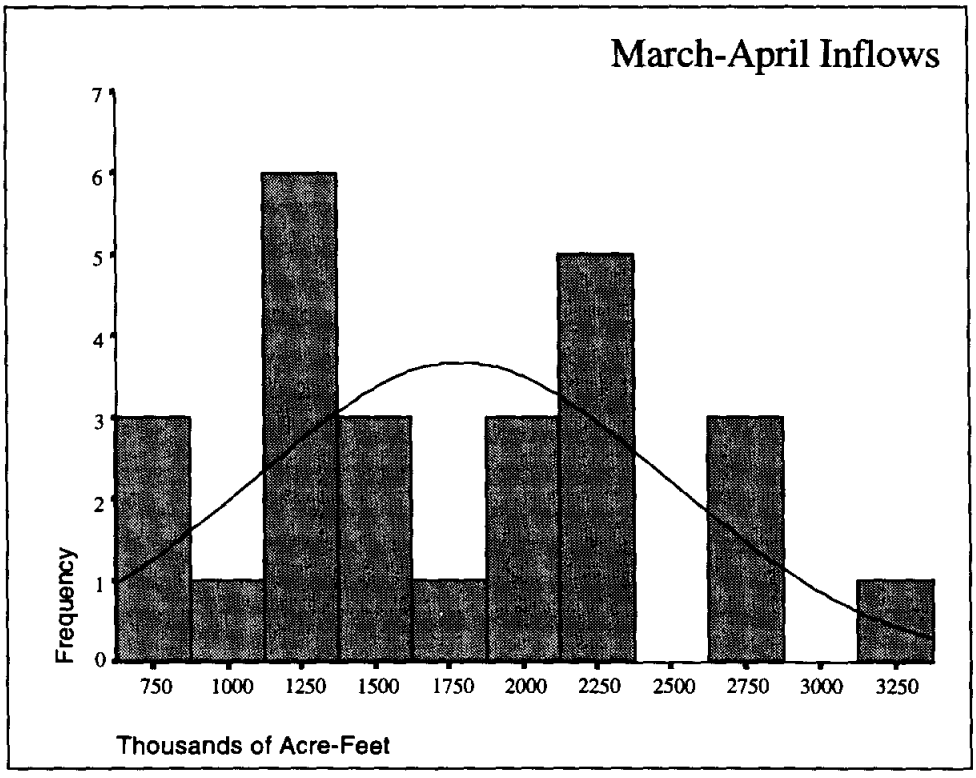
Extreme Values

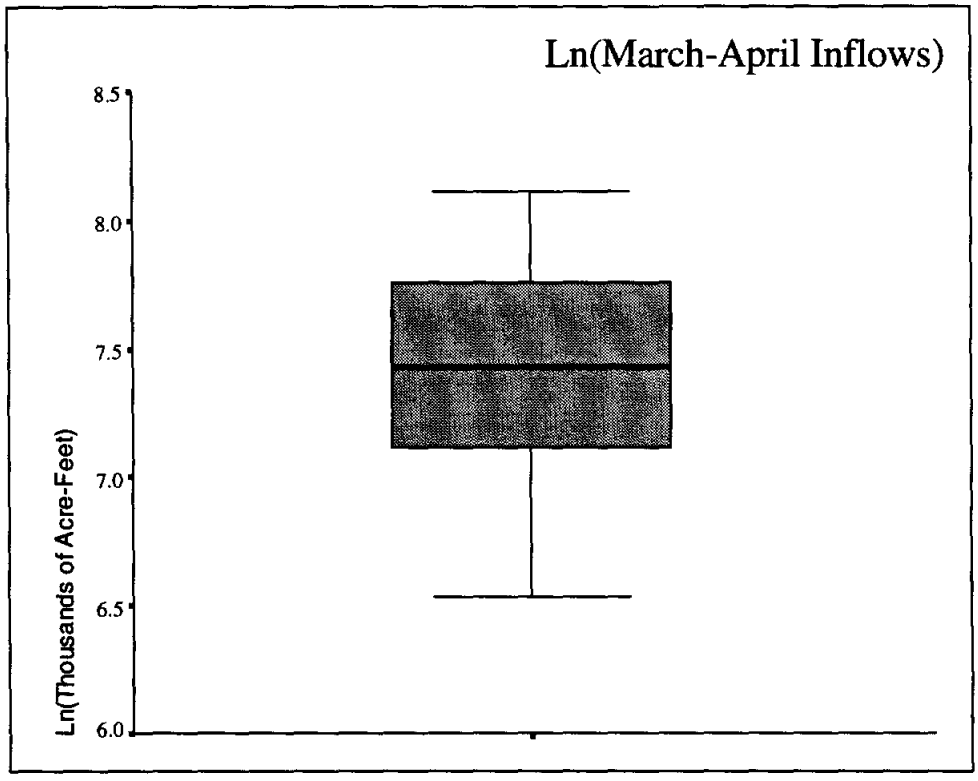
			Case Number	Year	Value
March-April Inflows	Highest	1	*9*	*1970*	*3337.73*
		2	*14*	*1975*	*2857.40*
		3	*18*	*1979*	*2853.94*
		4	*8*	*1969*	*2640.94*
		5	*10*	*1971*	*2360.83*
	Lowest	1	*3*	*1964*	*689.43*
		2	*2*	*1963*	*815.63*
		3	*4*	*1965*	*818.07*
		4	*1*	*1962*	*963.27*
		5	*6*	*1967*	*1199.18*


Normal Q-Q Plot
of March-April Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
4000
Observed Value


Normal Q-Q Plot
of Ln(March-April Inflows)
Expected Normal
2
1
0
-1
-2
6.5
7.0
7.5
8.0
8.5
Observed Value


March-April Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet


March-April Inflows
7
6
5
4
3
2
1
0
Frequency
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Acre-Feet

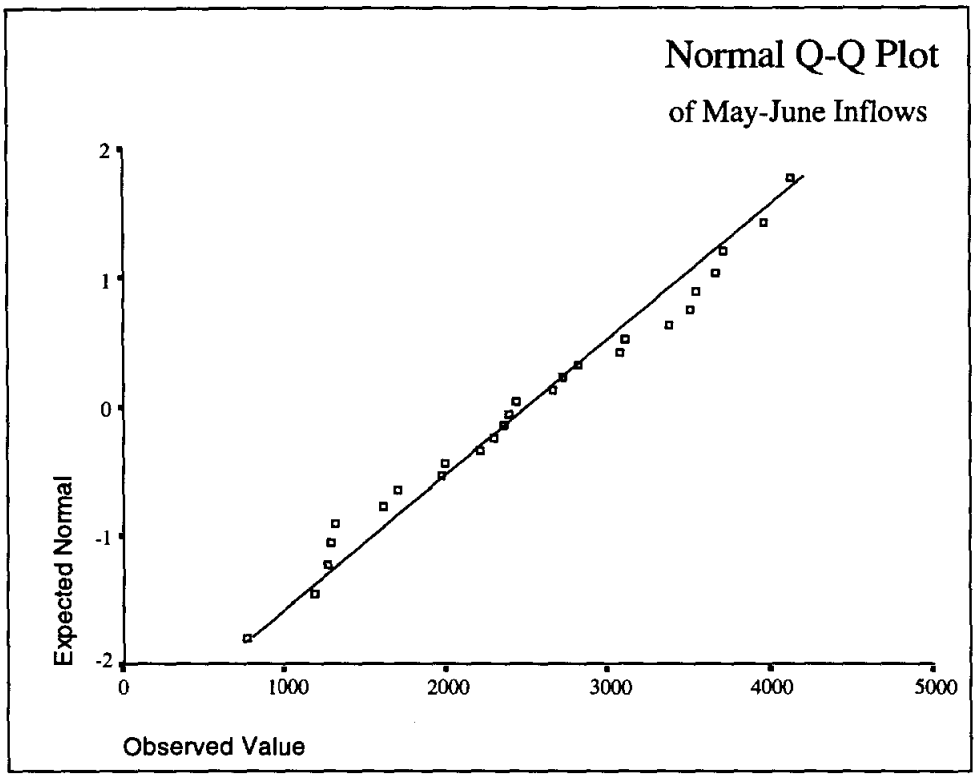

Ln(March-April Inflows)
Ln(Thousands of Acre-Feet)
8.5
8.0
7.5
7.0
6.5
6.0

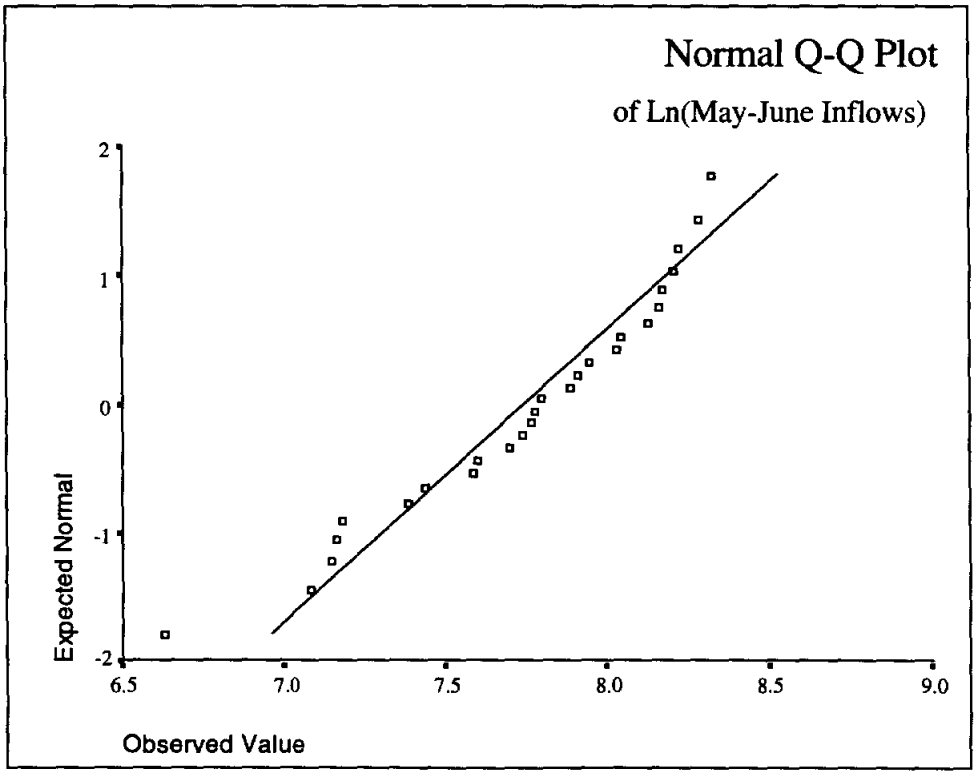
Descriptives

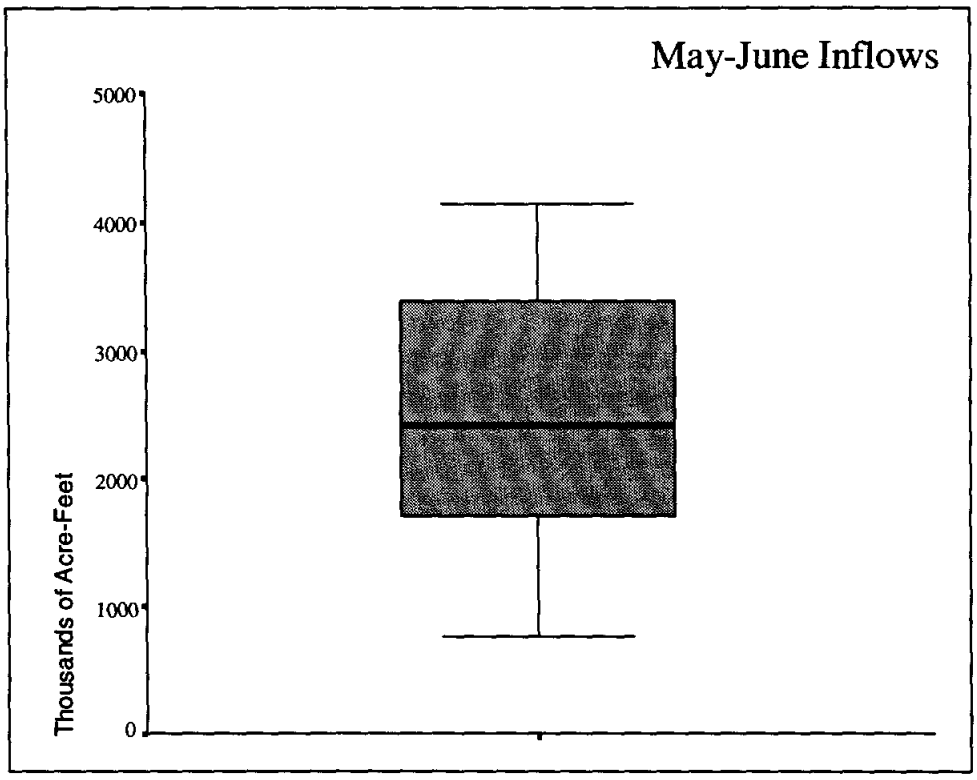
			Statistic	Std. Error
May-June Inflows	Mean		2507.8504	187.2047
	95% Confidence Interval for Mean	Lower Bound	2122.2951	
		Upper Bound	2893.4056	
	5% Trimmed Mean		2511.1013	
	Median		2417.1200	
	Variance		911185.363	
	Std. Deviation		954.5603	
	Minimum		759.57	
	Maximum		4136.47	
	Range		3376.90	
	Interquartile Range		1740.4775	
	Skewness		-.022	.456
	Kurtosis		-1.015	.887

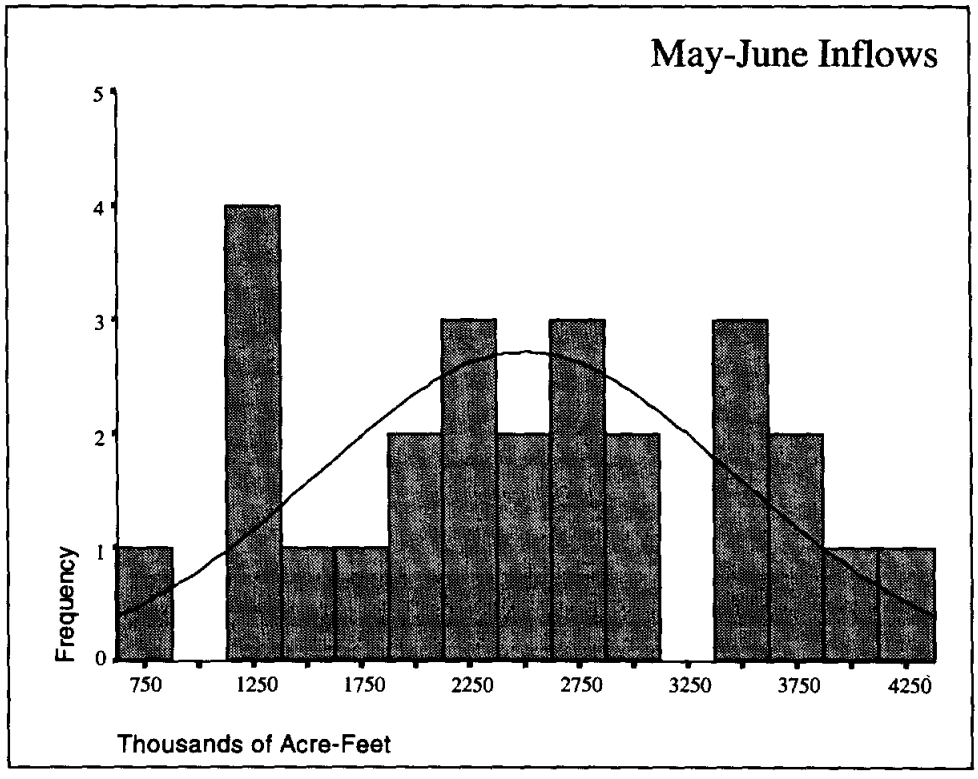
Extreme Values

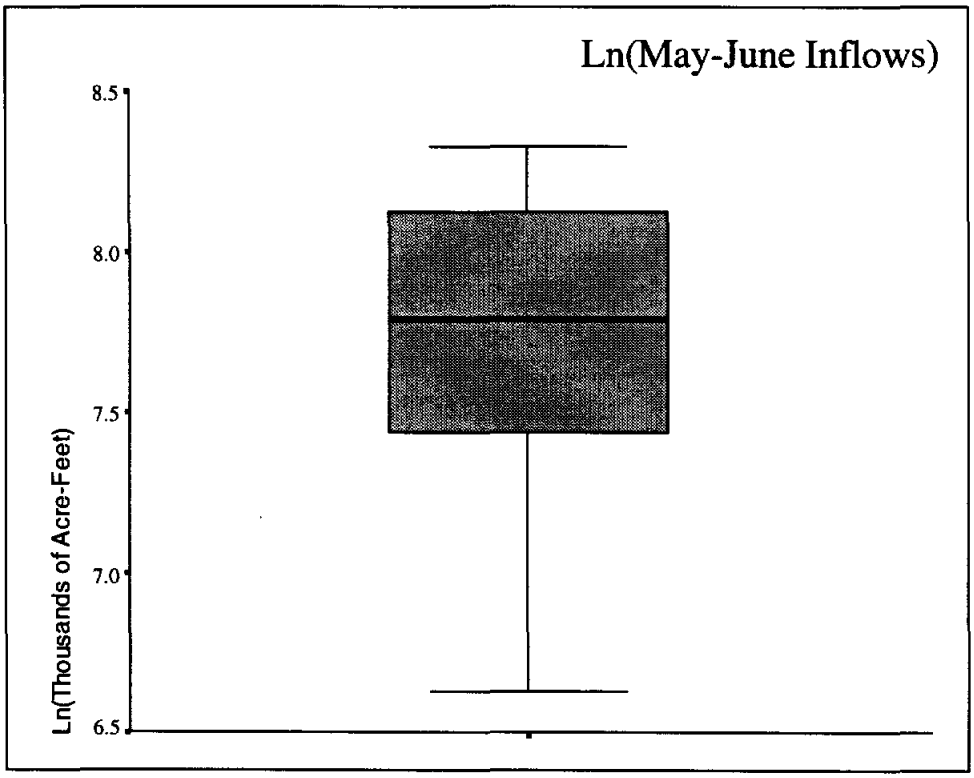
			Case Number	Year	Value
May-June Inflows	Highest	1	7	1968	4136.47
		2	9	1970	3968.77
		3	14	1975	3726.31
		4	8	1969	3676.87
		5	22	1983	3551.73
	Lowest	1	3	1964	759.57
		2	4	1965	1192.23
		3	2	1963	1270.07
		4	11	1972	1288.20
		5	17	1978	1315.67


Normal Q-Q Plot
of May-June Inflows
Expected Normal
Observed Value
2
1
0
-1
-2
0
1000
2000
3000
4000
5000


Normal Q-Q Plot
of Ln(May-June Inflows)
Expected Normal
Observed Value
2
1
0
-1
-2
6.5
7.0
7.5
8.0
8.5
9.0


May-June Inflows
5000
4000
3000
2000
1000
0
Thousands of Acre-Feet


May-June Inflows
5
4
3
2
1
0
Frequency
750
1250
1750
2250
2750
3250
3750
4250
Thousands of Acre-Feet

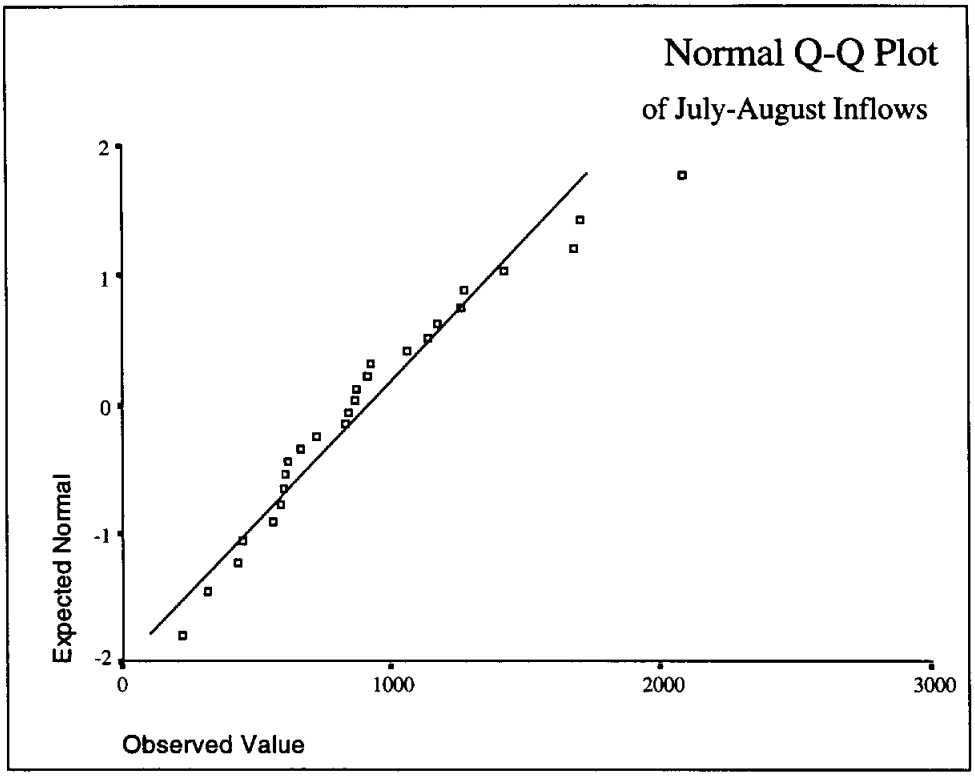

Ln(May-June Inflows)
Ln(Thousands of Acre-Feet)
8.5
8.0
7.5
7.0
6.5

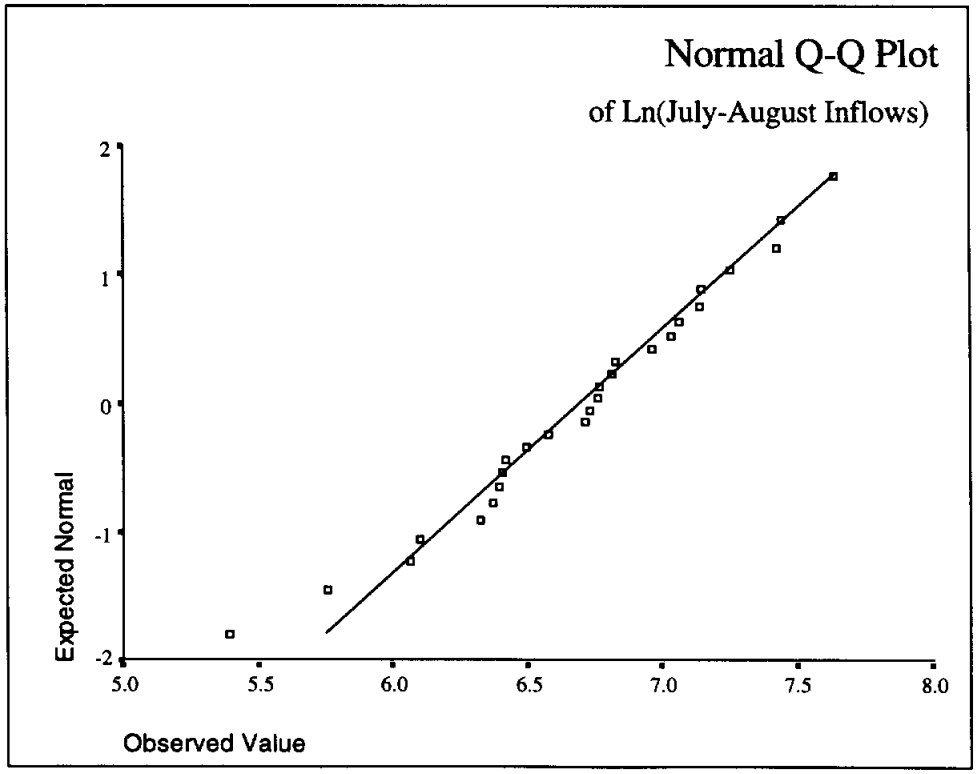
Descriptives

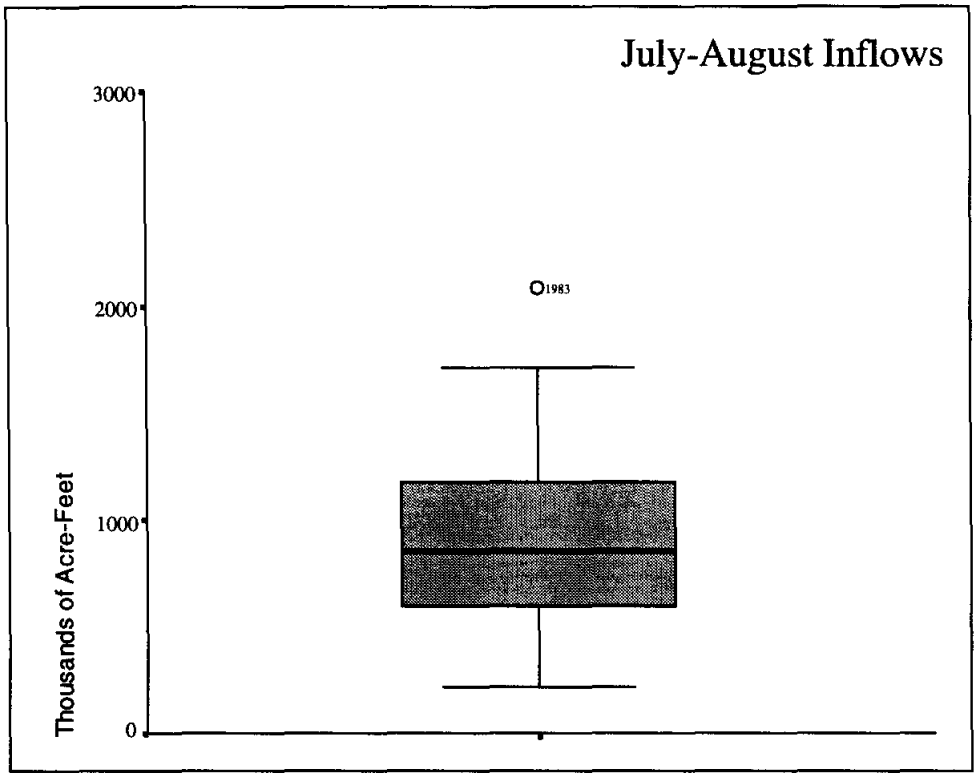
			Statistic	Std. Error
July-August Inflows	Mean		*917.3554*	*89.2122*
	95% Confidence Interval for Mean	Lower Bound	*733.6193*	
		Upper Bound	*1101.0914*	
	5% Trimmed Mean		*894.6915*	
	Median		*856.6600*	
	Variance		*206929.424*	
	Std. Deviation		*454.8950*	
	Minimum		*220.39*	
	Maximum		*2087.11*	
	Range		*1866.72*	
	Interquartile Range		*600.7800*	
	Skewness		*.843*	*.456*
	Kurtosis		*.466*	*.887*

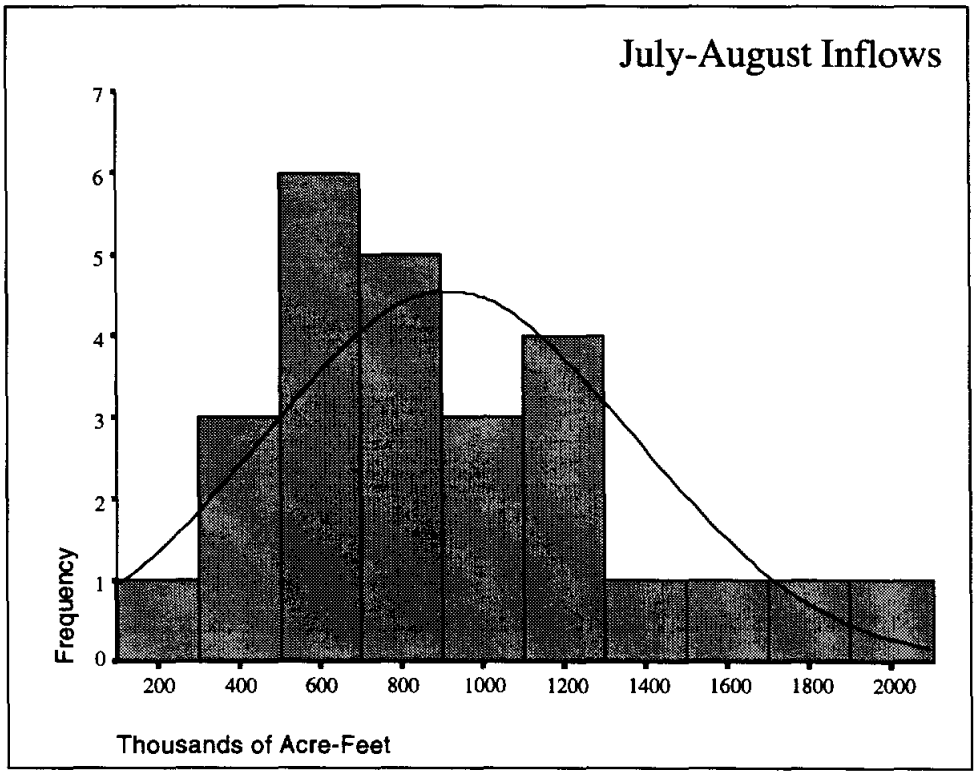
Extreme Values

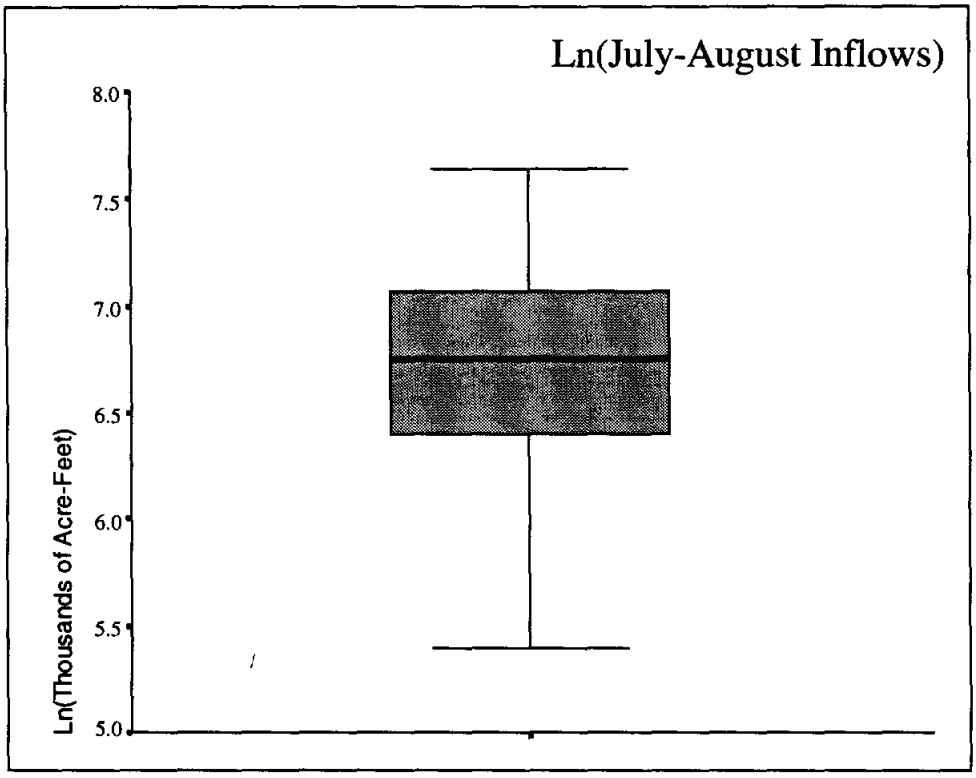
			Case Number	Year	Value
July-August Inflows	Highest	1	*22*	*1983*	*2087.11*
		2	*23*	*1984*	*1709.83*
		3	*20*	*1981*	*1686.25*
		4	*24*	*1985*	*1422.37*
		5	*18*	*1979*	*1274.52*
	Lowest	1	*4*	*1965*	*220.39*
		2	*3*	*1964*	*316.70*
		3	*11*	*1972*	*431.40*
		4	*10*	*1971*	*446.99*
		5	*5*	*1966*	*560.03*


Normal Q-Q Plot
of July-August Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(July-August Inflows)
Expected Normal
2
1
0
-1
-2
5.0
5.5
6.0
6.5
7.0
7.5
8.0
Observed Value


July-August Inflows
3000
2000
1000
0
Thousands of Acre-Feet
1983


July-August Inflows
7
6
5
4
3
2
1
0
Frequency
200
400
600
800
1000
1200
1400
1600
1800
2000
Thousands of Acre-Feet

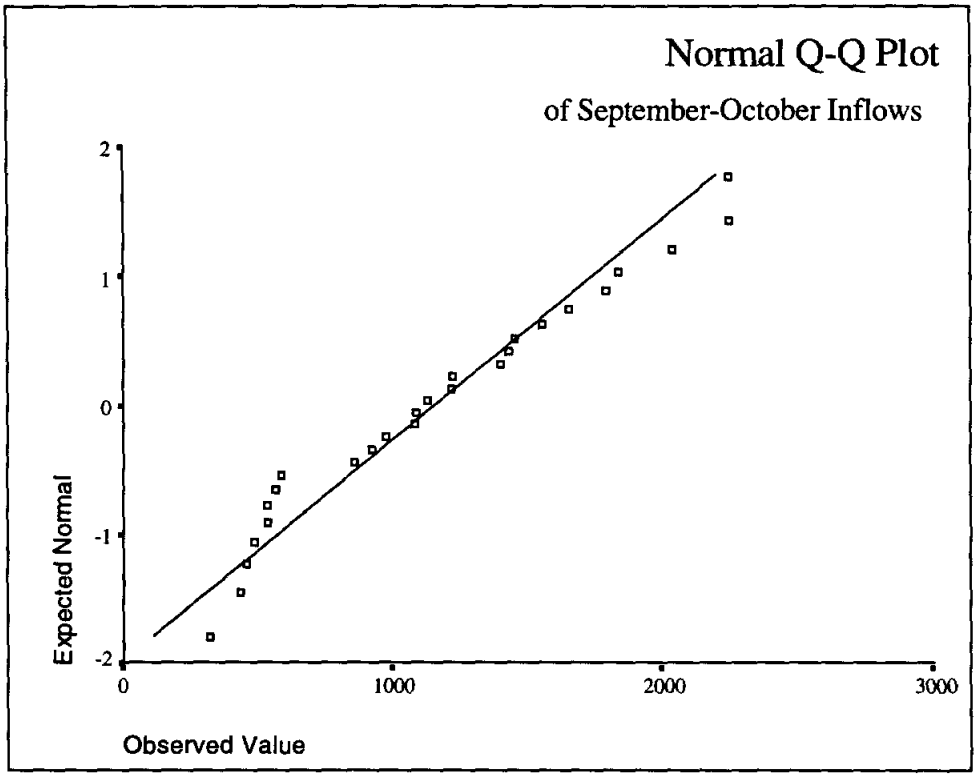

Ln(July-August Inflows)
Ln(Thousands of Acre-Feet)
8.0
7.5
7.0
6.5
6.0
5.5
5.0

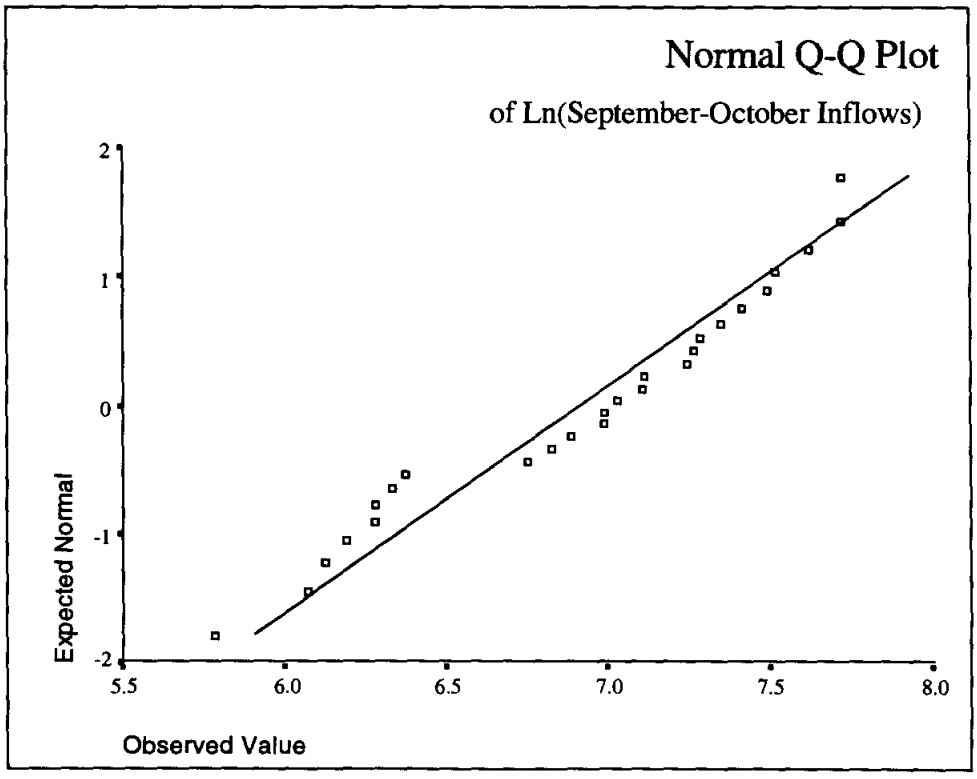
Descriptives

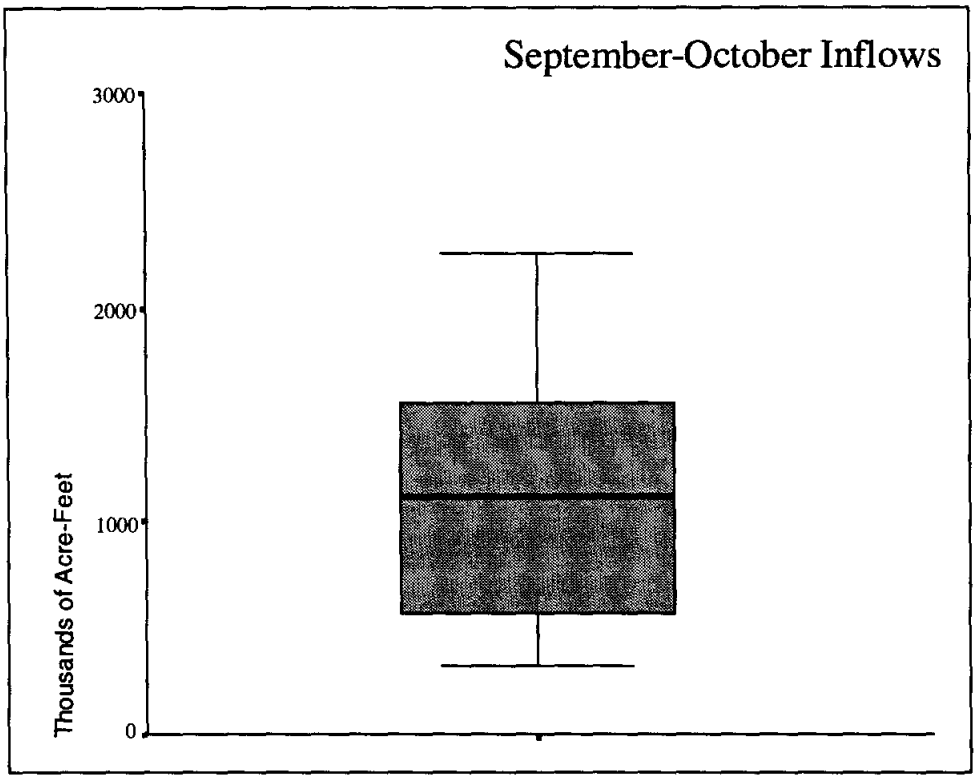
			Statistic	Std. Error
September-October Inflows	Mean		*1160.0942*	*114.4091*
	95% Confidence Interval for Mean	Lower Bound	*924.4643*	
		Upper Bound	*1395.7242*	
	5% Trimmed Mean		*1144.2825*	
	Median		*1110.4800*	
	Variance		*340325.473*	
	Std. Deviation		*583.3742*	
	Minimum		*325.37*	
	Maximum		*2254.37*	
	Range		*1929.00*	
	Interquartile Range		*1026.3825*	
	Skewness		*.347*	*.456*
	Kurtosis		*-.885*	*.887*

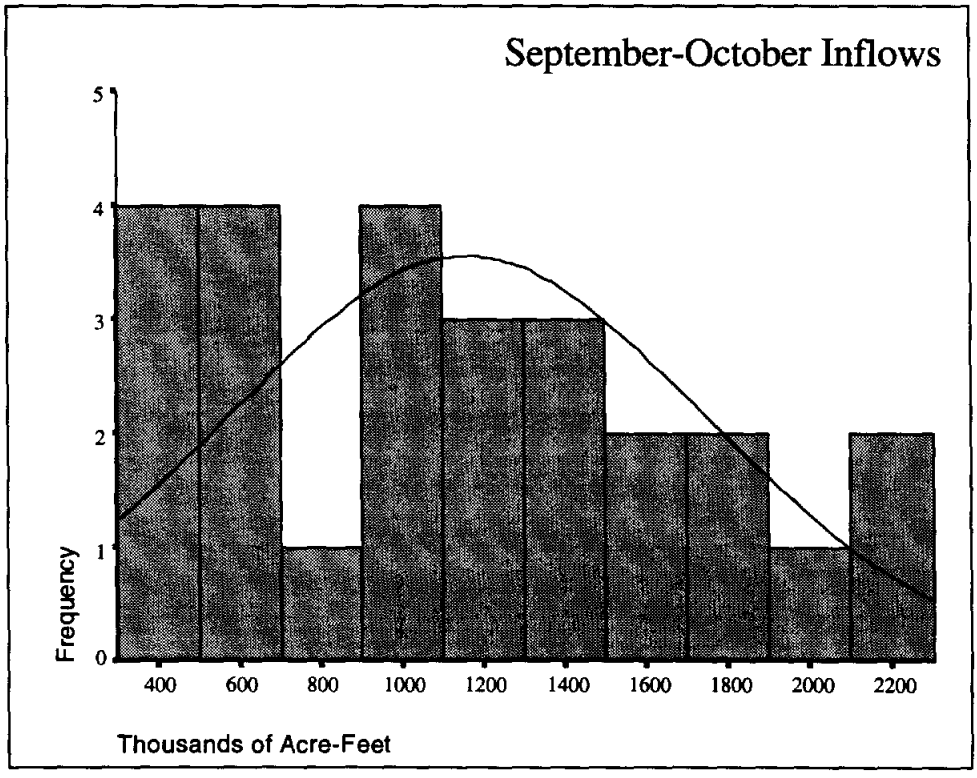
Extreme Values

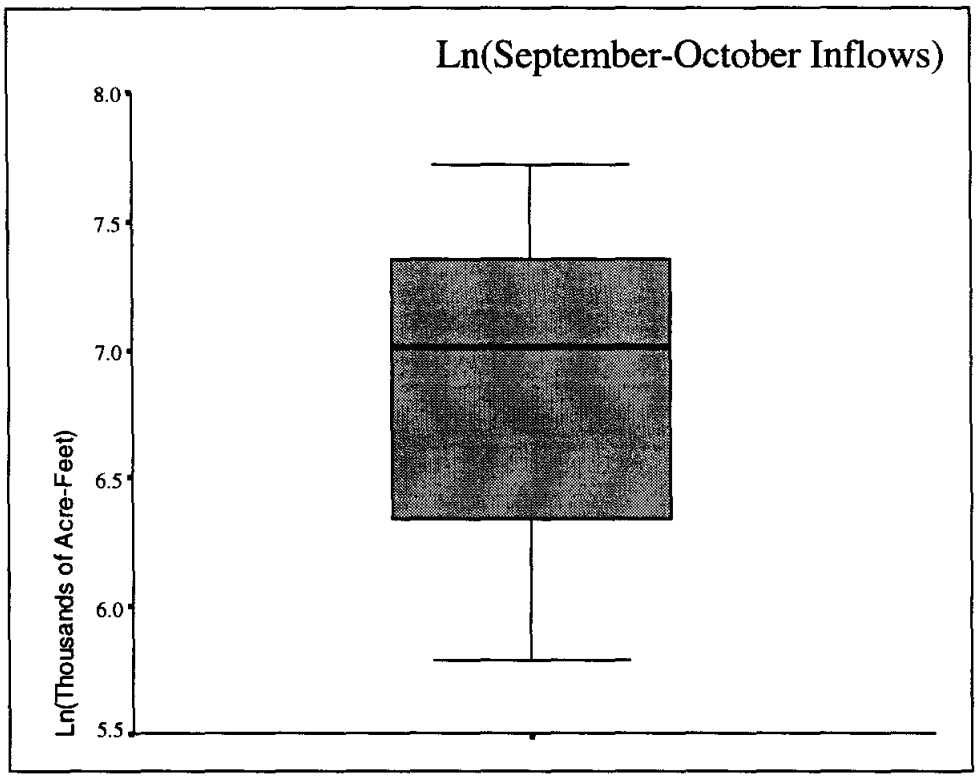
			Case Number	Year	Value
September-October Inflows	Highest	1	*14*	*1975*	*2254.37*
		2	*13*	*1974*	*2253.25*
		3	*20*	*1981*	*2043.34*
		4	*12*	*1973*	*1845.28*
		5	*24*	*1985*	*1797.78*
	Lowest	1	*4*	*1965*	*325.37*
		2	*6*	*1967*	*435.08*
		3	*5*	*1966*	*459.59*
		4	*8*	*1969*	*489.11*
		5	*7*	*1968*	*533.83*


Normal Q-Q Plot
of September-October Inflows
Expected Normal
2
1
0
-1
-2
0
1000
2000
3000
Observed Value


Normal Q-Q Plot
of Ln(September-October Inflows)
Expected Normal
2
1
0
-1
-2
5.5
6.0
6.5
7.0
7.5
8.0
Observed Value


September-October Inflows
3000
2000
1000
0
Thousands of Acre-Feet


September-October Inflows
5
4
3
2
1
0
Frequency
400
600
800
1000
1200
1400
1600
1800
2000
2200
Thousands of Acre-Feet

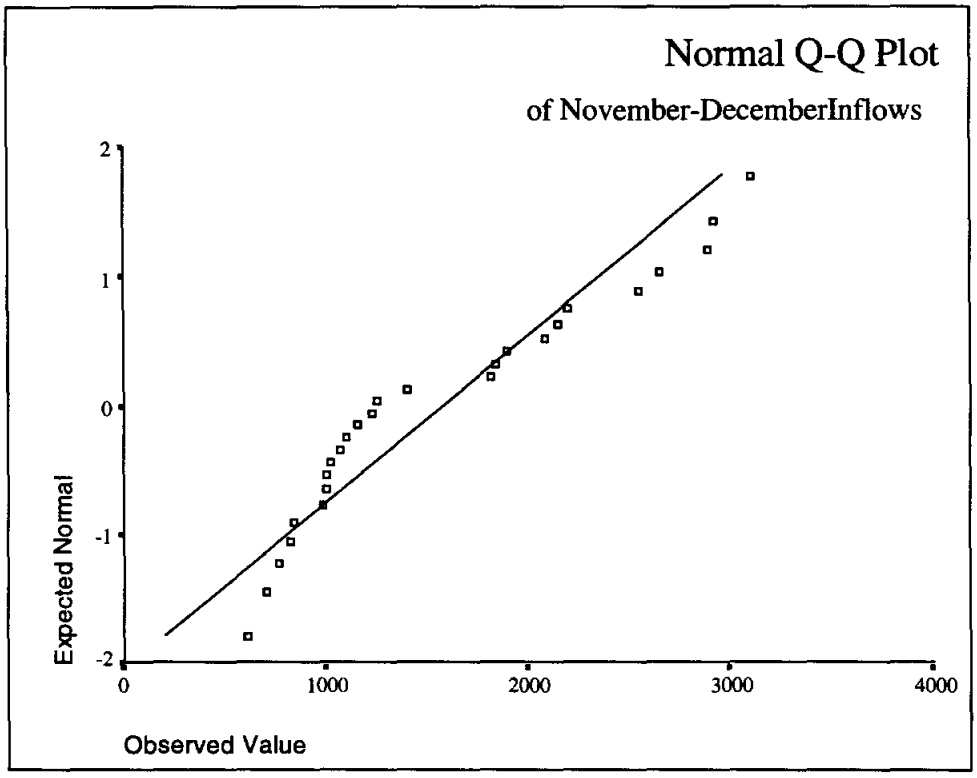

Ln(September-October Inflows)
Ln(Thousands of Acre-Feet)
8.0
7.5
7.0
6.5
6.0
5.5

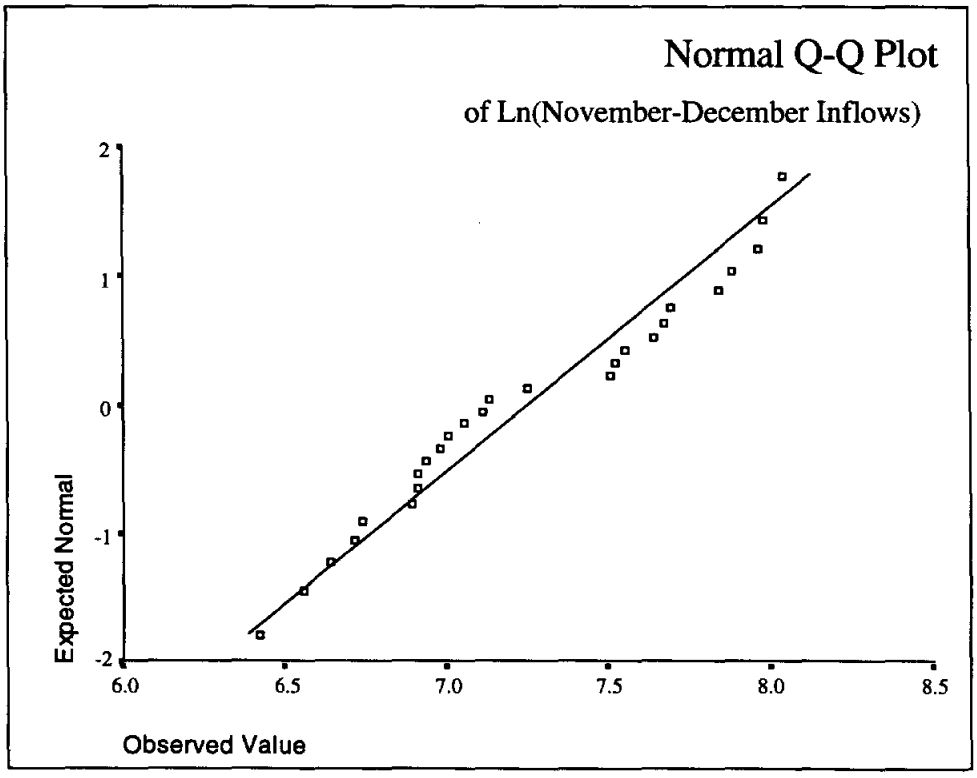
Descriptives

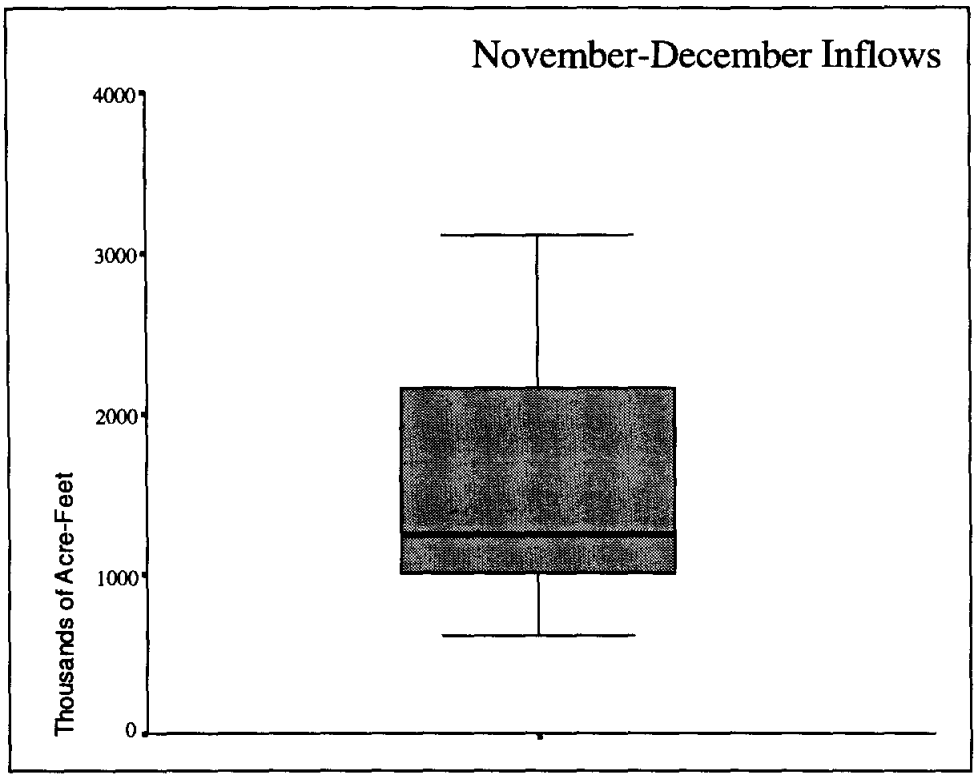
			Statistic	Std. Error
November-December Inflows	Mean		*1586.9488*	*151.6418*
	95% Confidence Interval for Mean	Lower Bound	*1274.6367*	
		Upper Bound	*1899.2610*	
	5% Trimmed Mean		*1557.2302*	
	Median		*1245.8500*	
	Variance		*597876.031*	
	Std. Deviation		*773.2244*	
	Minimum		*615.13*	
	Maximum		*3115.37*	
	Range		*2500.24*	
	Interquartile Range		*1169.2725*	
	Skewness		*.643*	*.456*
	Kurtosis		*-.915*	*.887*

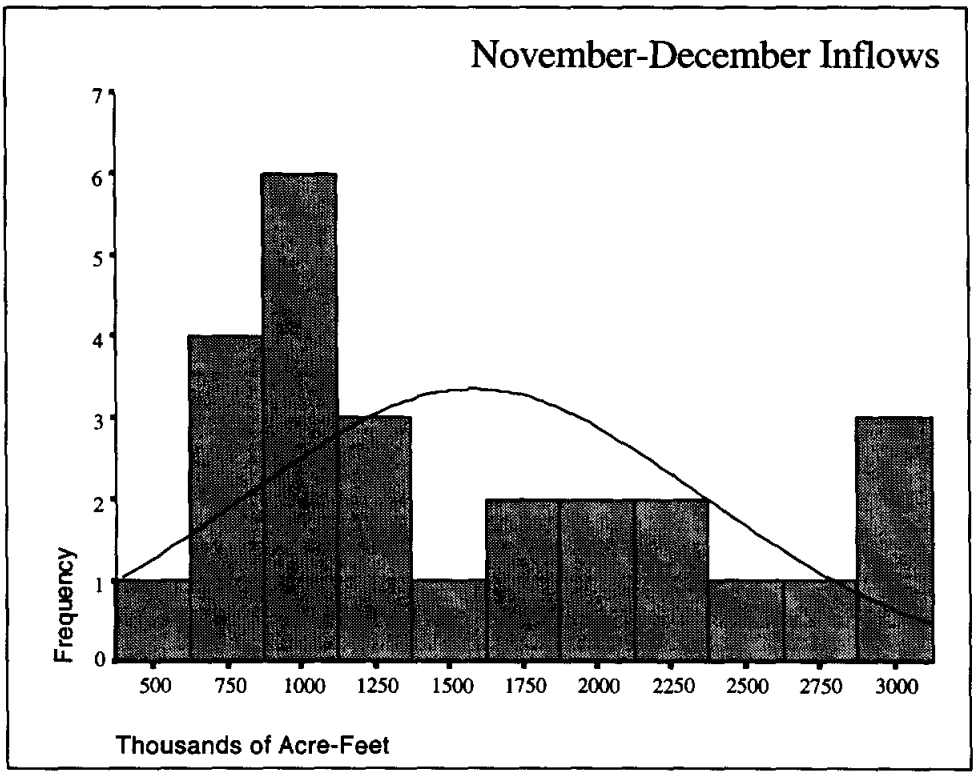
Extreme Values

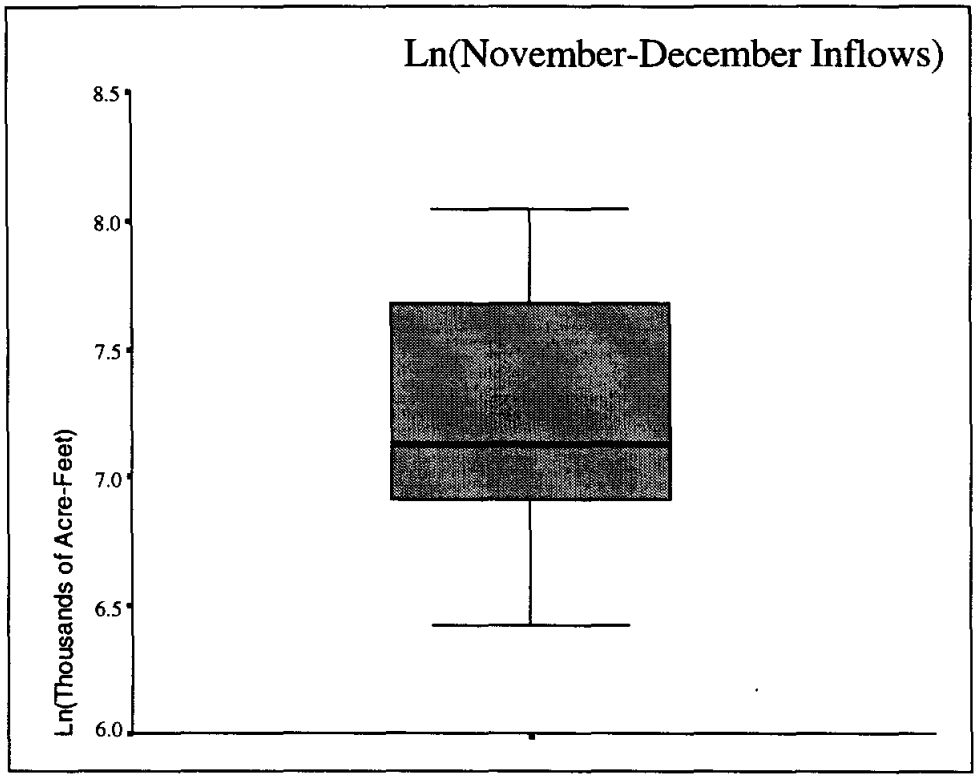
			Case Number	Year	Value
November-December Inflows	Highest	1	*25*	*1986*	*3115.37*
		2	*26*	*1987*	*2930.13*
		3	*13*	*1974*	*2897.57*
		4	*14*	*1975*	*2659.43*
		5	*15*	*1976*	*2562.96*
	Lowest	1	*9*	*1970*	*615.13*
		2	*7*	*1968*	*706.48*
		3	*19*	*1980*	*767.72*
		4	*8*	*1969*	*828.41*
		5	*6*	*1967*	*848.36*


Normal Q-Q Plot
of November-DecemberInflows
Expected Normal
Observed Value
2
1
0
-1
-2
0
1000
2000
3000
4000


Normal Q-Q Plot
of Ln(November-December Inflows)
Expected Normal
Observed Value
2
1
0
-1
-2
6.0
6.5
7.0
7.5
8.0
8.5


November-December Inflows
4000
3000
2000
1000
0
Thousands of Acre-Feet

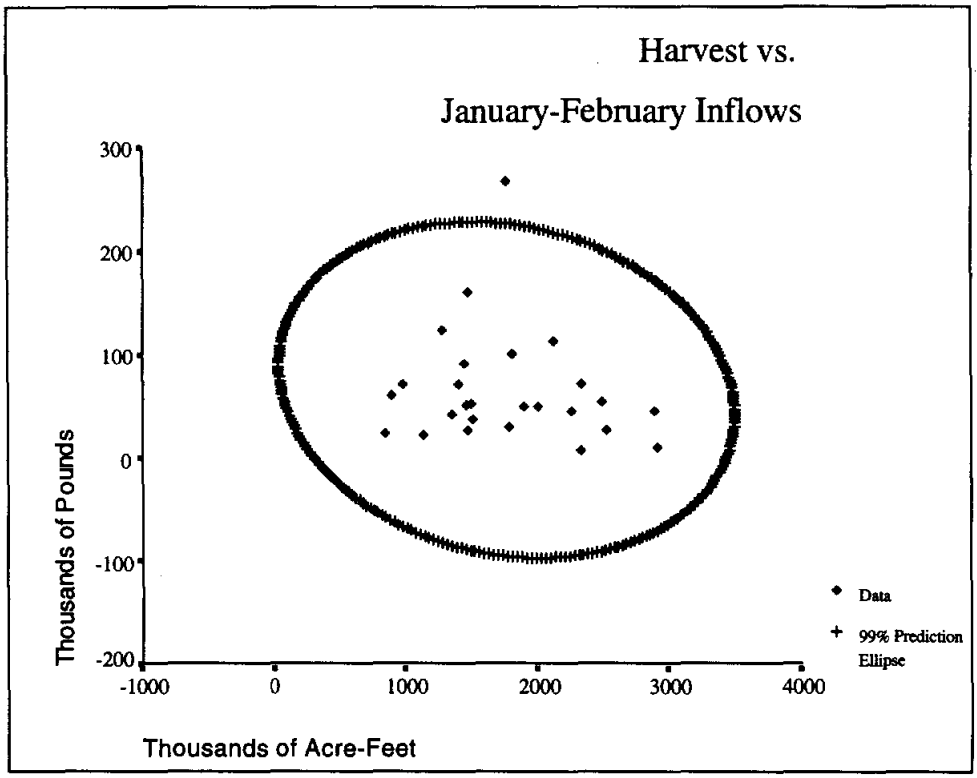

November-December Inflows
7
6
5
4
3
2
1
0
Frequency
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet


Ln(November-December Inflows)
Ln(Thousands of Acre-Feet)
8.5
8.0
7.5
7.0
6.5
6.0

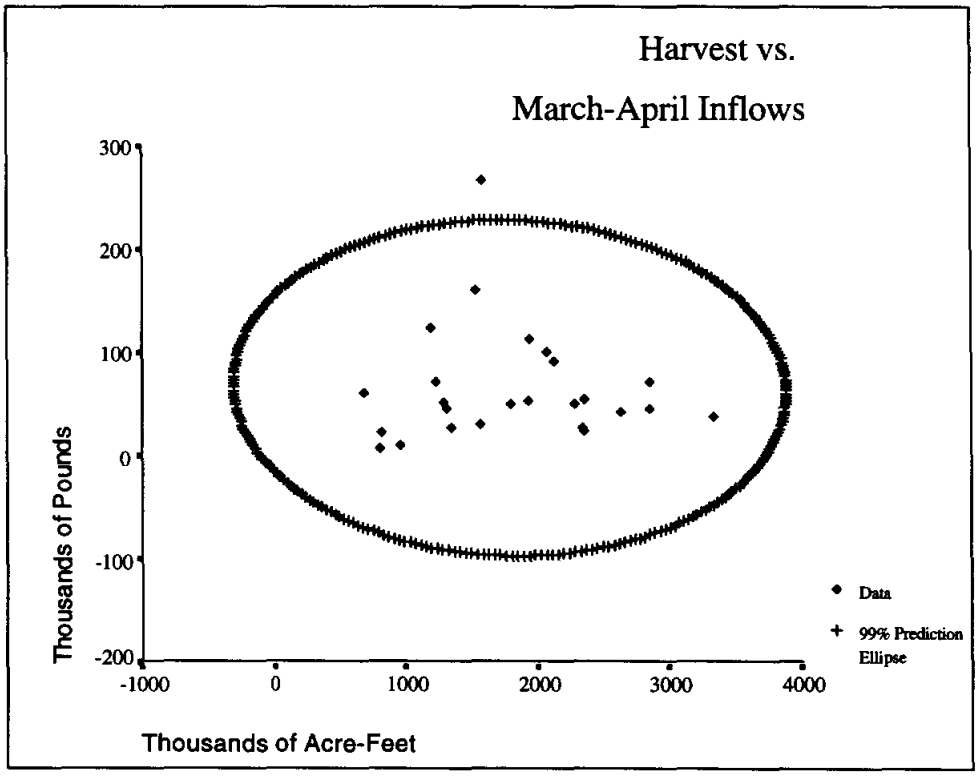
Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Black Drum Harvest	9.3000	20.3000	30.7500	52.7000	78.0750	136.0000	231.5150
	Ln(Black Drum Harvest)	2.210249	2.964676	3.425398	3.964500	4.352021	4.905353	5.417005
	January-February Inflows	865.3875	951.6270	1386.6000	1641.9300	2279.5050	2634.5900	2906.7340
	March-April Inflows	733.6000	817.3380	1232.7800	1692.5750	2350.4625	2854.9780	3169.6145
	May-June Inflows	911.0010	1246.7180	1679.6125	2417.1200	3420.0900	3799.0480	4077.7750
	July-August Inflows	254.0985	396.9900	597.3950	856.6600	1198.1750	1693.3240	1955.0620
	September-October Inflows	363.7685	452.2370	557.4175	1110.4800	1583.8000	2106.3130	2253.9780
	November-December Inflows	647.1025	749.3480	1001.9325	1245.8500	2171.2050	2907.3380	3050.5360
	Ln(January-February Inflows)	6.762883	6.857372	7.234492	7.400624	7.731610	7.874529	7.974777
	Ln(March-April Inflows)	6.594699	6.706052	7.117027	7.432014	7.762366	7.956819	8.058664
	Ln(May-June Inflows)	6.790542	7.127853	7.426070	7.790290	8.137291	8.242085	8.313113
	Ln(July-August Inflows)	5.522293	5.974311	6.392530	6.752942	7.088055	7.434428	7.573750
	Ln(September-October Inflows)	5.886661	6.113893	6.323057	7.012374	7.367226	7.651677	7.720452
	Ln(November-December Inflows)	6.470295	6.618486	6.909653	7.127514	7.682989	7.974980	8.022648
Tukey's Hinges	Black Drum Harvest			31.3000	52.7000	73.1000		
	Ln(Black Drum Harvest)			3.443618	3.964500	4.291828		
	January-February Inflows			1398.8200	1641.9300	2260.4600		
	March-April Inflows			1233.0300	1692.5750	2348.4400		
	May-June Inflows			1701.0500	2417.1200	3387.9400		
	July-August Inflows			600.7800	856.6600	1176.0500		
	September-October Inflows			564.6500	1110.4800	1559.1500		
	November-December Inflows			1006.6200	1245.8500	2158.8500		
	Ln(January-February Inflows)			7.243384	7.400624	7.723324		
	Ln(March-April Inflows)			7.117230	7.432014	7.761507		
	Ln(May-June Inflows)			7.439001	7.790290	8.127977		
	Ln(July-August Inflows)			6.398229	6.752942	7.069917		
	Ln(September-October Inflows)			6.336206	7.012374	7.351896		
	Ln(November-December Inflows)			6.914353	7.127514	7.677331		

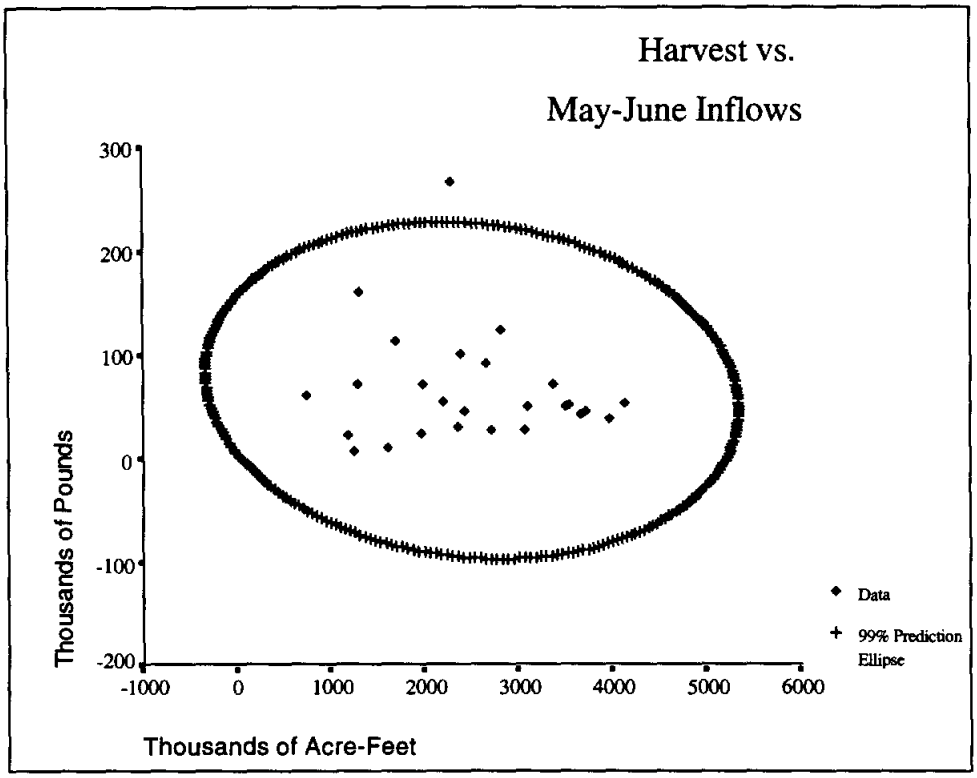
99% Prediction Ellipses



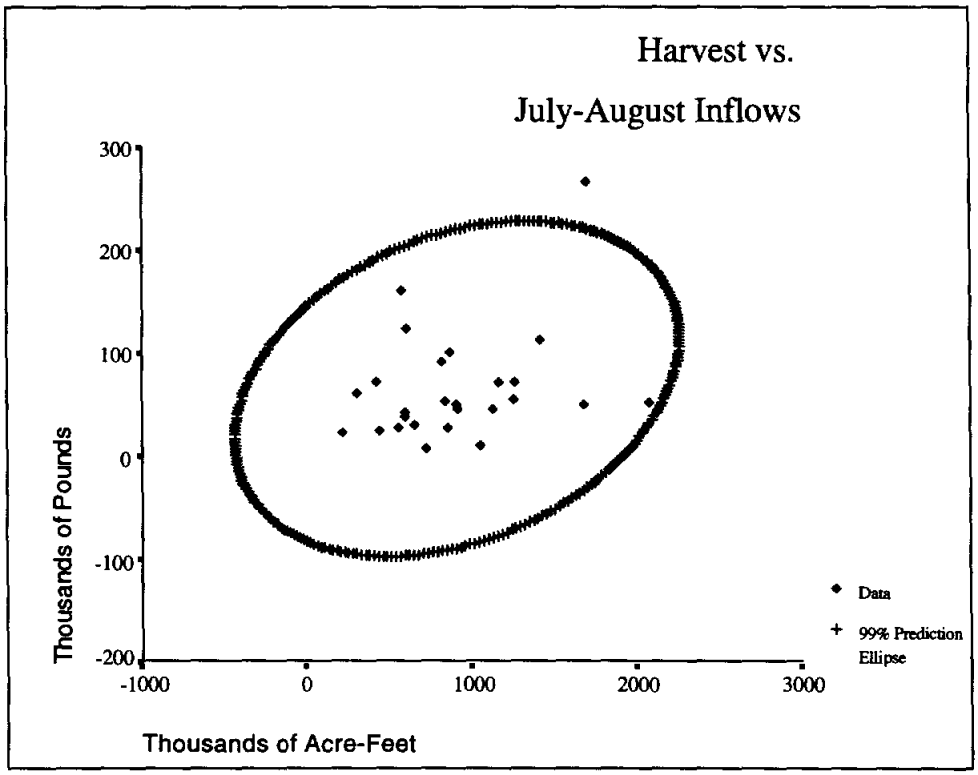
Outside ellipse: 1984.



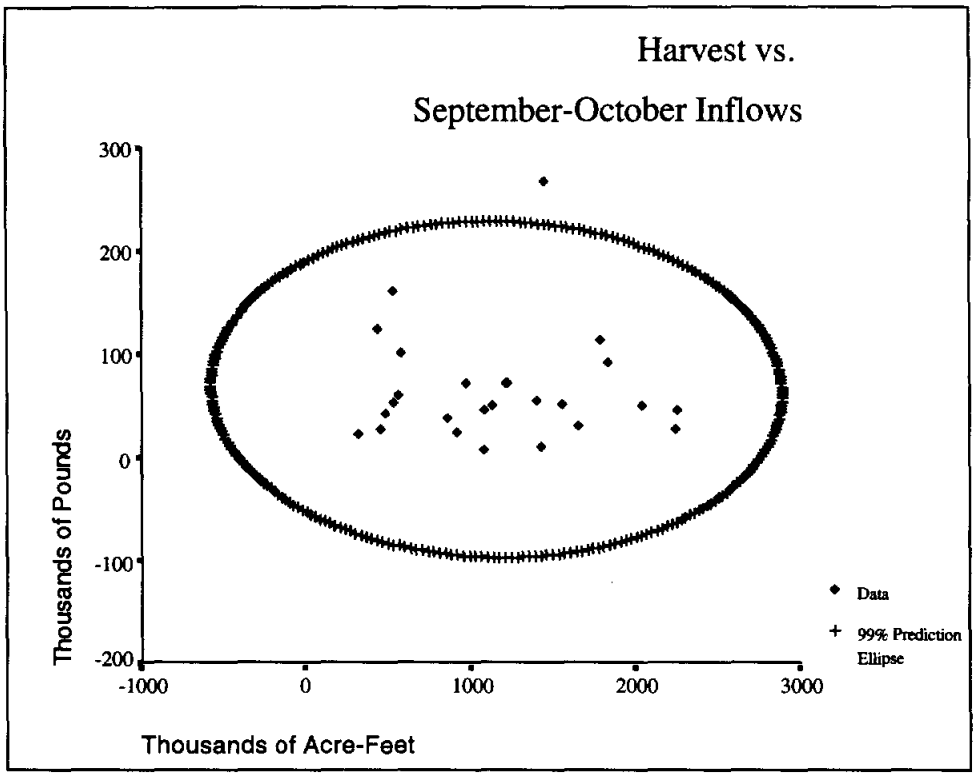
Outside ellipse: 1984.



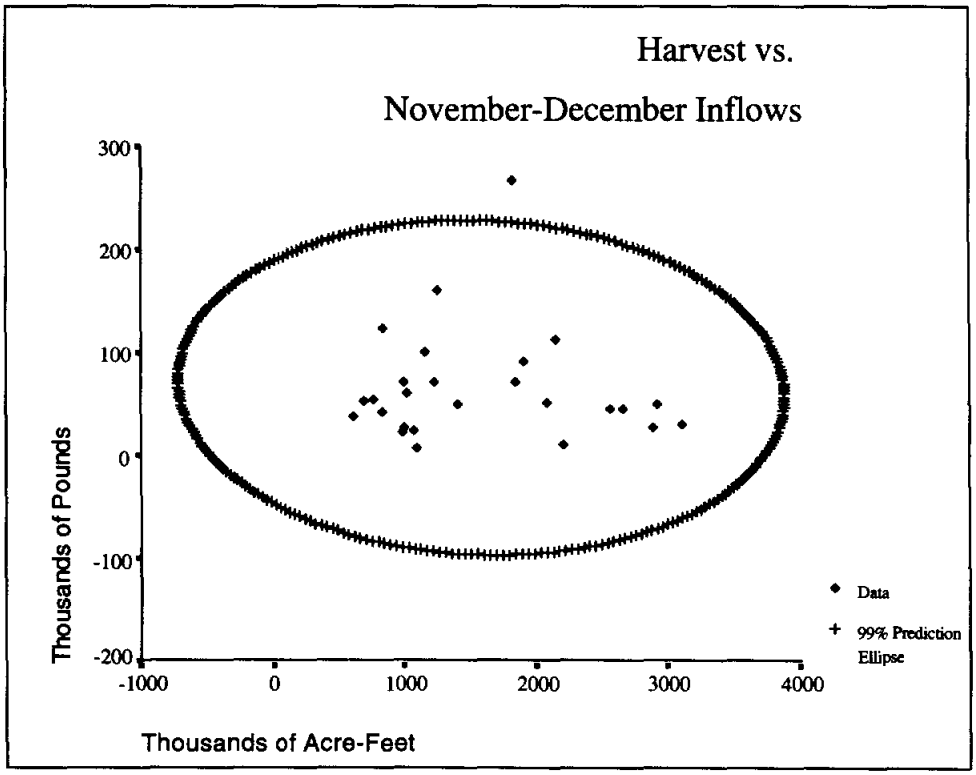
Outside ellipse: 1984.



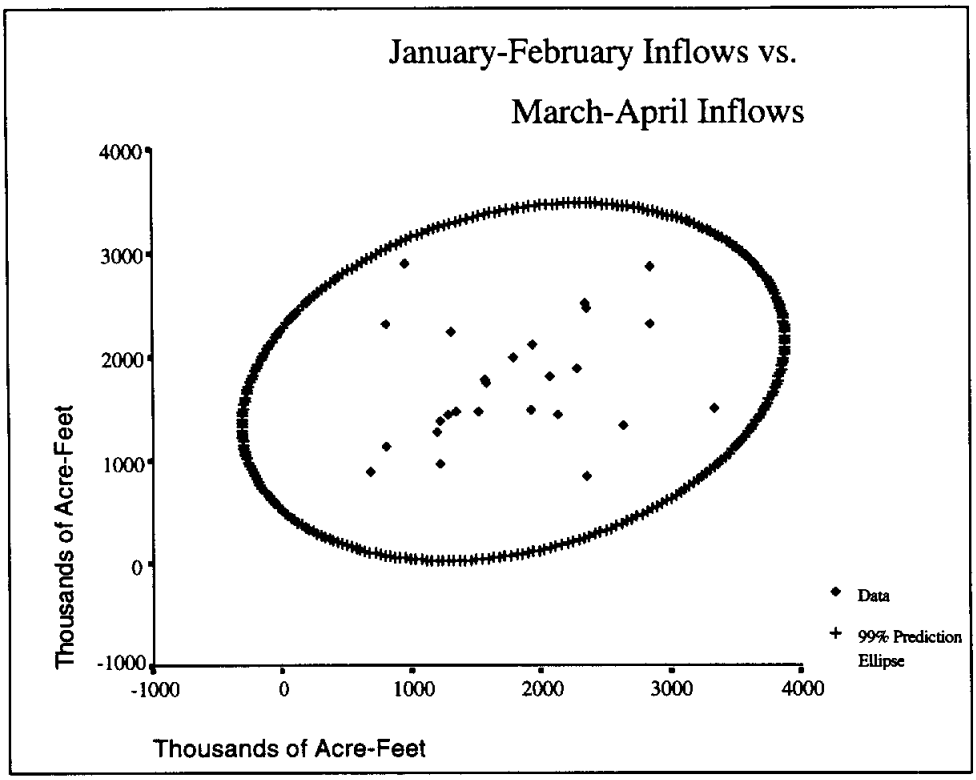
Outside ellipse: 1984. Near edge of ellipse: 1983.

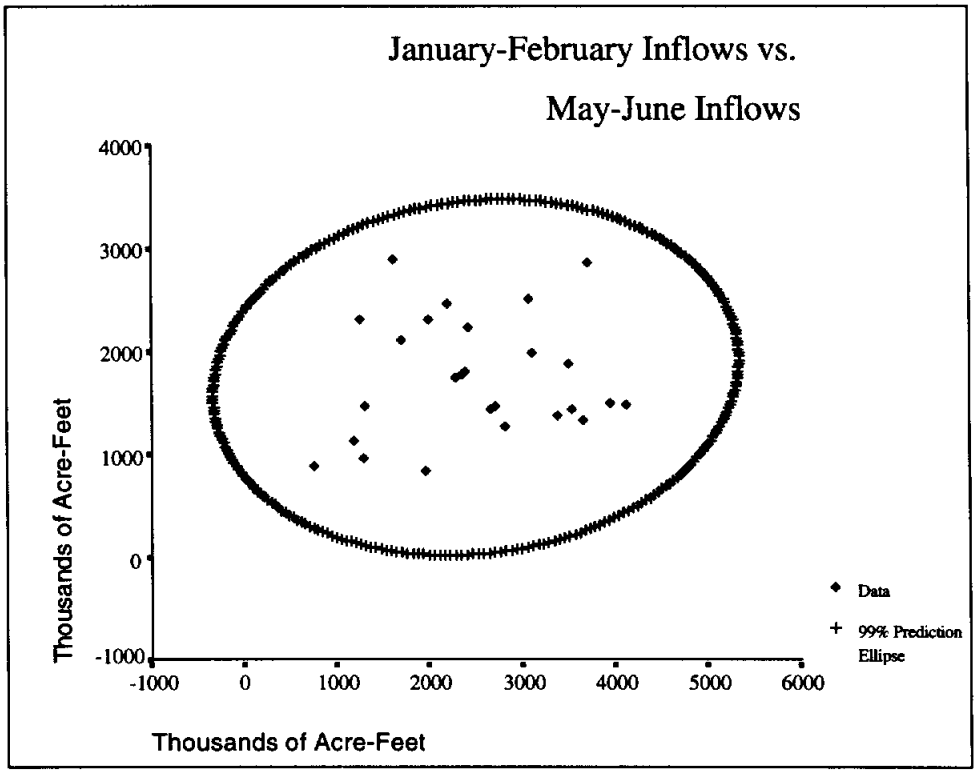


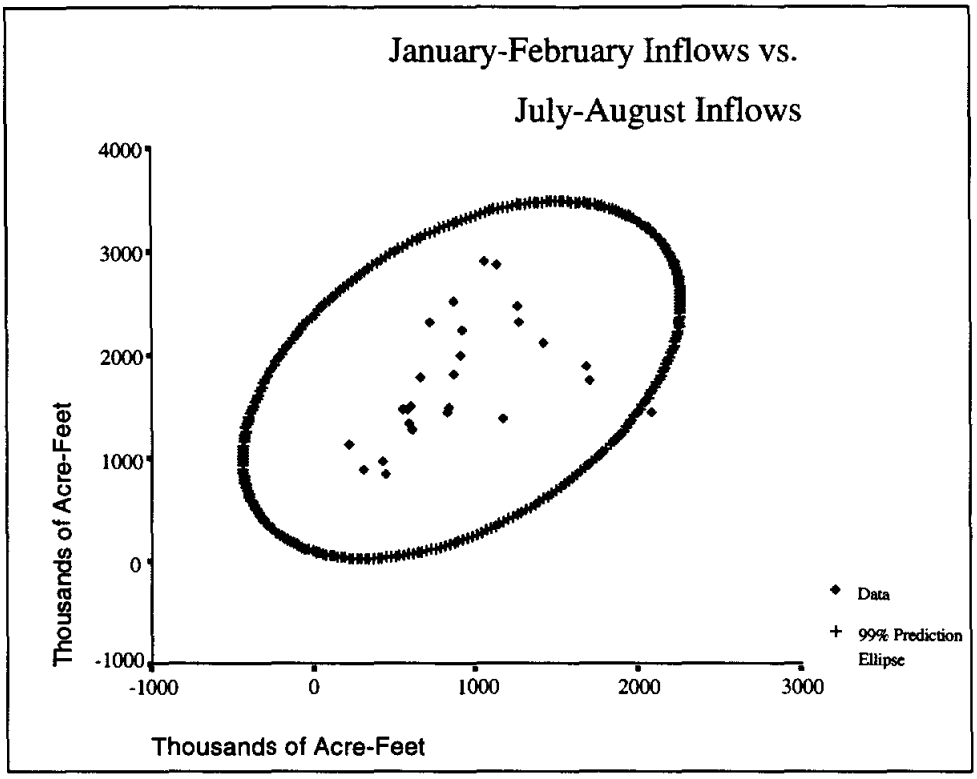
Outside ellipse: 1984.



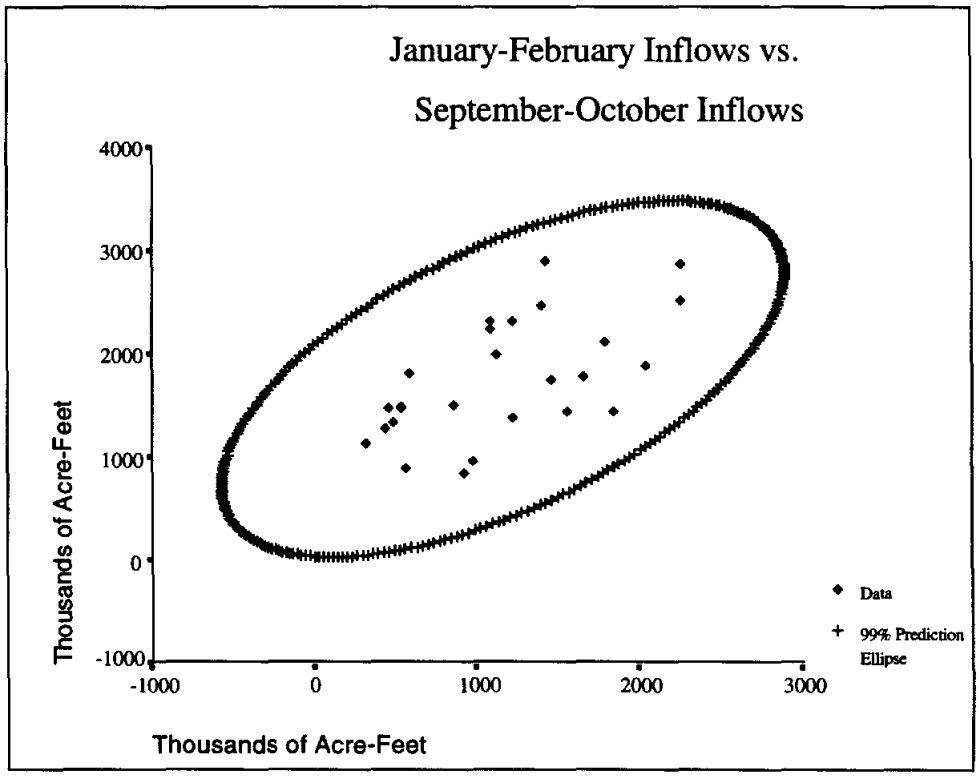
Outside ellipse: 1984.

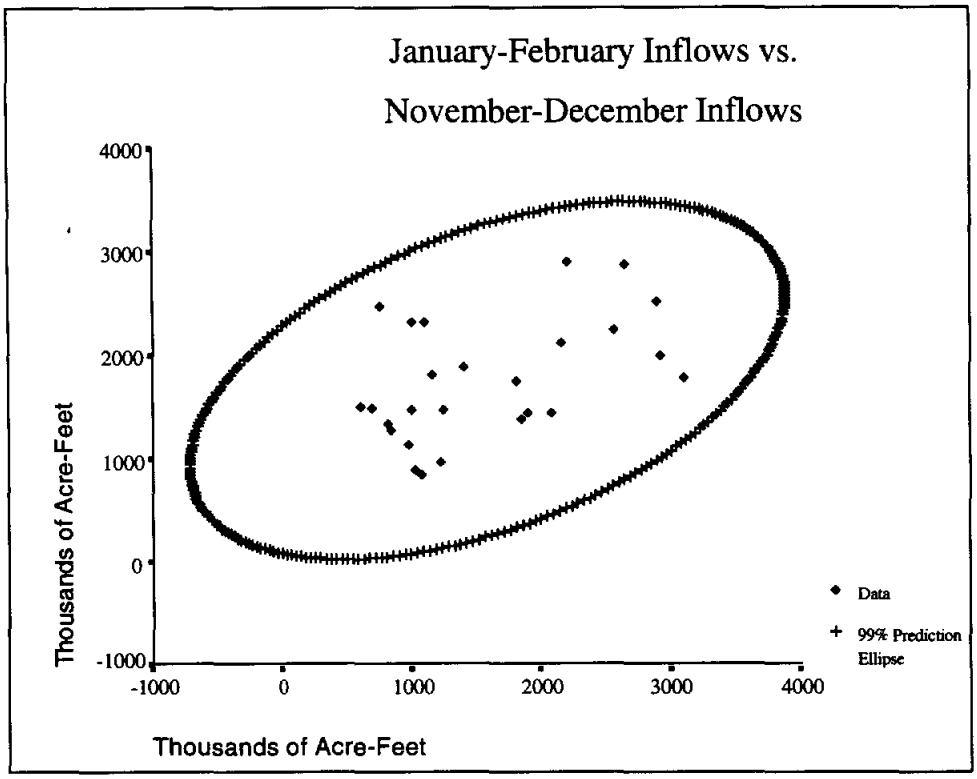

January-February Inflows vs.
March-April Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

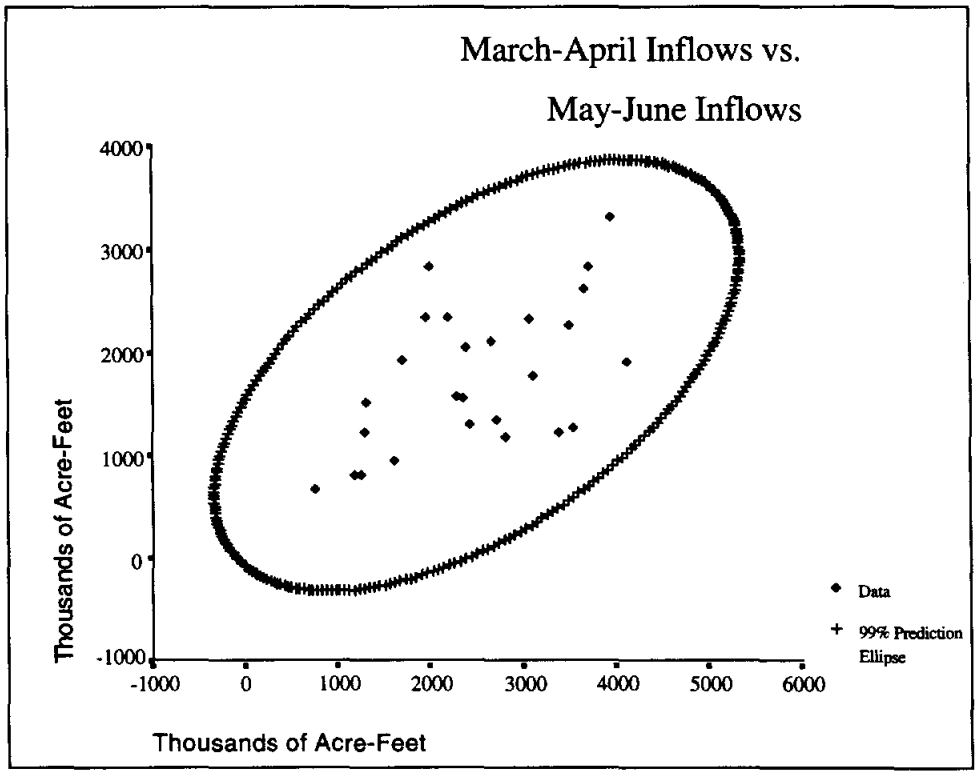

January-February Inflows vs.
May-June Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

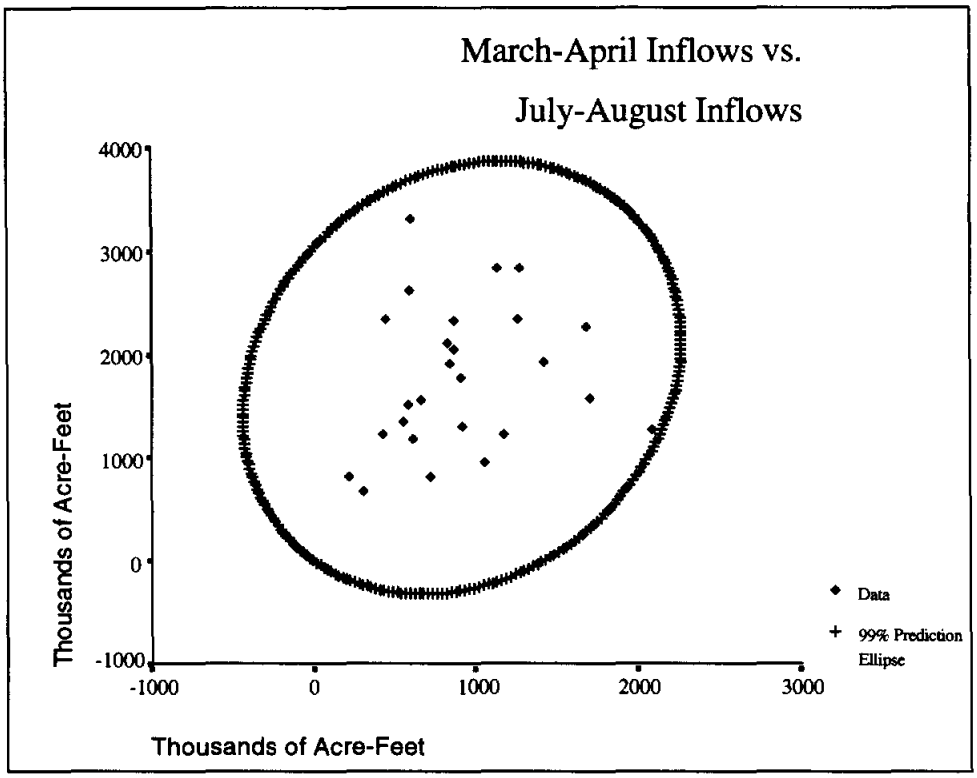


Outside ellipse: 1983.

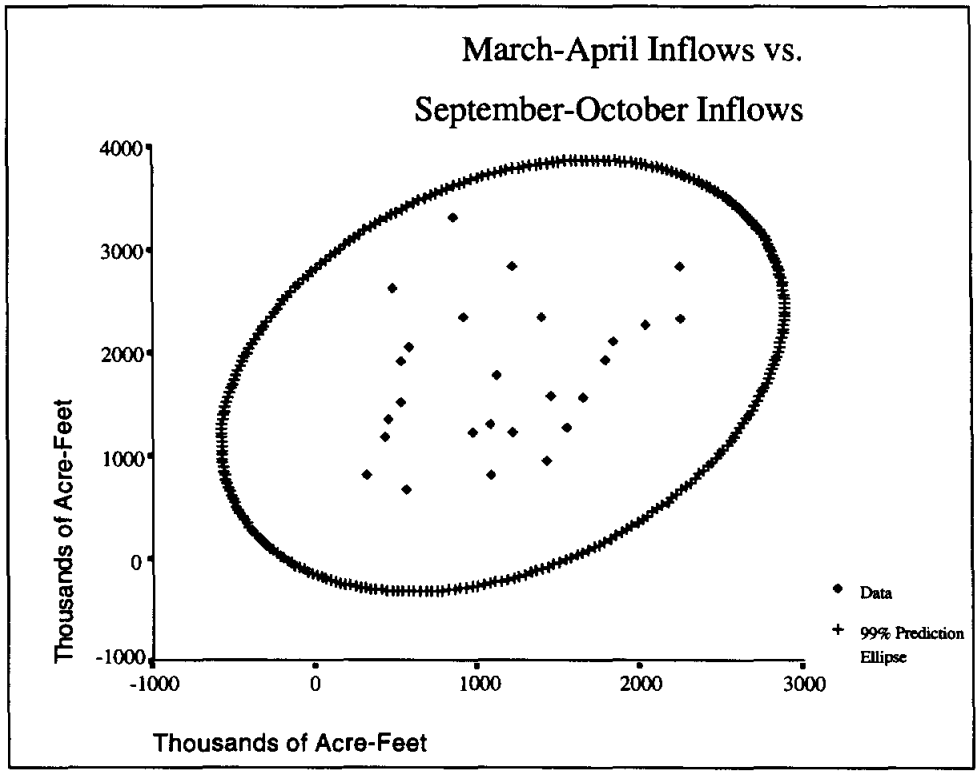


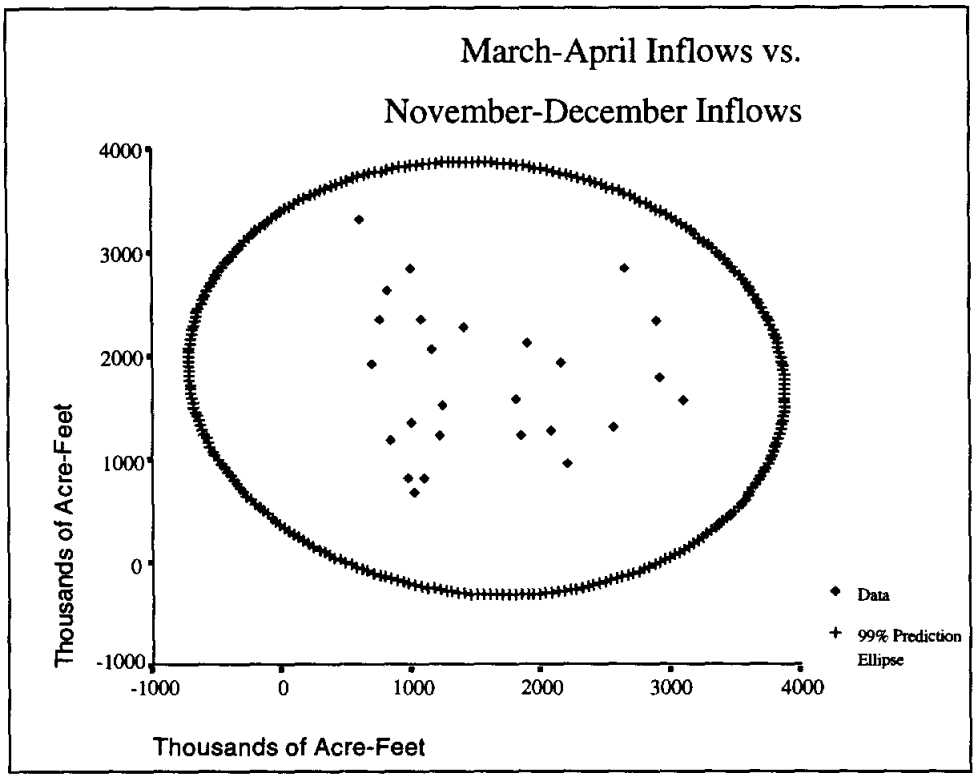

January-February Inflows vs.
November-December Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

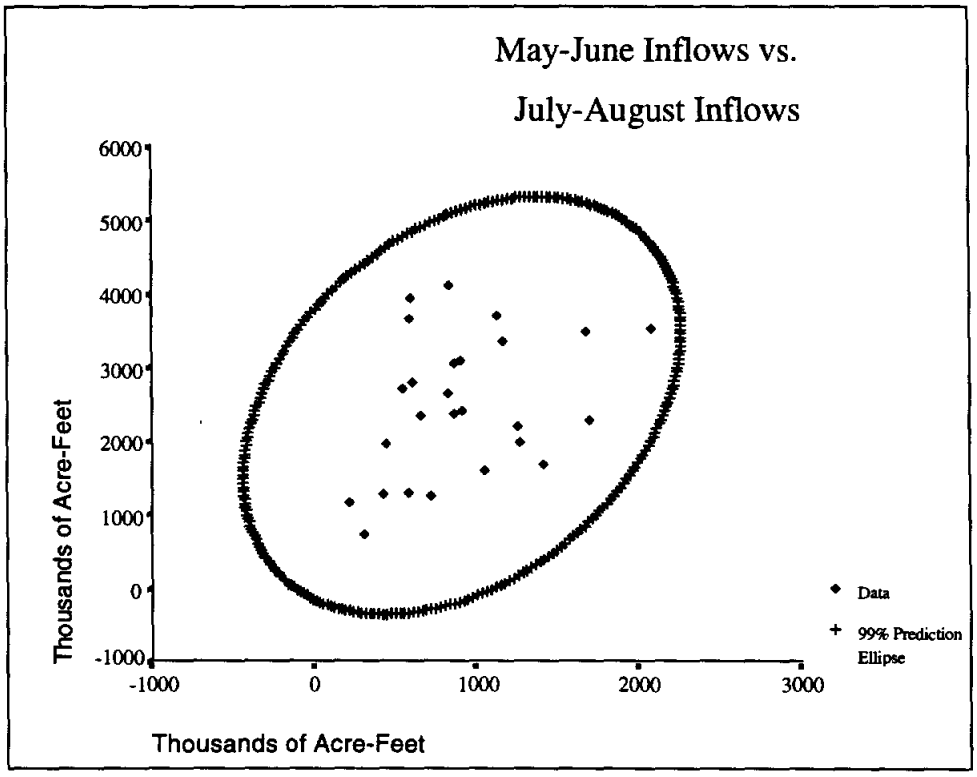

March-April Inflows vs.
May-June Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

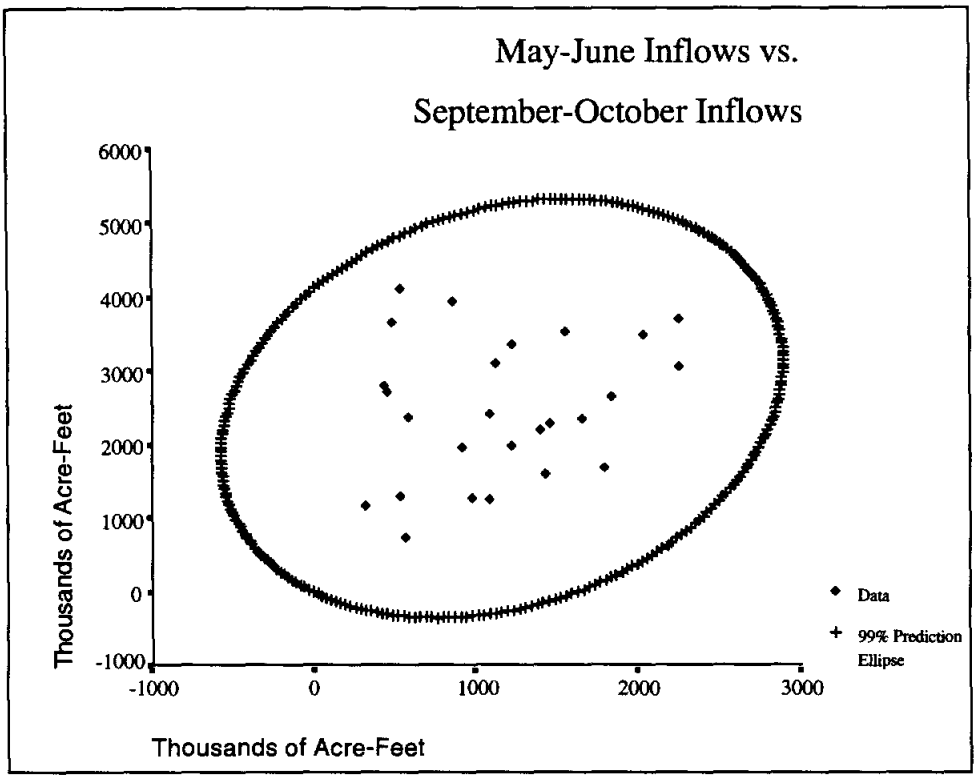


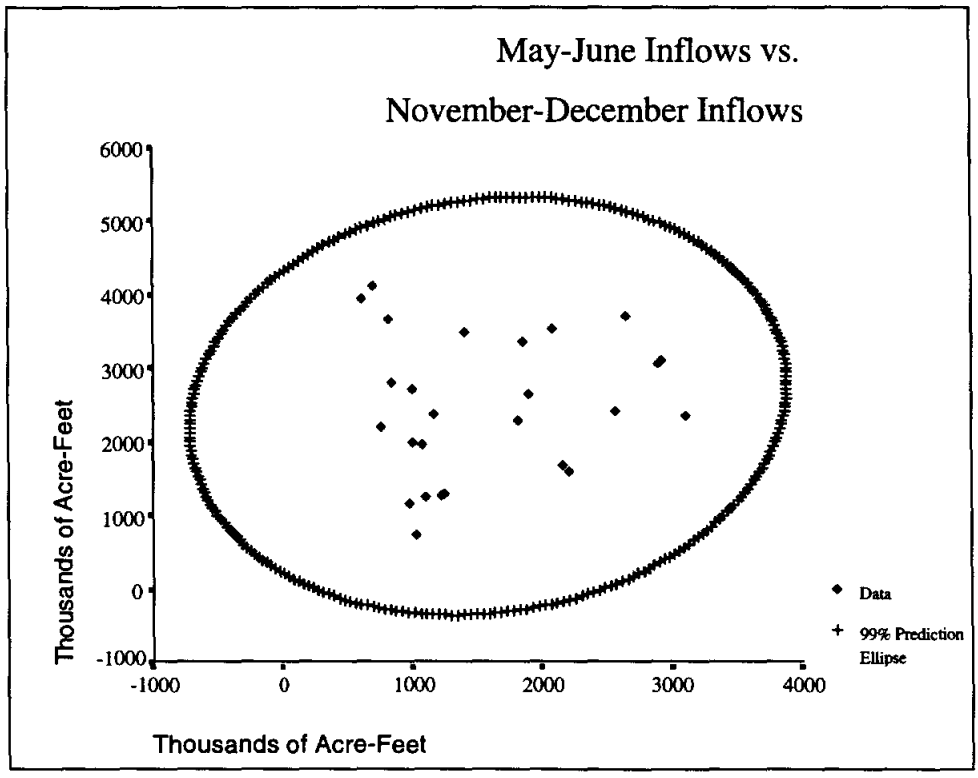
Near edge of ellipse: 1983.

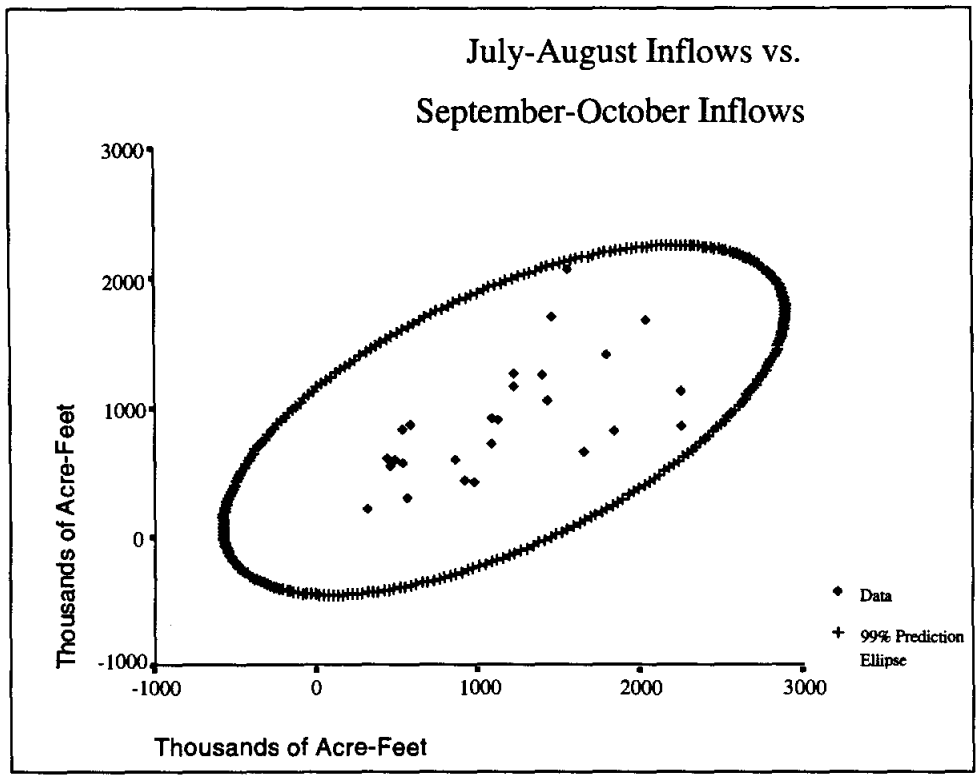



March-April Inflows vs.
November-December Inflows
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

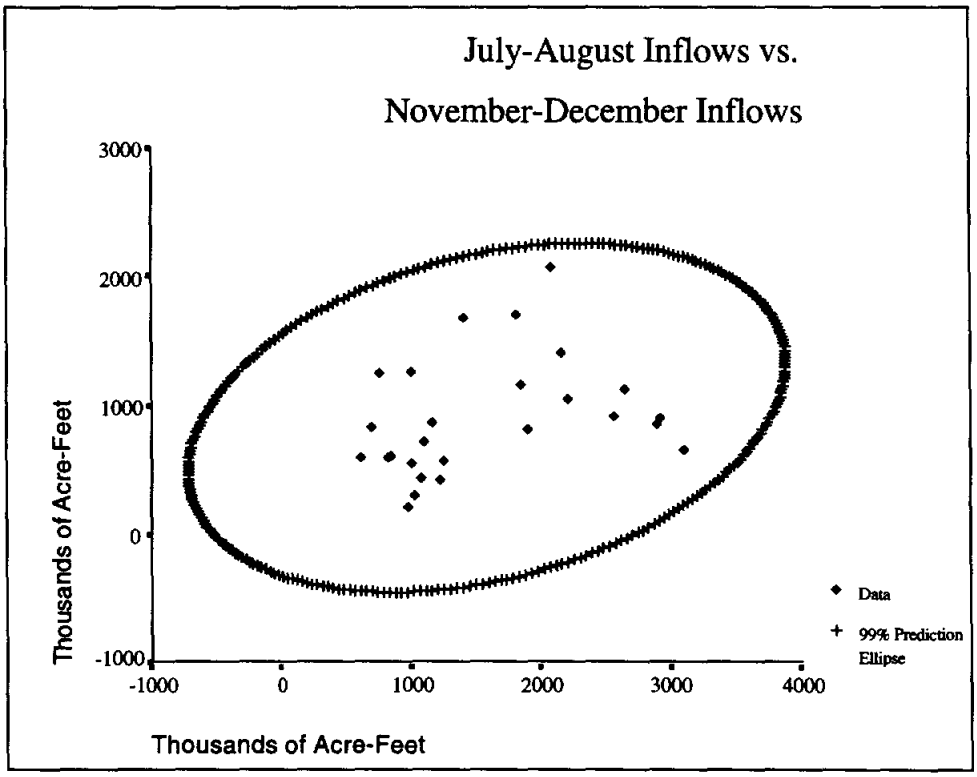

May-June Inflows vs.
July-August Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

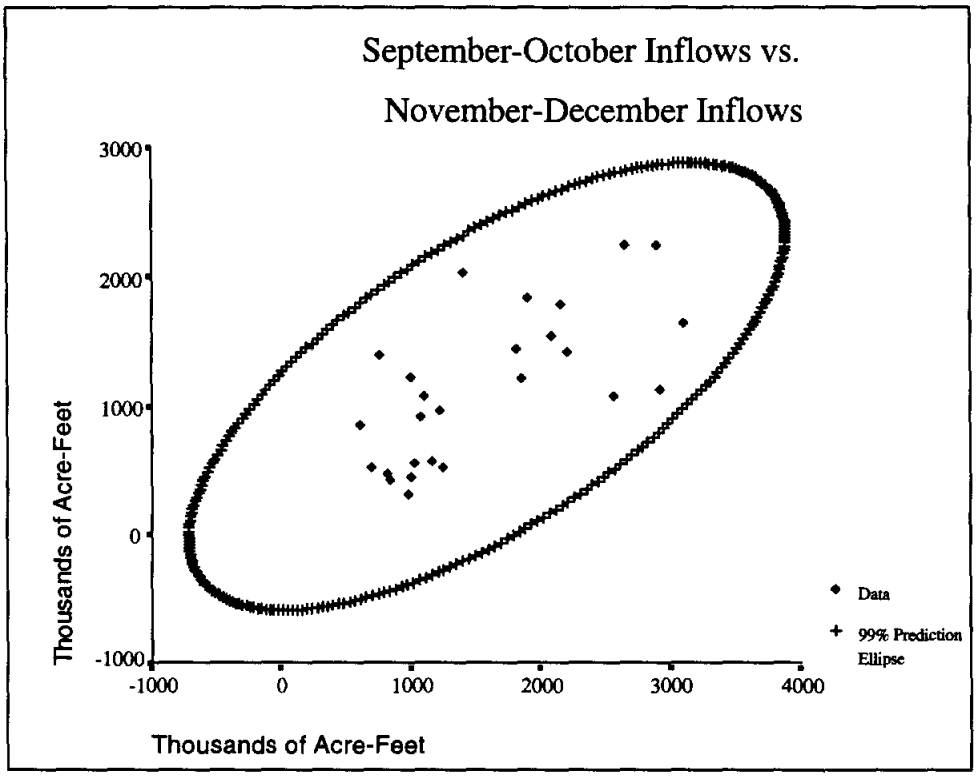

May-June Inflows vs.
September-October Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


May-June Inflows vs.
November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse



Near edge of ellipse: 1983.



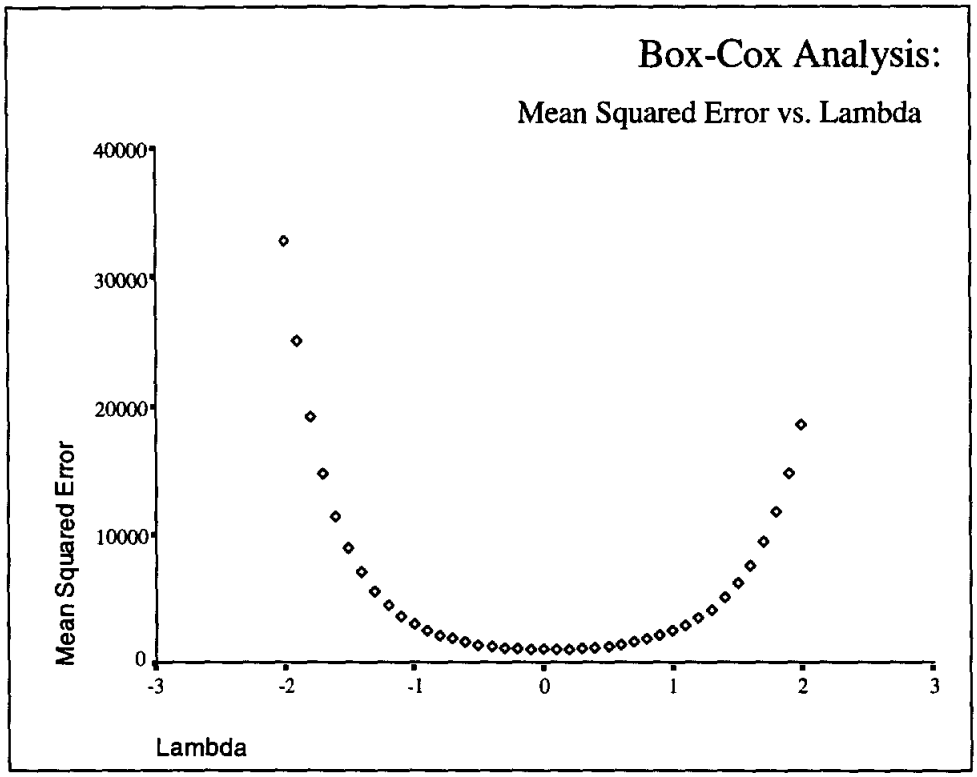

September-October Inflows vs.
November-December Inflows
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

Box–Cox Analysis

Numerical Results

LAMBDA	MSE
-2.0000	32978.4843
-1.9000	25115.8834
-1.8000	19250.2532
-1.7000	14858.6619
-1.6000	11558.2113
-1.5000	9067.9413
-1.4000	7181.2315
-1.3000	5745.7779
-1.2000	4649.0443
-1.1000	3807.6753
-1.0000	3159.7788
-.9000	2659.2934
-.8000	2271.8685
-.7000	1971.8497
-.6000	1740.0680
-.5000	1562.2194
-.4000	1427.6783
-.3000	1328.6300
-.2000	1259.4426
-.1000	1216.2170
.0000	1196.4760
.1000	1198.9603
.2000	1223.5142
.3000	1271.0485
.4000	1343.5751
.5000	1444.3139
.6000	1577.8789
.7000	1750.5542
.8000	1970.6800
.9000	2249.1744
1.0000	2600.2299
1.1000	3042.2328
1.2000	3598.9736
1.3000	4301.2389
1.4000	5188.9012
1.5000	6313.6657
1.6000	7742.6829
1.7000	9563.3036
1.8000	11889.3440
1.9000	14869.3519
2.0000	18697.5219

Plots


Box-Cox Analysis:
Mean Squared Error vs. Lambda
Mean Squared Error
40000
30000
20000
10000
0
-3
-2
-1
0
1
2
3
Lambda

Model Choice Diagnostics

Untransformed Data

N = 26 Regression Models for Dependent Variable: BLK_DRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0969	0.0593	4.009	208.5	2818	211.0	JA_INFL
1	0.0216	-.0191	6.177	210.5	3053	213.1	JF_INFL
1	0.0121	-.0290	6.450	210.8	3082	213.3	MJ_INFL
1	0.0024	-.0392	6.731	211.0	3113	213.6	ND_INFL
2	0.1977	0.1279	3.107	207.4	2612	211.2	JF_INFL JA_INFL
2	0.1723	0.1003	3.838	208.2	2695	212.0	JA_INFL SO_INFL
2	0.1522	0.0785	4.416	208.8	2760	212.6	MJ_INFL JA_INFL
2	0.1211	0.0446	5.313	209.8	2862	213.5	JA_INFL ND_INFL
3	0.2627	0.1621	3.235	207.2	2510	212.2	JF_INFL MJ_INFL JA_INFL
3	0.2258	0.1202	4.297	208.5	2635	213.5	MJ_INFL JA_INFL SO_INFL
3	0.2177	0.1111	4.529	208.7	2663	213.8	JF_INFL JA_INFL SO_INFL
3	0.1987	0.0894	5.079	209.3	2728	214.4	JF_INFL JA_INFL ND_INFL
4	0.2818	0.1450	4.684	208.5	2561	214.8	JF_INFL MA_INFL MJ_INFL JA_INFL
4	0.2794	0.1421	4.753	208.6	2570	214.9	JF_INFL MJ_INFL JA_INFL SO_INFL
4	0.2632	0.1229	5.219	209.2	2627	215.5	JF_INFL MJ_INFL JA_INFL ND_INFL
4	0.2451	0.1013	5.742	209.8	2692	216.1	MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.3087	0.1359	5.908	209.5	2588	217.1	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.2831	0.1039	6.646	210.5	2684	218.0	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.2821	0.1026	6.675	210.5	2688	218.0	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.2578	0.0722	7.376	211.4	2779	218.9	MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.3403	0.1319	7.000	210.3	2600	219.1	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	BLK_DRUM	53.0838	32.852	.	.
2	MODEL1	PARMS	BLK_DRUM	55.2517	91.712	-0.013860	.
3	MODEL1	PARMS	BLK_DRUM	55.5194	83.054	.	.
4	MODEL1	PARMS	BLK_DRUM	55.7923	72.718	.	.
5	MODEL1	PARMS	BLK_DRUM	51.1107	74.524	-0.033342	.
6	MODEL1	PARMS	BLK_DRUM	51.9127	47.133	.	.
7	MODEL1	PARMS	BLK_DRUM	52.5383	59.205	.	.
8	MODEL1	PARMS	BLK_DRUM	53.4954	45.537	.	.
9	MODEL1	PARMS	BLK_DRUM	50.0982	105.172	-0.034968	.
10	MODEL1	PARMS	BLK_DRUM	51.3358	72.874	.	.
11	MODEL1	PARMS	BLK_DRUM	51.6018	72.938	-0.025388	.
12	MODEL1	PARMS	BLK_DRUM	52.2276	75.518	-0.031913	.
13	MODEL1	PARMS	BLK_DRUM	50.6072	99.974	-0.038872	0.013448
14	MODEL1	PARMS	BLK_DRUM	50.6921	102.960	-0.027656	.
15	MODEL1	PARMS	BLK_DRUM	51.2572	105.853	-0.033866	.
16	MODEL1	PARMS	BLK_DRUM	51.8853	64.629	.	0.013719

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	BLK_DRUM	_IN_	_P_
1	.	0.037455	.	.	-1	1	2
2	.	.	.	.	-1	1	2
3	-0.006317	.	.	.	-1	1	2
4	.	.	.	-0.003470	-1	1	2
5	.	0.056279	.	.	-1	2	3
6	.	0.063170	-0.032644	.	-1	2	3
7	-0.014414	0.048132	.	.	-1	2	3
8	.	0.043687	.	-0.011596	-1	2	3
9	-0.015651	0.068791	.	.	-1	3	4
10	-0.014174	0.073356	-0.032247	.	-1	3	4
11	.	0.066831	-0.019096	.	-1	3	4
12	.	0.056838	.	-0.002541	-1	3	4
13	-0.021439	0.071559	.	.	-1	4	5
14	-0.015262	0.078127	-0.017458	.	-1	4	5
15	-0.015609	0.069186	.	-0.001952	-1	4	5
16	-0.019897	0.078058	-0.037654	.	-1	4	5

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	24	2817.89	0.09691	0.05928	4.00896	208.456	210.972
2	24	3052.75	0.02164	-0.01912	6.17677	210.538	213.054
3	24	3082.41	0.01214	-0.02902	6.45047	210.789	213.305
4	24	3112.78	0.00240	-0.03916	6.73085	211.044	213.560
5	23	2612.30	0.19768	0.12792	3.10677	207.380	211.154
6	23	2694.93	0.17231	0.10033	3.83763	208.190	211.964
7	23	2760.27	0.15224	0.07852	4.41565	208.813	212.587
8	23	2861.75	0.12107	0.04464	5.31328	209.751	213.526
9	22	2509.83	0.26267	0.16212	3.23517	207.184	212.216
10	22	2635.36	0.22579	0.12022	4.29725	208.453	213.485
11	22	2662.74	0.21775	0.11108	4.52891	208.722	213.754
12	22	2727.72	0.19866	0.08938	5.07870	209.348	214.381
13	21	2561.08	0.28181	0.14501	4.68385	208.500	214.790
14	21	2569.69	0.27940	0.14214	4.75334	208.587	214.878
15	21	2627.30	0.26324	0.12291	5.21861	209.164	215.454
16	21	2692.08	0.24508	0.10128	5.74184	209.797	216.087

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	BLK_DRUM	50.8754	95.696	-0.030411	0.017075
18	MODEL1	PARMS	BLK_DRUM	51.8091	100.111	-0.028669	.
19	MODEL1	PARMS	BLK_DRUM	51.8461	99.261	-0.039854	0.013964
20	MODEL1	PARMS	BLK_DRUM	52.7174	52.473	.	0.020102
21	MODEL1	PARMS	BLK_DRUM	50.9924	81.316	-0.035634	0.028004

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	BLK_DRUM	_IN_	_P_
17	-0.022494	0.084453	-0.022715	.	-1	5	6
18	-0.015264	0.079978	-0.023222	0.006070	-1	5	6
19	-0.021692	0.071367	.	0.001474	-1	5	6
20	-0.022480	0.083775	-0.053447	0.012781	-1	5	6
21	-0.027129	0.094825	-0.045761	0.020729	-1	6	7

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	20	2588.30	0.30874	0.13593	5.90826	209.506	217.055
18	20	2684.19	0.28314	0.10392	6.64575	210.452	218.001
19	20	2688.02	0.28211	0.10264	6.67522	210.489	218.038
20	20	2779.12	0.25778	0.07223	7.37596	211.356	218.904
21	19	2600.23	0.34028	0.13195	7.00000	210.292	219.099

Logged Inflows

N = 26 Regression Models for Dependent Variable: BLK_DRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0810	0.0427	10.31	208.9	2868	211.4	LGJAINFL
1	0.0070	-.0343	12.91	210.9	3098	213.4	LGJFINFL
1	0.0040	-.0375	13.01	211.0	3108	213.5	LGMJINFL
1	0.0025	-.0391	13.07	211.0	3113	213.6	LGMAINFL
2	0.1989	0.1293	8.160	207.3	2608	211.1	LGJFINFL LGJAINFL
2	0.1656	0.0930	9.332	208.4	2717	212.2	LGJAINFL LGSOINFL
2	0.1398	0.0650	10.24	209.2	2801	213.0	LGMJINFL LGJAINFL
2	0.0911	0.0120	11.95	210.6	2959	214.4	LGJAINFL LGNDINFL
3	0.2759	0.1772	7.455	206.7	2465	211.7	LGJFINFL LGMJINFL LGJAINFL
3	0.2524	0.1505	8.279	207.5	2545	212.6	LGMJINFL LGJAINFL LGSOINFL
3	0.2439	0.1408	8.579	207.8	2574	212.9	LGJFINFL LGJAINFL LGSOINFL
3	0.2008	0.0918	10.10	209.3	2721	214.3	LGJFINFL LGMAINFL LGJAINFL
4	0.3411	0.2156	7.164	206.3	2350	212.6	LGJFINFL LGMJINFL LGJAINFL LGSOINFL
4	0.2971	0.1632	8.710	207.9	2507	214.2	LGJFINFL LGMAINFL LGMJINFL LGJAINFL
4	0.2899	0.1546	8.964	208.2	2532	214.5	LGMAINFL LGMJINFL LGJAINFL LGSOINFL
4	0.2777	0.1401	9.392	208.6	2576	214.9	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
5	0.3877	0.2346	7.525	206.4	2293	213.9	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL
5	0.3570	0.1963	8.603	207.6	2408	215.2	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.3294	0.1617	9.574	208.7	2511	216.3	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.2971	0.1214	10.71	209.9	2632	217.5	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
6	0.4595	0.2888	7.000	205.1	2130	213.9	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	BLK_DRUM	53.5504	-130.603	.	.
2	MODEL1	PARMS	BLK_DRUM	55.6625	167.338	-13.4876	.
3	MODEL1	PARMS	BLK_DRUM	55.7483	128.152	.	.
4	MODEL1	PARMS	BLK_DRUM	55.7905	19.480	.	6.4422
5	MODEL1	PARMS	BLK_DRUM	51.0705	203.791	-71.5782	.
6	MODEL1	PARMS	BLK_DRUM	52.1227	-55.808	.	.
7	MODEL1	PARMS	BLK_DRUM	52.9209	41.851	.	.
8	MODEL1	PARMS	BLK_DRUM	54.4006	-71.772	.	.
9	MODEL1	PARMS	BLK_DRUM	49.6469	428.299	-77.2322	.
10	MODEL1	PARMS	BLK_DRUM	50.4445	169.229	.	.
11	MODEL1	PARMS	BLK_DRUM	50.7319	206.983	-60.2126	.
12	MODEL1	PARMS	BLK_DRUM	52.1586	233.956	-71.1042	-5.9875
13	MODEL1	PARMS	BLK_DRUM	48.4746	462.688	-64.1679	.
14	MODEL1	PARMS	BLK_DRUM	50.0666	386.305	-81.3317	25.0307
15	MODEL1	PARMS	BLK_DRUM	50.3231	104.395	.	34.2557
16	MODEL1	PARMS	BLK_DRUM	50.7527	446.684	-74.9195	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	BLK_DRUM	_IN_	_P_	_EDF_
1	.	29.536	.	.	-1	1	2	24
2	.	.	.	.	-1	1	2	24
3	-7.8691	.	.	.	-1	1	2	24
4	.	.	.	.	-1	1	2	24
5	.	58.946	.	.	-1	2	3	23
6	.	58.946	-39.2960	.	-1	2	3	23
7	-35.2259	44.518	.	.	-1	2	3	23
8	.	34.097	.	-12.3181	-1	2	3	23
9	-40.4632	78.479	.	.	-1	3	4	22
10	-43.3771	82.380	-45.9569	.	-1	3	4	22
11	.	76.409	-29.5732	.	-1	3	4	22
12	.	60.540	.	.	-1	3	4	22
13	-45.9611	102.387	-35.9922	.	-1	4	5	21
14	-55.6224	79.130	.	.	-1	4	5	21
15	-65.0680	86.961	-53.4288	.	-1	4	5	21
16	-41.1620	79.824	.	-5.3955	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	2867.65	0.08097	0.04267	10.3070	208.911	211.428
2	3098.32	0.00704	-0.03433	12.9058	210.923	213.439
3	3107.87	0.00398	-0.03752	13.0134	211.003	213.519
4	3112.58	0.00247	-0.03910	13.0665	211.042	213.558
5	2608.20	0.19894	0.12929	8.1597	207.339	211.113
6	2716.78	0.16560	0.09304	9.3320	208.400	212.174
7	2800.63	0.13984	0.06505	10.2373	209.190	212.964
8	2959.43	0.09107	0.01203	11.9518	210.624	214.398
9	2464.82	0.27589	0.17715	7.4547	206.713	211.746
10	2544.64	0.25244	0.15050	8.2791	207.542	212.574
11	2573.72	0.24390	0.14080	8.5793	207.837	212.870
12	2720.52	0.20077	0.09179	10.0954	209.280	214.312
13	2349.79	0.34106	0.21555	7.1637	206.261	212.552
14	2506.66	0.29707	0.16318	8.7102	207.941	214.232
15	2532.42	0.28985	0.15458	8.9640	208.207	214.498
16	2575.84	0.27768	0.14009	9.3920	208.649	214.940

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	BLK_DRUM	47.8821	405.833	-67.6063	38.3483
18	MODEL1	PARMS	BLK_DRUM	49.0670	407.513	-68.0992	.
19	MODEL1	PARMS	BLK_DRUM	50.1100	-61.523	.	53.3792
20	MODEL1	PARMS	BLK_DRUM	51.3017	389.427	-80.9516	24.7659
21	MODEL1	PARMS	BLK_DRUM	46.1551	231.040	-79.6283	65.4007

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	BLK_DRUM	_IN_	_P_	_EDF_
17	-70.3819	108.586	-43.8228	.	-1	5	6	20
18	-45.3072	105.717	-48.3857	19.6670	-1	5	6	20
19	-75.7367	93.250	-80.6602	34.8757	-1	5	6	20
20	-55.5638	79.319	.	-0.7857	-1	5	6	20
21	-86.0130	121.090	-79.6003	48.0086	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	2292.69	0.38769	0.23461	7.5246	206.353	213.902
18	2407.57	0.35701	0.19626	8.6031	207.624	215.173
19	2511.01	0.32938	0.16173	9.5743	208.718	216.267
20	2631.86	0.29711	0.12139	10.7089	209.940	217.489
21	2130.30	0.45951	0.28883	7.0000	205.109	213.916

Logged Harvest

N = 26 Regression Models for Dependent Variable: LBLKDRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0823	0.0441	7.656	-13.36	0.5555	-10.85	JA_INFL
1	0.0688	0.0300	8.094	-12.98	0.5637	-10.47	JF_INFL
1	0.0209	-.0199	9.642	-11.68	0.5927	-9.164	MA_INFL
1	0.0053	-.0361	10.14	-11.27	0.6021	-8.754	MJ_INFL
2	0.2706	0.2071	3.573	-17.33	0.4608	-13.56	JF_INFL JA_INFL
2	0.1531	0.0795	7.369	-13.45	0.5350	-9.677	JA_INFL SO_INFL
2	0.1148	0.0378	8.608	-12.30	0.5592	-8.526	JF_INFL MA_INFL
2	0.1096	0.0321	8.776	-12.15	0.5625	-8.374	JA_INFL ND_INFL
3	0.3023	0.2071	4.549	-16.49	0.4608	-11.46	JF_INFL MA_INFL JA_INFL
3	0.2754	0.1766	5.416	-15.51	0.4785	-10.48	JF_INFL JA_INFL SO_INFL
3	0.2738	0.1747	5.470	-15.45	0.4796	-10.42	JF_INFL MJ_INFL JA_INFL
3	0.2707	0.1712	5.570	-15.34	0.4817	-10.30	JF_INFL JA_INFL ND_INFL
4	0.3383	0.2122	5.386	-15.87	0.4578	-9.575	JF_INFL MA_INFL MJ_INFL JA_INFL
4	0.3143	0.1837	6.161	-14.94	0.4744	-8.650	JF_INFL MA_INFL JA_INFL SO_INFL
4	0.3048	0.1724	6.467	-14.58	0.4810	-8.293	JF_INFL MA_INFL JA_INFL ND_INFL
4	0.2790	0.1417	7.300	-13.64	0.4988	-7.346	JF_INFL JA_INFL SO_INFL ND_INFL
5	0.3542	0.1928	6.869	-14.50	0.4691	-6.953	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.3462	0.1827	7.130	-14.18	0.4750	-6.629	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.3402	0.1752	7.324	-13.94	0.4793	-6.393	JF_INFL MA_INFL JA_INFL SO_INFL ND_INFL
5	0.2818	0.1023	9.209	-11.74	0.5217	-4.190	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.4121	0.2264	7.000	-14.94	0.4496	-6.134	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
1	MODEL1	PARMS	LBLKDRUM	0.74534	3.50217	.	.
2	MODEL1	PARMS	LBLKDRUM	0.75082	4.55181	-.00034422	.
3	MODEL1	PARMS	LBLKDRUM	0.76988	3.66323	.	.00015646
4	MODEL1	PARMS	LBLKDRUM	0.77598	3.79692	.	.
5	MODEL1	PARMS	LBLKDRUM	0.67881	4.29550	-.00063473	.
6	MODEL1	PARMS	LBLKDRUM	0.73142	3.69489	.	.
7	MODEL1	PARMS	LBLKDRUM	0.74779	4.24781	-.00041436	.00023909
8	MODEL1	PARMS	LBLKDRUM	0.74999	3.68977	.	.
9	MODEL1	PARMS	LBLKDRUM	0.67882	4.05069	-.00068364	.00019915
10	MODEL1	PARMS	LBLKDRUM	0.69174	4.28462	-.00058021	.
11	MODEL1	PARMS	LBLKDRUM	0.69254	4.39019	-.00063976	.
12	MODEL1	PARMS	LBLKDRUM	0.69402	4.29149	-.00064050	.
13	MODEL1	PARMS	LBLKDRUM	0.67664	4.25734	-.00073955	.00034378
14	MODEL1	PARMS	LBLKDRUM	0.68878	4.00072	-.00060241	.00022556
15	MODEL1	PARMS	LBLKDRUM	0.69352	4.01154	-.00071995	.00021227
16	MODEL1	PARMS	LBLKDRUM	0.70627	4.24573	-.00059401	.

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LBLKDRUM	_IN_	_P_
1	.	.0004809	.	.	-1	1	2
2	.	.	.	.	-1	1	2
3	.	.	.	.	-1	1	2
4	0.00005837	.	.	.	-1	1	2
5	.	.0008392	.	.	-1	2	3
6	.	.0008279	-.00044054	.	-1	2	3
7	.	.	.	.	-1	2	3
8	.	.0005730	.	-.00017149	-1	2	3
9	.	.0008117	.	.	-1	3	4
10	.	.0009116	-.00013091	.	-1	3	4
11	-.00004836	.0008779	.	.	-1	3	4
12	.	.0008370	.	0.00001024	-1	3	4
13	-.00019632	.0009487	.	.	-1	4	5
14	.	.0009244	-.00021060	.	-1	4	5
15	.	.0007970	.	0.00005884	-1	4	5
16	.	.0009368	-.00020946	0.00008273	-1	4	5

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	24	0.55553	0.08234	0.04410	7.6564	-13.3647	-10.8485
2	24	0.56372	0.06881	0.03001	8.0937	-12.9841	-10.4679
3	24	0.59272	0.02091	-0.01988	9.6415	-11.6801	-9.1639
4	24	0.60214	0.00534	-0.03610	10.1447	-11.2698	-8.7536
5	23	0.46078	0.27058	0.20715	3.5731	-17.3336	-13.5593
6	23	0.53498	0.15311	0.07947	7.3693	-13.4513	-9.6770
7	23	0.55919	0.11479	0.03781	8.6078	-12.3007	-8.5264
8	23	0.56248	0.10957	0.03214	8.7764	-12.1479	-8.3736
9	22	0.46080	0.30226	0.20711	4.5492	-16.4882	-11.4558
10	22	0.47851	0.27544	0.17663	5.4160	-15.5074	-10.4750
11	22	0.47961	0.27377	0.17474	5.4697	-15.4478	-10.4154
12	22	0.48167	0.27066	0.17120	5.5704	-15.3365	-10.3041
13	21	0.45784	0.33825	0.21220	5.3860	-15.8652	-9.5747
14	21	0.47442	0.31428	0.18367	6.1607	-14.9400	-8.6495
15	21	0.48097	0.30482	0.17240	6.4665	-14.5836	-8.2931
16	21	0.49882	0.27901	0.14168	7.3005	-13.6360	-7.3455

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL
17	MODEL1	PARMS	LBLKDRUM	0.68492	4.21140	-.00064873	.00038271
18	MODEL1	PARMS	LBLKDRUM	0.68919	4.20625	-.00080981	.00038067
19	MODEL1	PARMS	LBLKDRUM	0.69234	3.77336	-.00065231	.00031397
20	MODEL1	PARMS	LBLKDRUM	0.72229	4.33538	-.00060079	.
21	MODEL1	PARMS	LBLKDRUM	0.67050	3.94016	-.00074724	.00058885

OBS	MJ_INFL	JA_INFL	SO_INFL	ND_INFL	LBLKDRUM	_IN_	_P_
17	-.00020765	.0010871	-.00024384	.	-1	5	6
18	-.00021446	.0009349	.	0.00010548	-1	5	6
19	.	.0010048	-.00047634	0.00024696	-1	5	6
20	-.00004558	.0009705	-.00020461	0.00008277	-1	5	6
21	-.00029508	.0012827	-.00067855	0.00039100	-1	6	7

OBS	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	20	0.46911	0.35425	0.19281	6.8691	-14.5014	-6.9528
18	20	0.47498	0.34616	0.18270	7.1304	-14.1778	-6.6292
19	20	0.47933	0.34018	0.17523	7.3236	-13.9411	-6.3925
20	20	0.52171	0.28185	0.10231	9.2089	-11.7384	-4.1899
21	19	0.44957	0.41208	0.22642	7.0000	-14.9409	-6.1342

All Variables Logged

N = 26 Regression Models for Dependent Variable: LBLKDRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0719	0.0332	18.49	-13.07	0.5619	-10.55	LGJAINFL
1	0.0538	0.0144	19.28	-12.57	0.5728	-10.05	LGMAINFL
1	0.0370	-.0032	20.01	-12.11	0.5830	-9.594	LGJFINFL
1	0.0094	-.0319	21.22	-11.38	0.5997	-8.860	LGMJINFL
2	0.2931	0.2317	10.84	-18.15	0.4465	-14.38	LGJFINFL LGJAINFL
2	0.1658	0.0933	16.39	-13.84	0.5270	-10.07	LGJAINFL LGSOINFL
2	0.1248	0.0487	18.18	-12.60	0.5528	-8.823	LGJFINFL LGMAINFL
2	0.0921	0.0132	19.61	-11.64	0.5735	-7.868	LGMAINFL LGJAINFL
3	0.3313	0.2401	11.17	-17.59	0.4416	-12.56	LGJFINFL LGJAINFL LGSOINFL
3	0.3212	0.2286	11.61	-17.20	0.4483	-12.17	LGJFINFL LGMAINFL LGJAINFL
3	0.3018	0.2066	12.46	-16.47	0.4611	-11.44	LGJFINFL LGMJINFL LGJAINFL
3	0.2933	0.1970	12.83	-16.16	0.4667	-11.13	LGJFINFL LGJAINFL LGNDINFL
4	0.3758	0.2569	11.23	-17.38	0.4319	-11.09	LGJFINFL LGMAINFL LGMJINFL LGJAINFL
4	0.3679	0.2475	11.57	-17.06	0.4373	-10.77	LGJFINFL LGMAINFL LGJAINFL LGSOINFL
4	0.3464	0.2219	12.51	-16.19	0.4522	-9.897	LGJFINFL LGMJINFL LGJAINFL LGSOINFL
4	0.3460	0.2214	12.53	-16.17	0.4525	-9.881	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4588	0.3235	9.610	-19.09	0.3932	-11.55	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL
5	0.4163	0.2703	11.47	-17.13	0.4241	-9.578	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.3778	0.2222	13.14	-15.47	0.4520	-7.919	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.3601	0.2001	13.92	-14.74	0.4649	-7.189	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.5645	0.4269	7.000	-22.74	0.3330	-13.93	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LBLKDRUM	0.74957	1.34712	.	.
2	MODEL1	PARMS	LBLKDRUM	0.75683	0.83868	.	0.41902
3	MODEL1	PARMS	LBLKDRUM	0.76355	7.13891	-0.43047	.
4	MODEL1	PARMS	LBLKDRUM	0.77440	2.63874	.	.
5	MODEL1	PARMS	LBLKDRUM	0.66823	7.72556	-1.36533	.
6	MODEL1	PARMS	LBLKDRUM	0.72592	2.44459	.	.
7	MODEL1	PARMS	LBLKDRUM	0.74353	4.42457	-0.62074	0.55699
8	MODEL1	PARMS	LBLKDRUM	0.75731	-0.14987	.	0.27682
9	MODEL1	PARMS	LBLKDRUM	0.66453	7.76654	-1.21940	.
10	MODEL1	PARMS	LBLKDRUM	0.66957	6.08138	-1.39116	0.32636
11	MODEL1	PARMS	LBLKDRUM	0.67906	8.77315	-1.39171	.
12	MODEL1	PARMS	LBLKDRUM	0.68315	7.79266	-1.35418	.
13	MODEL1	PARMS	LBLKDRUM	0.65717	7.67967	-1.49846	0.65177
14	MODEL1	PARMS	LBLKDRUM	0.66129	5.87967	-1.23249	0.37546
15	MODEL1	PARMS	LBLKDRUM	0.67245	9.16958	-1.24111	.
16	MODEL1	PARMS	LBLKDRUM	0.67266	7.07816	-1.27267	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
1	.	0.38764	.	.	-1	1	2	24
2	.	.	.	.	-1	1	2	24
3	.	.	.	.	-1	1	2	24
4	0.16846	.	.	.	-1	1	2	24
5	.	0.94862	.	.	-1	2	3	23
6	.	0.81918	-0.57660	.	-1	2	3	23
7	.	.	.	.	-1	2	3	23
8	.	0.30491	.	.	-1	2	3	23
9	.	1.17284	-0.37969	.	-1	3	4	22
10	.	0.86170	.	.	-1	3	4	22
11	-0.18881	1.03976	.	.	-1	3	4	22
12	.	0.95328	.	-0.02495	-1	3	4	22
13	-0.58353	1.05673	.	.	-1	4	5	21
14	.	1.09840	-0.42297	.	-1	4	5	21
15	-0.25219	1.31537	-0.41492	.	-1	4	5	21
16	.	1.22226	-0.54646	0.26269	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.56186	0.07188	0.03321	18.4893	-13.0701	-10.5539
2	0.57279	0.05382	0.01440	19.2771	-12.5691	-10.0529
3	0.58300	0.03696	-0.00317	20.0129	-12.1097	-9.5935
4	0.59969	0.00940	-0.03188	21.2153	-11.3760	-8.8598
5	0.44653	0.29313	0.23166	10.8373	-18.1503	-14.3760
6	0.52696	0.16580	0.09326	16.3922	-13.8439	-10.0696
7	0.55284	0.12484	0.04874	18.1790	-12.5977	-8.8234
8	0.57352	0.09210	0.01315	19.6073	-11.6427	-7.8685
9	0.44160	0.33133	0.24015	11.1709	-17.5947	-12.5623
10	0.44832	0.32115	0.22858	11.6148	-17.2019	-12.1695
11	0.46112	0.30177	0.20655	12.4605	-16.4699	-11.4375
12	0.46669	0.29333	0.19697	12.8286	-16.1576	-11.1252
13	0.43187	0.37578	0.25688	11.2316	-17.3833	-11.0928
14	0.43731	0.36792	0.24752	11.5746	-17.0578	-10.7673
15	0.45219	0.34641	0.22191	12.5131	-16.1876	-9.8971
16	0.45247	0.34601	0.22144	12.5304	-16.1719	-9.8814

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LBLKDRUM	0.62702	7.94003	-1.31546	0.82933
18	MODEL1	PARMS	LBLKDRUM	0.65120	3.52392	-1.34544	0.57128
19	MODEL1	PARMS	LBLKDRUM	0.67231	7.35215	-1.53834	0.67956
20	MODEL1	PARMS	LBLKDRUM	0.68181	8.45794	-1.29181	.
21	MODEL1	PARMS	LBLKDRUM	0.57710	4.98683	-1.51858	1.28639

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
17	-0.78031	1.44945	-0.58426	.	-1	5	6	20
18	.	1.15805	-0.77782	0.52343	-1	5	6	20
19	-0.58968	1.03691	.	0.08244	-1	5	6	20
20	-0.24375	1.35833	-0.57477	0.25366	-1	5	6	20
21	-1.04441	1.66070	-1.18874	0.81112	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.39315	0.45881	0.32351	9.6097	-19.0940	-11.5454
18	0.42406	0.41626	0.27032	11.4658	-17.1263	-9.5777
19	0.45201	0.37779	0.22224	13.1439	-15.4671	-7.9185
20	0.46487	0.36008	0.20010	13.9166	-14.7373	-7.1887
21	0.33304	0.56447	0.42694	7.0000	-22.7417	-13.9350

Regression—Logged Harvest and Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)[c,d]*	.	*.751*	*.565*	*.427*	*.577071*	*2.428*

a. Dependent Variable: Ln(Black Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*8.202*	*6*	*1.367*	*4.105*	*.008[b]*
	Residual	*6.327*	*19*	*.333*		
	Total	*14.529*	*25*			

a. Dependent Variable: Ln(Black Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(March-April Inflows), Ln(January-February Inflows), Ln(May-June Inflows), Ln(July-August Inflows, Ln(September-October Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	*4.986*	*3.402*		*1.466*	*.159*	*-2.133*	*12.106*
	Ln(January-February Inflows)	*-1.519*	*.466*	*-.678*	*-3.262*	*.004*	*-2.493*	*-.544*
	Ln(March-April Inflows)	*1.286*	*.431*	*.712*	*2.986*	*.008*	*.385*	*2.188*
	Ln(May-June Inflows)	*-1.044*	*.411*	*-.601*	*-2.543*	*.020*	*-1.904*	*-.185*
	Ln(July-August Inflows	*1.661*	*.394*	*1.149*	*4.220*	*.000*	*.837*	*2.484*
	Ln(September-October Inflows)	*-1.189*	*.417*	*-.882*	*-2.854*	*.010*	*-2.061*	*-.317*
	Ln(November-December Inflows)	*.811*	*.378*	*.519*	*2.147*	*.045*	*.021*	*1.602*

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	*.530*	*1.886*
	Ln(March-April Inflows)	*.403*	*2.482*
	Ln(May-June Inflows)	*.410*	*2.437*
	Ln(July-August Inflows	*.309*	*3.233*
	Ln(September-October Inflows)	*.240*	*4.167*
	Ln(November-December Inflows)	*.393*	*2.546*

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	*6.986*	*1.000*	*.00*	*.00*	*.00*
	2	*5.902E-03*	*34.403*	*.01*	*.00*	*.05*
	3	*3.570E-03*	*44.236*	*.06*	*.01*	*.00*
	4	*1.917E-03*	*60.366*	*.02*	*.06*	*.20*
	5	*1.509E-03*	*68.051*	*.05*	*.22*	*.02*
	6	*6.527E-04*	*103.457*	*.82*	*.63*	*.03*
	7	*4.882E-04*	*119.625*	*.04*	*.08*	*.70*

a. Dependent Variable: Ln(Black Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	*.00*	*.00*	*.00*	*.00*
	2	*.04*	*.01*	*.07*	*.06*
	3	*.00*	*.22*	*.02*	*.13*
	4	*.00*	*.23*	*.25*	*.00*
	5	*.33*	*.00*	*.02*	*.21*
	6	*.06*	*.14*	*.04*	*.06*
	7	*.56*	*.39*	*.60*	*.54*

a. Dependent Variable: Ln(Black Drum Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*2.673727*	*4.819534*	*3.943309*	*.572777*	*26*
Std. Predicted Value	*-2.217*	*1.530*	*.000*	*1.000*	*26*
Standard Error of Predicted Value	*.233084*	*.375777*	*.296763*	*4.06474E-02*	*26*
Adjusted Predicted Value	*3.120511*	*5.302643*	*3.973134*	*.626447*	*26*
Residual	*-1.264507*	*.975474*	*6.31973E-16*	*.503079*	*26*
Std. Residual	*-2.191*	*1.690*	*.000*	*.872*	*26*
Stud. Residual	*-2.732*	*1.900*	*-.021*	*1.043*	*26*
Deleted Residual	*-1.965019*	*1.232533*	*-2.982482E-02*	*.725689*	*26*
Stud. Deleted Residual	*-3.412*	*2.055*	*-.047*	*1.143*	*26*
Mahal. Distance	*3.117*	*9.639*	*5.769*	*1.857*	*26*
Cook's Distance	*.000*	*.591*	*.068*	*.129*	*26*
Centered Leverage Value	*.125*	*.386*	*.231*	*.074*	*26*

a. Dependent Variable: Ln(Black Drum Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	3.16959	-.69305	-.96095	3.43749	-1.35082	-1.20098	-1.41417	-1.45517
1963	2.67373	-.60686	-1.05365	3.12051	-2.21654	-1.05163	-1.38568	-1.42252
1964	3.80494	.32863	.52433	3.60924	-.24158	.56947	.71932	.70987
1965	3.20360	-.02972	-.04466	3.21854	-1.29144	-.05151	-.06314	-.06146
1966	3.74826	-.37752	-.45112	3.82186	-.34053	-.65421	-.71514	-.70562
1967	3.85204	.97547	1.23253	3.59498	-.15935	1.69039	1.90010	2.05494
1968	3.96012	.03625	.04807	3.94829	.02934	.06282	.07234	.07042
1969	4.31661	-.51887	-.67272	4.47046	.65173	-.89915	-1.02381	-1.02518
1970	3.46809	.19547	.30708	3.35648	-.82967	.33873	.42456	.41521
1971	4.49135	-1.26451	-1.96502	5.19186	.95681	-2.19125	-2.73158	*-3.41175
1972	3.86883	.41613	.55455	3.73042	-.13003	.72111	.83245	.82544
1973	3.89926	.63334	.76577	3.76683	-.07691	1.09751	1.20681	1.22241
1974	3.21268	.10875	.14952	3.17192	-1.27559	.18846	.22097	.21535
1975	3.43907	.39823	.53792	3.29938	-.88034	.69008	.80204	.79421
1976	3.75715	.10569	.12672	3.73611	-.32502	.18314	.20054	.19540
1977	4.68501	-.05808	-.07545	4.70238	1.29492	-.10064	-.11471	-.11169
1978	4.74265	.34433	.49298	4.59400	1.39555	.59669	.71396	.70443
1979	4.53123	-.23940	-.34335	4.63517	1.02644	-.41486	-.49682	-.48674
1980	3.68724	.33811	.50514	3.52021	-.44707	.58591	.71615	.70665
1981	4.10850	-.15918	-.19803	4.14735	.28840	-.27584	-.30767	-.30021
1982	4.04696	.23663	.31075	3.97283	.18096	.41005	.46990	.46005
1983	4.75295	-.77327	-1.32296	5.30264	1.41354	-1.34000	-1.75271	-1.86323
1984	4.81953	.77518	.97591	4.61880	1.52978	1.34330	1.50722	1.56346
1985	4.69681	.04464	.05880	4.68265	1.31552	.07736	.08878	.08643
1986	3.47148	-.02786	-.03571	3.47933	-.82376	-.04828	-.05466	-.05320
1987	4.11837	-.18851	-.24189	4.17175	.30564	-.32667	-.37004	-.36147

PRE_1 Predicted value of the natural log of harvest

RES_1 Ordinary residual; observed log harvest minus predicted log harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of the log of harvest

ZRE_1 Z-score of the residual

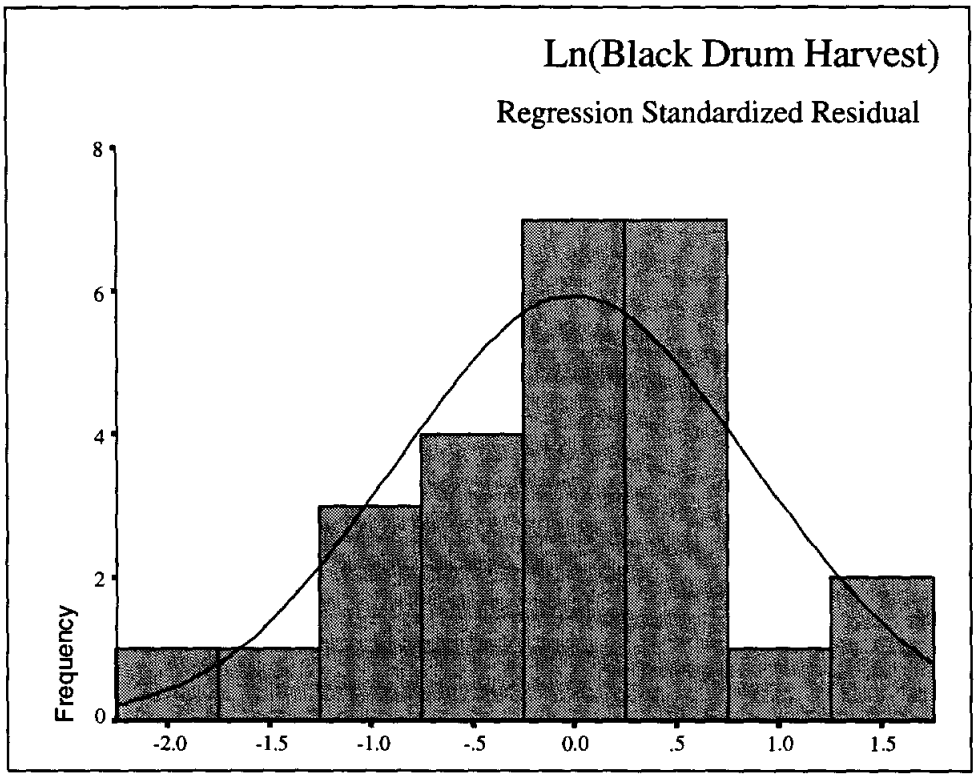
SRE_1 Studentized residual

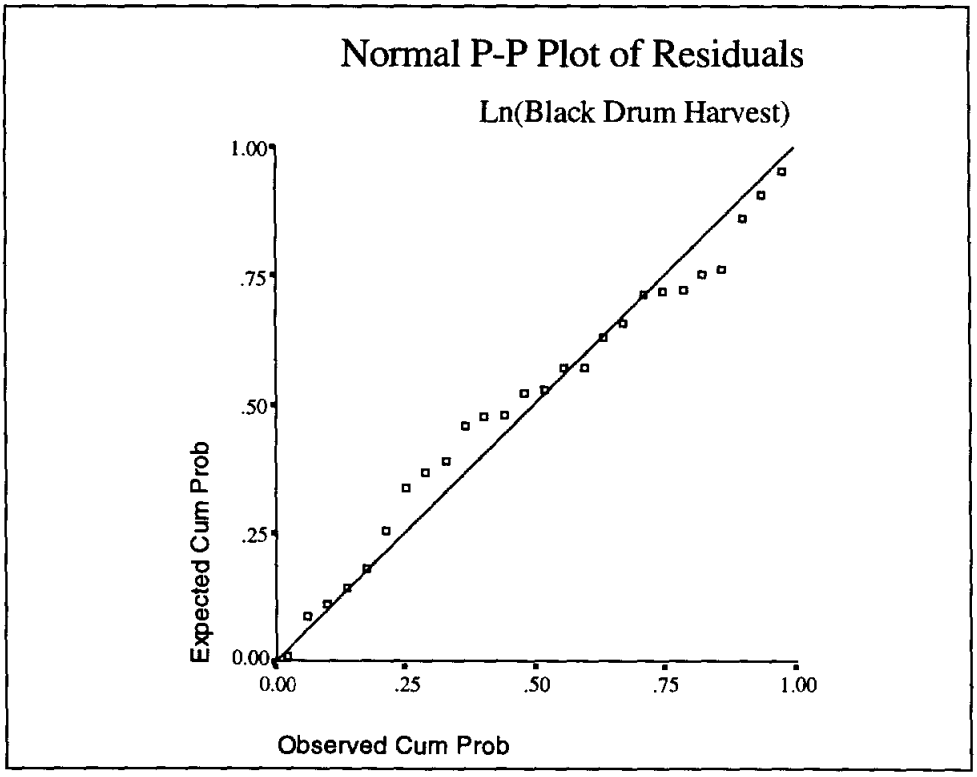
SDR_1 Studentized deleted residuals

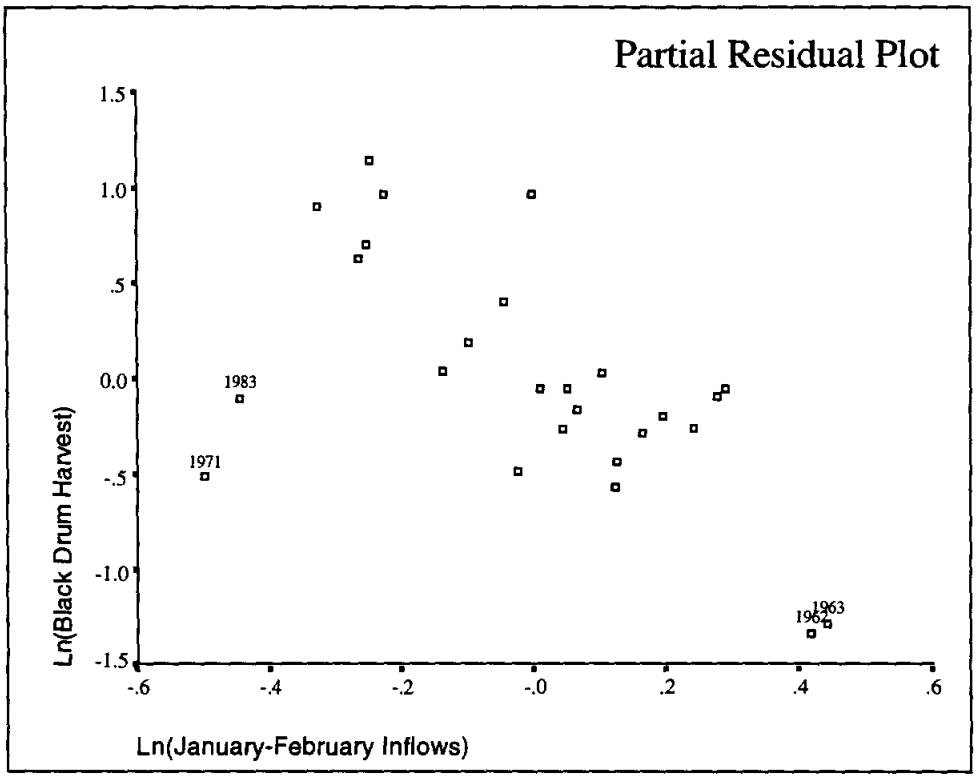
[1]Values greater than 3 are flagged.

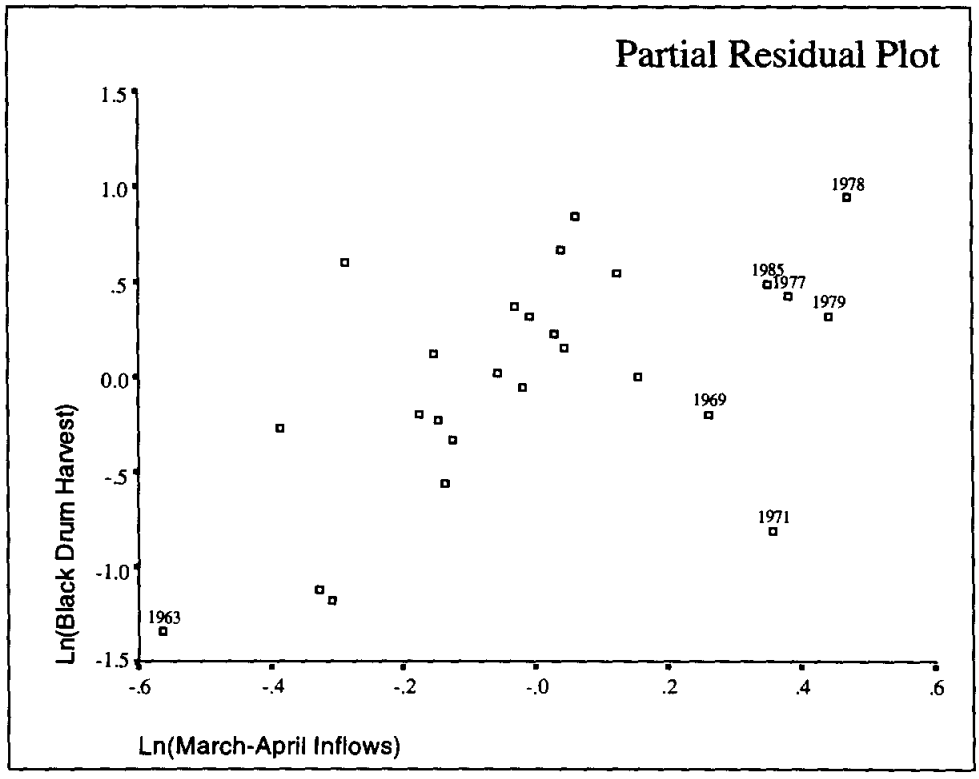
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$.

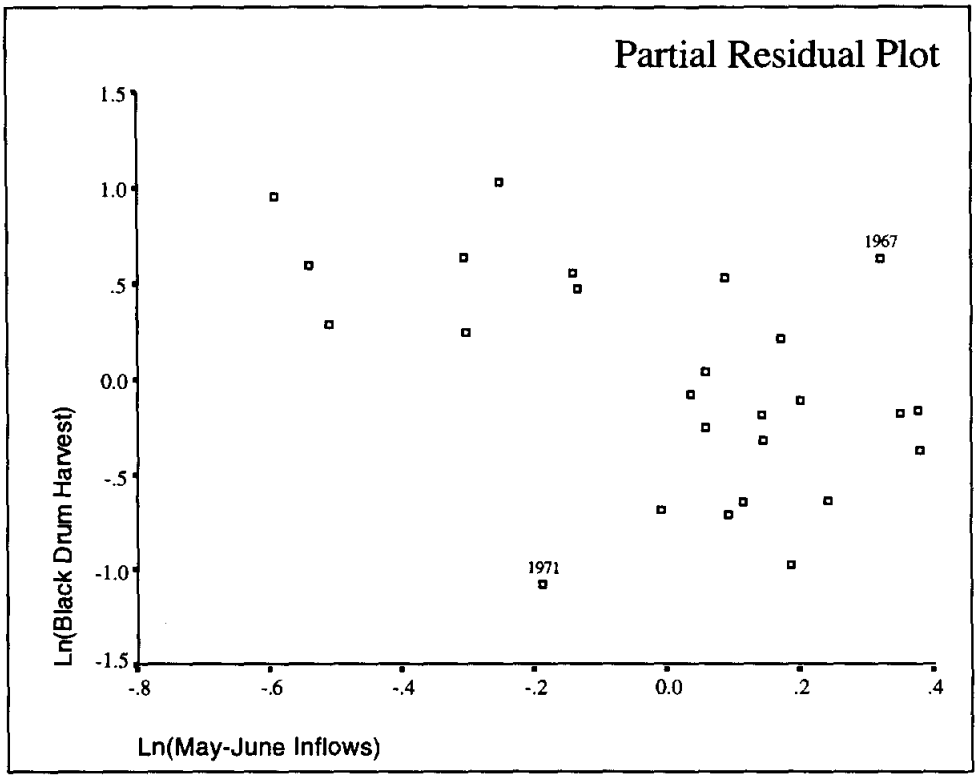
Graphics

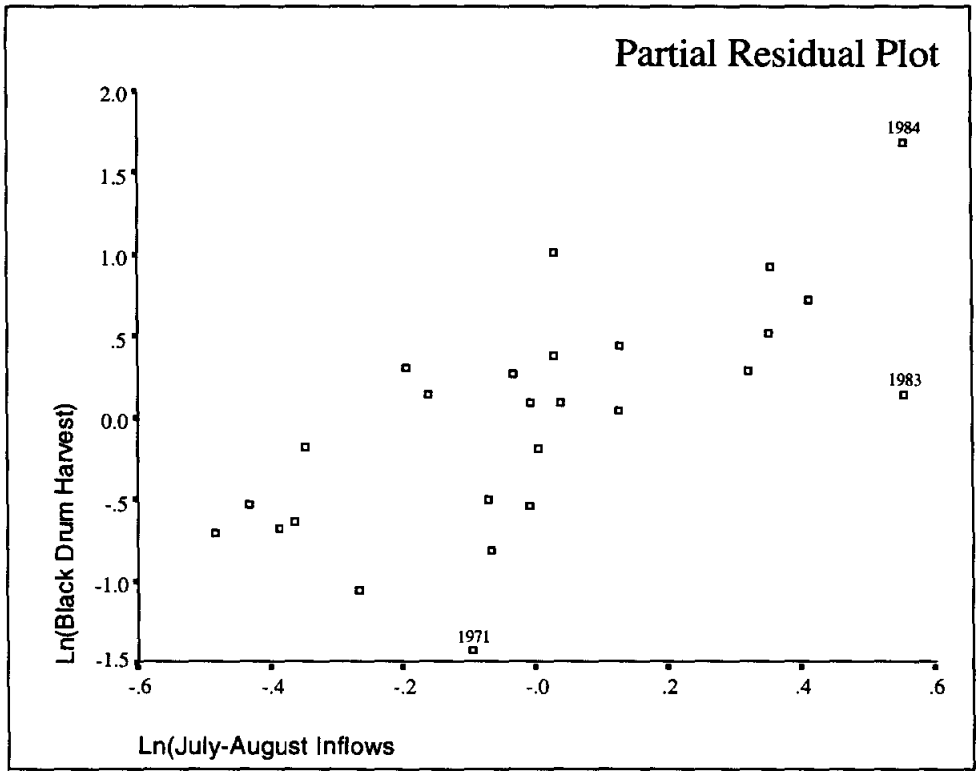

Ln(Black Drum Harvest)
Regression Standardized Residual
Frequency
8
6
4
2
0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

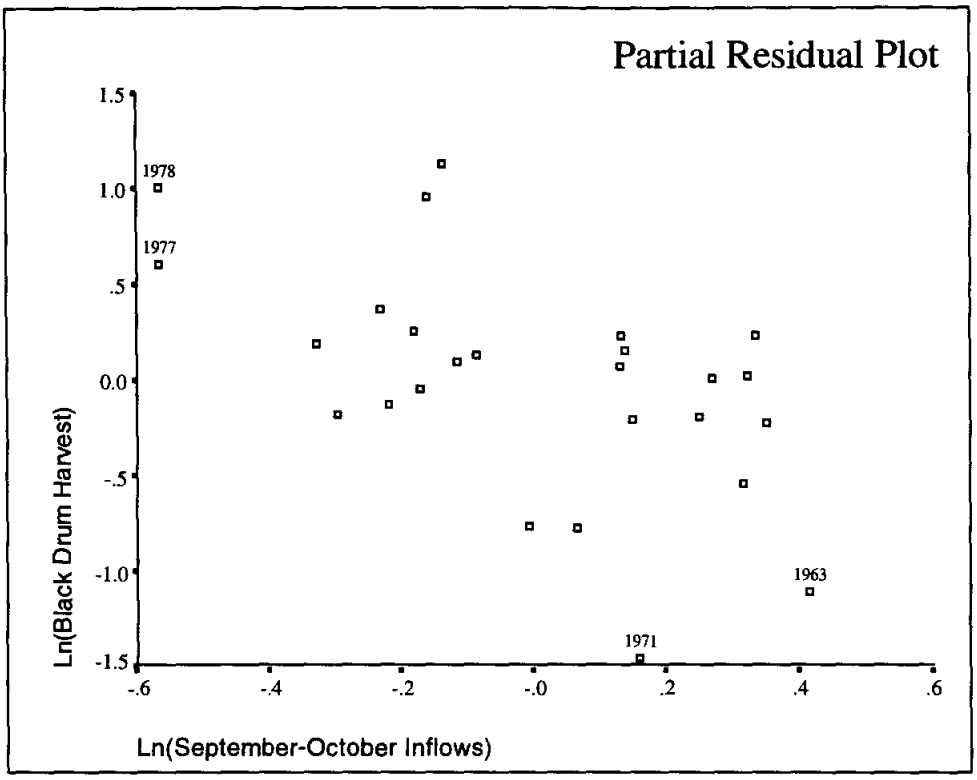

Normal P-P Plot of Residuals
Ln(Black Drum Harvest)
Expected Cum Prob
1.00
.75
.50
.25
0.00
0.00
.25
.50
.75
1.00
Observed Cum Prob

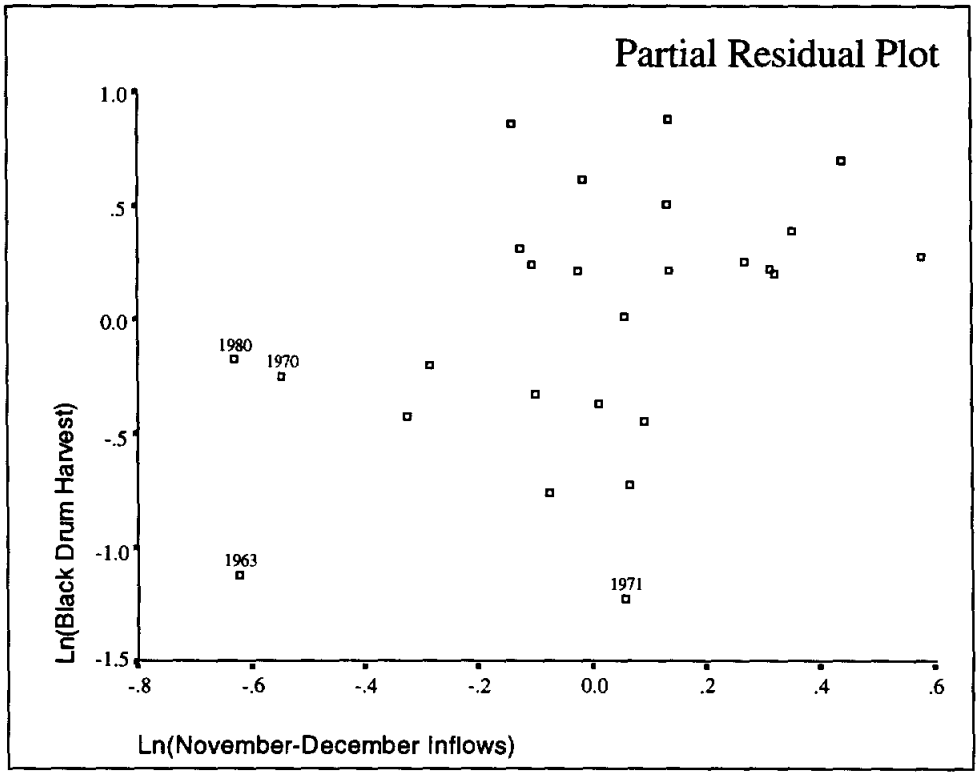

Partial Residual Plot
Ln(Black Drum Harvest)
Ln(January-February Inflows)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6
1983
1971
1963
1962

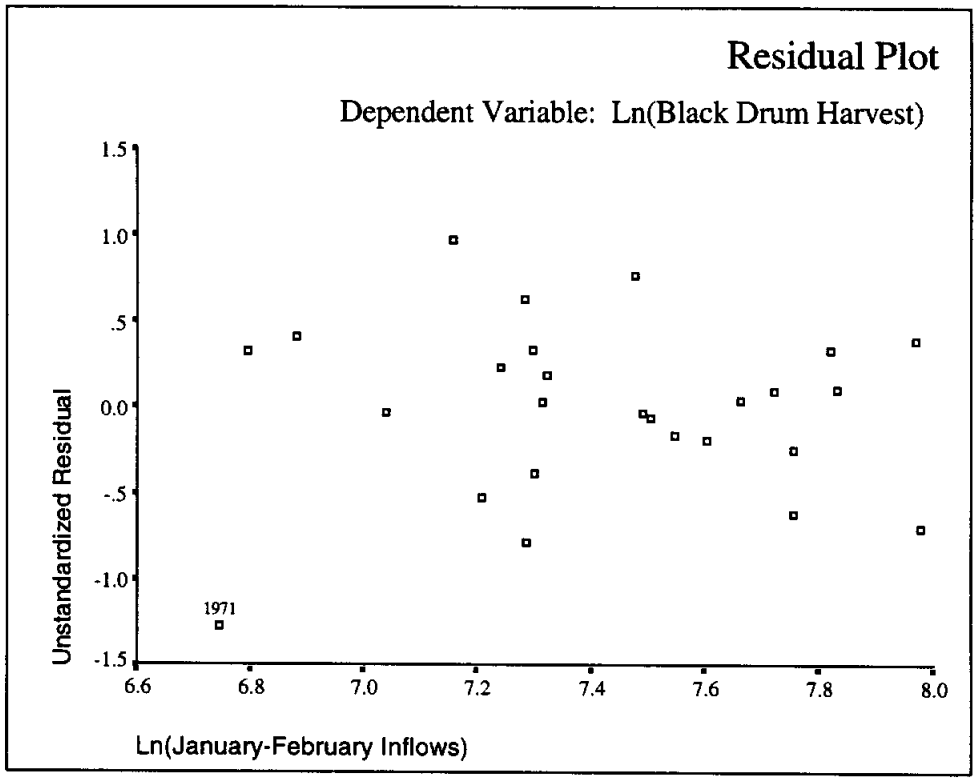

Partial Residual Plot
Ln(Black Drum Harvest)
Ln(March-April Inflows)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6
1978
1985
1977
1979
1969
1971
1963

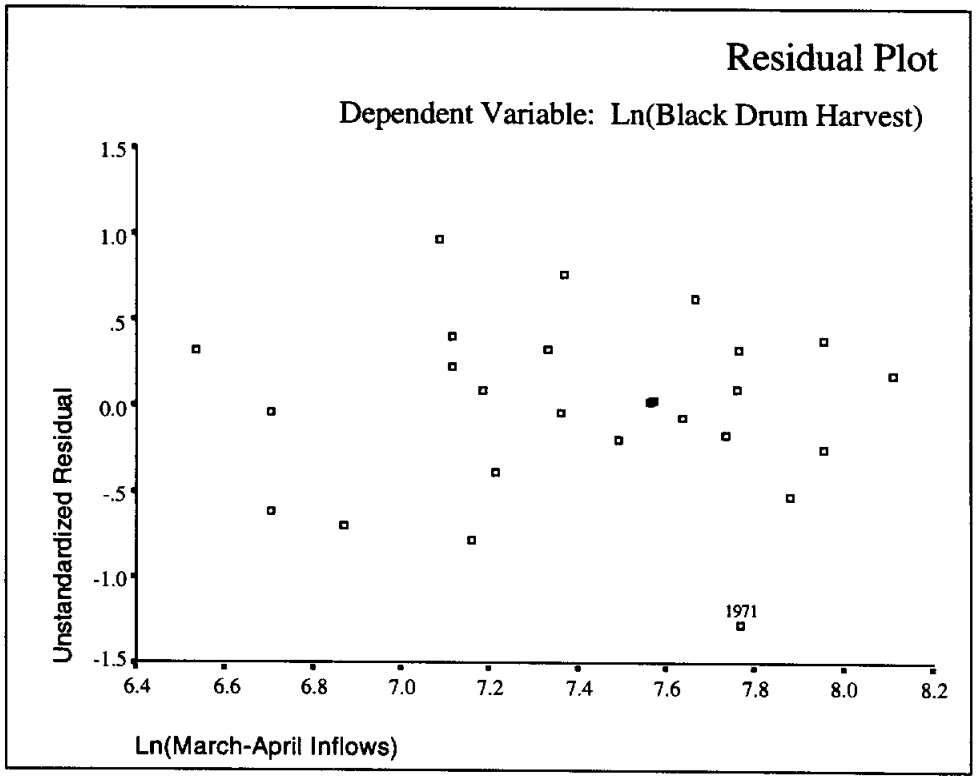

Partial Residual Plot
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.8
-.6
-.4
-.2
0.0
.2
.4
1967
1971
Ln(Black Drum Harvest)
Ln(May-June Inflows)

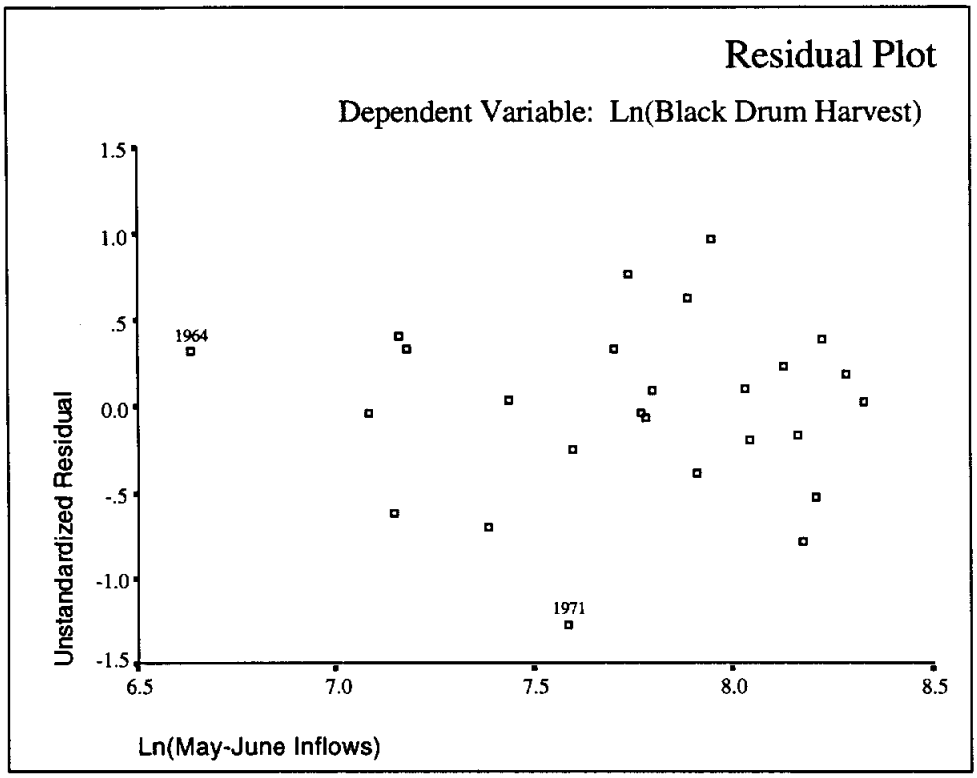

Partial Residual Plot
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-.6
-.4
-.2
-.0
.2
.4
.6
1984
1983
1971
Ln(Black Drum Harvest)
Ln(July-August Inflows

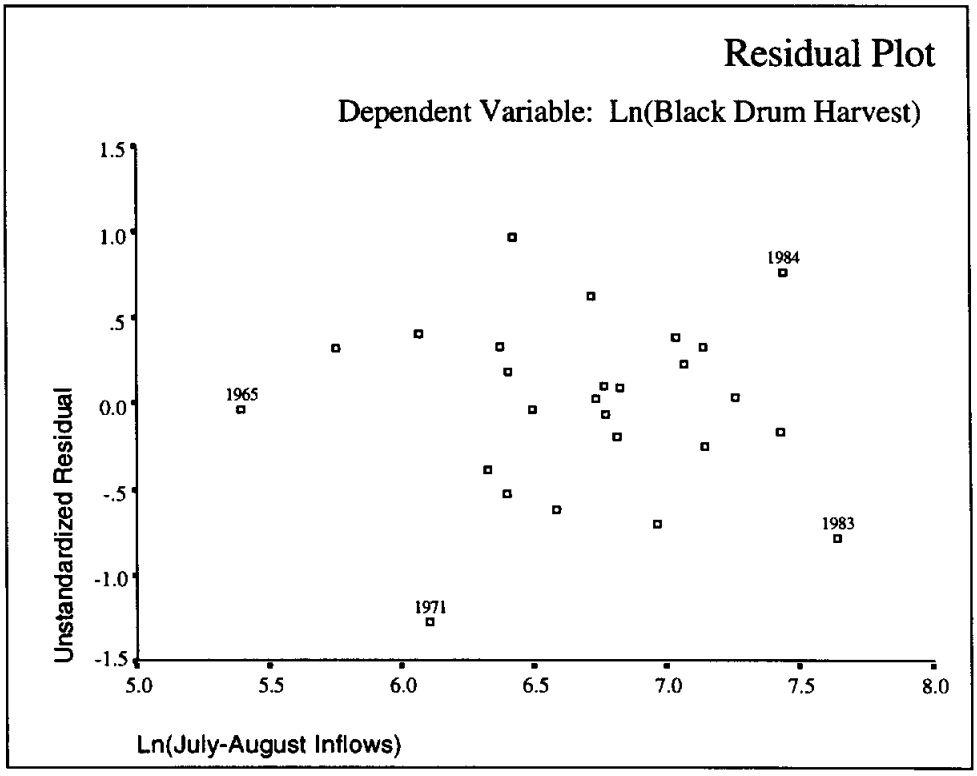

Partial Residual Plot
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1978
1977
1963
1971
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(Black Drum Harvest)
Ln(September-October Inflows)

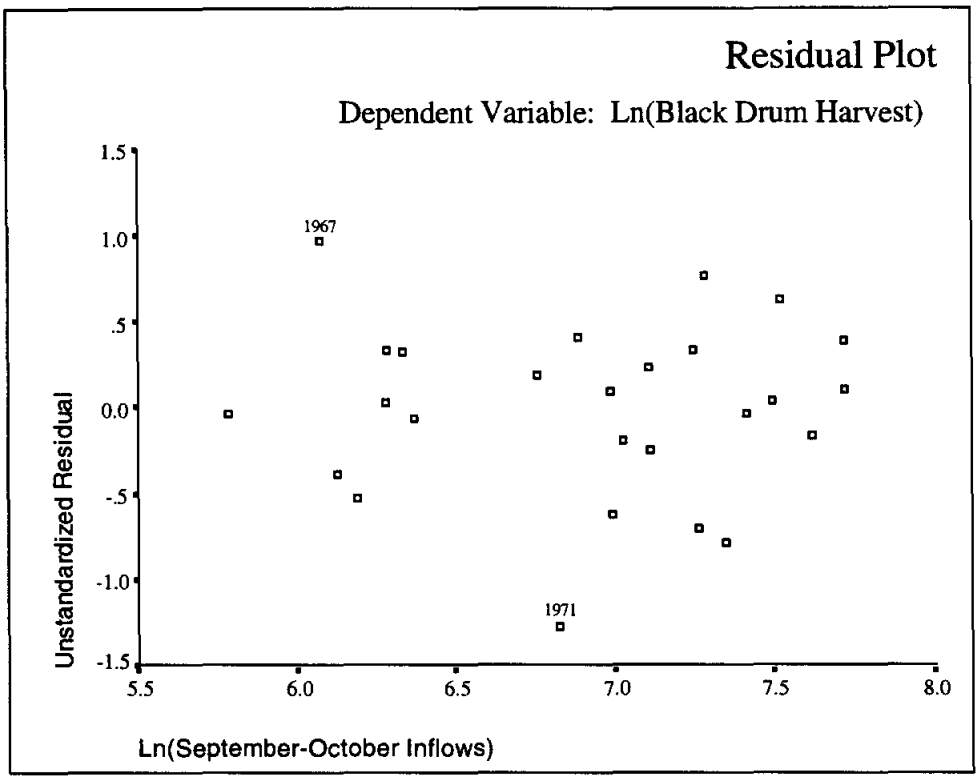

Partial Residual Plot
1.0
.5
0.0
-.5
-1.0
-1.5
1980
1970
1963
1971
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(Black Drum Harvest)
Ln(November-December Inflows)

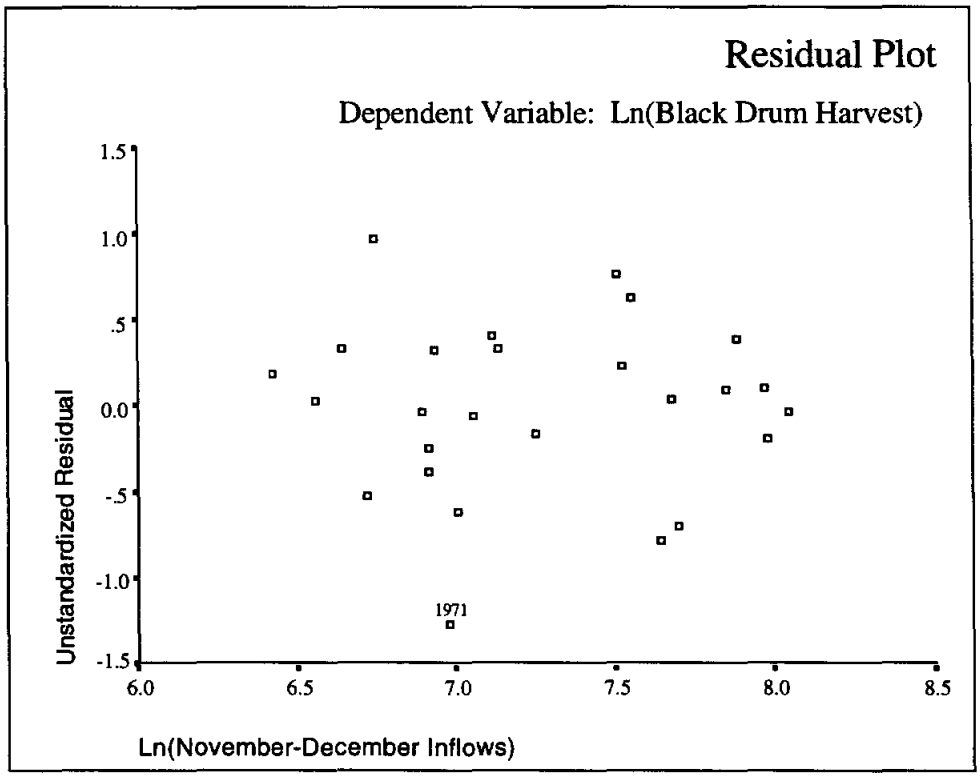

Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1971
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1971
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1964
1971
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1965
1984
1983
1971
5.0
5.5
6.0
6.5
7.0
7.5
8.0
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1967
1971
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Black Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
1971
6.0
6.5
7.0
7.5
8.0
8.5
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Black Drum Harvest

YEAR	LBLKDRUM	LICI_1	UICI_1
1962	2.4765	1.30263	5.03655
1963	2.0669	.70358	4.64387
1964	4.1336	1.87025	5.73963
1965	3.1739	1.29644	5.11077
1966	3.3707	1.96771	5.52881
1967	4.8275	2.03706	5.66702
1968	3.9964	2.11725	5.80298
1969	3.7977	2.48657	6.14665
1970	3.6636	1.54031	5.39587
1971	3.2268	2.56850	6.41420
1972	4.2850	2.02329	5.71437
1973	4.5326	2.11123	5.68728
1974	3.3214	1.35021	5.07515
1975	3.8373	1.58610	5.29205
1976	3.8628	1.97443	5.53987
1977	4.6269	2.85382	6.51620
1978	5.0870	2.85915	6.62614
1979	4.2918	2.64687	6.41560
1980	4.0254	1.78279	5.59169
1981	3.9493	2.30284	5.91416
1982	4.2836	2.20961	5.88431
1983	3.9797	2.78873	6.71718
1984	5.5947	3.00671	6.63235
1985	4.7414	2.85780	6.53581
1986	3.4436	1.64807	5.29489
1987	3.9299	2.29431	5.94243

LBLKDRUM Natural log of black drum harvest

LICI_1 Lower limit for 99% prediction interval for the natural log of black drum harvest

UICI_1 Upper limit for 99% prediction interval for the natural log of black drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.00802	.11044	.24032	.5388	.0031
1963	9.63934	.20195	.38557	.2099	.0189
1964	8.36951	.04402	.33478	.3011	.0002
1965	7.39957	.00029	.29598	.3885	.0000
1966	3.11701	.01424	.12468	.8740	.0000
1967	4.25249	.13592	.17010	.7503	.0059
1968	5.18799	.00024	.20752	.6370	.0000
1969	4.75592	.04440	.19024	.6897	.0002
1970	8.12486	.01470	.32499	.3217	.0000
1971	7.95075	.59051	.31803	.3370	.2443
1972	5.27843	.03293	.21114	.6260	.0001
1973	3.36180	.04350	.13447	.8496	.0002
1974	5.85435	.00261	.23417	.5569	.0000
1975	5.53068	.03224	.22123	.5955	.0001
1976	3.18799	.00114	.12752	.8671	.0000
1977	4.79458	.00056	.19178	.6850	.0000
1978	6.57670	.03144	.26307	.4742	.0001
1979	6.60682	.01531	.26427	.4709	.0000
1980	7.30486	.03619	.29219	.3978	.0001
1981	3.94293	.00330	.15772	.7863	.0000
1982	5.00182	.00988	.20007	.6597	.0000
1983	9.42591	.31197	.37704	.2235	.0605
1984	4.18065	.08404	.16723	.7588	.0013
1985	5.05763	.00036	.20231	.6529	.0000
1986	4.53381	.00012	.18135	.7166	.0000
1987	4.55557	.00554	.18222	.7140	.0000

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.90472	.11588	-.57755	.41763
1963	*-1.22056	-.35949	-.66765	.78817
1964	.54780	.45613	-.18131	-.10228
1965	-.04357	-.01442	-.01008	.00820
1966	-.31155	-.00159	-.07723	.07883
1967	*1.05489	.30709	-.00039	-.49134
1968	.04022	.00130	.00345	-.01059
1969	-.55824	.11213	.02246	-.22683
1970	.31375	-.01701	.04359	.01196
1971	*-2.53936	-.88703	*1.70987	*-1.13673
1972	.47606	.32510	-.25145	-.02124
1973	.55897	.01385	-.24506	.03870
1974	.13185	-.08224	.04915	.00819
1975	.47038	-.37344	.21680	.08474
1976	.08717	-.04191	.03372	-.00916
1977	-.06108	.01600	-.00678	-.03636
1978	.46284	.02745	-.03044	.29627
1979	-.32072	.04745	-.05973	-.19232
1980	.49667	.02044	.19448	-.00528
1981	-.14831	-.00630	.03674	.03124
1982	.25749	.05638	-.11215	-.15249
1983	*-1.57093	-.33816	.87569	.56063
1984	.79560	.11490	-.35044	.08088
1985	.04867	-.00514	-.00777	.02600
1986	-.02824	.00919	-.00055	.00077
1987	-.19236	.11694	-.01441	-.04758

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

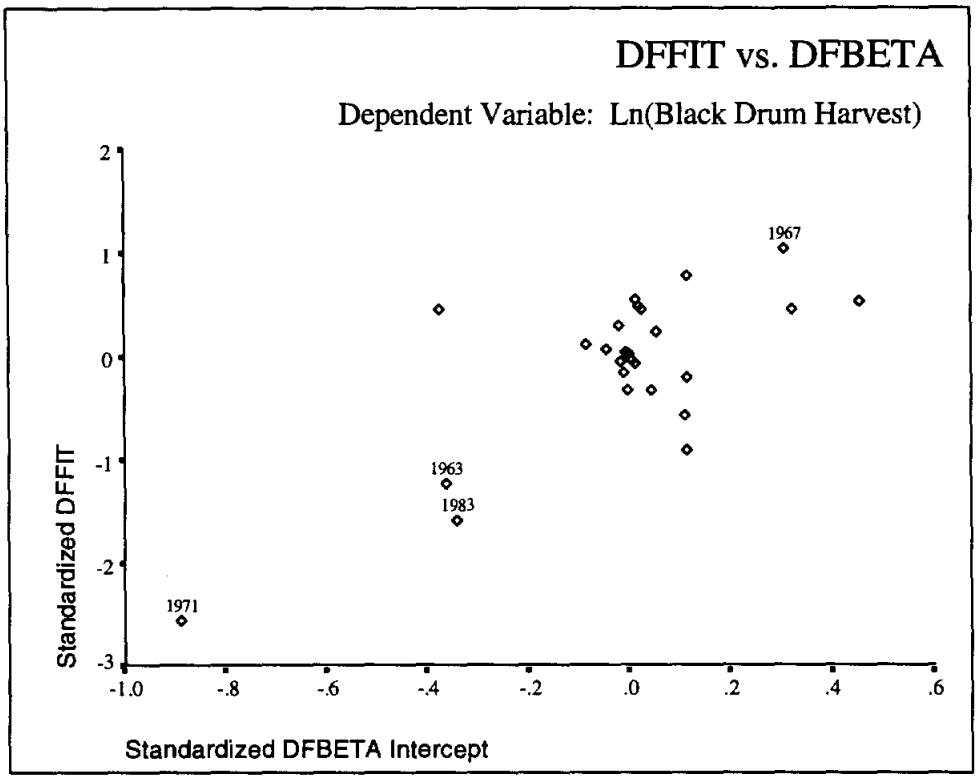
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

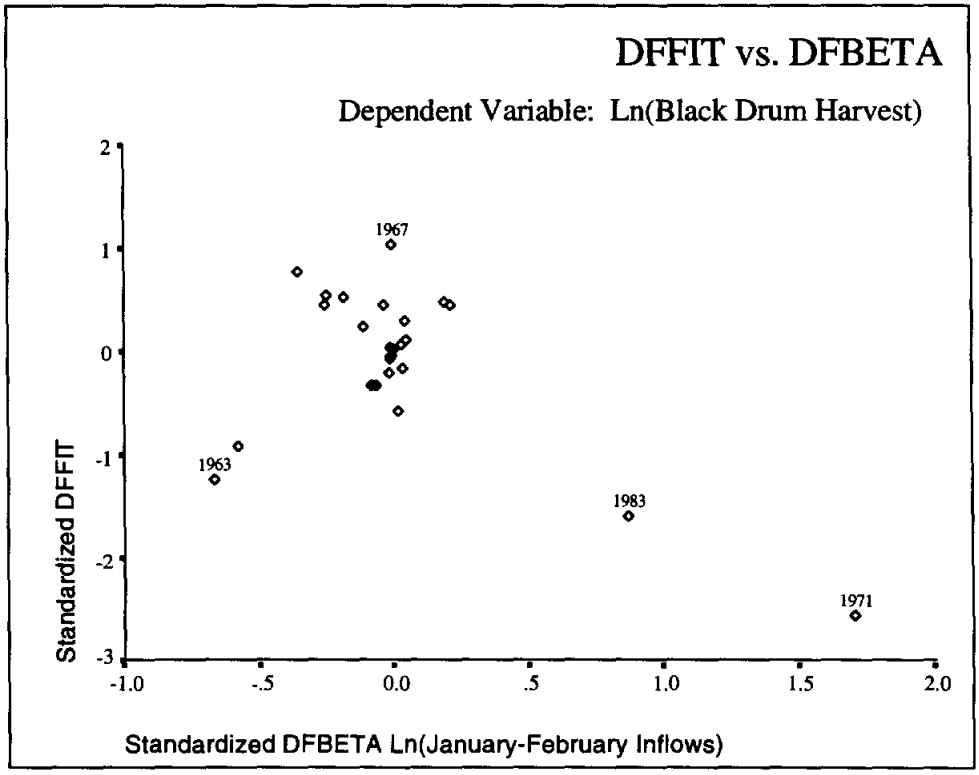
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.01147	.07855	-.08335	.08291
1963	-.12511	.34008	-.56139	.76299
1964	-.19520	-.01927	.09009	-.06075
1965	-.00201	.01990	.00623	-.00291
1966	-.13329	.03783	.12110	-.00770
1967	.52712	.04818	-.22828	-.20785
1968	.02189	.00218	-.00507	-.01515
1969	-.09593	.00724	.24899	-.07012
1970	.12949	-.15339	.13278	-.18584
1971	.56480	.27439	-.49455	-.16519
1972	-.09591	-.10411	.22256	-.07646
1973	.08486	-.17831	.32547	-.01145
1974	.03602	-.08331	.04601	.02257
1975	.11385	-.21731	.08947	.08174
1976	.00905	-.00098	-.03540	.04954
1977	.02734	-.03059	.05198	-.02694
1978	-.35516	.20423	-.34398	.24337
1979	.21143	-.12763	.07133	.03809
1980	-.08235	.01765	.16907	-.35651
1981	-.03456	-.02906	-.07657	.07093
1982	.14135	.04603	.05030	-.00788
1983	-.32333	-.92278	.01068	-.10554
1984	-.31407	.66358	-.20224	.15807
1985	-.03794	.02789	-.01289	.01745
1986	-.00611	.01485	-.00656	-.01239
1987	-.01695	-.00163	.09636	-.15490

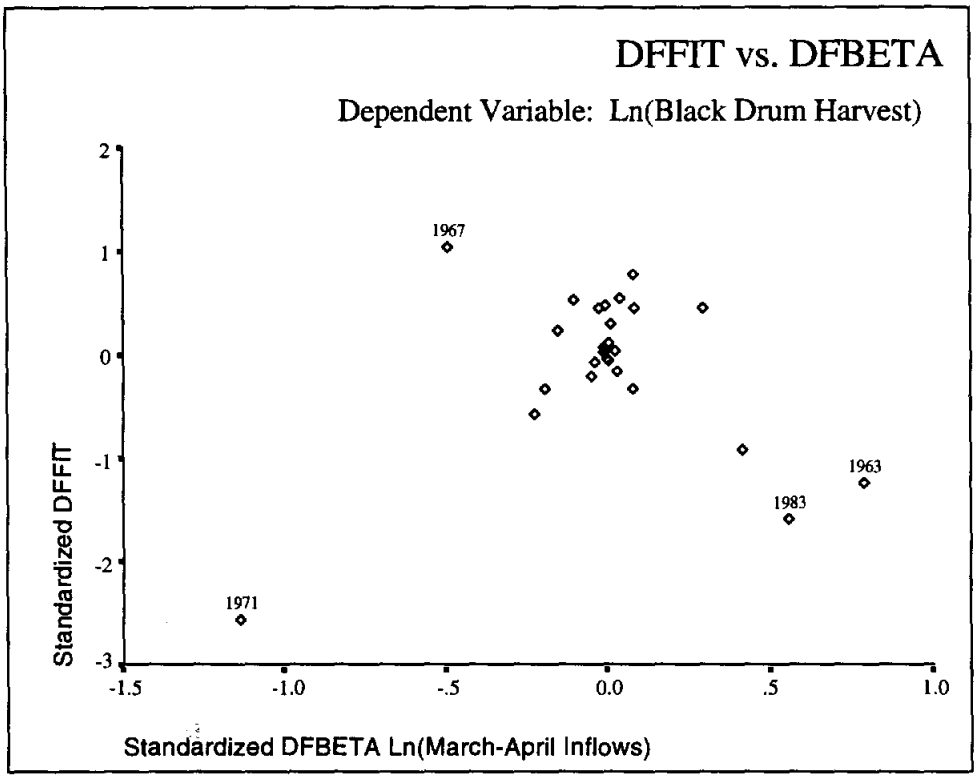
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

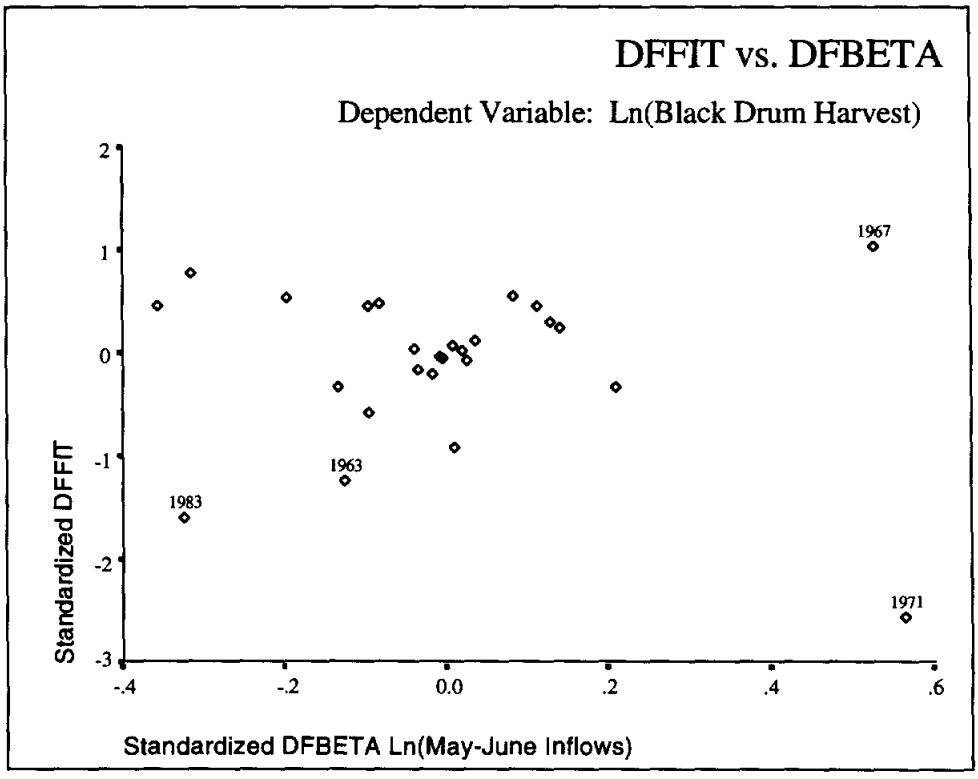
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

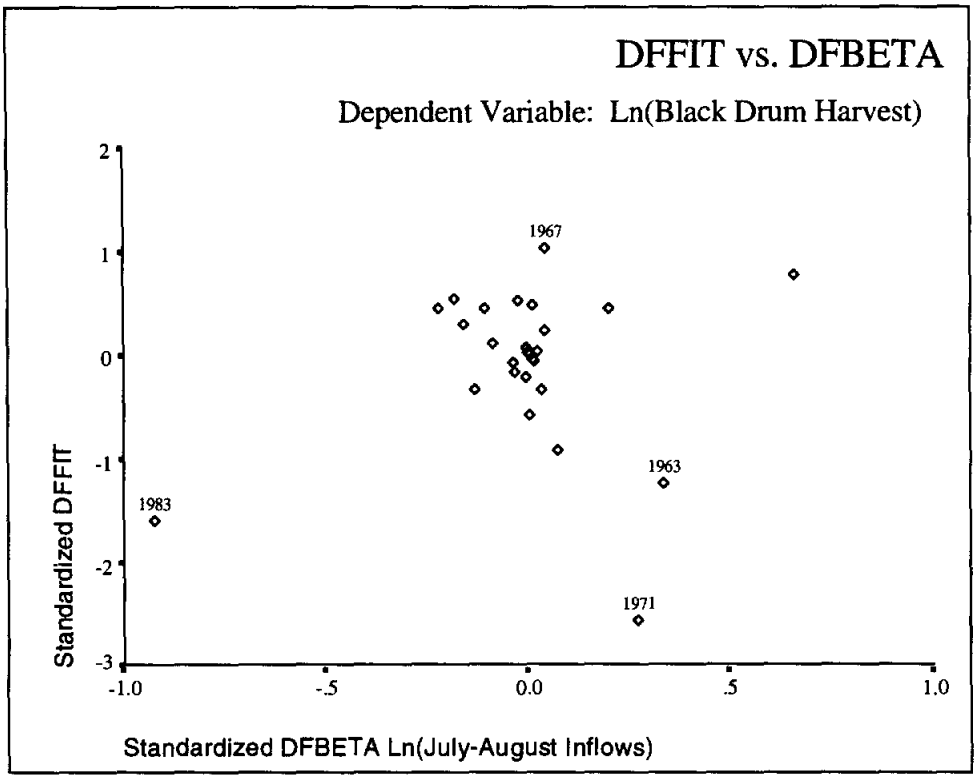
Graphics

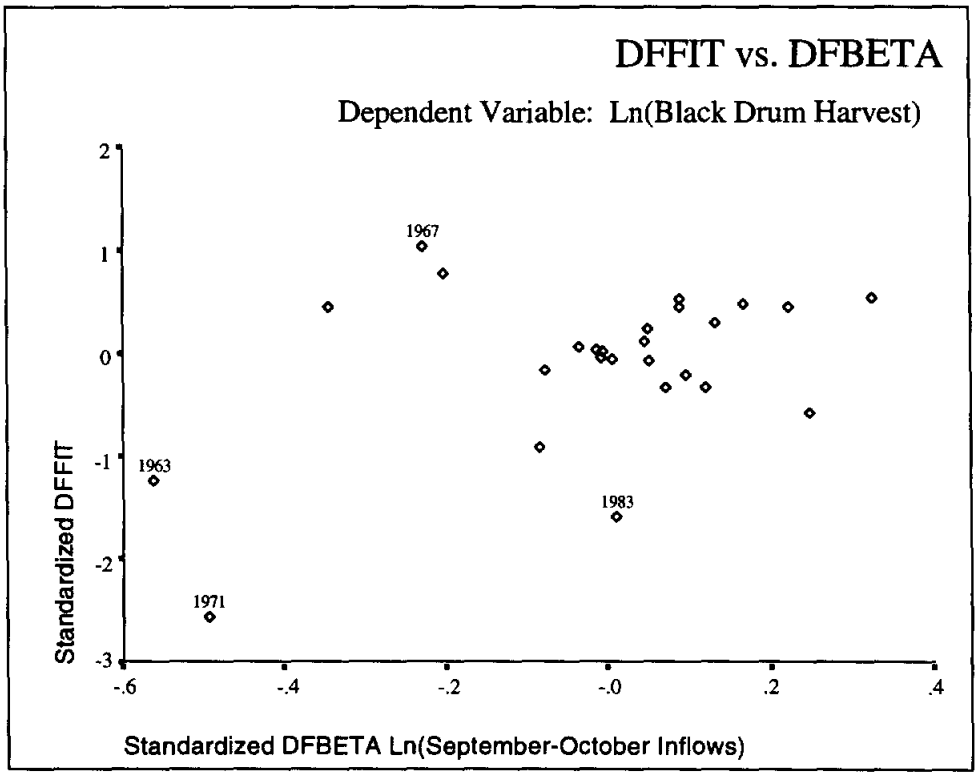

DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
Standardized DFBETA Intercept
1967
1963
1983
1971
2
1
0
-1
-2
-3
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6

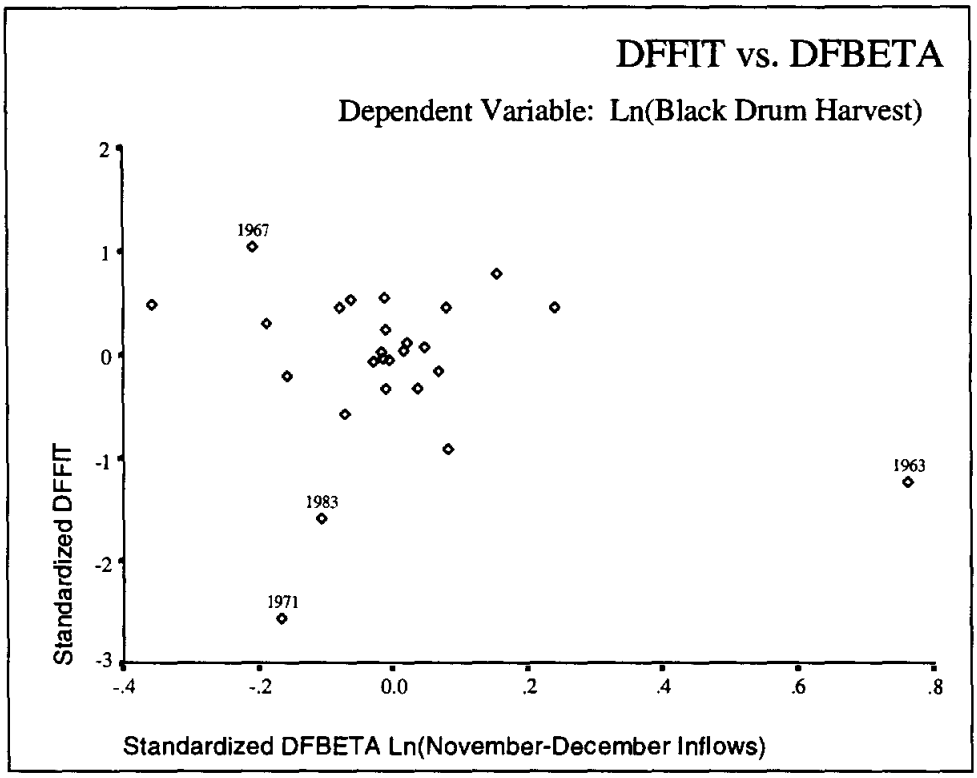

DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
Standardized DFBETA Ln(January-February Inflows)
1967
1963
1983
1971
2
1
0
-1
-2
-3
-1.0
-.5
0.0
.5
1.0
1.5
2.0


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1963
1983
1971
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA Ln(March-April Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1963
1983
1971
-.4
-.2
0.0
.2
.4
.6
Standardized DFBETA Ln(May-June Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1963
1983
1971
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA Ln(July-August Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1963
1983
1971
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Ln(September-October Inflows)


DFFIT vs. DFBETA
Dependent Variable: Ln(Black Drum Harvest)
Standardized DFFIT
2
1
0
-1
-2
-3
1967
1983
1971
1963
-.4
-.2
0.0
.2
.4
.6
.8
Standardized DFBETA Ln(November-December Inflows)

Examining Subsets of the Data

All Variables Logged: 1971 Omitted

N = 25 Regression Models for Dependent Variable: LBLKDRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.0908	0.0512	38.61	-12.88	0.5533	-10.45	LGJFINFL
1	0.0752	0.0350	39.63	-12.46	0.5627	-10.02	LGMAINFL
1	0.0550	0.0139	40.95	-11.92	0.5750	-9.481	LGJAINFL
1	0.0072	-.0360	44.09	-10.68	0.6041	-8.247	LGMJINFL
2	0.3699	0.3126	22.31	-20.05	0.4009	-16.39	LGJFINFL LGJAINFL
2	0.2692	0.2028	28.91	-16.35	0.4649	-12.69	LGJFINFL LGMAINFL
2	0.1403	0.0622	37.36	-12.28	0.5469	-8.628	LGJAINFL LGSOINFL
2	0.1267	0.0474	38.25	-11.89	0.5555	-8.236	LGJFINFL LGSOINFL
3	0.4547	0.3768	18.75	-21.66	0.3634	-16.79	LGJFINFL LGMAINFL LGJAINFL
3	0.3815	0.2931	23.55	-18.52	0.4122	-13.64	LGJFINFL LGJAINFL LGSOINFL
3	0.3776	0.2887	23.80	-18.36	0.4148	-13.48	LGJFINFL LGMJINFL LGJAINFL
3	0.3699	0.2799	24.30	-18.05	0.4199	-13.18	LGJFINFL LGJAINFL LGNDINFL
4	0.5657	0.4789	13.47	-25.36	0.3039	-19.26	LGJFINFL LGMAINFL LGMJINFL LGJAINFL
4	0.4677	0.3612	19.90	-20.27	0.3725	-14.17	LGJFINFL LGMAINFL LGJAINFL LGSOINFL
4	0.4656	0.3587	20.03	-20.17	0.3740	-14.07	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.3928	0.2714	24.80	-16.98	0.4249	-10.88	LGJFINFL LGMJINFL LGJAINFL LGSOINFL
5	0.6021	0.4974	13.09	-25.54	0.2931	-18.23	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL
5	0.5846	0.4753	14.23	-24.47	0.3060	-17.16	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.5176	0.3907	18.62	-20.73	0.3553	-13.42	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4003	0.2424	26.32	-15.29	0.4418	-7.973	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.7254	0.6339	7.000	-32.82	0.2135	-24.29	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LBLKDRUM	0.74381	9.3710	-0.72464	.
2	MODEL1	PARMS	LBLKDRUM	0.75014	0.3220	.	0.49357
3	MODEL1	PARMS	LBLKDRUM	0.75830	1.6735	.	.
4	MODEL1	PARMS	LBLKDRUM	0.77725	2.8483	.	.
5	MODEL1	PARMS	LBLKDRUM	0.63313	10.1311	-1.70403	.
6	MODEL1	PARMS	LBLKDRUM	0.68182	6.4321	-1.14750	0.82346
7	MODEL1	PARMS	LBLKDRUM	0.73951	2.5863	.	.
8	MODEL1	PARMS	LBLKDRUM	0.74533	9.8570	-1.08787	.
9	MODEL1	PARMS	LBLKDRUM	0.60284	7.9108	-1.85613	0.58938
10	MODEL1	PARMS	LBLKDRUM	0.64202	9.9022	-1.58568	.
11	MODEL1	PARMS	LBLKDRUM	0.64405	11.0890	-1.72653	.
12	MODEL1	PARMS	LBLKDRUM	0.64799	10.0931	-1.71188	.
13	MODEL1	PARMS	LBLKDRUM	0.55125	10.5436	-2.09668	1.10501
14	MODEL1	PARMS	LBLKDRUM	0.61034	7.6514	-1.73242	0.59409
15	MODEL1	PARMS	LBLKDRUM	0.61152	7.1976	-1.96777	0.65817
16	MODEL1	PARMS	LBLKDRUM	0.65182	11.0415	-1.59441	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	23
2	.	.	.	.	-1	1	2	23
3	.	0.34197	.	.	-1	1	2	23
4	0.14498	.	.	.	-1	1	2	23
5	.	0.97259	.	.	-1	2	3	22
6	.	.	.	.	-1	2	3	22
7	.	0.77122	-0.54888	.	-1	2	3	22
8	.	.	0.32088	.	-1	2	3	22
9	.	0.82309	.	.	-1	3	4	21
10	.	1.09736	-0.21554	.	-1	3	4	21
11	-0.17517	1.05701	.	.	-1	3	4	21
12	.	0.96966	.	0.01599	-1	3	4	21
13	-0.83668	1.09552	.	.	-1	4	5	20
14	.	0.95360	-0.22753	.	-1	4	5	20
15	.	0.77053	.	0.19123	-1	4	5	20
16	-0.21504	1.22091	-0.24995	.	-1	4	5	20

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.55326	0.09077	0.05123	38.6066	-12.8829	-10.4452
2	0.56272	0.07522	0.03501	39.6260	-12.4590	-10.0212
3	0.57502	0.05500	0.01391	40.9512	-11.9184	-9.4806
4	0.60411	0.00719	-0.03598	44.0857	-10.6845	-8.2467
5	0.40086	0.36987	0.31258	22.3096	-20.0497	-16.3931
6	0.46488	0.26922	0.20278	28.9079	-16.3451	-12.6885
7	0.54688	0.14033	0.06217	37.3575	-12.2842	-8.6276
8	0.55552	0.12674	0.04735	38.2482	-11.8922	-8.2356
9	0.36342	0.45469	0.37679	18.7490	-21.6640	-16.7885
10	0.41219	0.38150	0.29315	23.5467	-18.5157	-13.6402
11	0.41480	0.37758	0.28866	23.8040	-18.3576	-13.4821
12	0.41989	0.36995	0.27994	24.3041	-18.0530	-13.1775
13	0.30388	0.56574	0.47888	13.4689	-25.3567	-19.2624
14	0.37251	0.46765	0.36118	19.8991	-20.2655	-14.1712
15	0.37395	0.46560	0.35872	20.0338	-20.1693	-14.0749
16	0.42487	0.39283	0.27140	24.8041	-16.9778	-10.8835

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LBLKDRUM	0.54139	10.4332	-1.91506	1.17861
18	MODEL1	PARMS	LBLKDRUM	0.55313	9.7065	-2.25397	1.21671
19	MODEL1	PARMS	LBLKDRUM	0.59607	5.2986	-1.84479	0.78939
20	MODEL1	PARMS	LBLKDRUM	0.66465	10.4458	-1.61694	.
21	MODEL1	PARMS	LBLKDRUM	0.46204	7.4027	-2.15590	1.67852

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
17	-0.94298	1.35398	-0.39024	.	-1	5	6	19
18	-0.87034	1.03699	.	0.25283	-1	5	6	19
19	.	1.01325	-0.58187	0.52246	-1	5	6	19
20	-0.21040	1.25611	-0.37331	0.18504	-1	5	6	19
21	-1.23019	1.57423	-1.02382	0.86112	-1	6	7	18

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.29310	0.60208	0.49736	13.0864	-25.5418	-18.2285
18	0.30596	0.58463	0.47532	14.2305	-24.4686	-17.1554
19	0.35529	0.51765	0.39071	18.6215	-20.7312	-13.4179
20	0.44176	0.40026	0.24244	26.3168	-15.2858	-7.9725
21	0.21348	0.72543	0.63391	7.0000	-32.8178	-24.2857

All Variables Logged: 1967 and 1971 Omitted

N = 24 Regression Models for Dependent Variable: LBLKDRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1035	0.0627	61.01	-12.91	0.5392	-10.55	LGMAINFL
1	0.0737	0.0316	63.70	-12.13	0.5571	-9.770	LGJAINFL
1	0.0722	0.0300	63.84	-12.09	0.5581	-9.730	LGJFINFL
1	0.0043	-.0410	69.98	-10.39	0.5989	-8.035	LGMJINFL
2	0.3676	0.3074	39.15	-19.29	0.3985	-15.75	LGJFINFL LGJAINFL
2	0.2760	0.2070	47.42	-16.04	0.4562	-12.51	LGJFINFL LGMAINFL
2	0.1523	0.0716	58.60	-12.25	0.5342	-8.720	LGMAINFL LGMJINFL
2	0.1330	0.0504	60.35	-11.71	0.5463	-8.179	LGJFINFL LGSOINFL
3	0.4679	0.3881	32.08	-21.43	0.3520	-16.72	LGJFINFL LGMAINFL LGJAINFL
3	0.3827	0.2901	39.78	-17.87	0.4084	-13.16	LGJFINFL LGMJINFL LGJAINFL
3	0.3713	0.2770	40.81	-17.43	0.4160	-12.72	LGJFINFL LGJAINFL LGSOINFL
3	0.3691	0.2745	41.01	-17.34	0.4174	-12.63	LGJFINFL LGJAINFL LGNDINFL
4	0.6428	0.5676	18.28	-29.00	0.2488	-23.11	LGJFINFL LGMAINFL LGMJINFL LGJAINFL
4	0.4908	0.3836	32.01	-20.49	0.3546	-14.60	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.4715	0.3602	33.76	-19.59	0.3681	-13.70	LGJFINFL LGMAINFL LGJAINFL LGSOINFL
4	0.4229	0.3014	38.15	-17.48	0.4019	-11.59	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
5	0.6918	0.6062	15.85	-30.54	0.2265	-23.47	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.6581	0.5632	18.89	-28.05	0.2513	-20.98	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL
5	0.5265	0.3950	30.79	-20.23	0.3481	-13.16	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.4229	0.2626	40.15	-15.48	0.4243	-8.414	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
6	0.8119	0.7455	7.000	-40.38	0.1464	-32.14	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LBLKDRUM	0.73433	-0.2817	.	0.56941
2	MODEL1	PARMS	LBLKDRUM	0.74642	1.3257	.	.
3	MODEL1	PARMS	LBLKDRUM	0.74704	8.7149	-0.64031	.
4	MODEL1	PARMS	LBLKDRUM	0.77390	3.0909	.	.
5	MODEL1	PARMS	LBLKDRUM	0.63127	9.4730	-1.61979	.
6	MODEL1	PARMS	LBLKDRUM	0.67544	5.5142	-1.06385	0.85878
7	MODEL1	PARMS	LBLKDRUM	0.73086	0.8882	.	0.94877
8	MODEL1	PARMS	LBLKDRUM	0.73915	9.1296	-1.08533	.
9	MODEL1	PARMS	LBLKDRUM	0.59334	7.0176	-1.76864	0.62563
10	MODEL1	PARMS	LBLKDRUM	0.63907	10.7221	-1.64132	.
11	MODEL1	PARMS	LBLKDRUM	0.64494	9.4059	-1.56004	.
12	MODEL1	PARMS	LBLKDRUM	0.64608	9.2924	-1.64974	.
13	MODEL1	PARMS	LBLKDRUM	0.49876	9.8500	-2.02405	1.30171
14	MODEL1	PARMS	LBLKDRUM	0.59550	5.8662	-1.91661	0.72960
15	MODEL1	PARMS	LBLKDRUM	0.60670	6.9541	-1.71012	0.62511
16	MODEL1	PARMS	LBLKDRUM	0.63398	4.7668	-1.49356	1.52304

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	22
2	.	0.38770	.	.	-1	1	2	22
3	.	.	.	.	-1	1	2	22
4	0.10919	.	.	.	-1	1	2	22
5	.	0.97298	.	.	-1	2	3	21
6	.	.	.	.	-1	2	3	21
7	-0.51408	.	.	.	-1	2	3	21
8	.	.	0.41792	.	-1	2	3	21
9	.	0.81434	.	.	-1	3	4	20
10	-0.24209	1.08970	.	.	-1	3	4	20
11	.	1.04464	-0.12386	.	-1	3	4	20
12	.	0.96074	.	0.06675	-1	3	4	20
13	-1.06324	1.15551	.	.	-1	4	5	19
14	.	0.73759	.	0.27471	-1	4	5	19
15	.	0.88451	-0.12105	.	-1	4	5	19
16	-0.67364	.	.	0.58298	-1	4	5	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.53924	0.10349	0.06274	61.0129	-12.9105	-10.5544
2	0.55715	0.07372	0.03162	63.7029	-12.1266	-9.7704
3	0.55807	0.07218	0.03000	63.8424	-12.0866	-9.7305
4	0.59892	0.00428	-0.04099	69.9782	-10.3915	-8.0354
5	0.39850	0.36759	0.30736	39.1472	-19.2860	-15.7518
6	0.45621	0.27600	0.20705	47.4241	-16.0398	-12.5056
7	0.53415	0.15231	0.07158	58.6012	-12.2544	-8.7203
8	0.54634	0.13298	0.05040	60.3483	-11.7132	-8.1790
9	0.35205	0.46791	0.38810	32.0819	-21.4314	-16.7192
10	0.40841	0.38273	0.29014	39.7790	-17.8676	-13.1554
11	0.41595	0.37133	0.27703	40.8095	-17.4283	-12.7161
12	0.41742	0.36911	0.27448	41.0102	-17.3436	-12.6314
13	0.24876	0.64282	0.56763	18.2761	-28.9973	-23.1070
14	0.35462	0.49083	0.38363	32.0114	-20.4878	-14.5975
15	0.36809	0.47148	0.36022	33.7593	-19.5930	-13.7027
16	0.40194	0.42289	0.30139	38.1507	-17.4818	-11.5916

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LBLKDRUM	0.47596	8.3877	-2.26532	1.51402
18	MODEL1	PARMS	LBLKDRUM	0.50132	9.8438	-1.91290	1.33092
19	MODEL1	PARMS	LBLKDRUM	0.58998	4.5313	-1.82411	0.82539
20	MODEL1	PARMS	LBLKDRUM	0.65135	4.7860	-1.49591	1.52095
21	MODEL1	PARMS	LBLKDRUM	0.38267	6.4519	-2.17542	1.89840

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
17	-1.15481	1.07117	.	0.40709	-1	5	6	18
18	-1.11087	1.31778	-0.25358	.	-1	5	6	18
19	.	0.94323	-0.47936	0.53321	-1	5	6	18
20	-0.67323	.	0.00498	0.57969	-1	5	6	18
21	-1.44847	1.55294	-0.92535	0.93976	-1	6	7	17

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.22654	0.69184	0.60624	15.8465	-30.5402	-23.4719
18	0.25132	0.65814	0.56318	18.8921	-28.0491	-20.9808
19	0.34808	0.52652	0.39500	30.7854	-20.2324	-13.1641
20	0.42426	0.42289	0.26258	40.1502	-15.4820	-8.4137
21	0.14644	0.81187	0.74548	7.0000	-40.3840	-32.1376

All Variables Logged: 1967, 1971, and 1983 Omitted

N = 23 Regression Models for Dependent Variable: LBLKDRUM

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1060	0.0635	86.36	-11.30	0.5632	-9.025	LGMAINFL
1	0.0823	0.0386	89.16	-10.69	0.5782	-8.422	LGJAINFL
1	0.0724	0.0283	90.32	-10.45	0.5844	-8.176	LGJFINFL
1	0.0041	-.0433	98.37	-8.813	0.6274	-6.542	LGMJINFL
2	0.5137	0.4651	40.31	-23.30	0.3217	-19.89	LGJFINFL LGJAINFL
2	0.2762	0.2039	68.30	-14.15	0.4788	-10.75	LGJFINFL LGMAINFL
2	0.1760	0.0936	80.11	-11.17	0.5451	-7.765	LGMAINFL LGMJINFL
2	0.1427	0.0569	84.05	-10.26	0.5672	-6.851	LGJAINFL LGSOINFL
3	0.5599	0.4904	36.87	-23.59	0.3065	-19.05	LGJFINFL LGMAINFL LGJAINFL
3	0.5302	0.4561	40.37	-22.10	0.3271	-17.55	LGJFINFL LGMJINFL LGJAINFL
3	0.5237	0.4485	41.13	-21.78	0.3317	-17.24	LGJFINFL LGJAINFL LGNDINFL
3	0.5190	0.4430	41.69	-21.55	0.3350	-17.01	LGJFINFL LGJAINFL LGSOINFL
4	0.6882	0.6189	23.75	-29.52	0.2292	-23.84	LGJFINFL LGMAINFL LGMJINFL LGJAINFL
4	0.5896	0.4984	35.37	-23.20	0.3017	-17.52	LGJFINFL LGMAINFL LGJAINFL LGNDINFL
4	0.5647	0.4680	38.30	-21.85	0.3199	-16.17	LGJFINFL LGMAINFL LGJAINFL LGSOINFL
4	0.5497	0.4496	40.08	-21.07	0.3310	-15.39	LGJFINFL LGJAINFL LGSOINFL LGNDINFL
5	0.7403	0.6640	19.60	-31.73	0.2021	-24.92	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.7034	0.6162	23.96	-28.67	0.2308	-21.86	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL
5	0.6375	0.5308	31.73	-24.05	0.2822	-17.24	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
5	0.5676	0.4404	39.97	-20.00	0.3365	-13.19	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.8642	0.8133	7.000	-44.65	0.1123	-36.70	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
1	MODEL1	PARMS	LBLKDRUM	0.75048	-0.3735	.	0.58072
2	MODEL1	PARMS	LBLKDRUM	0.76039	0.9897	.	.
3	MODEL1	PARMS	LBLKDRUM	0.76446	8.7599	-0.64593	.
4	MODEL1	PARMS	LBLKDRUM	0.79211	3.0881	.	.
5	MODEL1	PARMS	LBLKDRUM	0.56718	10.8680	-2.20469	.
6	MODEL1	PARMS	LBLKDRUM	0.69195	5.4597	-1.05999	0.86185
7	MODEL1	PARMS	LBLKDRUM	0.73830	0.9509	.	1.10283
8	MODEL1	PARMS	LBLKDRUM	0.75310	1.7442	.	.
9	MODEL1	PARMS	LBLKDRUM	0.55361	8.8892	-2.21033	0.44350
10	MODEL1	PARMS	LBLKDRUM	0.57194	12.1795	-2.22999	.
11	MODEL1	PARMS	LBLKDRUM	0.57589	10.4559	-2.30689	.
12	MODEL1	PARMS	LBLKDRUM	0.57875	10.7962	-2.13700	.
13	MODEL1	PARMS	LBLKDRUM	0.47874	10.8605	-2.31214	1.08908
14	MODEL1	PARMS	LBLKDRUM	0.54926	7.6477	-2.39615	0.55511
15	MODEL1	PARMS	LBLKDRUM	0.56563	8.8291	-2.14534	0.44153
16	MODEL1	PARMS	LBLKDRUM	0.57534	9.7856	-2.24009	.

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	21
2	.	0.43991	.	.	-1	1	2	21
3	.	.	.	.	-1	1	2	21
4	0.10958	.	.	.	-1	1	2	21
5	.	1.42467	.	.	-1	2	3	20
6	.	.	.	.	-1	2	3	20
7	-0.67297	.	.	.	-1	2	3	20
8	.	0.82441	-0.47979	.	-1	2	3	20
9	.	1.23507	.	.	-1	3	4	19
10	-0.25290	1.54877	.	.	-1	3	4	19
11	.	1.41156	.	0.17369	-1	3	4	19
12	.	1.51242	-0.14723	.	-1	3	4	19
13	-0.93554	1.41818	.	.	-1	4	5	18
14	.	1.16372	.	0.31340	-1	4	5	18
15	.	1.32013	-0.14129	.	-1	4	5	18
16	.	1.63567	-0.40132	0.37375	-1	4	5	18

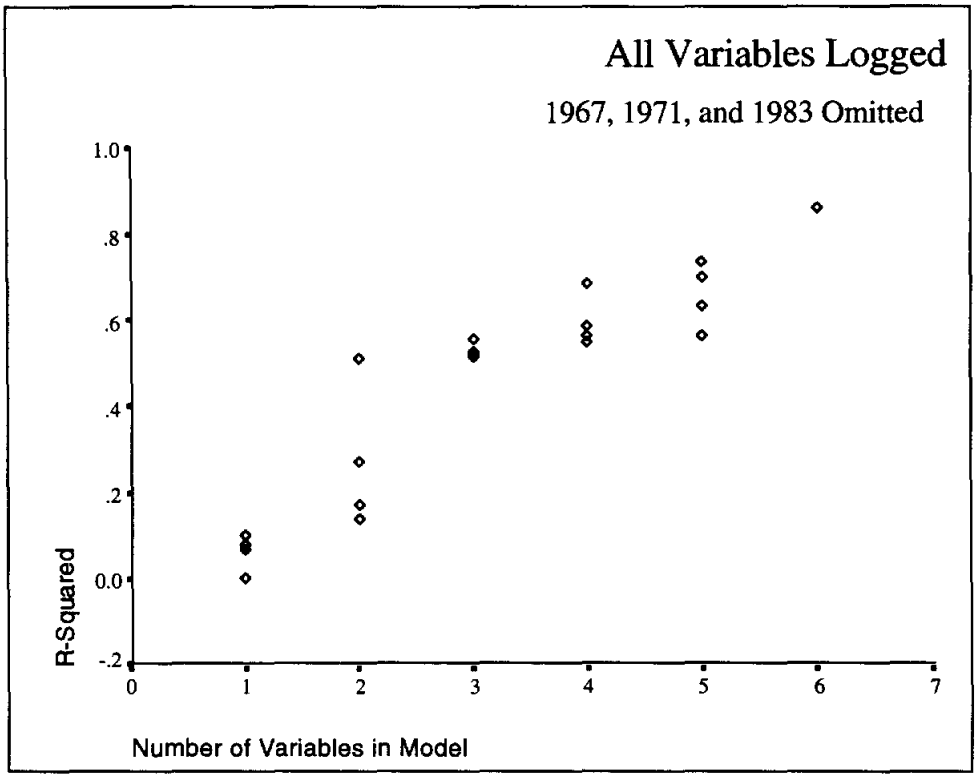
OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.56322	0.10605	0.06348	86.3620	-11.2962	-9.0252
2	0.57819	0.08229	0.03859	89.1621	-10.6930	-8.4220
3	0.58440	0.07243	0.02826	90.3243	-10.4471	-8.1762
4	0.62743	0.00413	-0.04329	98.3743	-8.8130	-6.5420
5	0.32170	0.51372	0.46509	40.3138	-23.3000	-19.8935
6	0.47879	0.27625	0.20387	68.3024	-14.1538	-10.7473
7	0.54508	0.17604	0.09364	80.1127	-11.1714	-7.7649
8	0.56717	0.14265	0.05692	84.0474	-10.2579	-6.8514
9	0.30648	0.55987	0.49038	36.8737	-23.5938	-19.0518
10	0.32712	0.53024	0.45607	40.3663	-22.0951	-17.5531
11	0.33165	0.52373	0.44853	41.1332	-21.7787	-17.2368
12	0.33495	0.51899	0.44305	41.6918	-21.5510	-17.0090
13	0.22920	0.68819	0.61889	23.7507	-29.5209	-23.8434
14	0.30169	0.58956	0.49835	35.3746	-23.2001	-17.5226
15	0.31994	0.56473	0.46801	38.3009	-21.8492	-16.1717
16	0.33102	0.54966	0.44958	40.0779	-21.0660	-15.3885

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL
17	MODEL1	PARMS	LBLKDRUM	0.44954	9.3862	-2.57102	1.30085
18	MODEL1	PARMS	LBLKDRUM	0.48044	10.8534	-2.20103	1.11841
19	MODEL1	PARMS	LBLKDRUM	0.53119	6.2097	-2.31944	0.65528
20	MODEL1	PARMS	LBLKDRUM	0.58013	11.1650	-2.24969	.
21	MODEL1	PARMS	LBLKDRUM	0.33505	7.4582	-2.49168	1.68311

OBS	LGMJINFL	LGJAINFL	LGSOINFL	LGNDINFL	LBLKDRUM	_IN_	_P_	_EDF_
17	-1.02565	1.34017	.	0.42009	-1	5	6	17
18	-0.98317	1.57970	-0.25283	.	-1	5	6	17
19	.	1.43037	-0.55758	0.61657	-1	5	6	17
20	-0.26531	1.78291	-0.42902	0.36661	-1	5	6	17
21	-1.31900	1.84035	-0.94039	0.96192	-1	6	7	16

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
17	0.20209	0.74034	0.66397	19.6037	-31.7307	-24.9178
18	0.23083	0.70341	0.61618	23.9560	-28.6724	-21.8595
19	0.28216	0.63746	0.53083	31.7293	-24.0541	-17.2411
20	0.33655	0.56757	0.44039	39.9664	-19.9997	-13.1867
21	0.11226	0.86425	0.81334	7.0000	-44.6469	-36.6985

Scree Plots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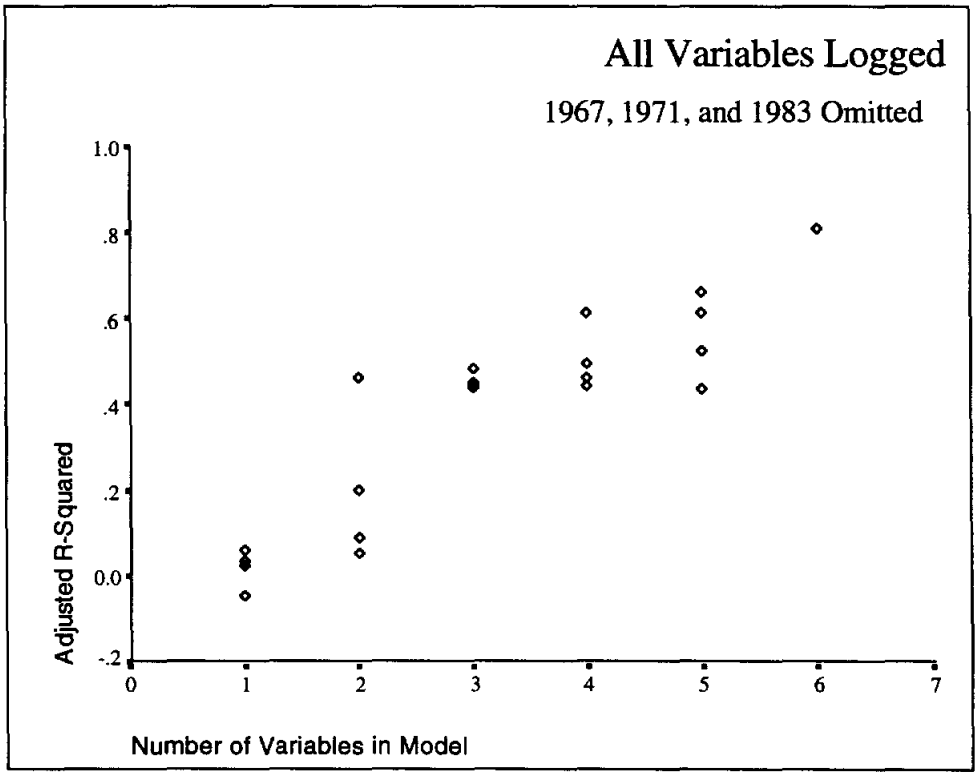
Number of Variables in Model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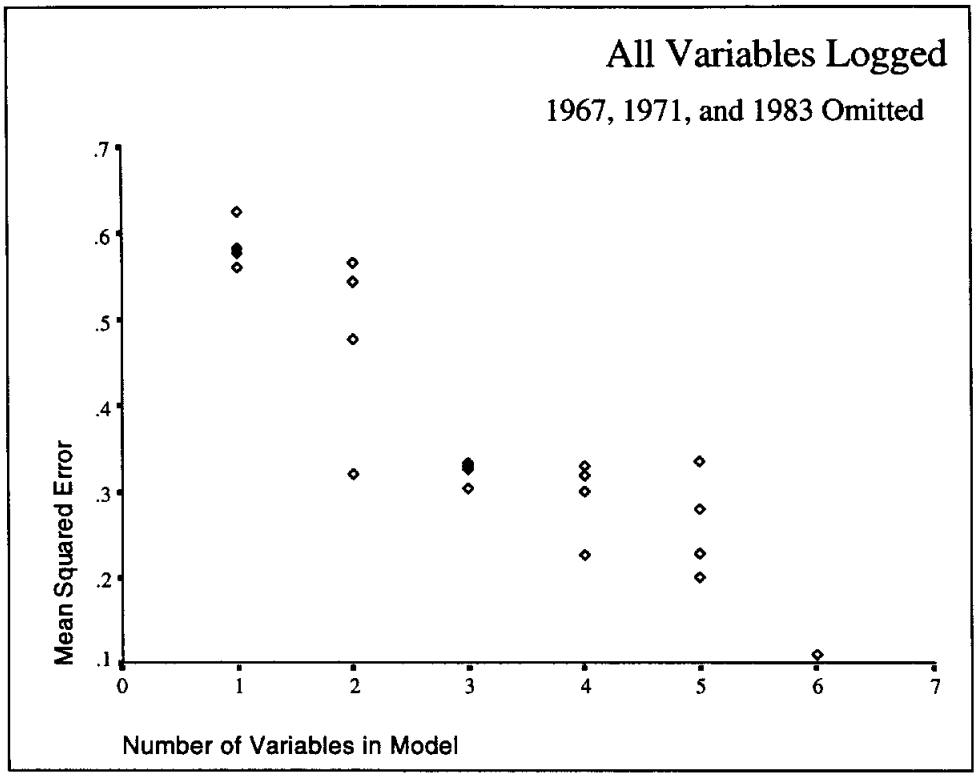
Number of Variables in Model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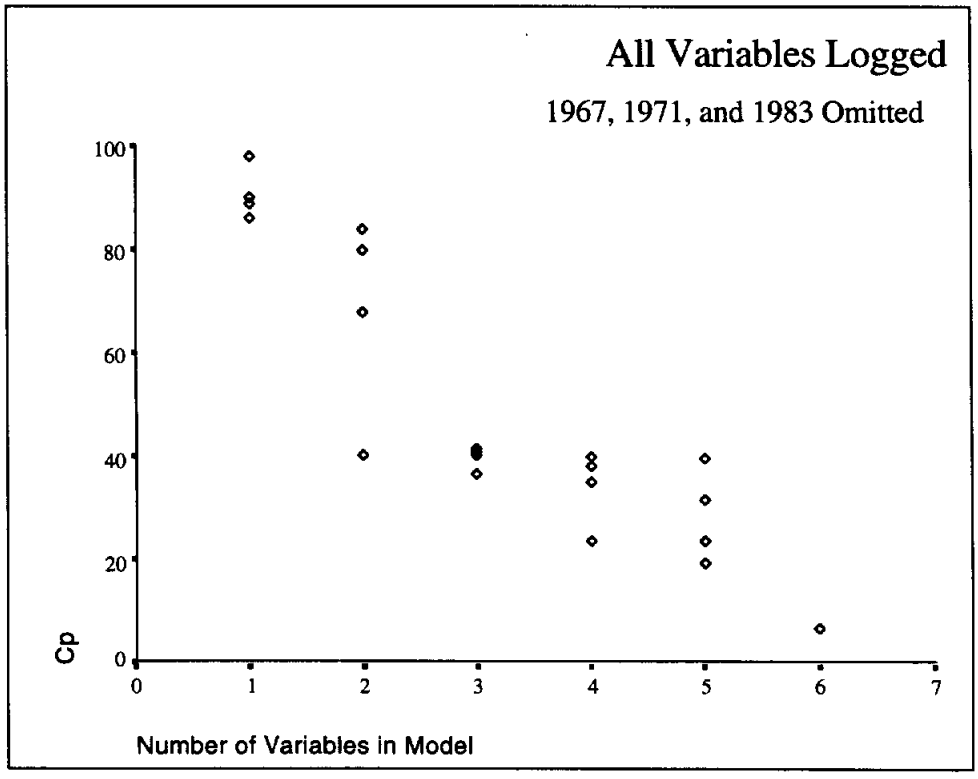
Number of Variables in Model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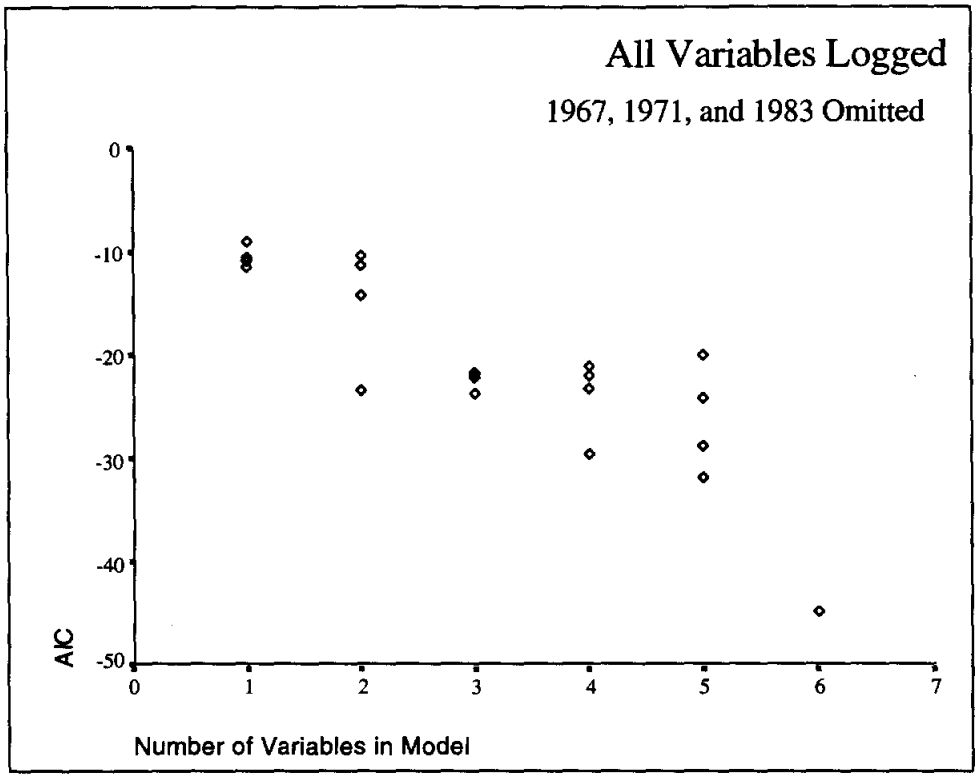
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
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-50
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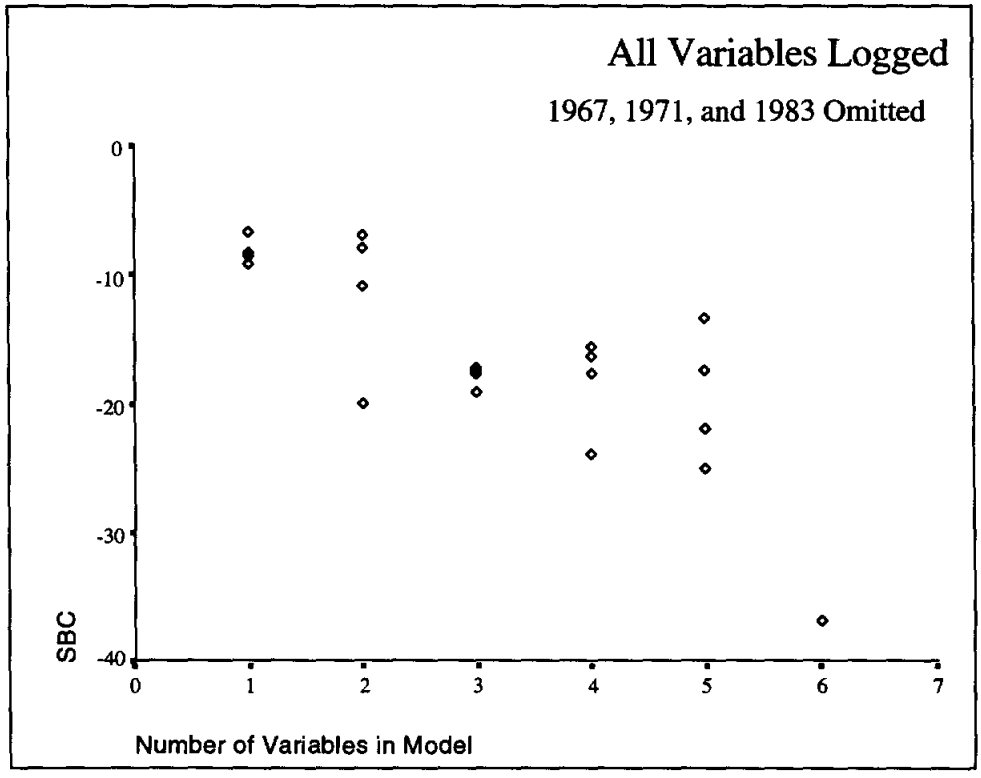
2
3
4
5
6
7
Number of Variables in Model


All Variables Logged
1967, 1971, and 1983 Omitted
SBC
0
-10
-20
-30
-40
0
1
2
3
4
5
6
7
Number of Variables in Model

Red Drum Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

F. Michael Speed
Jacqueline Kiffe

Department of Statistics
Texas A&M University

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Table of Contents

Summary Report 3

Description of the Problem 3

Constructing Models—General Discussion 3

Detecting Influential Points and Outliers 3

Variable Selection 4

Multicollinearity 4

Other Procedures 4

How the Final Models Were Chosen 4

Model 1 8

Model 2 11

Exploring the Data 14

Listing of Data 14

Examination of Individual Variables 15

99% Prediction Ellipses 44

Box–Cox Analysis 55

Numerical Results 55

Plots 56

Model Choice Diagnostics 57

Untransformed Data 57

Square Root of Harvest (Box–Cox Transformation) 59

Logged Inflows 61

Logged Harvest 63

Logged Harvest and Inflows 65

Regression—Untransformed Data 67

ANOVA and Parameter Estimates 67

Collinearity Diagnostics 68

Residuals Diagnostics 70

Summary Information 70

Case Values for Residuals Diagnostics 71

Graphics 72

Prediction Intervals for Red Drum Harvest 79

Outlier and Influential Point Detection 80

Calculated Quantities 80

Graphics 83

Regression—Square Root of Harvest (Box–Cox Transformation) 87

ANOVA and Parameter Estimates 87

Collinearity Diagnostics 88

Residuals Diagnostics 90
Summary Information 90
Case Values for Residuals Diagnostics 91
Graphics 92

Prediction Intervals for Square Root of Red Drum Harvest 99

Outlier and Influential Point Detection 100
Calculated Quantities 100
Graphics 103

Regression—Logged Inflows *107*

ANOVA and Parameter Estimates 107

Collinearity Diagnostics 108

Residuals Diagnostics 110
Summary Information 110
Case Values for Residuals Diagnostics 111
Graphics 112

Prediction Intervals for Red Drum Harvest 119

Outlier and Influential Point Detection 120
Calculated Quantities 120
Graphics 123

Regression—Logged Harvest and Inflows *127*

ANOVA and Parameter Estimates 127

Collinearity Diagnostics 128

Residuals Diagnostics 130
Summary Information 130
Case Values for Residuals Diagnostics 131
Graphics 132

Prediction Intervals for Natural Log of Red Drum Harvest 139

Outlier and Influential Point Detection 140
Calculated Quantities 140
Graphics 143

Examining Subsets of the Data *147*

Untransformed Data: 1977, 1979, and 1981 Omitted 147
Scree Plots 149

Square Root of Harvest (Box–Cox Transformation): 1977, 1979, and 1981 Omitted 152

Logged Inflows: 1976, 1977, and 1979 Omitted 154
Scree Plots 156

All Variables Logged: 1963, 1977, and 1979 Omitted 159

Summary Report

Description of the Problem

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1981. These variables, and various transformations of them, were used to construct a model for the annual harvest of red drum.

Constructing Models—General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 99% prediction ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values of Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standardized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less that 10. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation, were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Models Were Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS® programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. In addition to the untransformed data, three transformed data sets were selected for this procedure, based on prior experience. Before we proceeded, the Box-Cox procedure was performed to find if a transformation to normality was suggested. The recommended transformation was the square root of harvest. At this point, there were five data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Square root of harvest; remaining variables untransformed

3. Natural log of inflow variables; harvest untransformed
4. Natural log of harvest; inflows untransformed
5. Natural log of all variables

Selecting the Points to be Omitted. The maximum R^2 values for these data sets were 0.55, 0.52, 0.55, 0.48, and 0.56, in order of data set. Thus, this initial examination of the five models did not produce an immediate candidate for a superior model; however, the fourth data set seemed less promising than the remaining four. Therefore, full regressions were performed for four models, each of which contained all variables in its corresponding data set. A number of diagnostics were employed to determine potentially influential points; the results are summarized in the table below. (An asterisk indicates that the observation year was deleted for subsequent analysis.) The abbreviation key and a similar summary table for points designated by box plots as potentially influential appear on the next page. A point was not considered to be a problem unless it garnered multiple flags.

	BOX	SDR	LEV	MAH	COO	SDF	SDB	Total
Data set 1								
1976	1					1		2
***1977**			1		1	1	4	7
***1979**			1			1	3	5
***1981**	1		1		1	1	2	6
Data Set 2								
1963						1		1
1971						1		1
1976	1					1		2
***1977**			1			1	4	6
***1979**			1			1	3	5
***1981**	1		1		1	1	2	6
Data Set 3								
1965	1							1
***1976**	1	1				1		3
***1977**		1				1	3	5
***1979**			1			1	2	4
1981			1					1
Data Set 5								
***1963**	1	1				1		3
1965	1							1
1971						1		1
1976						1		1
***1977**						1	1	2
***1979**			1			1	1	3
1981			1					1

Summary of points flagged by diagnostic measures

Key to Abbreviations:

BOX	Box plot
SDR	Studentized deleted residual
LEV	Leverage value
MAH	Mahalanobis distance
COO	Cook's distance
SDF	Standardized Dffits value
SDB	Standardized Dfbeta value

Year	Variable
1962	Natural log of Red Drum Harvest
1963	Natural log of Red Drum Harvest
1965	Natural log of July-August Inflows
1975	Red Drum Harvest
1976	Red Drum Harvest, Square Root of Red Drum Harvest
1981	July-August Inflows

Summary of points flagged by box plots

Selecting the Final Candidate Models. Twenty-one different models were examined for each of the four data subsets (Data Sets 1, 2, 3, and 5, each without the points indicated by an asterisk), and three models were chosen from each of two data subsets (1 and 3) for further examination.

1977, 1979, and 1981 Omitted:

1a. Harvest regressed on January-February, May-June, and November-December inflows (adjusted $R^2 = 0.589$)

1b. Harvest regressed on January-February, May-June, September-October, and November-December inflows (adjusted $R^2 = 0.634$)

1c. Harvest regressed on January-February, May-June, July-August, and September-October, and November-December inflows (adjusted $R^2 = 0.627$)

1976, 1977, and 1979 Omitted:

3a. Harvest regressed on natural log of January-February, May-June, and November-December inflows (adjusted $R^2 = 0.607$)

3b. Harvest regressed on natural log of January-February, March-April, May-June, and November-December inflows (adjusted $R^2 = 0.632$)

3c. Harvest regressed on natural log of January-February, March-April, May-June, July-August, and November-December inflows (adjusted $R^2 = 0.635$)

Selecting the Final Models. To put these models on a common ground for testing, the observations corresponding to the years 1976, 1977, 1979, and 1981 were deleted. Regression was performed using each of these six models, and the deleted residuals were calculated. Various descriptive statistics were calculated for the square of these deleted residuals. (See tabular results.) Two models, 3a and 3b, were clearly better than the others. Incidentally, the poorer results from models with a larger number of variables shows the danger of overfitting the model.

Descriptive Statistics for Squared Deleted Residuals

	N	Minimum	Maximum	Mean	Std. Deviation
1a	16	.0605	2322.9546	465.617784	782.259005
1b	16	.2584	2171.0065	445.043241	676.275526
1c	16	2.7460	2690.4705	514.005926	782.252689
3a	16	.0140	1886.1565	348.985208	575.176139
3b	16	8.8319	1587.6798	342.194402	480.842916
3c	16	.1097	2526.1724	426.897013	650.251199

To be more confident in our final choice, we repeated the previous deleted residual analysis using all data points. Model 3a, which was second-ranked in the previous analysis, is first-ranked when all data points are used. Model 3b, which was first-ranked in the previous analysis, is third-ranked when all observations are used. No other model shows any clear advantage over either of these two, when both set of results are taken into account.

Descriptive Statistics for Squared Deleted Residuals (All Data)

	N	Minimum	Maximum	Mean	Std. Deviation
1a	20	.8780	3204.3323	533.948180	917.760300
1b	20	1.9131	2762.5477	568.136366	816.686987
1c	20	3.3703	3231.0915	740.122015	1046.356996
3a	20	.0821	3024.1501	478.749371	876.635946
3b	20	.0240	3728.1851	544.136083	1017.543199
3c	20	1.9308	3582.0904	549.319335	1041.582161

If we look at the actual diagnostic numbers, we find that the difference between these two models is relatively small. (See table at right.) Therefore, we recommend both these two models as our final choice, with somewhat of a preference for model 3b. The results of these two regressions appear on the following pages.

	3a	3b
R^2	0.681	0.724
Adjusted R^2	0.607	0.632
MSE	148.397	139.166
C_p	3.726	4.016
AIC	88.438	87.9851
SBC	91.771	92.151

Model 1

Red Drum Harvest = −198.741 − 62.120*Ln(January-February Inflows)
+ 38.007*Ln(May-June Inflows)
+ 55.626*Ln(November-December Inflows)

Notes on the results. There is no evidence of serial autocorrelation from examining the Durbin-Watson results. The relatively small variance inflation factors (VIF's) indicate no serious multicollinearity, while the condition index *does*. This apparent contradiction is caused by the presence of the intercept term. When the standardized data are analyzed via principal components, the apparent multicollinearity disappears. (See BMDP® output section.) We can get a more accurate version of the condition index (the ratio of largest to smallest eigenvalues) from this output: 1.72761/0.14847 = 11.636, which is considerably smaller than the 94.028 indicated in the standard regression. (See the shaded area of the BMDP® output for the source of the values.) For both this model and the next, the fitted coefficients resulting from principle components regression are the same as the fitted coefficients from ordinary least squares regression.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln(November-December Inflows), Ln(May-June Inflows), Ln(January-February Inflows)[c,d]	.	.825	.681	.607	12.1819	2.093

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4117.590	3	1372.530	9.249	.002[b]
	Residual	1929.167	13	148.397		
	Total	6046.758	16			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(January-February Inflows)

Coefficients[a]

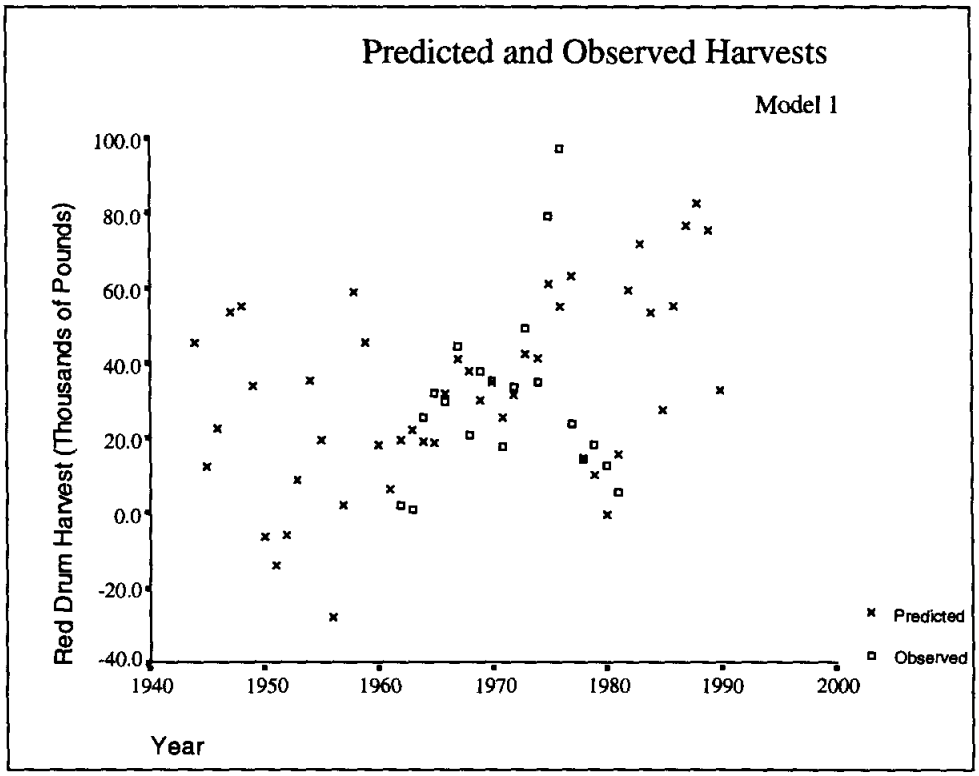
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-198.741	73.487		-2.704	.018	-357.501	-39.982		
	Ln(January-February Inflows)	-62.120	14.198	-1.260	-4.375	.001	-92.793	-31.447	.296	3.379
	Ln(May-June Inflows)	38.007	7.851	1.006	4.841	.000	21.047	54.967	.569	1.758
	Ln(November-December Inflows)	55.626	12.248	1.246	4.542	.001	29.166	82.086	.326	3.066

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Ln(January-February Inflows)	Ln(May-June Inflows)	Ln(November-December Inflows)
1	1	3.994	1.000	.00	.00	.00	.00
	2	4.657E-03	29.283	.00	.00	.30	.10
	3	1.381E-03	53.775	.82	.13	.10	.01
	4	4.517E-04	94.028	.18	.86	.61	.89

a. Dependent Variable: Red Drum Harvest



BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION
Copyright 1977, 1979, 1981, 1982, 1983, 1985, 1987, 1988, 1990, 1993
by BMDP Statistical Software, Inc.

COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

MAXIMUM NUMBER OF COMPONENTS TO ENTER 3
NUMBER OF COMPONENTS TO ENTER LIMITED BY
MAGNITUDE OF CORRELATION GREATER THAN 0.0100

NUMBER OF CASES READ. 17

CORRELATION MATRIX

		red_drum 2	lgjfinfl 5	lgmjinfl 7	lgndinfl 10
red_drum	2	1.0000			
lgjfinfl	5	-0.0426	1.0000		
lgmjinfl	7	0.3765	0.3406	1.0000	
lgndinfl	10	0.1996	0.7023	-0.1605	1.0000

EIGENVALUES

1.72761	**1.12392**	**0.14847**

CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

0.57587	0.95051	1.00000

EIGENVECTORS

	1	2	3
5 lgjfinfl	0.7269	0.1329	-0.6738
7 lgmjinfl	0.1950	0.9008	0.3880
10 lgndinfl	0.6585	-0.4134	0.6288

DEPENDENT VARIABLE 2 red_drum

TOTAL SUM OF SQUARES 6046.757810
DEGREES OF FREEDOM 16
MEAN SQUARE 377.922363

CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE

0.13233	0.23671	0.77937

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS

CONSTANT (MEAN OF Y)	COMPONENTS		
28.28823	1.95724	4.34059	39.32120

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

INDEX OF COMPONENTS ENTERING	RESIDUAL SUM OF SQUARES	F-VALUES REGRESSION MODEL	COMPONENT TO ENTER	R2	CONSTANT	VARIABLES 5 lgjfinfl
3	2373.87109	23.21	23.21	0.6074	-105.3260	-67.1911
2	2035.06226	13.80	2.33	0.6634	-145.5779	-65.7277
1	1929.17285	9.25	0.71	0.6810	-198.7393	-62.1199

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION (CONTINUED)

	7 lgmjinfl	10 lgndinfl
3	29.66326	56.78691
2	37.26490	52.66591
1	38.00673	55.62605

Model 2

Red Drum Harvest = −234.131 − 64.132*Ln(January-February Inflows)
+ 14.634*Ln(March-April Inflows) − 27.510*Ln(May-June Inflows)
+ 58.853*Ln(November-December Inflows)

Notes on the results. There is no evidence of serial autocorrelation from examining the Durbin-Watson results for this second model, either. The apparent contradiction between multicollinearity indicators exists here, as well, and for the same reasons. We can again calculate the effective condition index as 1.98478/0.14558 = 13.6336, much smaller than the apparent condition index of 105.190.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln(March-April Inflows), Ln(January-February Inflows), Ln(November-December Inflows), Ln(May-June Inflows)[c,d]	.	.851	.724	.632	11.7968	2.193

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(March-April Inflows), Ln(January-February Inflows), Ln(November-December Inflows), Ln(May-June Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4376.771	4	1094.193	7.863	.002[b]
	Residual	1669.987	12	139.166		
	Total	6046.758	16			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), Ln(March-April Inflows), Ln(January-February Inflows), Ln(November-December Inflows), Ln(May-June Inflows)

Coefficients[a]

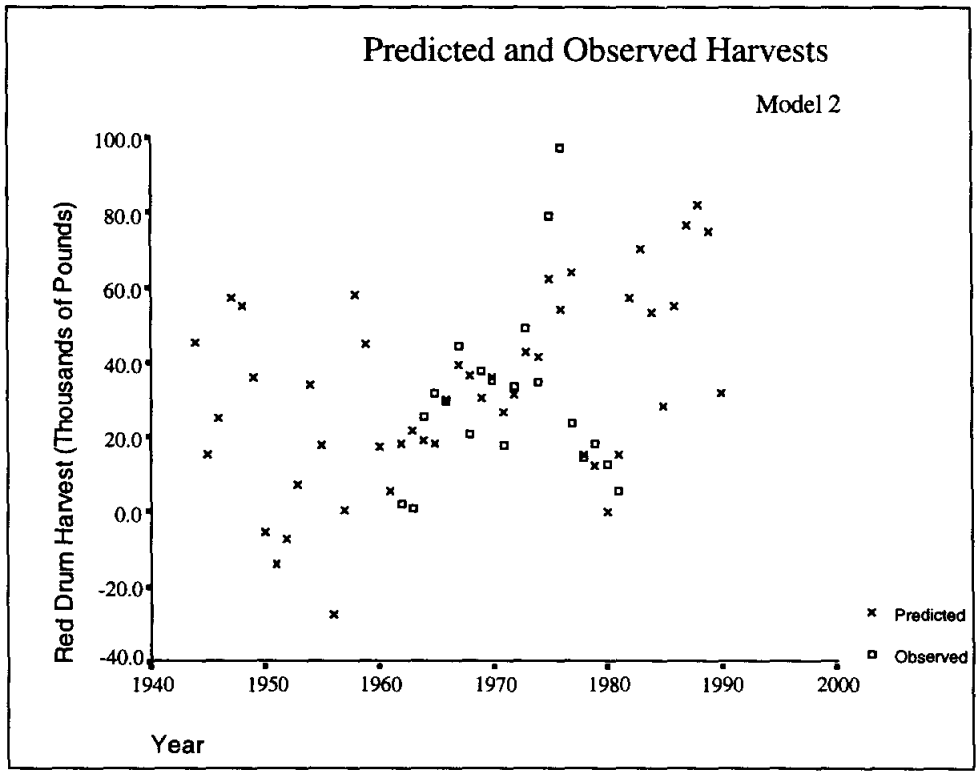
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-234.131	75.742		-3.091	.009	-399.160	-69.103		
	Ln(January-February Inflows)	-64.132	13.828	-1.301	-4.638	.001	-94.261	-34.003	.293	3.418
	Ln(May-June Inflows)	27.510	10.815	.728	2.544	.026	3.946	51.074	.281	3.558
	Ln(November-December Inflows)	58.853	12.094	1.318	4.866	.000	32.502	85.204	.314	3.188
	Ln(March-April Inflows)	14.634	10.723	.370	1.365	.197	-8.730	37.999	.313	3.194

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions				
				(Constant)	Ln(January-February Inflows)	Ln(May-June Inflows)	Ln(November-December Inflows)	Ln(March-April Inflows)
1	1	4.991	1.000	.00	.00	.00	.00	.00
	2	6.739E-03	27.214	.00	.01	.04	.07	.05
	3	1.385E-03	60.034	.69	.13	.07	.01	.00
	4	7.152E-04	83.532	.13	.00	.64	.04	.94
	5	4.510E-04	105.190	.18	.86	.25	.88	.00

a. Dependent Variable: Red Drum Harvest



BMDP4R - REGRESSION ON PRINCIPAL COMPONENTS AND RIDGE REGRESSION

COMPUTATION BASED ON CORRELATION MATRIX OF INDEPENDENT VARIABLES.
PRINCIPAL COMPONENTS ARE ENTERED IN ORDER OF
MAGNITUDE OF CORRELATIONS WITH DEPENDENT VARIABLE.

MAXIMUM NUMBER OF COMPONENTS TO ENTER 4
NUMBER OF COMPONENTS TO ENTER LIMITED BY
MAGNITUDE OF CORRELATION GREATER THAN 0.0100

NUMBER OF CASES READ. 17

CORRELATION MATRIX

		red_drum 2	lgjfinfl 5	lgmainfl 6	lgmjinfl 7	lgndinfl 10
red_drum	2	1.0000				
lgjfinfl	5	-0.0426	1.0000			
lgmainfl	6	0.3547	0.2287	1.0000		
lgmjinfl	7	0.3765	0.3406	0.8195	1.0000	
lgndinfl	10	0.1996	0.7023	-0.2384	-0.1605	1.0000

EIGENVALUES

1.98478 1.68418 0.18546 0.14558

CUMULATIVE PROPORTION OF TOTAL VARIANCE OF INDEPENDENT VARIABLES

0.49619 0.91724 0.96360 1.00000

EIGENVECTORS

	1	2	3	4
5 lgjfinfl	0.3878	-0.6106	0.3225	-0.6105
6 lgmainfl	0.6393	0.2322	-0.7056	-0.1989
7 lgmjinfl	0.6639	0.1483	0.4990	0.5369
10 lgndinfl	0.0136	-0.7425	-0.3862	0.5472

DEPENDENT VARIABLE 2 red_drum

TOTAL SUM OF SQUARES 6046.757810
DEGREES OF FREEDOM 16
MEAN SQUARE 377.922363

CORRELATION BETWEEN PRINCIPAL COMPONENTS AND DEPENDENT VARIABLE
0.32860 0.01230 -0.35595 0.69928

REGRESSION COEFFICIENTS OF PRINCIPAL COMPONENTS

CONSTANT (MEAN OF Y)	COMPONENTS			
28.28823	4.53435	0.18431	-16.06832	35.62813

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION

INDEX OF COMPONENTS ENTERING	RESIDUAL SUM OF SQUARES	F-VALUES REGRESSION MODEL	COMPONENT TO ENTER	R2	CONSTANT	VARIABLES 5 lgjfinfl
4	3089.95923	14.35	14.35	0.4890	-60.5444	-55.1632
3	2323.82373	11.21	4.62	0.6157	-114.8519	-68.3055
1	1670.90088	11.35	5.08	0.7237	-237.3963	-63.8461
2	1669.98547	7.86	0.01	0.7238	-234.1312	-64.1315

COEFFICIENTS OF VARIABLES OBTAINED FROM PRINCIPAL COMPONENTS REGRESSION
(CONTINUED)

	6 lgmainfl	7 lgmjinfl	10 lgndinfl
4	-14.41642	37.19105	44.77312
3	8.64986	21.60399	59.02561
1	14.54716	27.45659	59.16724
2	14.63422	27.50974	58.85297

Exploring the Data

Listing of Data

YEAR	RED_DRUM	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL	ND_INFL
1962	2.60	2915.47	963.27	1615.30	1059.68	1469.86	2205.60
1963	1.30	2336.83	815.63	1270.07	724.21	1432.16	2208.27
1964	25.70	894.15	689.43	759.57	316.70	1089.76	1105.07
1965	32.20	1140.22	818.07	1192.23	220.39	564.65	1030.93
1966	29.80	1481.65	1358.37	2727.63	560.03	325.37	987.87
1967	45.00	1283.51	1199.18	2828.73	616.20	459.59	1007.86
1968	21.20	1504.38	1932.88	4136.47	844.60	435.08	848.36
1969	38.10	1349.94	2640.94	3676.87	600.78	533.83	706.48
1970	35.30	1514.87	3337.73	3968.77	607.07	489.11	828.41
1971	18.10	849.90	2360.83	1973.78	446.99	859.88	615.13
1972	33.60	976.26	1232.03	1288.20	431.40	923.73	1077.87
1973	49.60	1455.68	2134.83	2664.22	829.55	980.35	1232.31
1974	34.90	2524.91	2348.44	3077.98	868.72	1845.28	1908.59
1975	79.50	2890.51	2857.40	3726.31	1138.54	2253.25	2897.57
1976	97.50	2260.46	1321.18	2439.21	925.46	2254.37	2659.43
1977	24.20	1819.08	2075.70	2395.03	874.23	1085.72	2562.96
1978	14.90	1479.44	1530.34	1315.67	587.24	585.86	1162.82
1979	18.70	2336.64	2853.94	1997.58	1274.52	535.72	1259.39
1980	13.10	2491.90	2356.53	2213.29	1264.55	1229.99	1006.62
1981	6.00	1895.84	2285.70	3516.54	1686.25	1407.21	767.72

RED_DRUM	Red drum harvest (thousands of pounds)
JF_INFL	Lagged January-February inflows (thousands of acre-feet)
MA_INFL	Lagged March-April inflows (thousands of acre-feet)
MJ_INFL	Lagged May-June inflows (thousands of acre-feet)
JA_INFL	Lagged July-August inflows (thousands of acre-feet)
SO_INFL	Lagged September-October inflows (thousands of acre-feet)
ND_INFL	Lagged November-December inflows (thousands of acre-feet)

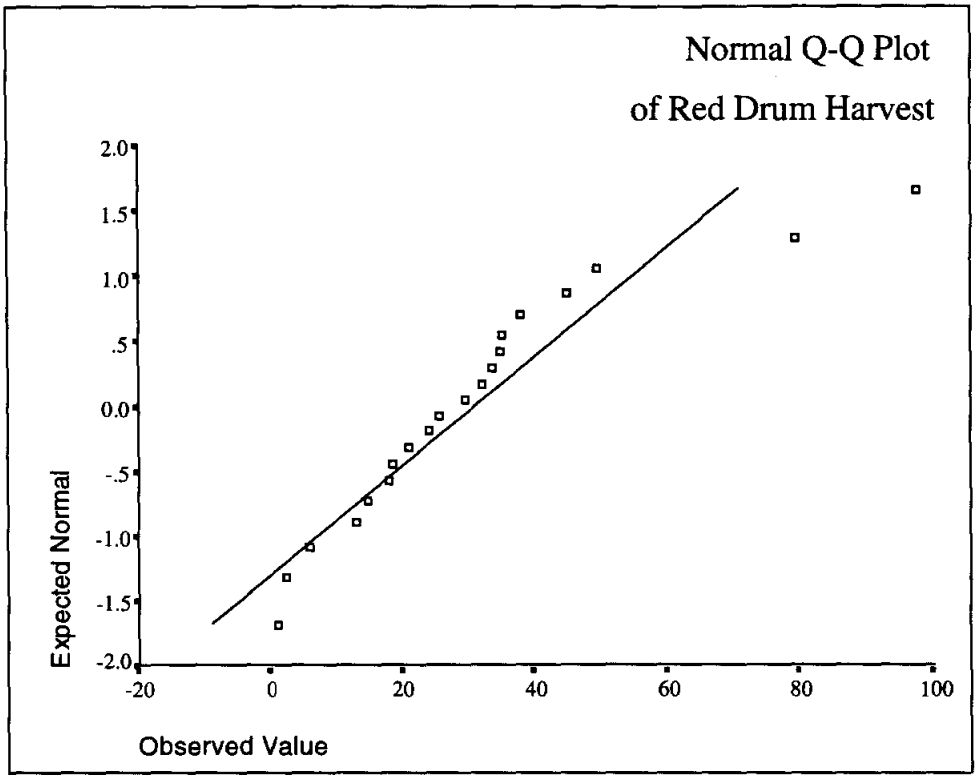
Examination of Individual Variables

Descriptives

			Statistic	Std. Error
Red Drum Harvest	Mean		*31.0650*	*5.3290*
	95% Confidence Interval for Mean	Lower Bound	*19.9112*	
		Upper Bound	*42.2188*	
	5% Trimmed Mean		*29.0278*	
	Median		*27.7500*	
	Variance		*567.972*	
	Std. Deviation		*23.8322*	
	Minimum		*1.30*	
	Maximum		*97.50*	
	Range		*96.20*	
	Interquartile Range		*21.7000*	
	Skewness		*1.450*	*.512*
	Kurtosis		*2.555*	*.992*

Extreme Values

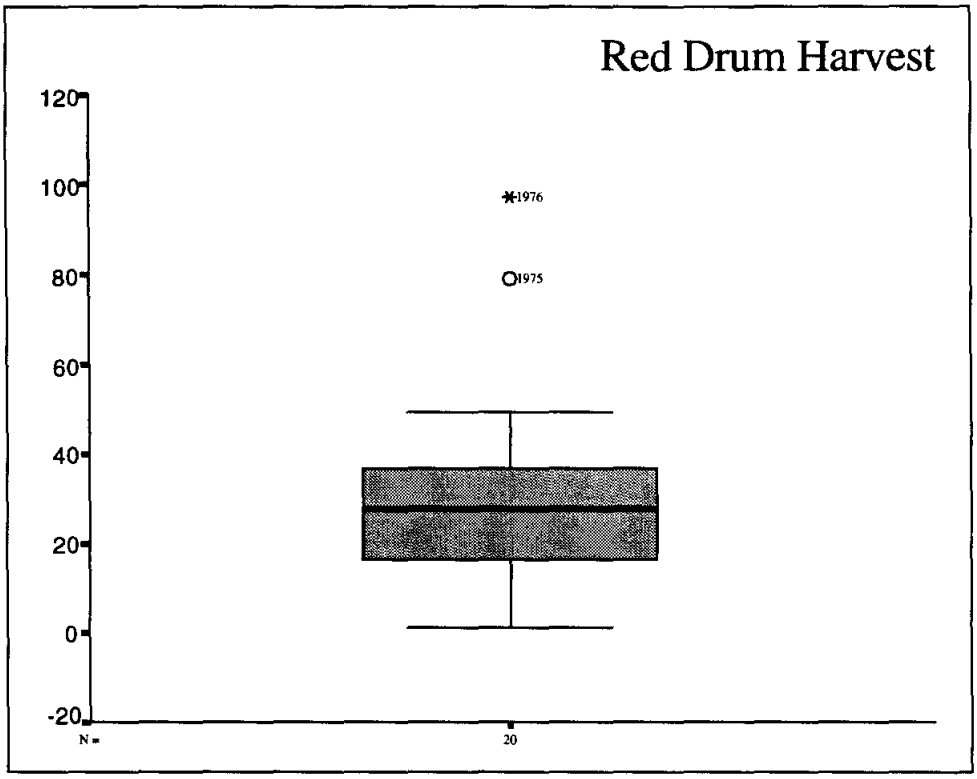
			Case Number	Year	Value
Red Drum Harvest	Highest	1	*15*	*1976*	*97.50*
		2	*14*	*1975*	*79.50*
		3	*12*	*1973*	*49.60*
		4	*6*	*1967*	*45.00*
		5	*8*	*1969*	*38.10*
	Lowest	1	*2*	*1963*	*1.30*
		2	*1*	*1962*	*2.60*
		3	*20*	*1981*	*6.00*
		4	*19*	*1980*	*13.10*
		5	*17*	*1978*	*14.90*

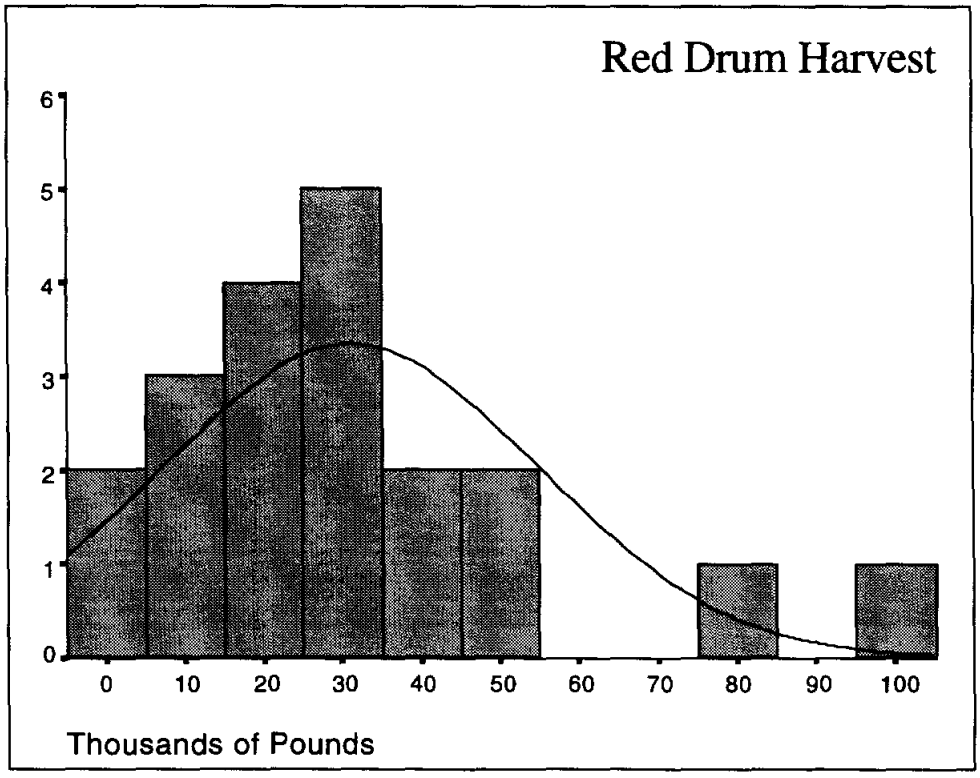


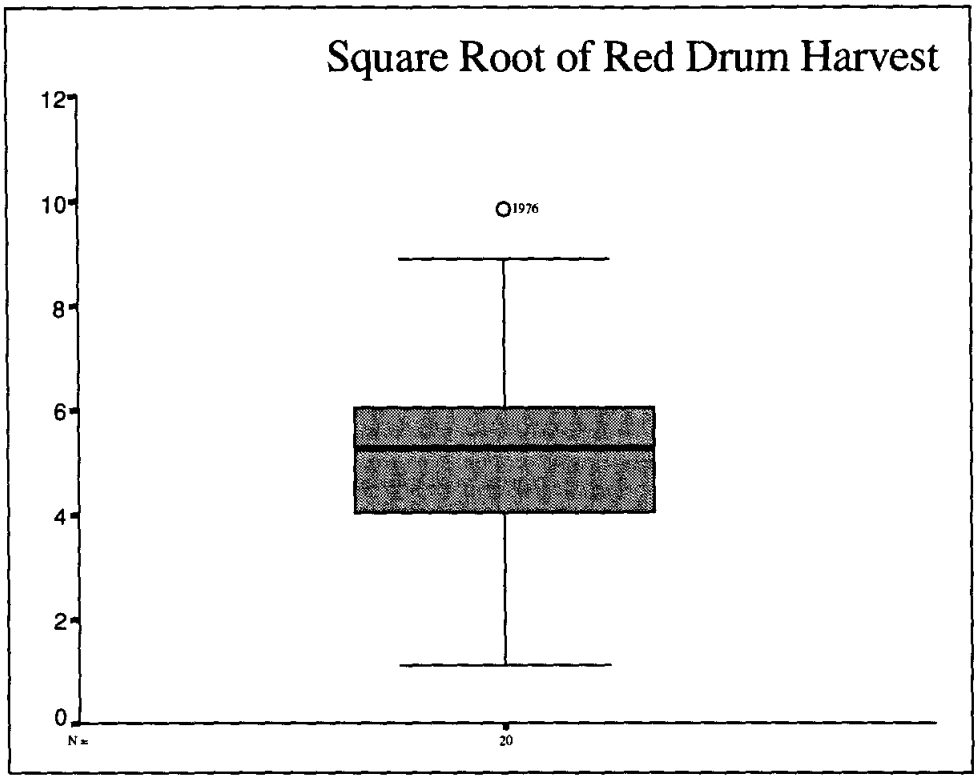
Tests of Normality

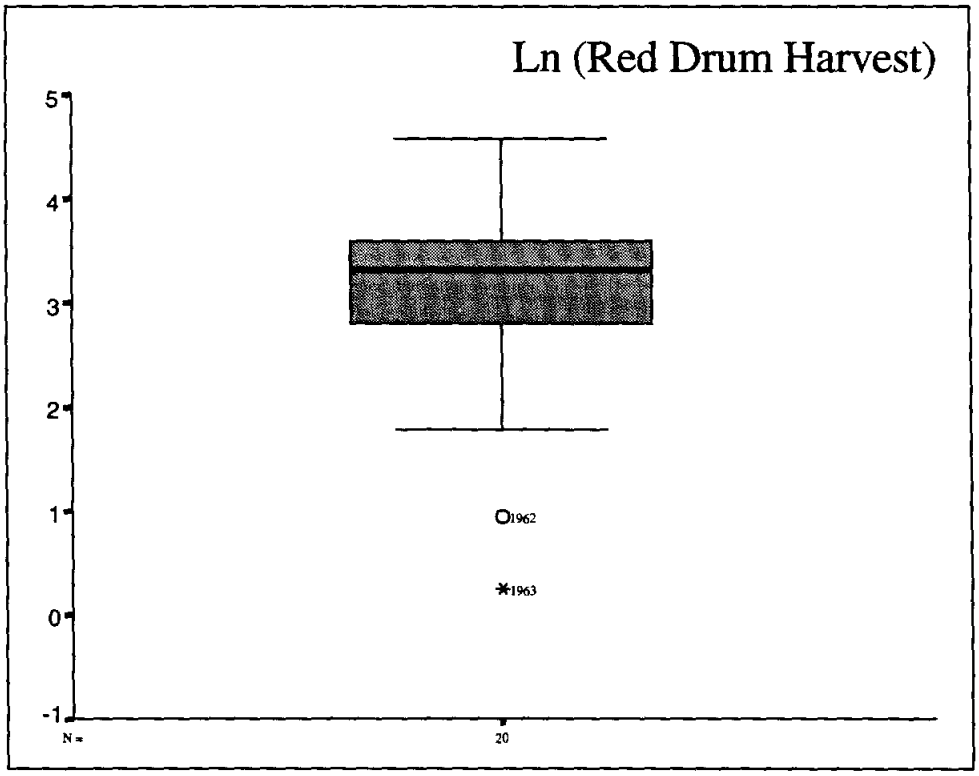
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Red Drum Harvest	*.184*	*20*	*.075*	*.875*	*20*	*.014*

a. Lilliefors Significance Correction


Red Drum Harvest
120
100
80
60
40
20
0
-20
1976
1975
N =
20


Red Drum Harvest
6
5
4
3
2
1
0
0
10
20
30
40
50
60
70
80
90
100
Thousands of Pounds


Square Root of Red Drum Harvest
12
10
8
6
4
2
0
1976
N =
20

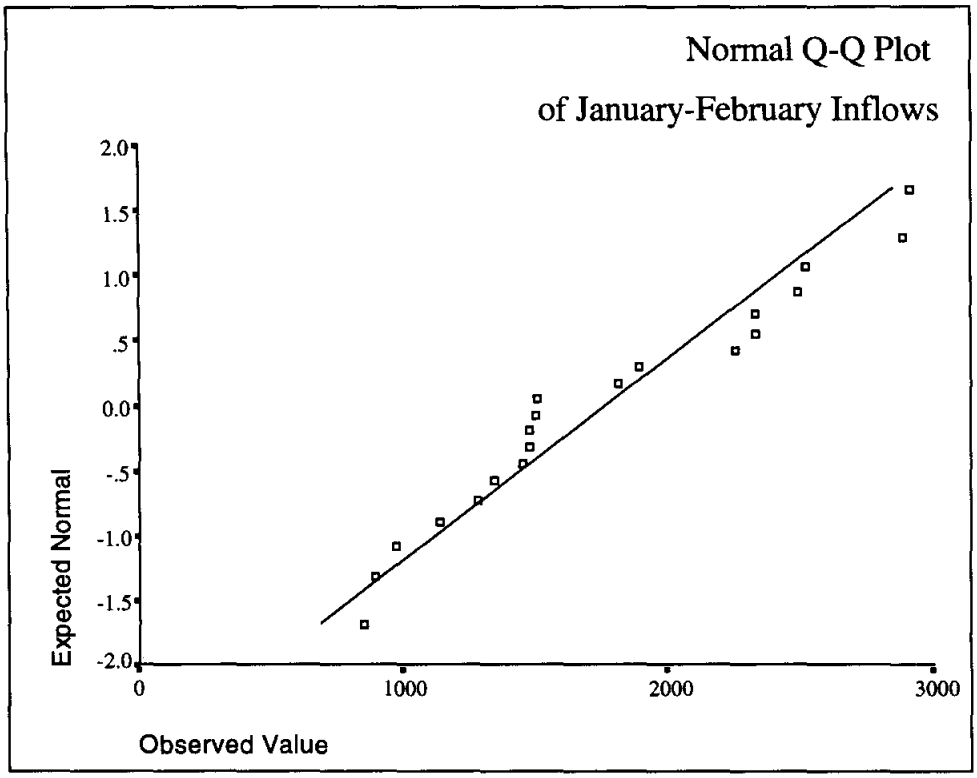

Ln (Red Drum Harvest)
5
4
3
2
1
0
-1
1962
1963
N =
20

Descriptives

			Statistic	Std. Error
January-February Inflows	Mean		*1770.0820*	*145.2342*
	95% Confidence Interval for Mean	Lower Bound	*1466.1034*	
		Upper Bound	*2074.0606*	
	5% Trimmed Mean		*1757.5706*	
	Median		*1509.6250*	
	Variance		*421859.203*	
	Std. Deviation		*649.5069*	
	Minimum		*849.90*	
	Maximum		*2915.47*	
	Range		*2065.57*	
	Interquartile Range		*1036.6650*	
	Skewness		*.361*	*.512*
	Kurtosis		*-1.048*	*.992*

Extreme Values

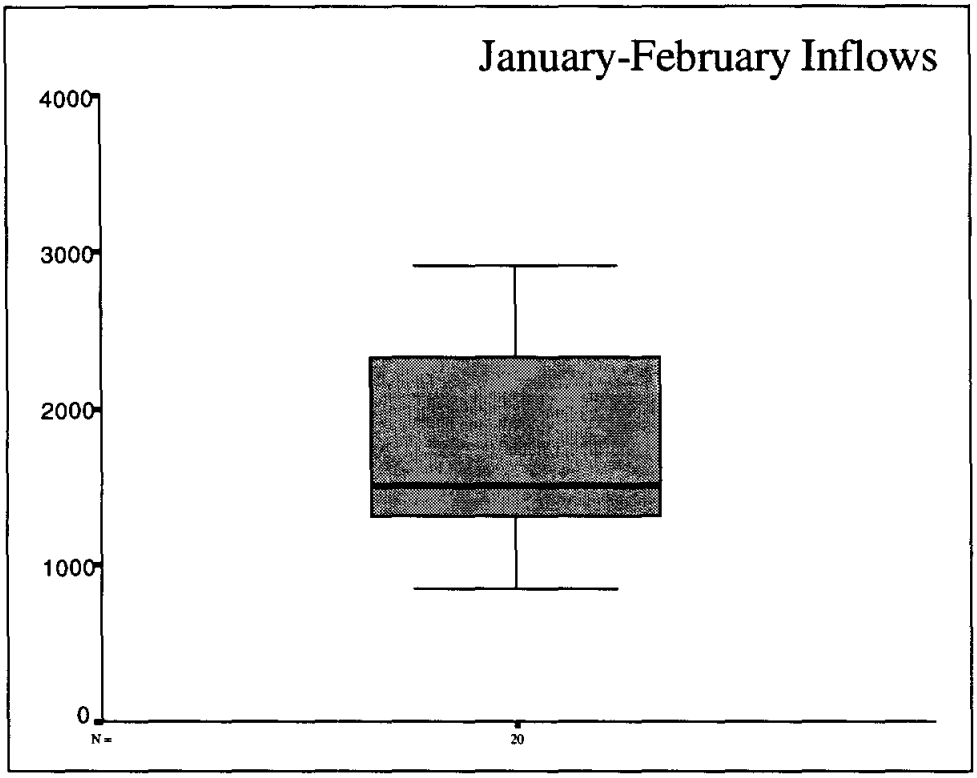
			Case Number	Year	Value
January-February Inflows	Highest	1	*1*	*1962*	*2915.47*
		2	*14*	*1975*	*2890.51*
		3	*13*	*1974*	*2524.91*
		4	*19*	*1980*	*2491.90*
		5	*2*	*1963*	*2336.83*
	Lowest	1	*10*	*1971*	*849.90*
		2	*3*	*1964*	*894.15*
		3	*11*	*1972*	*976.26*
		4	*4*	*1965*	*1140.22*
		5	*6*	*1967*	*1283.51*

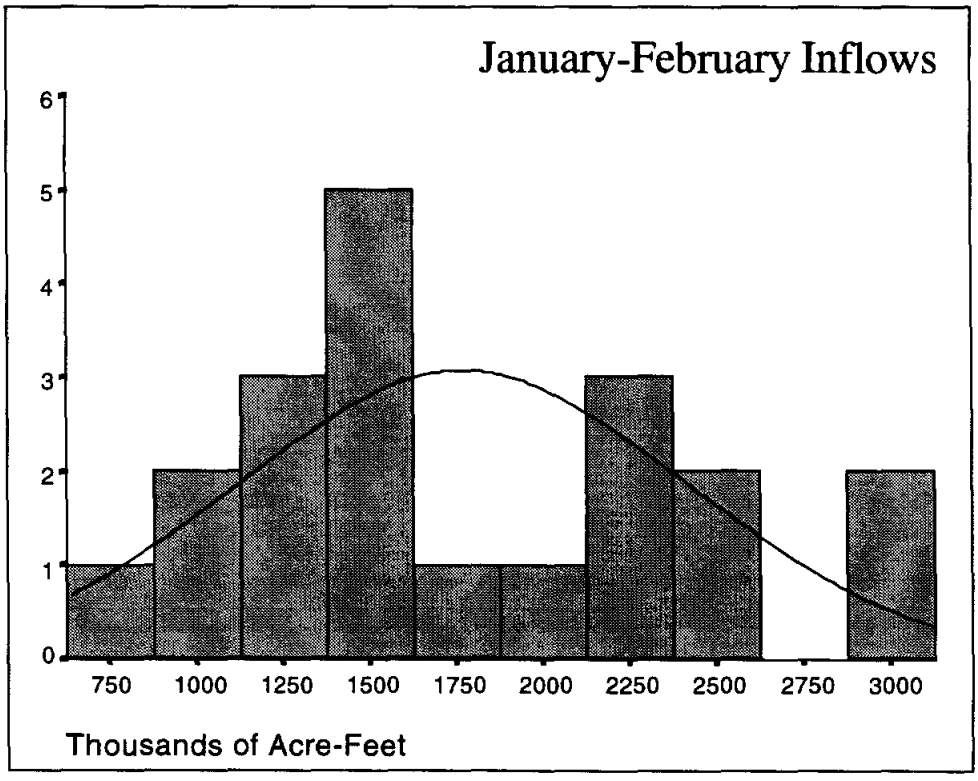


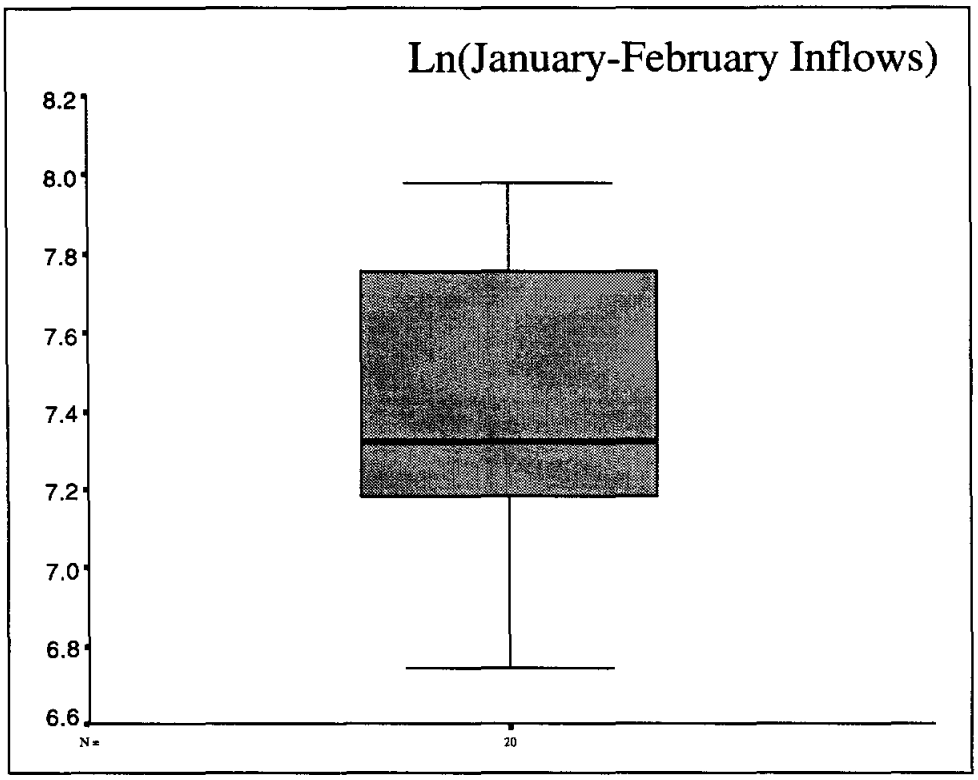
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
January-February Inflows	*.203*	*20*	*.030*	*.930*	*20*	*.205*

a. Lilliefors Significance Correction


January-February Inflows
4000
3000
2000
1000
0
N =
20


January-February Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet

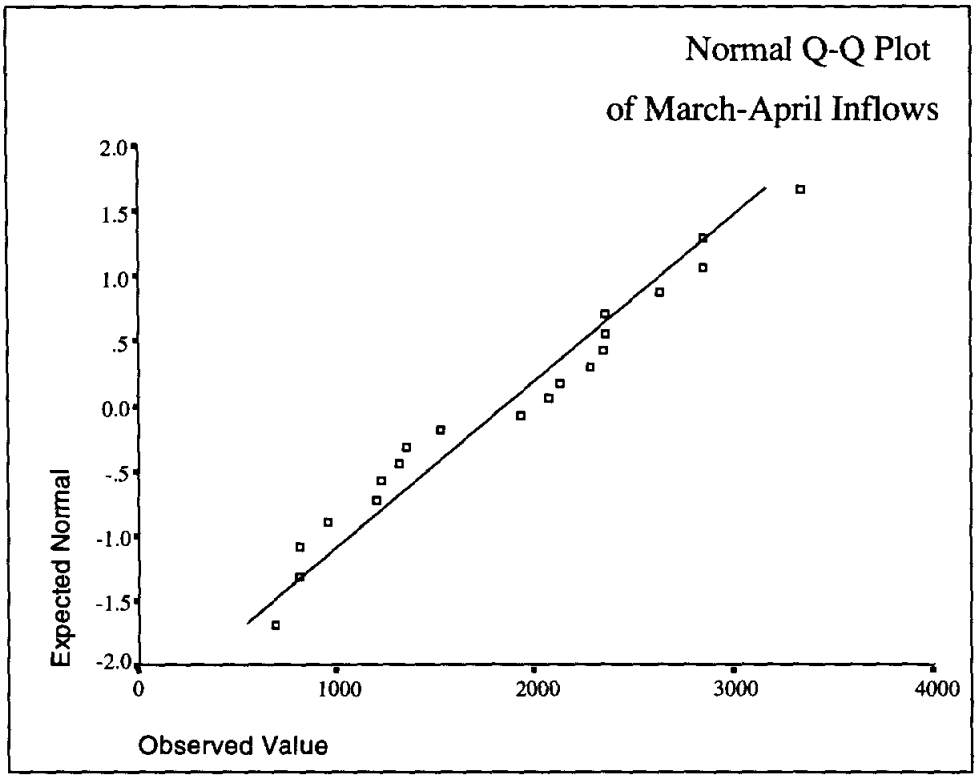

Ln(January-February Inflows)
8.2
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
N =
20

Descriptives

			Statistic	Std. Error
March-April Inflows	Mean		*1855.6210*	*175.1148*
	95% Confidence Interval for Mean	Lower Bound	*1489.1014*	
		Upper Bound	*2222.1406*	
	5% Trimmed Mean		*1838.0700*	
	Median		*2004.2900*	
	Variance		*613304.209*	
	Std. Deviation		*783.1374*	
	Minimum		*689.43*	
	Maximum		*3337.73*	
	Range		*2648.30*	
	Interquartile Range		*1152.3625*	
	Skewness		*.104*	*.512*
	Kurtosis		*-1.093*	*.992*

Extreme Values

			Case Number	Year	Value
March-April Inflows	Highest	1	*9*	*1970*	*3337.73*
		2	*14*	*1975*	*2857.40*
		3	*18*	*1979*	*2853.94*
		4	*8*	*1969*	*2640.94*
		5	*10*	*1971*	*2360.83*
	Lowest	1	*3*	*1964*	*689.43*
		2	*2*	*1963*	*815.63*
		3	*4*	*1965*	*818.07*
		4	*1*	*1962*	*963.27*
		5	*6*	*1967*	*1199.18*

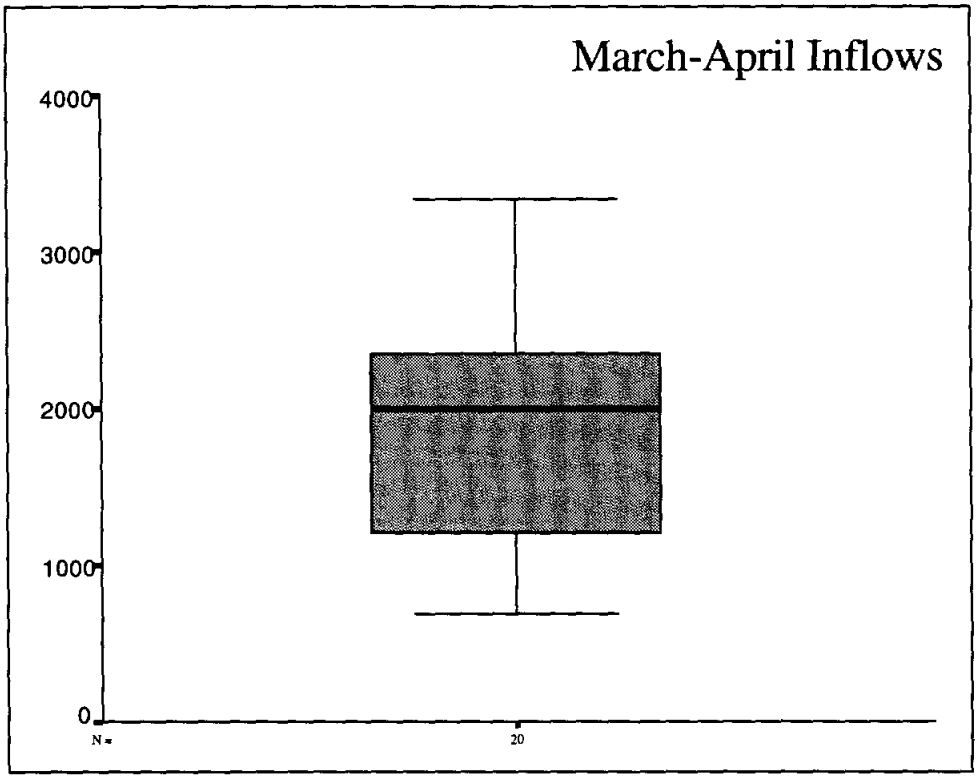


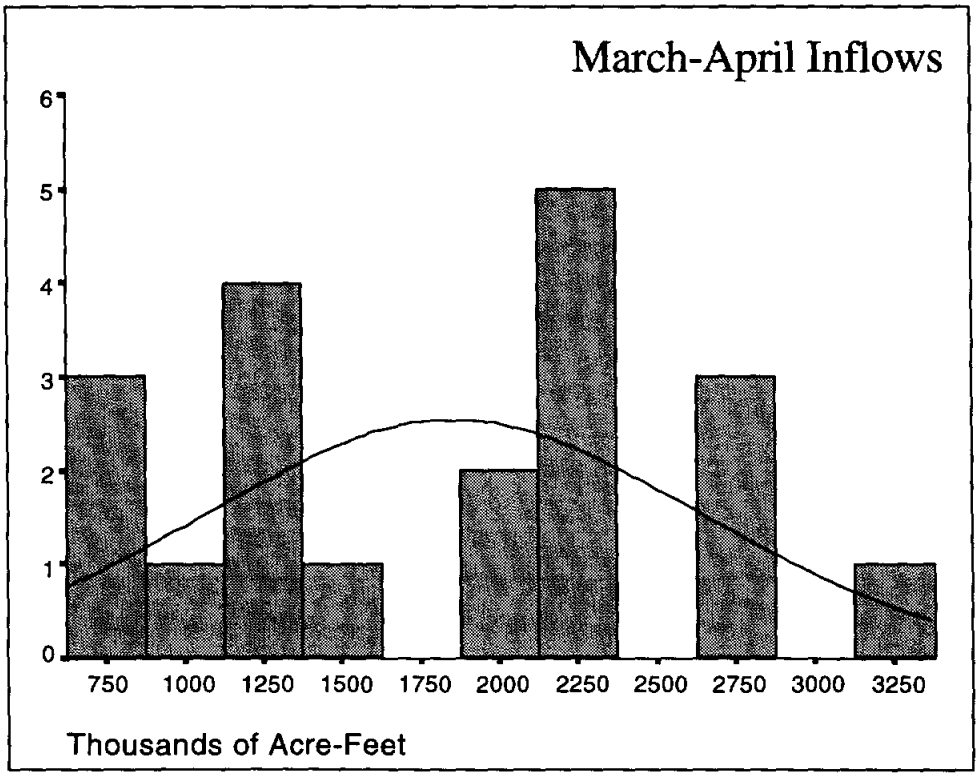
Tests of Normality

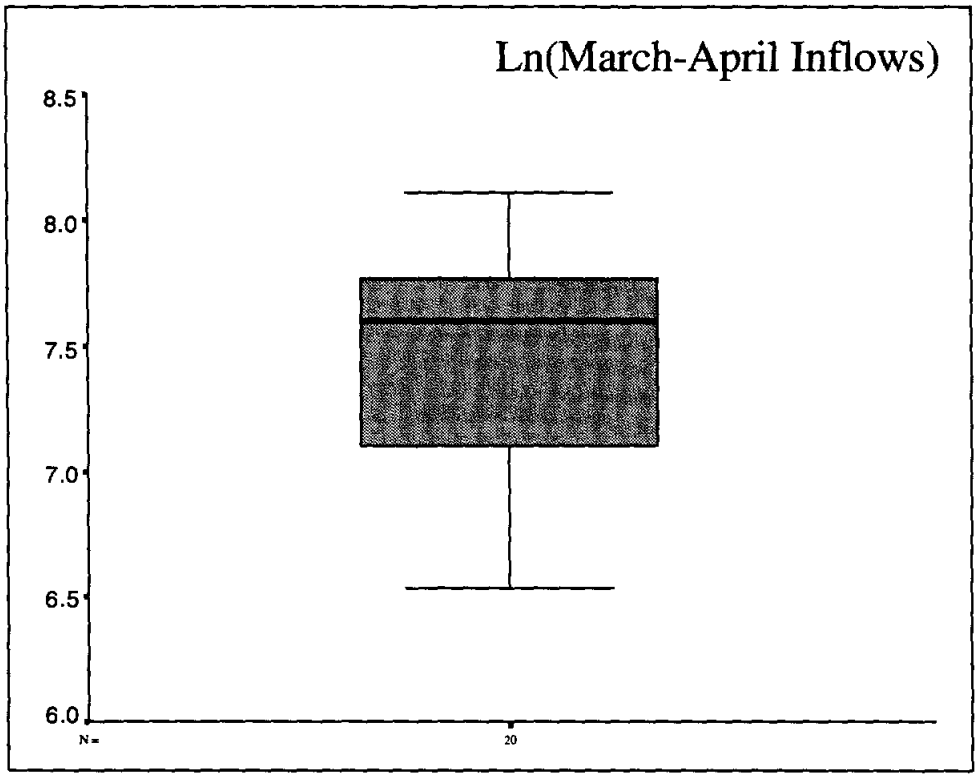
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
March-April Inflows	*.137*	*20*	*.200**	*.948*	*20*	*.387*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


March-April Inflows
4000
3000
2000
1000
0
N =
20


March-April Inflows
6
5
4
3
2
1
0
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
3250
Thousands of Acre-Feet

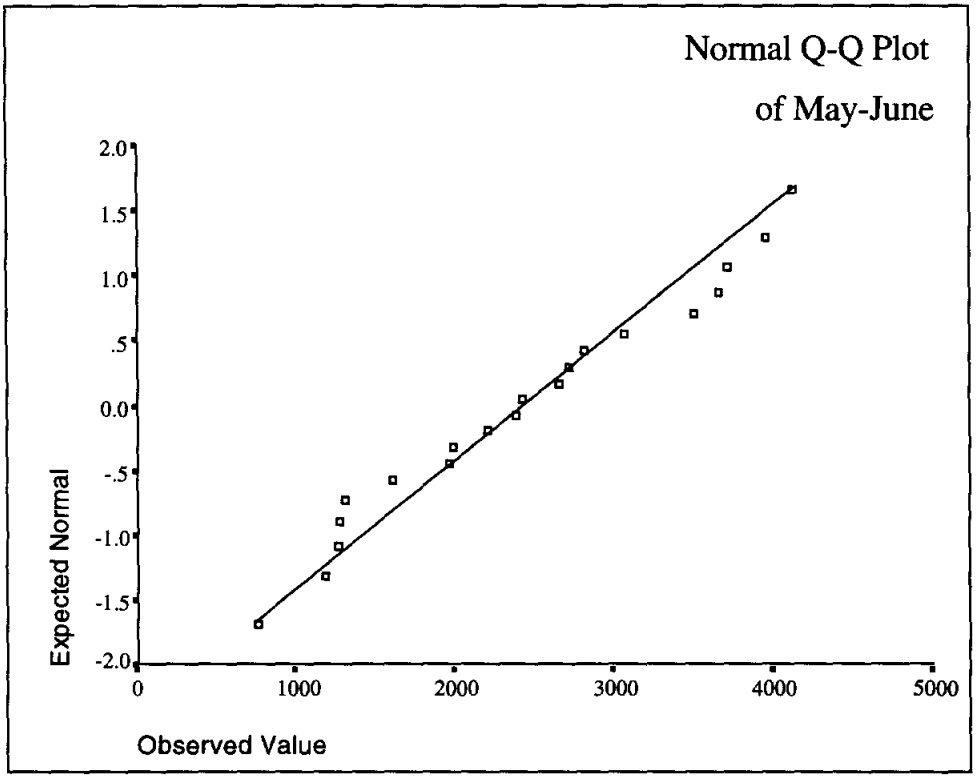

Ln(March-April Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N =
20

Descriptives

			Statistic	Std. Error
May-June Inflows	Mean		*2439.1725*	*227.8998*
	95% Confidence Interval for Mean	Lower Bound	*1962.1727*	
		Upper Bound	*2916.1723*	
	5% Trimmed Mean		*2438.1894*	
	Median		*2417.1200*	
	Variance		*1038766.743*	
	Std. Deviation		*1019.1991*	
	Minimum		*759.57*	
	Maximum		*4136.47*	
	Range		*3376.90*	
	Interquartile Range		*2016.3225*	
	Skewness		*.117*	*.512*
	Kurtosis		*-1.092*	*.992*

Extreme Values

			Case Number	Year	Value
May-June Inflows	Highest	1	*7*	*1968*	*4136.47*
		2	*9*	*1970*	*3968.77*
		3	*14*	*1975*	*3726.31*
		4	*8*	*1969*	*3676.87*
		5	*20*	*1981*	*3516.54*
	Lowest	1	*3*	*1964*	*759.57*
		2	*4*	*1965*	*1192.23*
		3	*2*	*1963*	*1270.07*
		4	*11*	*1972*	*1288.20*
		5	*17*	*1978*	*1315.67*

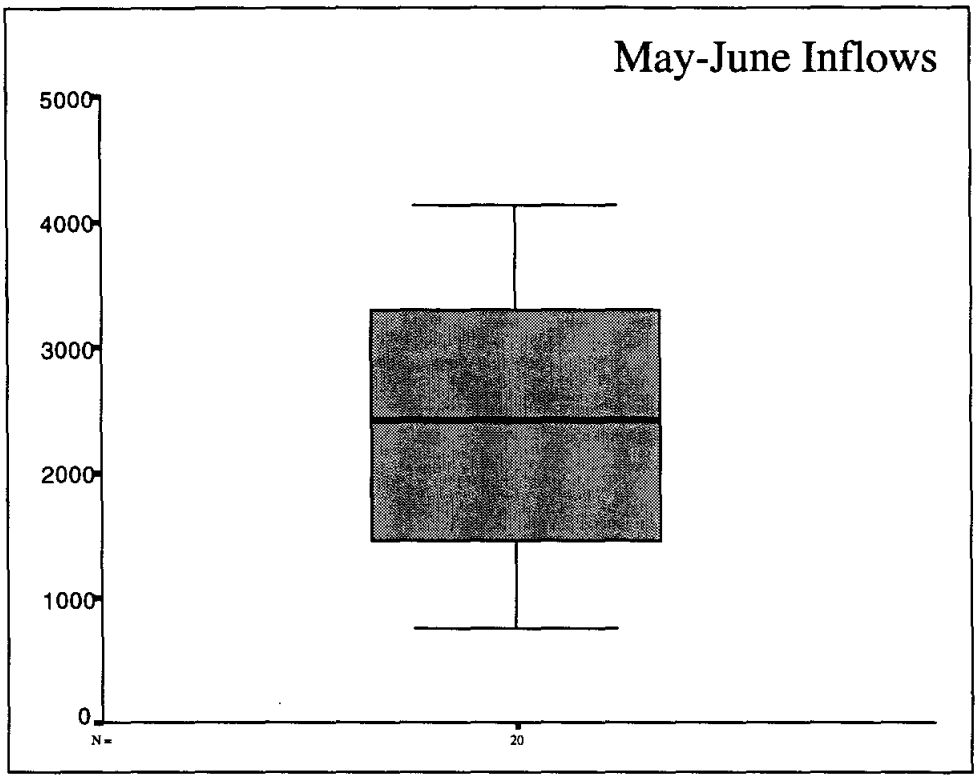


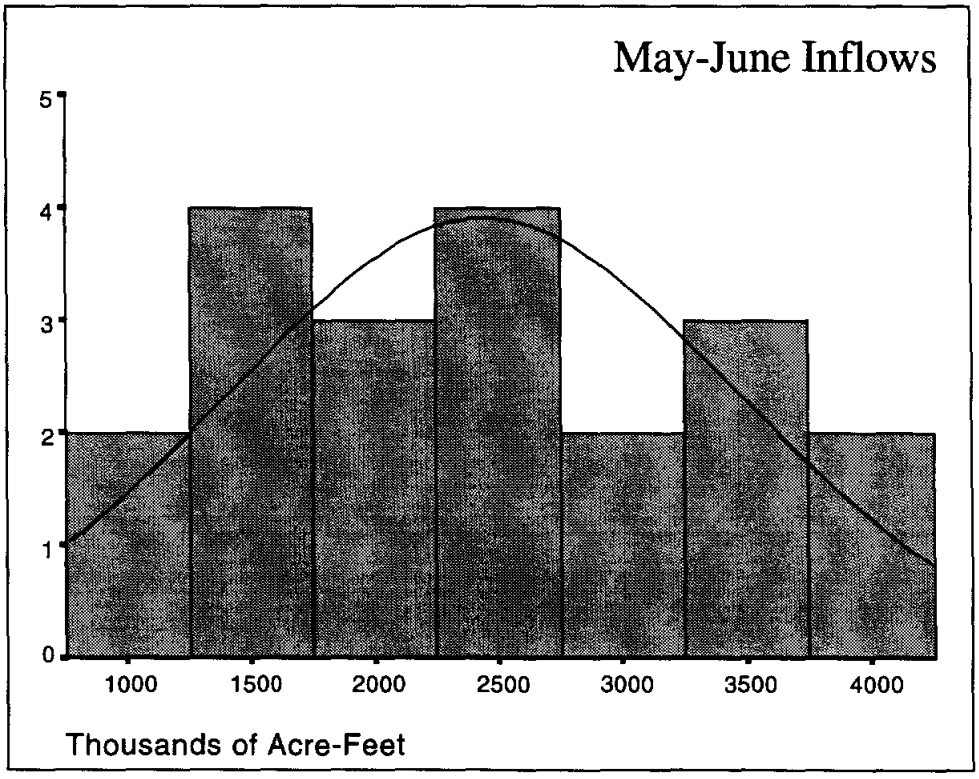
Tests of Normality

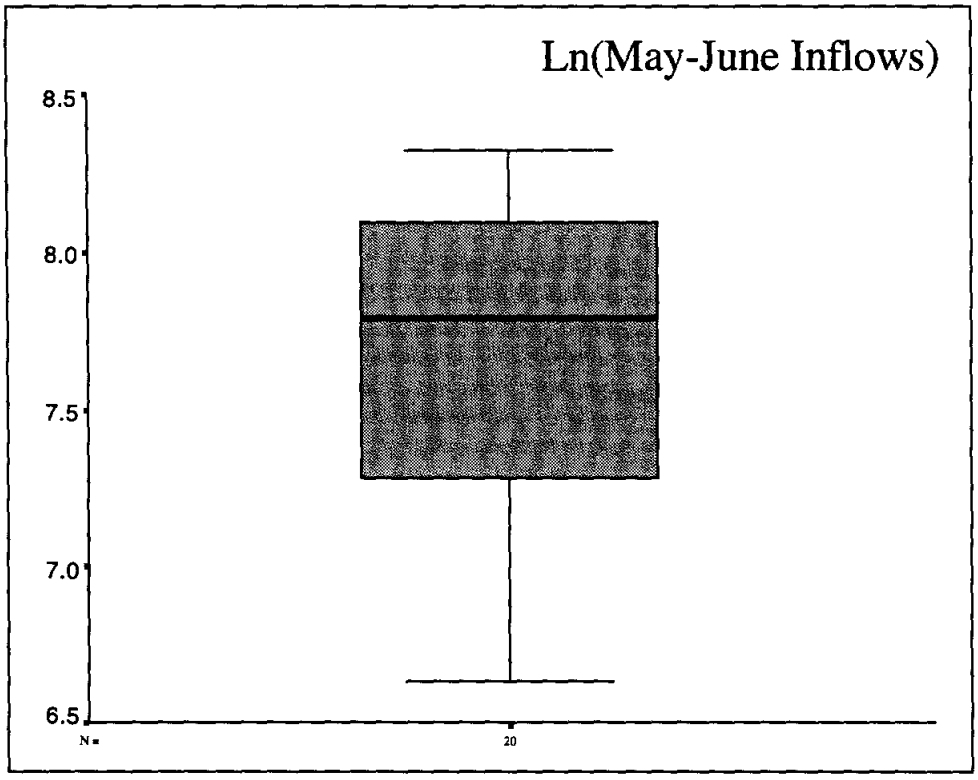
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
May-June Inflows	.115	20	.200*	.955	20	.455

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


May-June Inflows
5000
4000
3000
2000
1000
0
N =
20


May-June Inflows
5
4
3
2
1
0
1000
1500
2000
2500
3000
3500
4000
Thousands of Acre-Feet

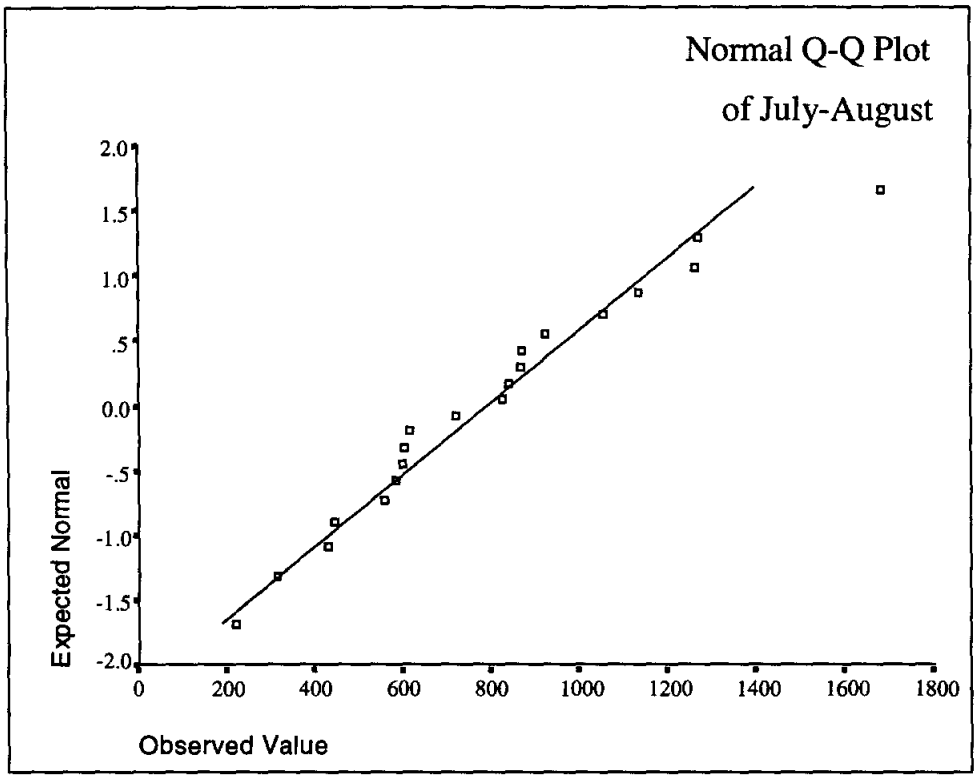

Ln(May-June Inflows)
8.5
8.0
7.5
7.0
6.5
N =
20

Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		*793.8555*	*80.8806*
	95% Confidence Interval for Mean	Lower Bound	*624.5704*	
		Upper Bound	*963.1406*	
	5% Trimmed Mean		*776.1372*	
	Median		*776.8800*	
	Variance		*130833.488*	
	Std. Deviation		*361.7091*	
	Minimum		*220.39*	
	Maximum		*1686.25*	
	Range		*1465.86*	
	Interquartile Range		*459.2925*	
	Skewness		*.694*	*.512*
	Kurtosis		*.497*	*.992*

Extreme Values

			Case Number	Year	Value
July-August Inflows	Highest	1	*20*	*1981*	*1686.25*
		2	*18*	*1979*	*1274.52*
		3	*19*	*1980*	*1264.55*
		4	*14*	*1975*	*1138.54*
		5	*1*	*1962*	*1059.68*
	Lowest	1	*4*	*1965*	*220.39*
		2	*3*	*1964*	*316.70*
		3	*11*	*1972*	*431.40*
		4	*10*	*1971*	*446.99*
		5	*5*	*1966*	*560.03*

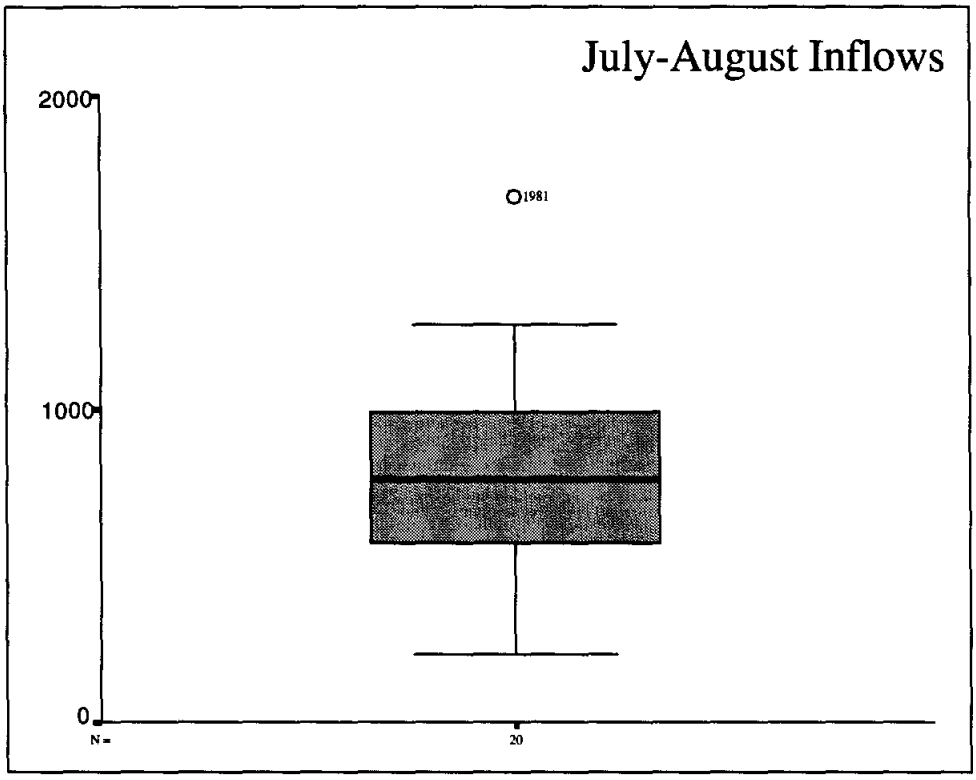


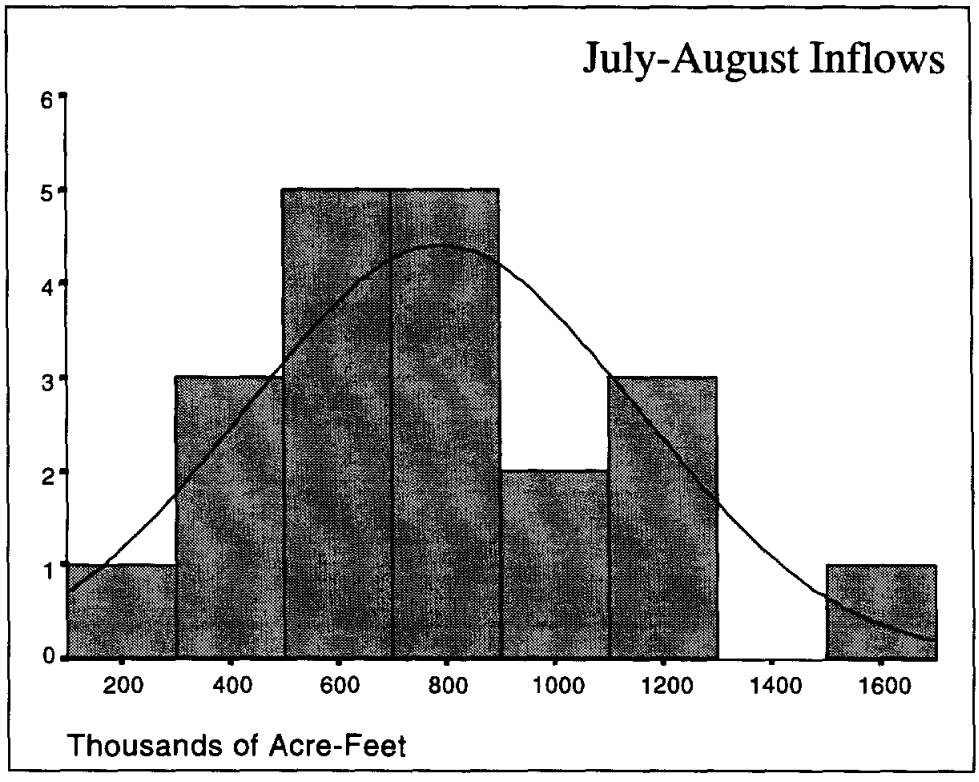
Tests of Normality

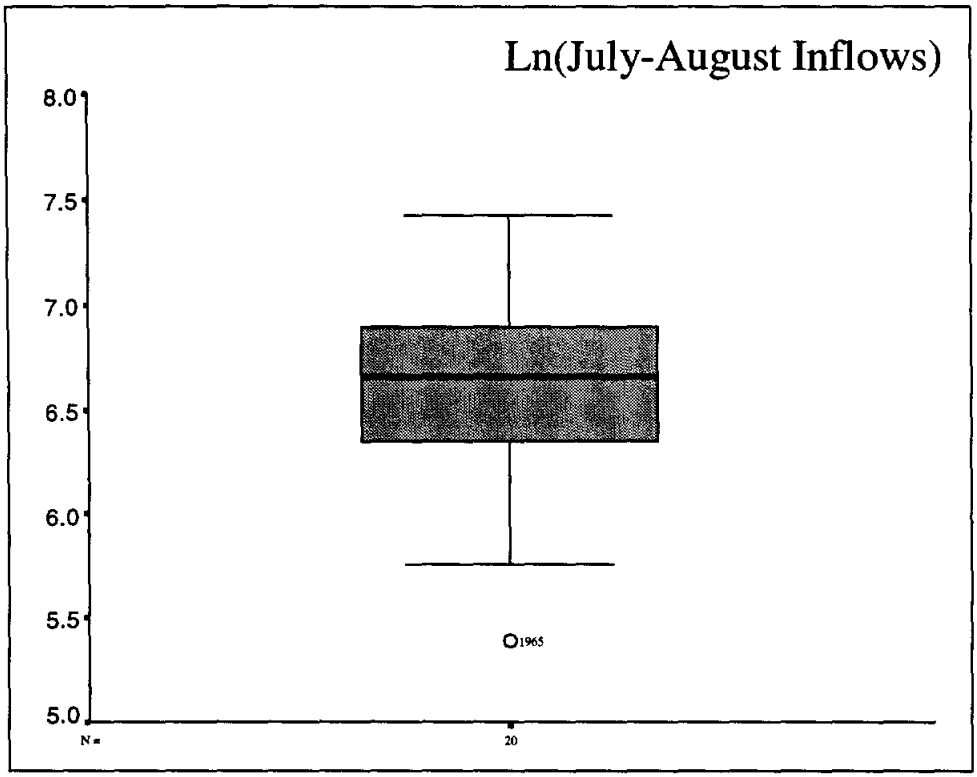
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
July-August Inflows	*.138*	*20*	*.200**	*.962*	*20*	*.555*

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


July-August Inflows
2000
1000
0
1981
N =
20


July-August Inflows
6
5
4
3
2
1
0
200
400
600
800
1000
1200
1400
1600
Thousands of Acre-Feet

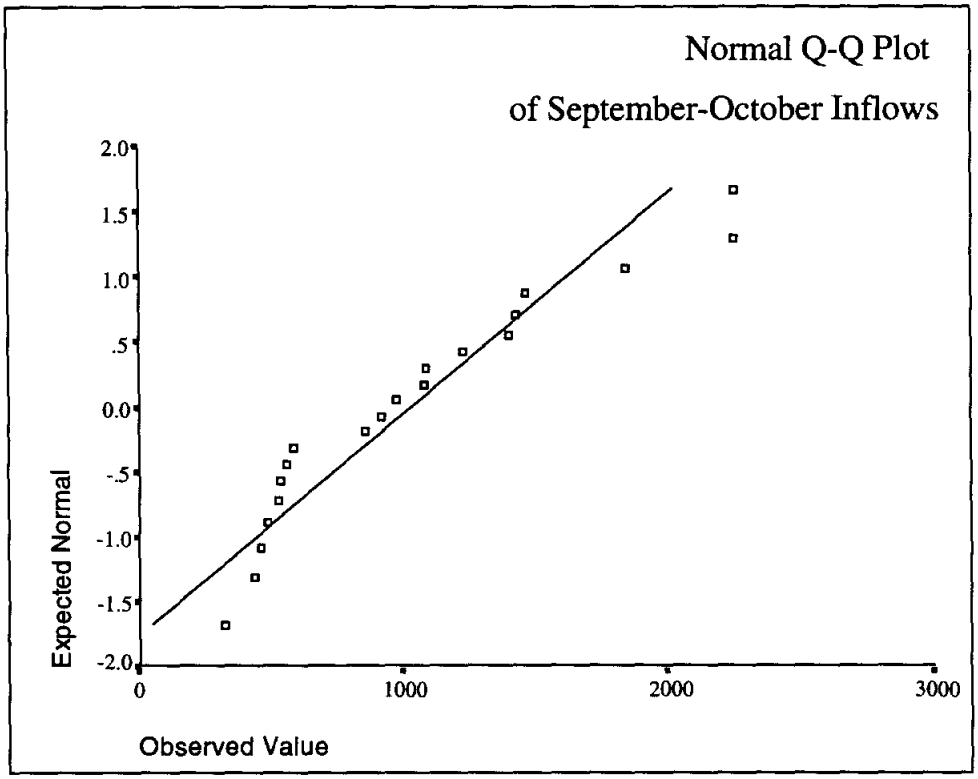

Ln(July-August Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
5.0
1965
N =
20

Descriptives

			Statistic	Std. Error
September-October Inflows	Mean		*1038.0385*	*131.9724*
	95% Confidence Interval for Mean	Lower Bound	*761.8171*	
		Upper Bound	*1314.2599*	
	5% Trimmed Mean		*1010.0572*	
	Median		*952.0400*	
	Variance		*348334.255*	
	Std. Deviation		*590.1985*	
	Minimum		*325.37*	
	Maximum		*2254.37*	
	Range		*1929.00*	
	Interquartile Range		*891.6200*	
	Skewness		*.830*	*.512*
	Kurtosis		*-.153*	*.992*

Extreme Values

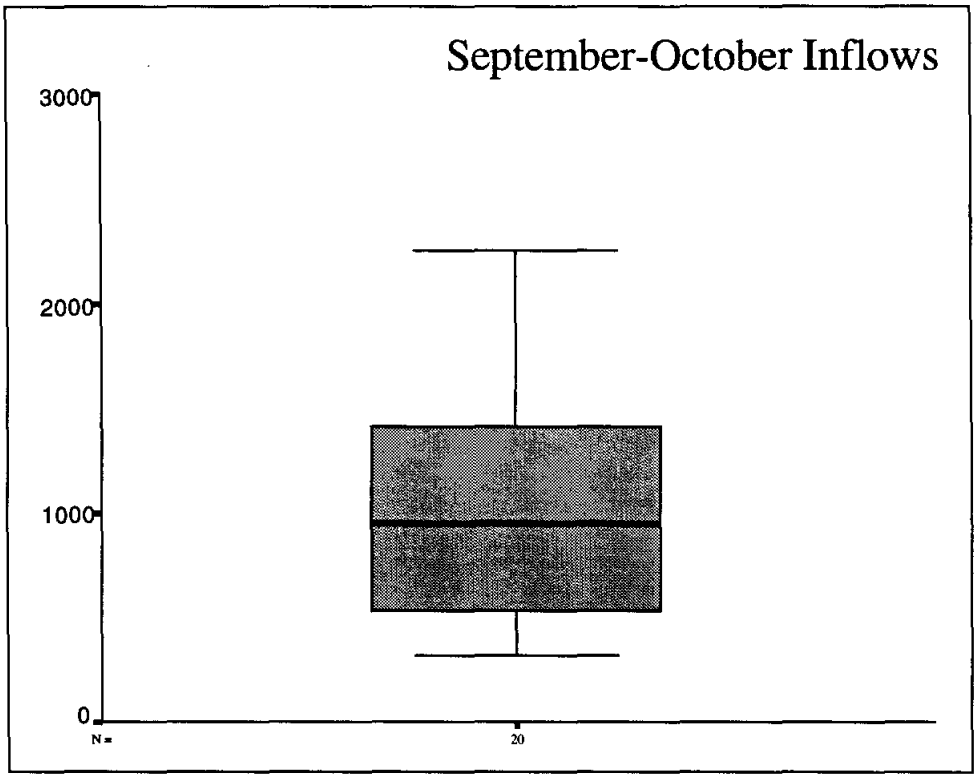
			Case Number	Year	Value
September-October Inflows	Highest	1	*15*	*1976*	*2254.37*
		2	*14*	*1975*	*2253.25*
		3	*13*	*1974*	*1845.28*
		4	*1*	*1962*	*1469.86*
		5	*2*	*1963*	*1432.16*
	Lowest	1	*5*	*1966*	*325.37*
		2	*7*	*1968*	*435.08*
		3	*6*	*1967*	*459.59*
		4	*9*	*1970*	*489.11*
		5	*8*	*1969*	*533.83*

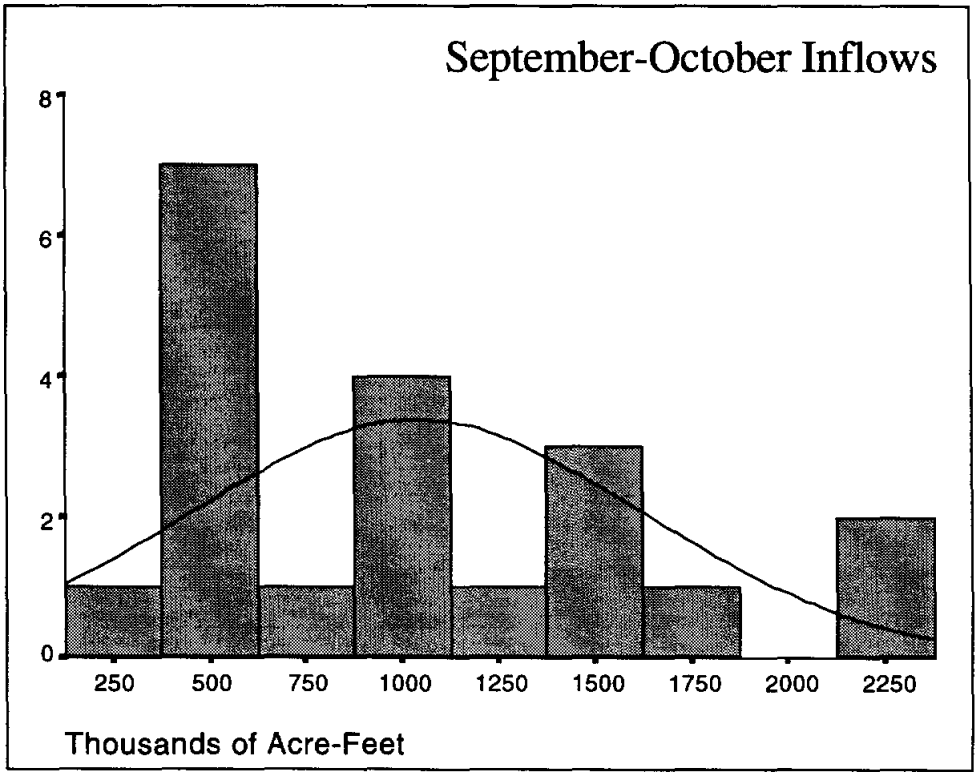


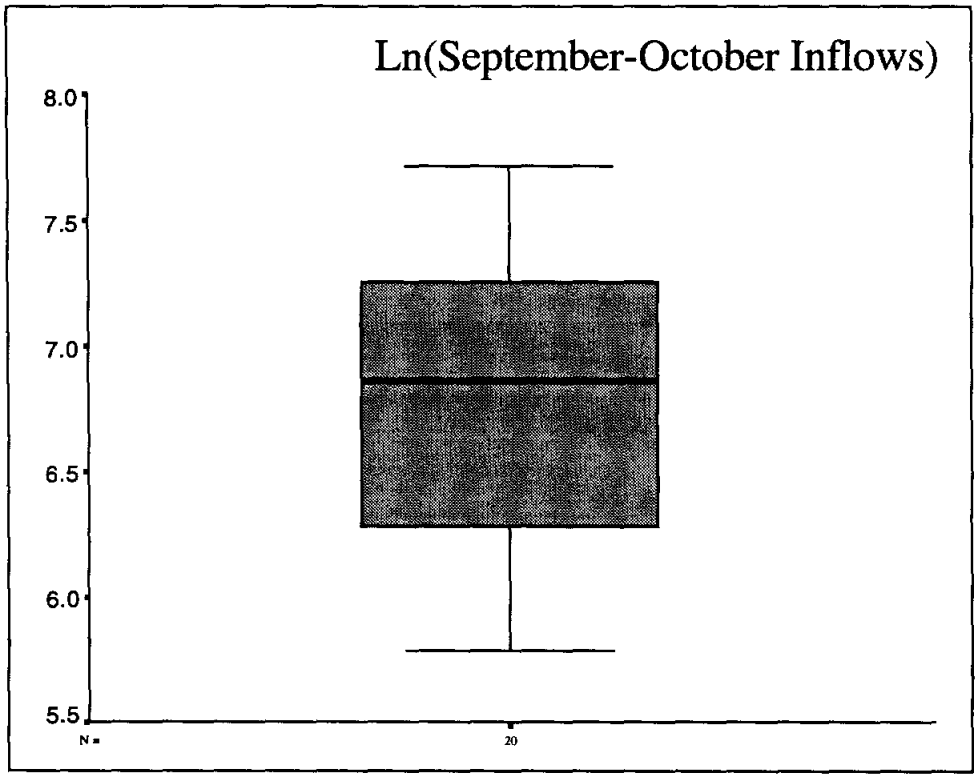
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
September-October Inflows	*.178*	*20*	*.096*	*.897*	*20*	*.039*

a. Lilliefors Significance Correction


September-October Inflows
3000
2000
1000
0
N =
20


September-October Inflows
8
6
4
2
0
250
500
750
1000
1250
1500
1750
2000
2250
Thousands of Acre-Feet

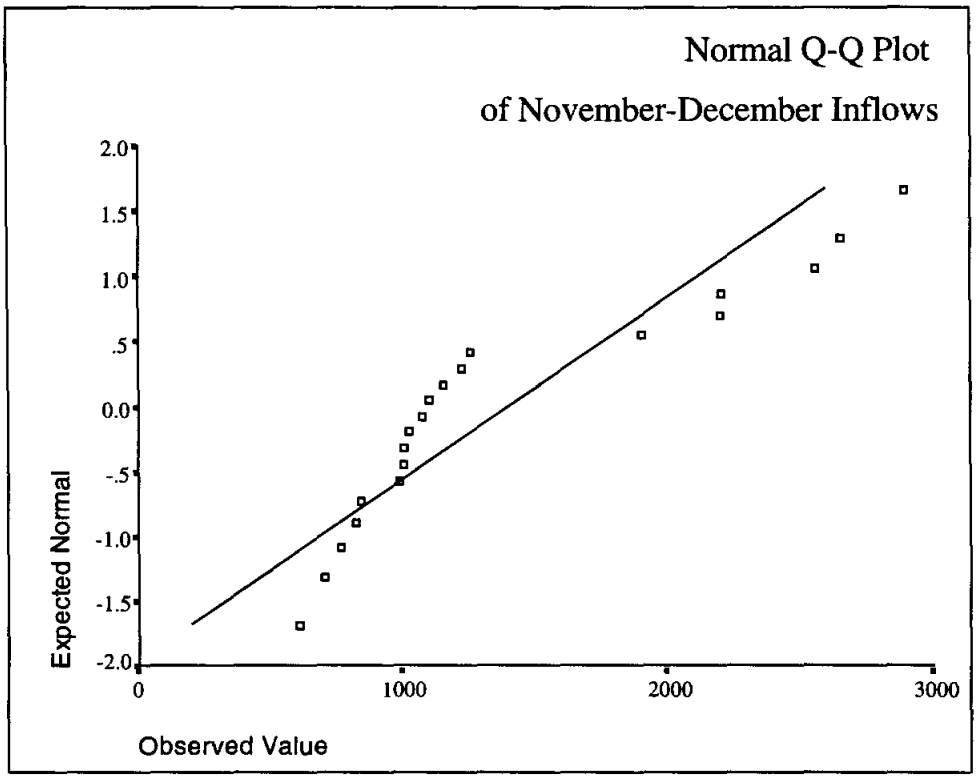

Ln(September-October Inflows)
8.0
7.5
7.0
6.5
6.0
5.5
N =
20

Descriptives

			Statistic	Std. Error
November-December Inflows	Mean		*1403.9630*	*160.4211*
	95% Confidence Interval for Mean	Lower Bound	*1068.1978*	
		Upper Bound	*1739.7282*	
	5% Trimmed Mean		*1364.8089*	
	Median		*1091.4700*	
	Variance		*514698.435*	
	Std. Deviation		*717.4249*	
	Minimum		*615.13*	
	Maximum		*2897.57*	
	Range		*2282.44*	
	Interquartile Range		*1248.1100*	
	Skewness		*.990*	*.512*
	Kurtosis		*-.464*	*.992*

Extreme Values

			Case Number	Year	Value
November-December Inflows	Highest	1	*14*	*1975*	*2897.57*
		2	*15*	*1976*	*2659.43*
		3	*16*	*1977*	*2562.96*
		4	*2*	*1963*	*2208.27*
		5	*1*	*1962*	*2205.60*
	Lowest	1	*10*	*1971*	*615.13*
		2	*8*	*1969*	*706.48*
		3	*20*	*1981*	*767.72*
		4	*9*	*1970*	*828.41*
		5	*7*	*1968*	*848.36*

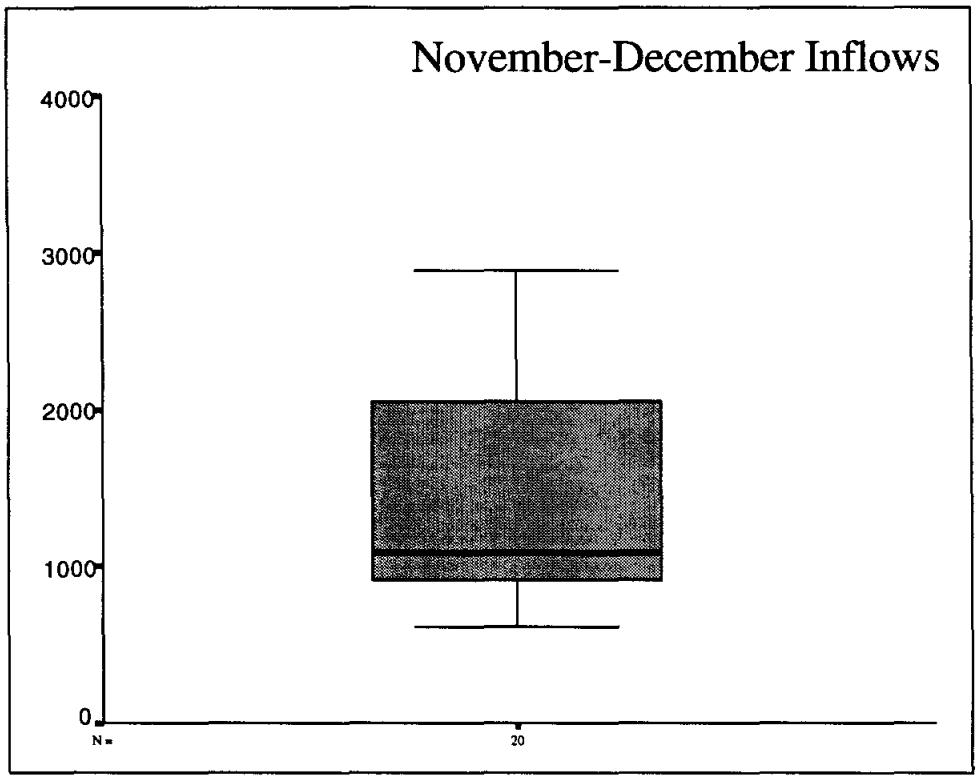


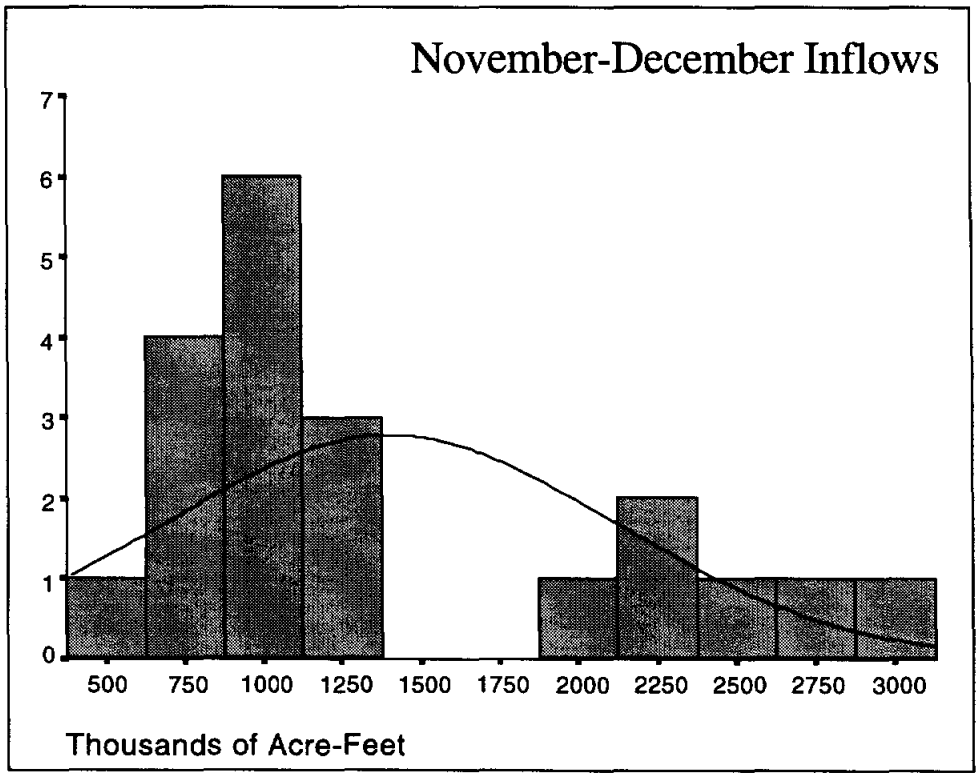
Tests of Normality

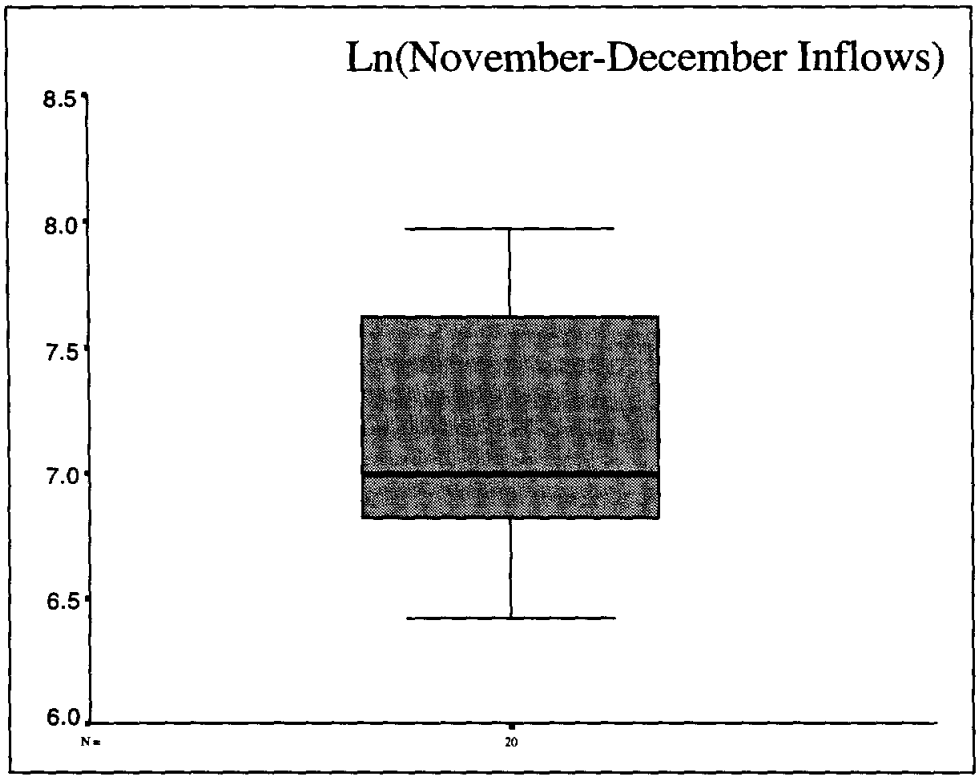
	Kolmogoro		Shapiro-Wilk	
	df	Sig.	df	Sig.
November-December Inflows	*20*	*.000*	*20*	*.010***

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction


November-December Inflows
4000
3000
2000
1000
0
N =
20

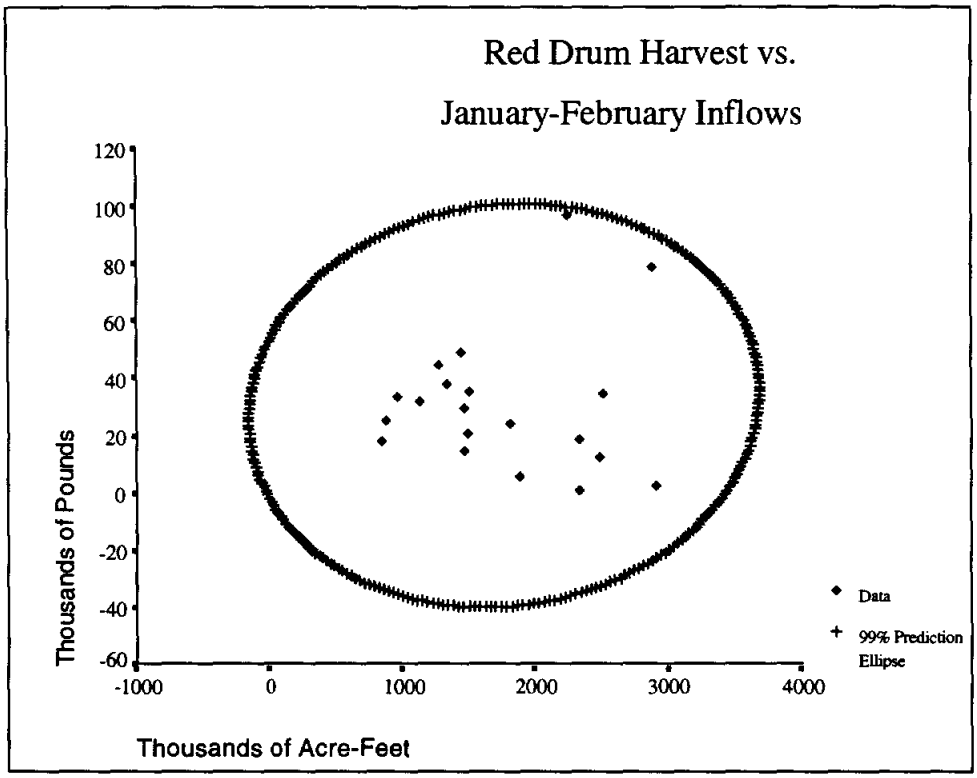

November-December Inflows
7
6
5
4
3
2
1
0
500
750
1000
1250
1500
1750
2000
2250
2500
2750
3000
Thousands of Acre-Feet


Ln(November-December Inflows)
8.5
8.0
7.5
7.0
6.5
6.0
N=
20

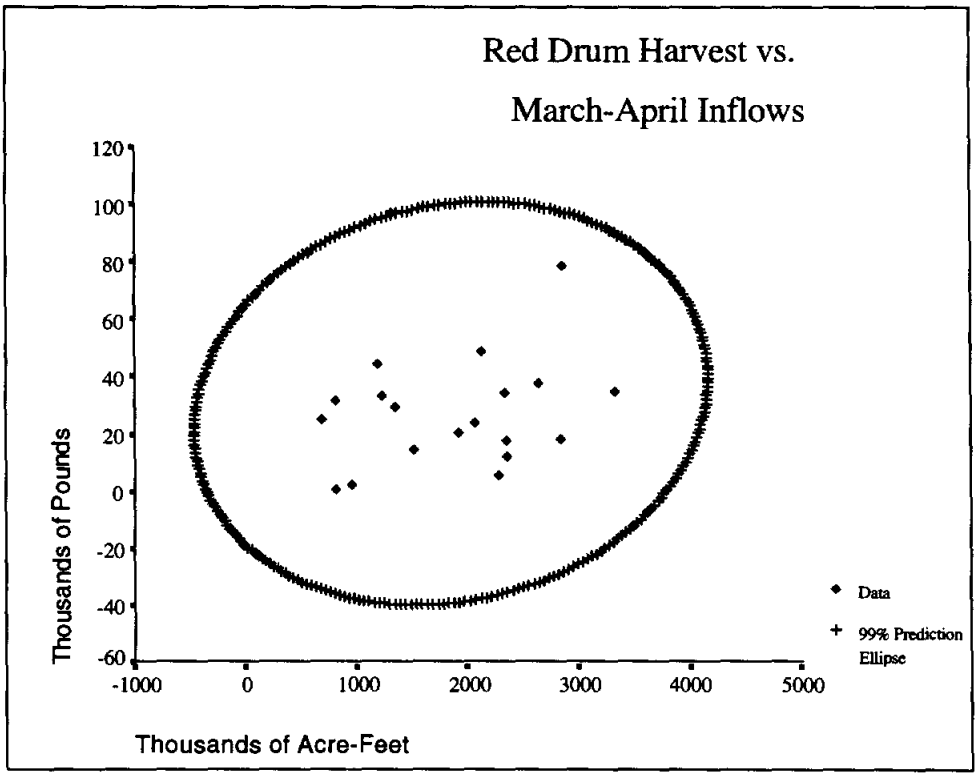
Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Red Drum Harvest	*1.3650*	*2.9400*	*15.7000*	*27.7500*	*37.4000*	*76.5100*	*96.6000*
	January-February Inflows	*852.1125*	*902.3610*	*1300.1175*	*1509.6250*	*2336.7825*	*2853.9500*	*2914.2220*
	March-April Inflows	*695.7400*	*815.8740*	*1207.3925*	*2004.2900*	*2359.7550*	*2857.0540*	*3313.7135*
	May-June Inflows	*781.2030*	*1200.0140*	*1390.5775*	*2417.1200*	*3406.9000*	*3944.5240*	*4128.0850*
	July-August Inflows	*225.2055*	*328.1700*	*566.8325*	*776.8800*	*1026.1250*	*1273.5230*	*1665.6635*
	September-October Inflows	*330.8555*	*437.5310*	*534.3025*	*952.0400*	*1425.9225*	*2212.4530*	*2254.3140*
	November-December Inflows	*619.6975*	*712.6040*	*883.2375*	*1091.4700*	*2131.3475*	*2649.7830*	*2885.6630*
Tukey's Hinges	Red Drum Harvest			*16.5000*	*27.7500*	*36.7000*		
	January-February Inflows			*1316.7250*	*1509.6250*	*2336.7350*		
	March-April Inflows			*1215.6050*	*2004.2900*	*2358.6800*		
	May-June Inflows			*1465.4850*	*2417.1200*	*3297.2600*		
	July-August Inflows			*573.6350*	*776.8800*	*992.5700*		
	September-October Inflows			*534.7750*	*952.0400*	*1419.6850*		
	November-December Inflows			*918.1150*	*1091.4700*	*2057.0950*		

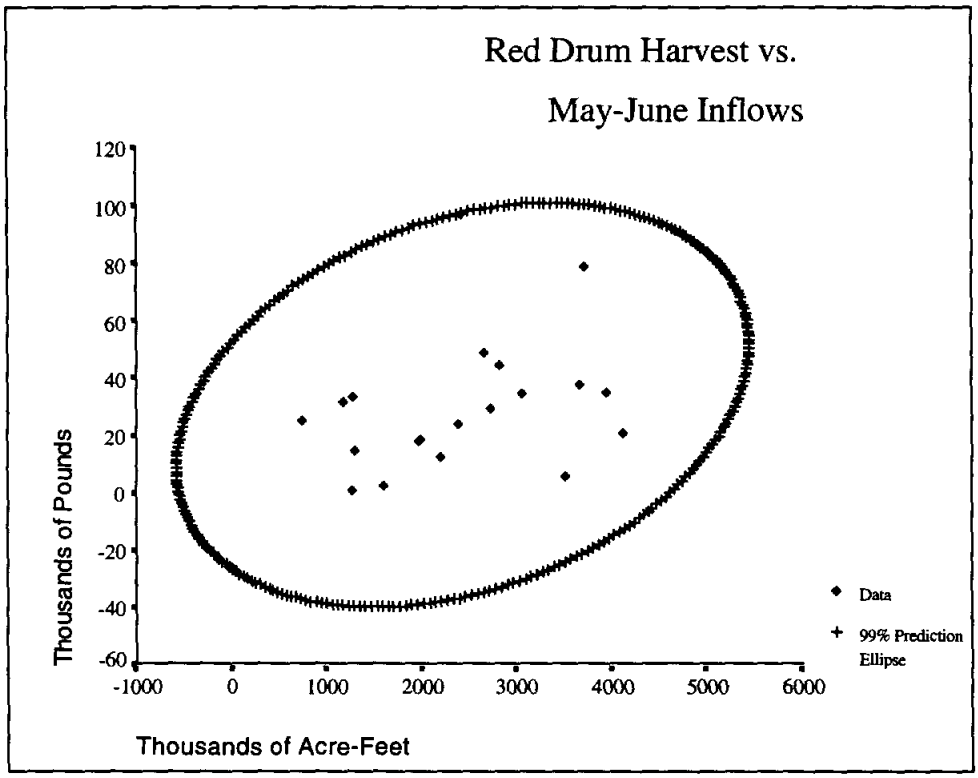
99% Prediction Ellipses



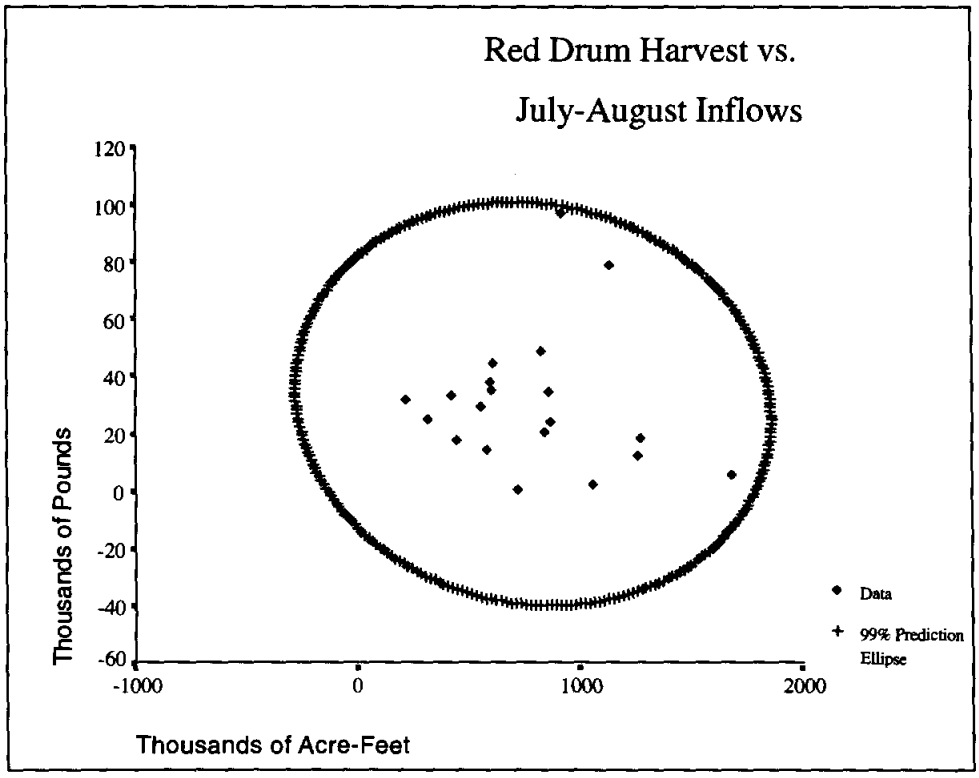
Near edge of ellipse: 1976.



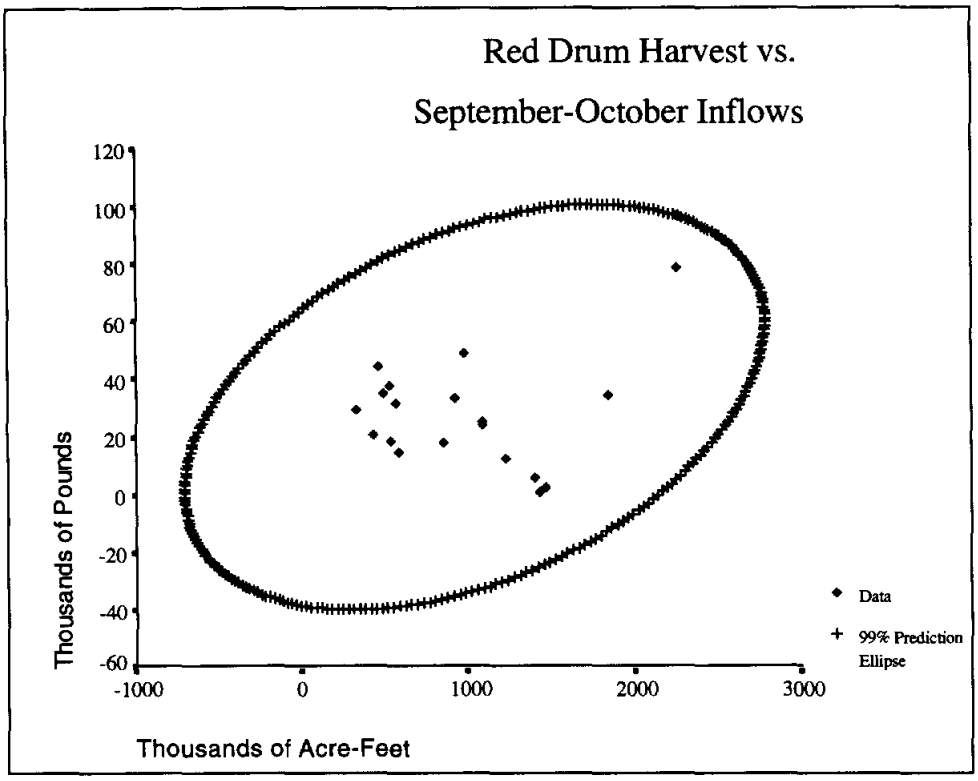
Lying on ellipse: 1976.



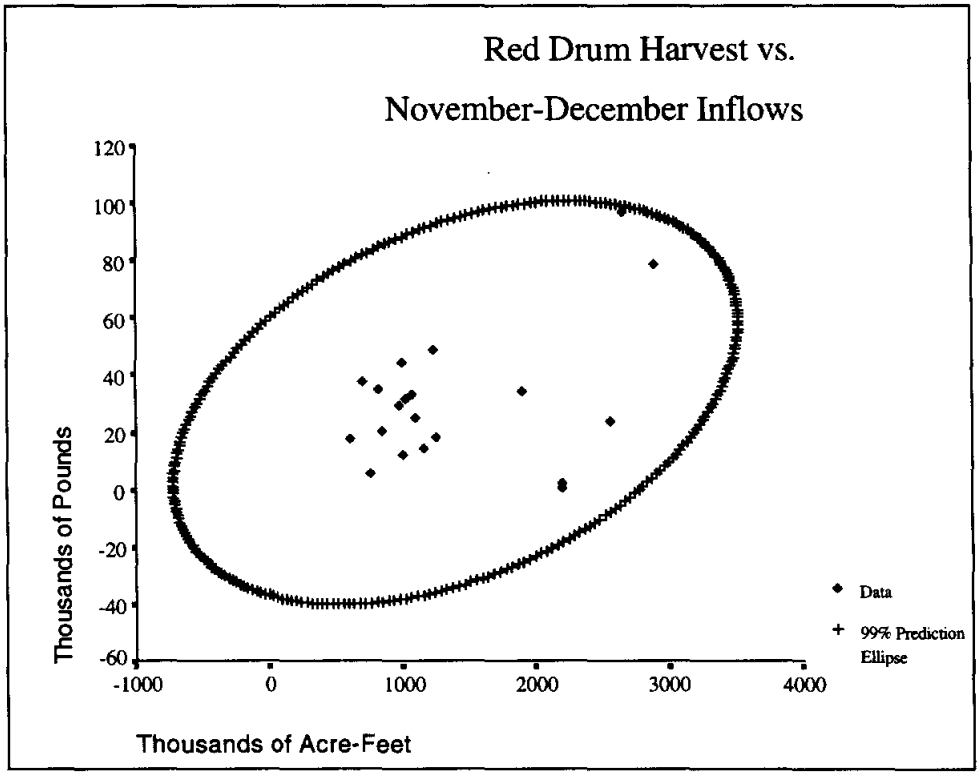
Lying on ellipse: 1976.



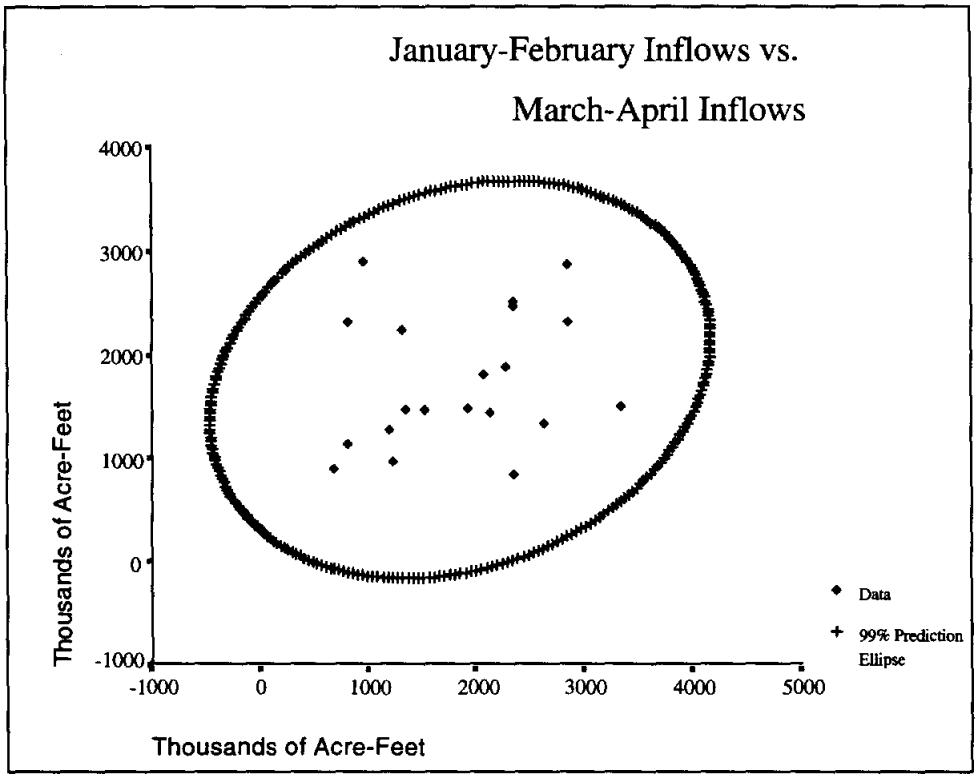
Lying on ellipse: 1976.

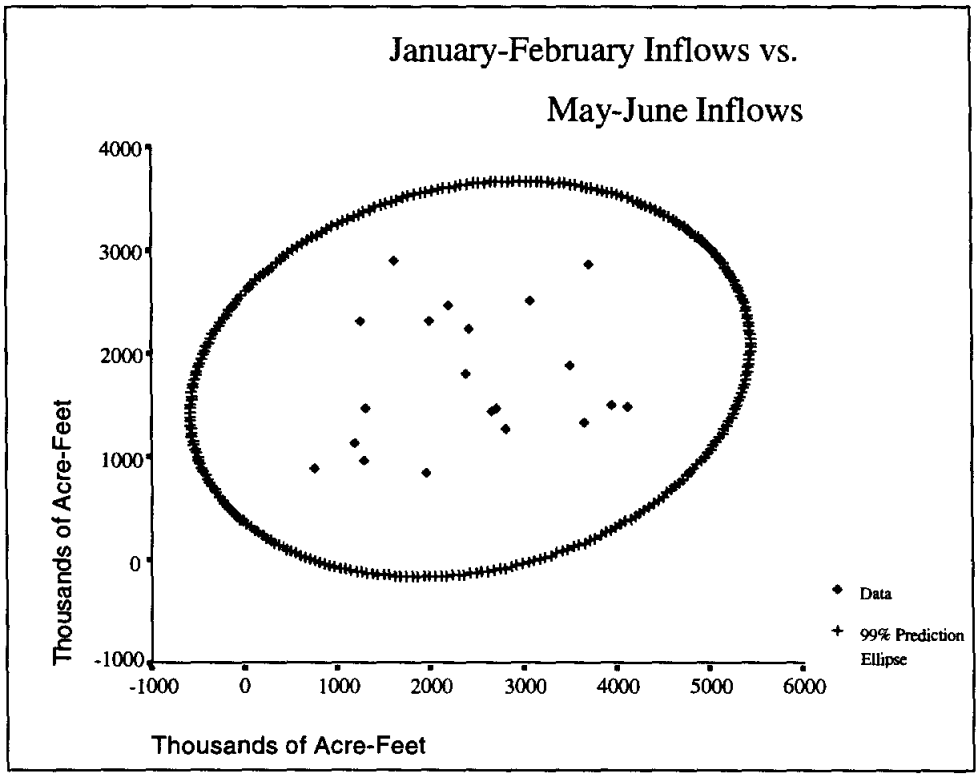


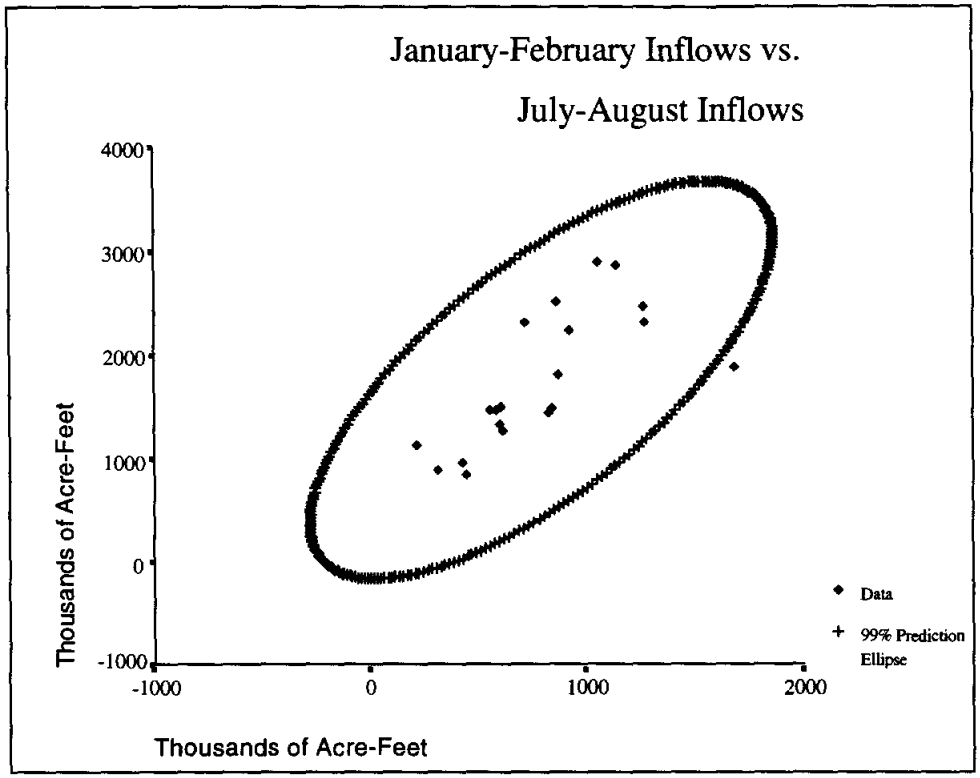
Lying on ellipse: 1976.



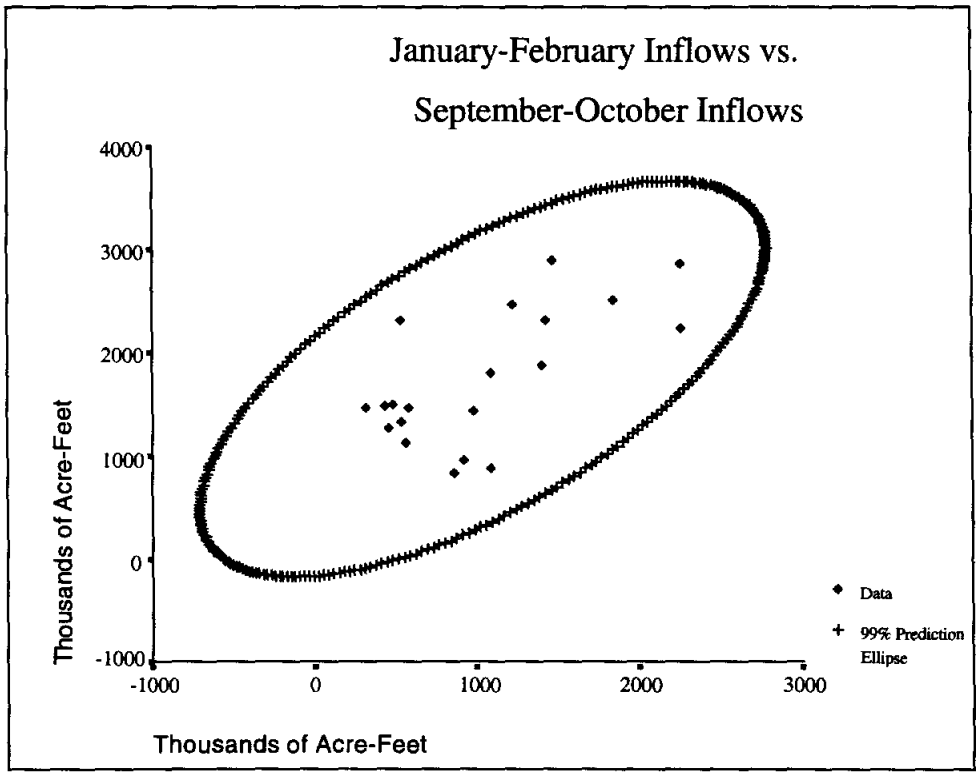
Lying on ellipse: 1976.

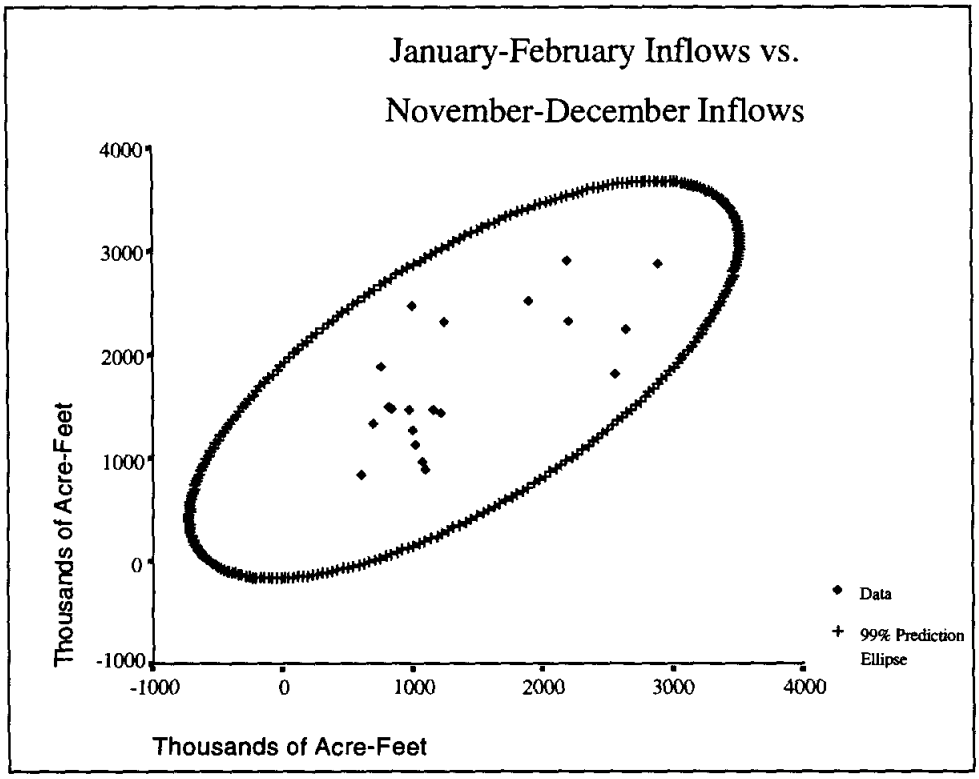

January-February Inflows vs.
March-April Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

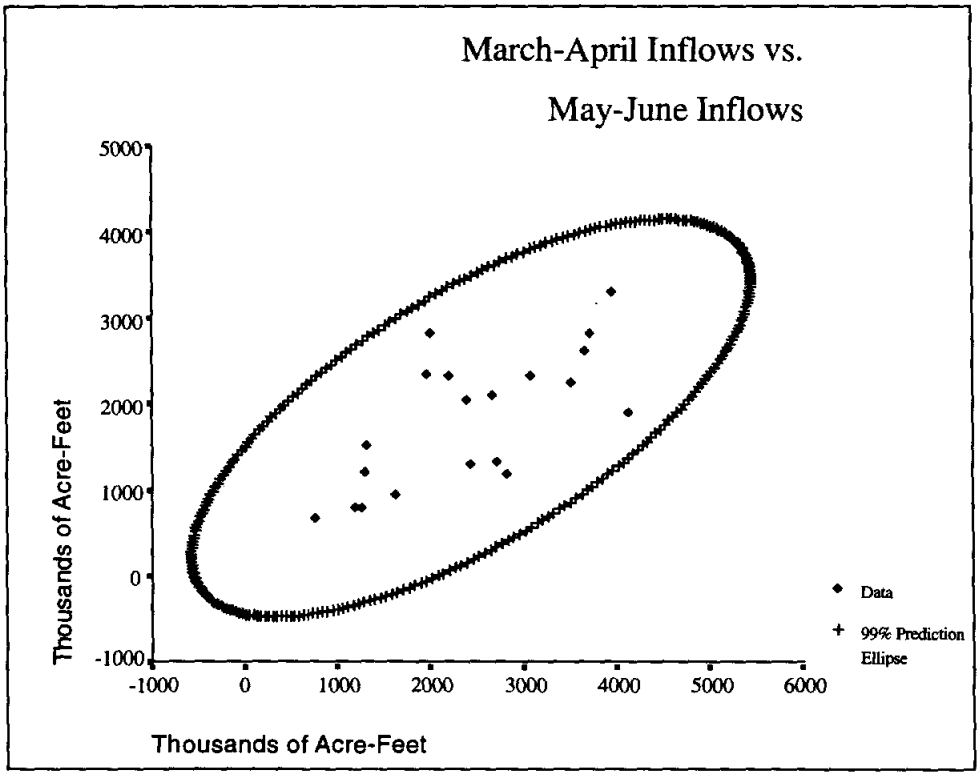

January-February Inflows vs.
May-June Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

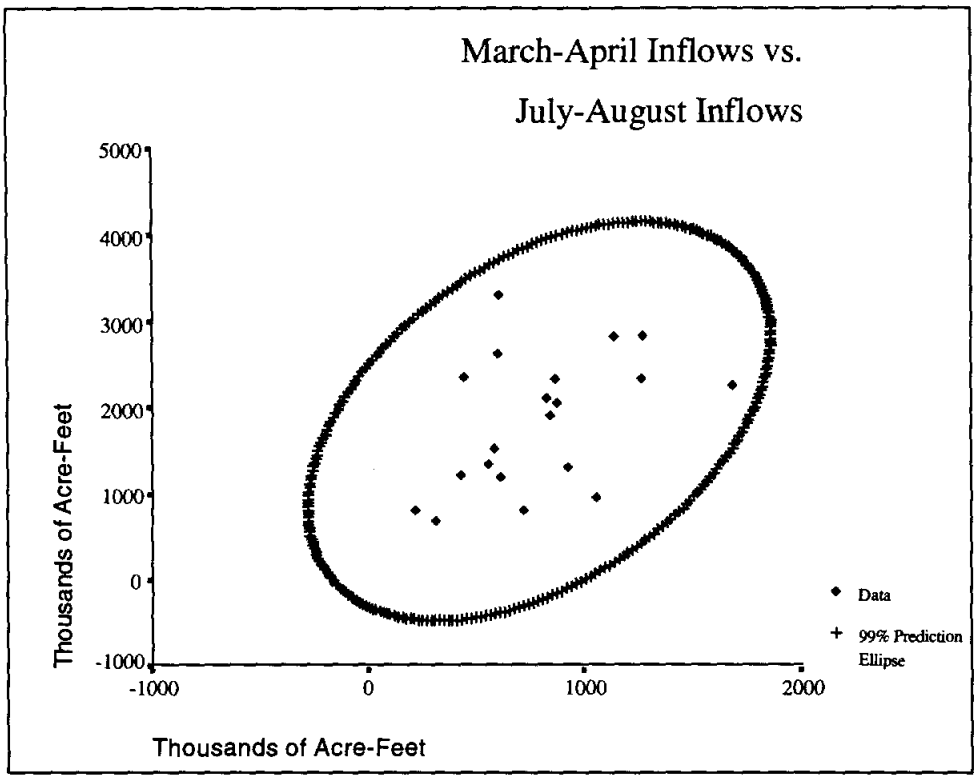


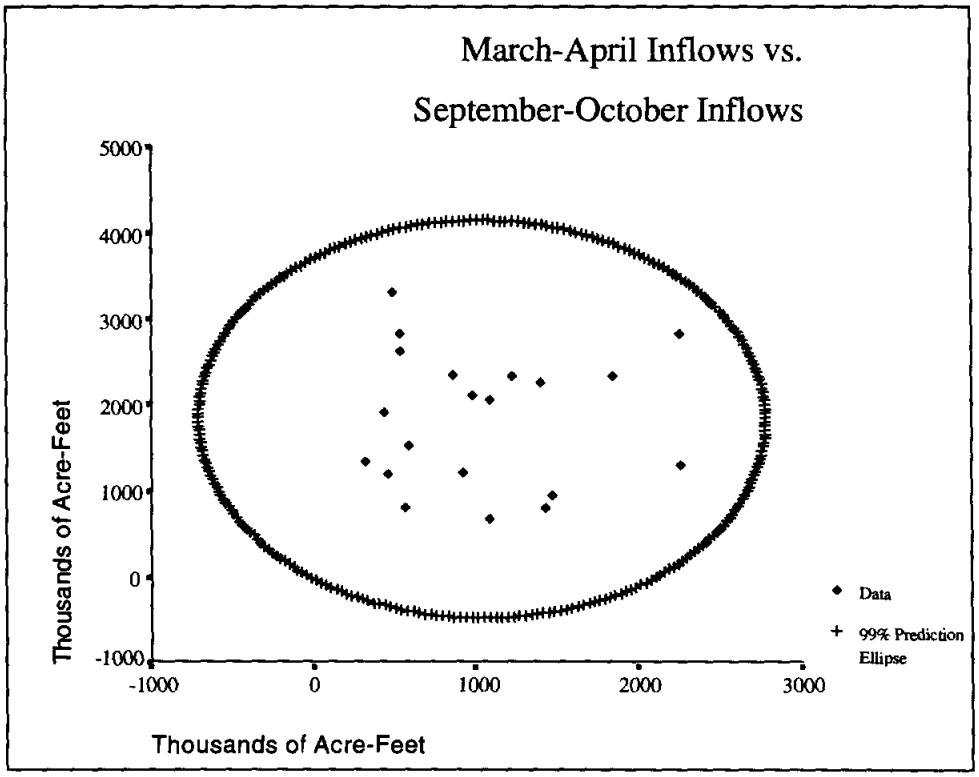
Outside ellipse: 1981.

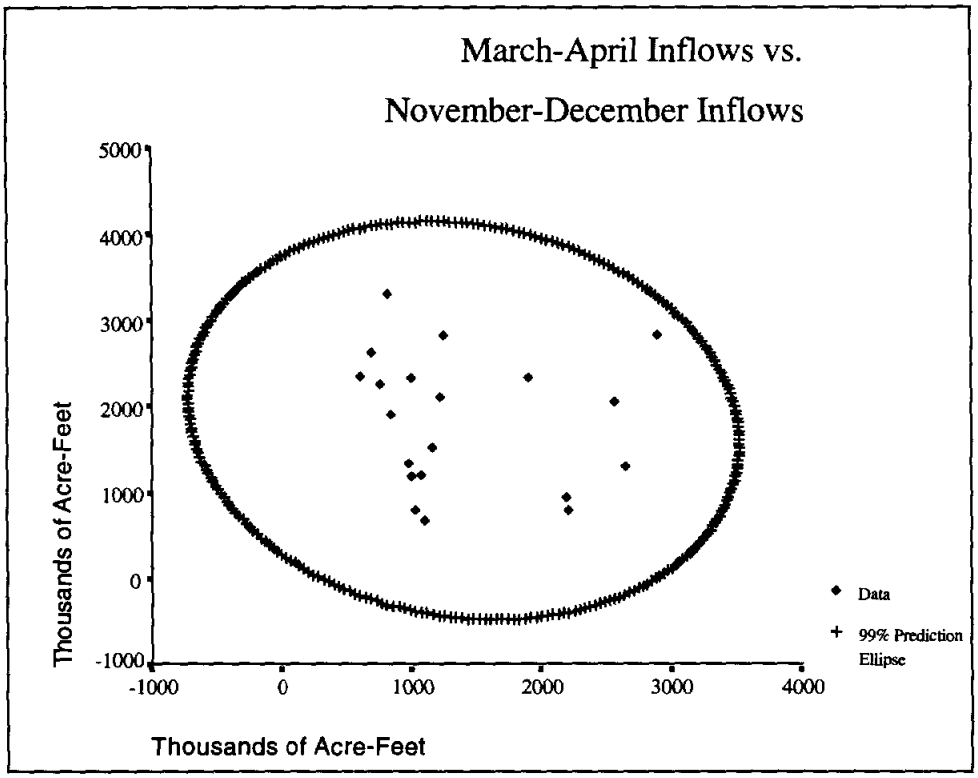


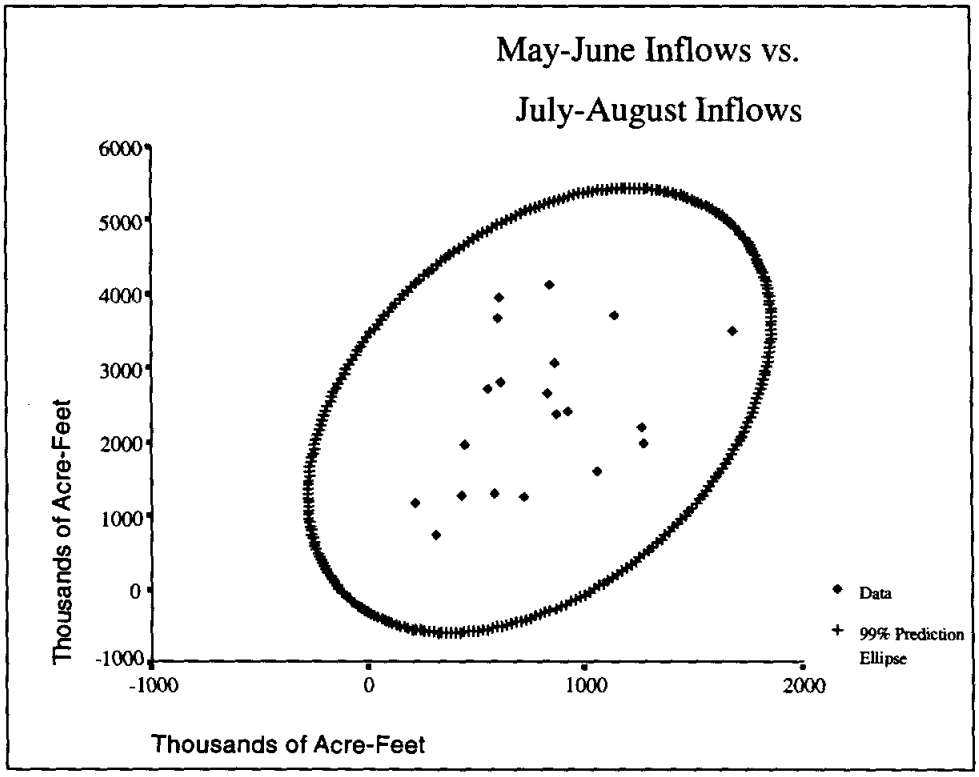

January-February Inflows vs.
November-December Inflows
Thousands of Acre-Feet
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

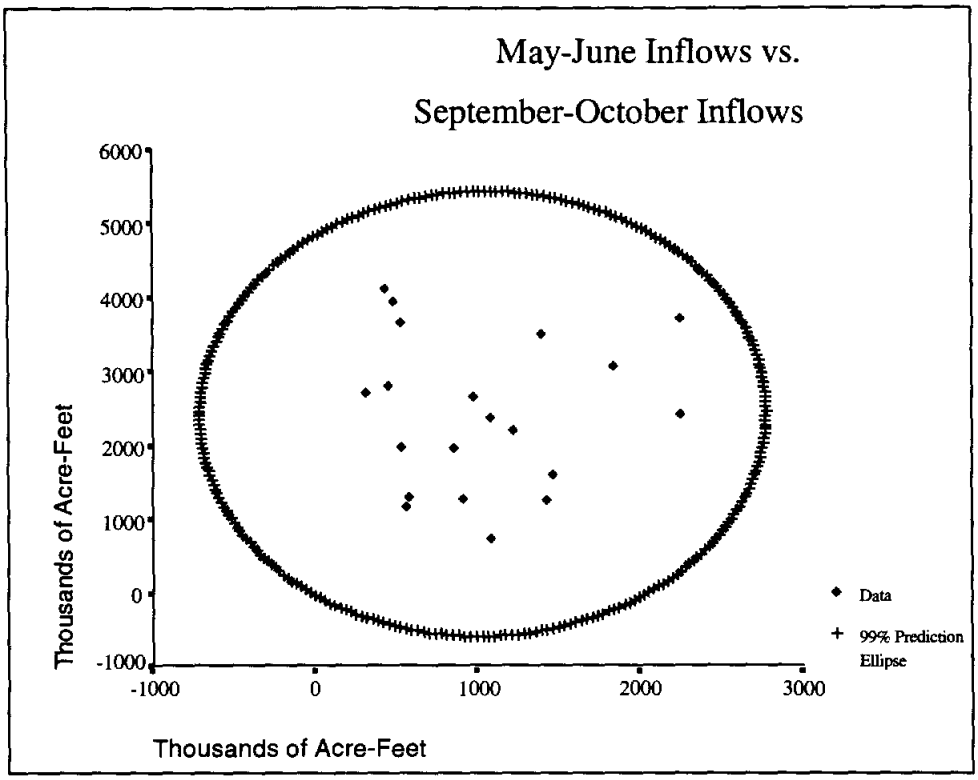

March-April Inflows vs.
May-June Inflows
Thousands of Acre-Feet
5000
4000
3000
2000
1000
0
-1000
-1000
0
1000
2000
3000
4000
5000
6000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

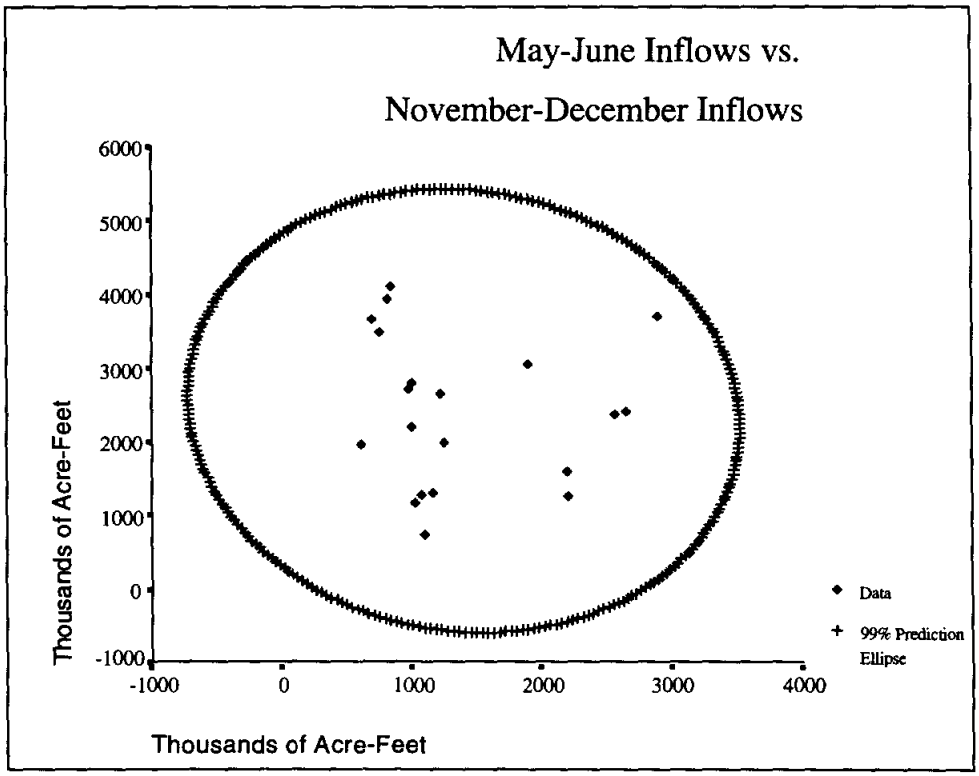

March-April Inflows vs.
July-August Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

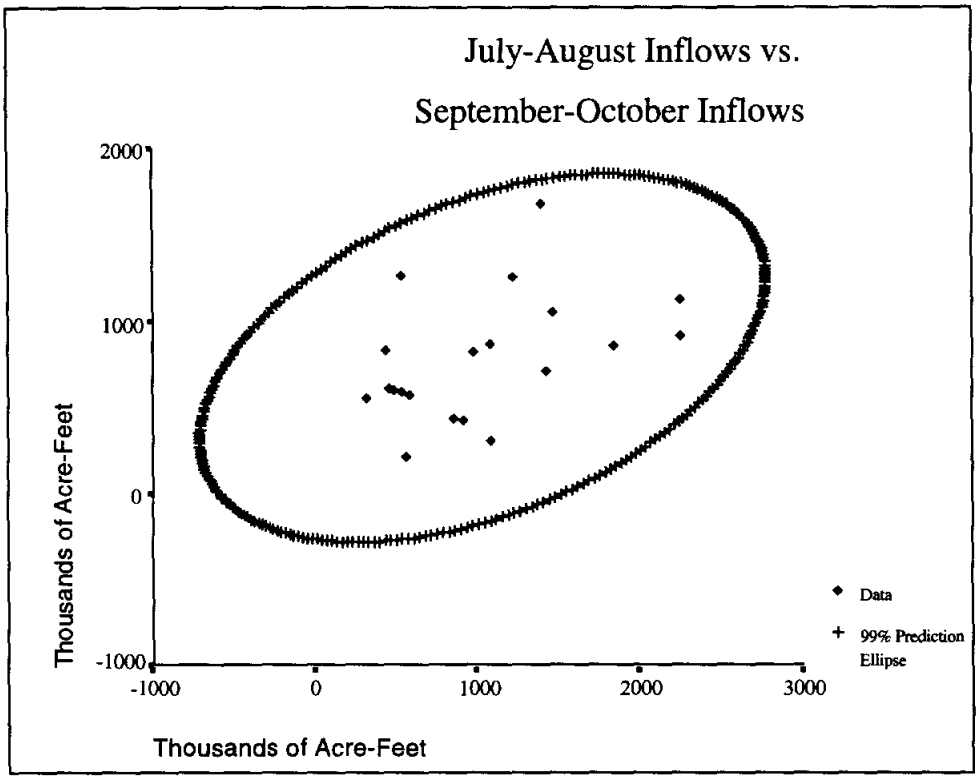

March-April Inflows vs.
September-October Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

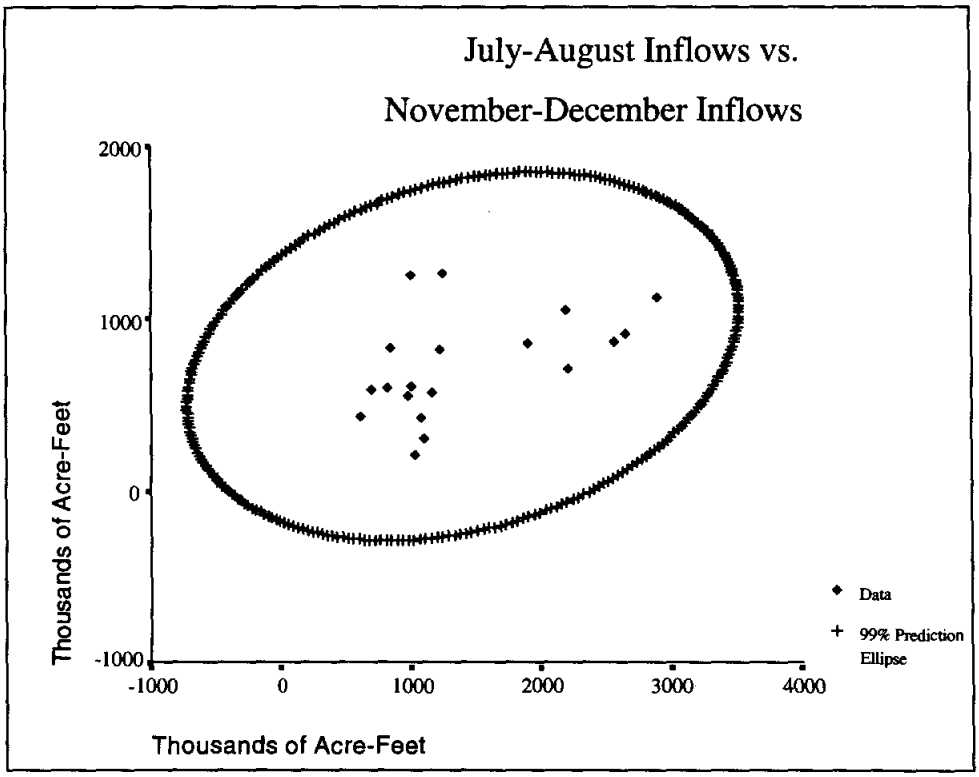

March-April Inflows vs.
November-December Inflows
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


May-June Inflows vs.
July-August Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

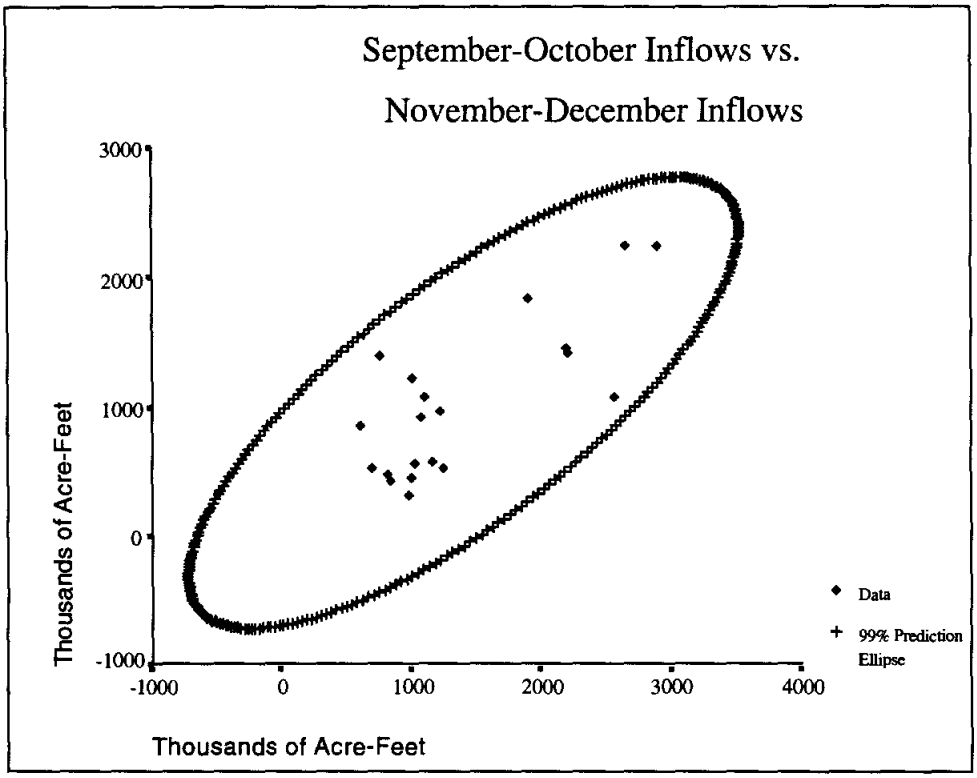

May-June Inflows vs.
September-October Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
Thousands of Acre-Feet
Data
99% Prediction Ellipse


May-June Inflows vs.
November-December Inflows
6000
5000
4000
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse





Lying on ellipse: 1981.

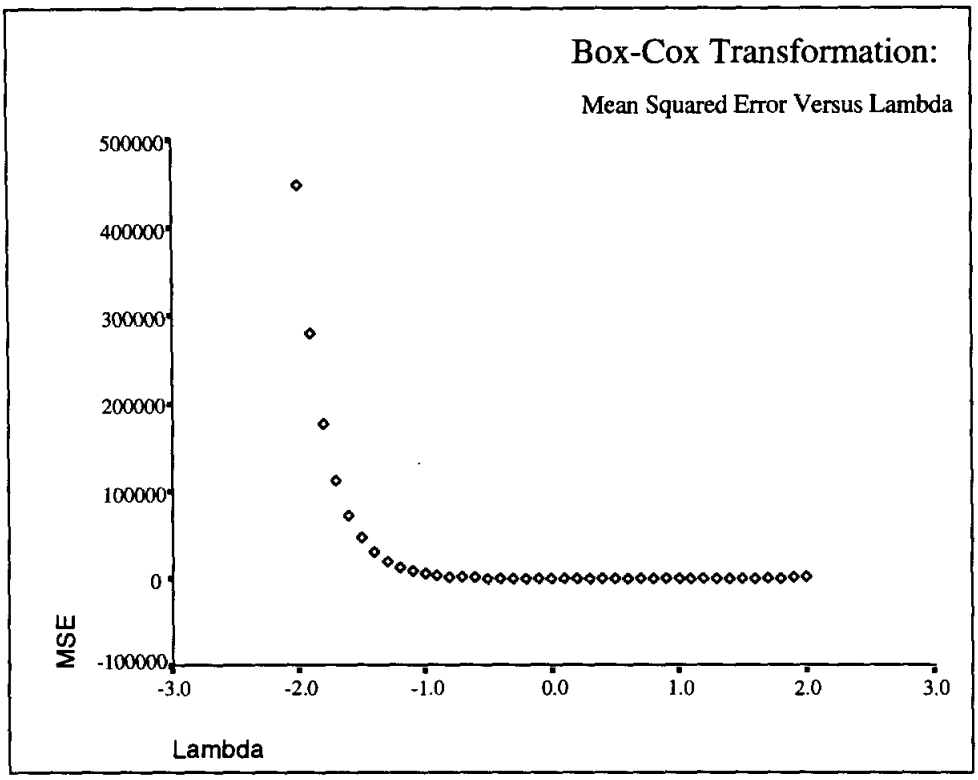

September-October Inflows vs.
November-December Inflows
3000
2000
1000
0
-1000
Thousands of Acre-Feet
-1000
0
1000
2000
3000
4000
Thousands of Acre-Feet
Data
99% Prediction Ellipse

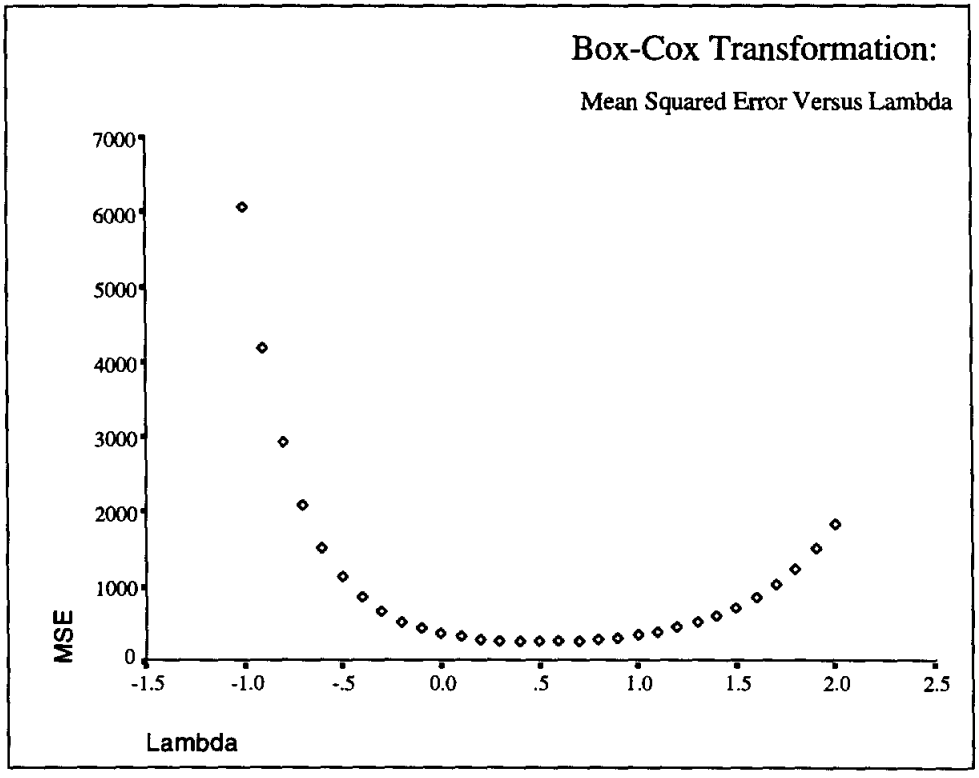
Box–Cox Analysis

Numerical Results

Lambda	Error MS
-2.0	449380.9912
-1.9	282454.5014
-1.8	178522.9342
-1.7	113531.9354
-1.6	72697.7464
-1.5	46907.2705
-1.4	30524.8639
-1.3	20053.2130
-1.2	13313.7686
-1.1	8943.8865
-1.0	6087.4561
-0.9	4204.0016
-0.8	2950.5242
-0.7	2108.1156
-0.6	1536.2127
-0.5	1143.9709
-0.4	872.2725
-0.3	682.3703
-0.2	548.6823
-0.1	454.1985
0.0	387.5374
0.1	341.0485
0.2	309.5851
0.3	289.7053
0.4	279.1533
0.5	276.5220
0.6	281.0381
0.7	292.4293
0.8	310.8499
0.9	336.8495
1.0	371.3774
1.1	415.8166
1.2	472.0488
1.3	542.5513
1.4	630.5314
1.5	740.1059
1.6	876.5360
1.7	1046.5336
1.8	1258.6573
1.9	1523.8237
2.0	1855.9695

Plots


Box-Cox Transformation:
Mean Squared Error Versus Lambda
500000
400000
300000
200000
100000
0
-100000
MSE
-3.0
-2.0
-1.0
0.0
1.0
2.0
3.0
Lambda


Box-Cox Transformation:
Mean Squared Error Versus Lambda
7000
6000
5000
4000
3000
2000
1000
0
MSE
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
Lambda

Model Choice Diagnostics

Untransformed Data

N = 20 Regression Models for Dependent Variable: RED_DRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.176523	0.130775	7.9285	125.9	493.696	127.9	SO_INFL
1	0.165816	0.119472	8.2397	126.2	500.115	128.2	ND_INFL
1	0.095222	0.044956	10.2910	127.8	542.438	129.8	MJ_INFL
1	0.017965	-.036592	12.5359	129.5	588.755	131.4	MA_INFL
2	0.279697	0.194955	6.9305	125.3	457.243	128.2	MJ_INFL ND_INFL
2	0.268778	0.182752	7.2478	125.6	464.174	128.5	MJ_INFL SO_INFL
2	0.261220	0.174305	7.4674	125.8	468.972	128.7	JA_INFL SO_INFL
2	0.252252	0.164282	7.7280	126.0	474.665	129.0	JF_INFL SO_INFL
3	0.488148	0.392176	2.8734	120.4	345.227	124.4	MJ_INFL JA_INFL SO_INFL
3	0.456201	0.354239	3.8017	121.6	366.774	125.6	JF_INFL MJ_INFL ND_INFL
3	0.418010	0.308887	4.9114	123.0	392.533	127.0	MJ_INFL JA_INFL ND_INFL
3	0.394531	0.281005	5.5937	123.8	408.369	127.8	JF_INFL MJ_INFL SO_INFL
4	0.519420	0.391266	3.9647	121.2	345.744	126.1	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.504873	0.372839	4.3874	121.8	356.210	126.7	MJ_INFL JA_INFL SO_INFL ND_INFL
4	0.495840	0.361398	4.6499	122.1	362.708	127.1	JF_INFL MJ_INFL JA_INFL SO_INFL
4	0.489131	0.352899	4.8448	122.4	367.535	127.4	MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.548192	0.386832	5.1286	121.9	348.262	127.9	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.521263	0.350286	5.9111	123.1	369.019	129.1	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.506973	0.330892	6.3264	123.7	380.035	129.6	MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.496887	0.317203	6.6194	124.1	387.809	130.1	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
6	0.552618	0.346134	7.0000	123.7	371.377	130.7	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	RED_DRUM	22.2193	13.4542	.	.	.	.	0.016965
2	MODEL1	PARMS	RED_DRUM	22.3633	12.0737	.	.	.	.	.
3	MODEL1	PARMS	RED_DRUM	23.2903	13.4649	.	.	0.007216	.	.
4	MODEL1	PARMS	RED_DRUM	24.2643	23.4962	.	.0040789	.	.	.
5	MODEL1	PARMS	RED_DRUM	21.3832	-8.3076	.	.	0.007910	.	.
6	MODEL1	PARMS	RED_DRUM	21.5447	-3.7233	.	.	0.007103	.	0.016823
7	MODEL1	PARMS	RED_DRUM	21.6558	24.4204	.	.	.	-0.021366	0.022741
8	MODEL1	PARMS	RED_DRUM	21.7868	27.1153	-0.013522	.	.	.	0.026863
9	MODEL1	PARMS	RED_DRUM	18.5803	3.1494	.	.	0.012354	-0.038133	0.027026
10	MODEL1	PARMS	RED_DRUM	19.1513	3.2456	-0.022626	.	0.011206	.	.
11	MODEL1	PARMS	RED_DRUM	19.8124	-1.9315	.	.	0.012039	-0.028137	.
12	MODEL1	PARMS	RED_DRUM	20.2081	9.6232	-0.017905	.	0.009064	.	0.029890
13	MODEL1	PARMS	RED_DRUM	18.5942	4.3183	-0.026308	.	0.011114	.	0.016660
14	MODEL1	PARMS	RED_DRUM	18.8735	-0.8562	.	.	0.012606	-0.037235	0.020352
15	MODEL1	PARMS	RED_DRUM	19.0449	6.3223	-0.005581	.	0.012211	-0.032657	0.029633
16	MODEL1	PARMS	RED_DRUM	19.1712	2.5022	.	.0013933	0.011713	-0.038908	0.027258
17	MODEL1	PARMS	RED_DRUM	18.6618	3.7049	-0.016620	.	0.012487	-0.019831	0.019973
18	MODEL1	PARMS	RED_DRUM	19.2099	3.3973	-0.026975	.0019108	0.010195	.	0.016613
19	MODEL1	PARMS	RED_DRUM	19.4945	-1.9646	.	.0020485	0.011673	-0.038339	0.020432
20	MODEL1	PARMS	RED_DRUM	19.6929	5.6677	-0.005604	.0014375	0.011549	-0.033434	0.029883
21	MODEL1	PARMS	RED_DRUM	19.2712	2.2314	-0.017143	.0029887	0.011123	-0.020895	0.020078

OBS	ND_INFL	RED_DRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	493.696	0.17652	0.13077	7.9285	125.931	127.923
2	0.013527	-1	1	2	18	500.115	0.16582	0.11947	8.2397	126.190	128.181
3	.	-1	1	2	18	542.438	0.09522	0.04496	10.2910	127.814	129.806
4	.	-1	1	2	18	588.755	0.01797	-0.03659	12.5359	129.453	131.444
5	0.014302	-1	2	3	17	457.243	0.27970	0.19496	6.9305	125.254	128.241
6	.	-1	2	3	17	464.174	0.26878	0.18275	7.2478	125.555	128.542
7	.	-1	2	3	17	468.972	0.26122	0.17430	7.4674	125.760	128.748
8	.	-1	2	3	17	474.665	0.25225	0.16428	7.7280	126.002	128.989
9	.	-1	3	4	16	345.227	0.48815	0.39218	2.8734	120.421	124.404
10	0.028872	-1	3	4	16	366.774	0.45620	0.35424	3.8017	121.632	125.615
11	0.018497	-1	3	4	16	392.533	0.41801	0.30889	4.9114	122.990	126.972
12	.	-1	3	4	16	408.369	0.39453	0.28101	5.5937	123.781	127.763
13	0.020593	-1	4	5	15	345.744	0.51942	0.39127	3.9647	121.160	126.139
14	0.006843	-1	4	5	15	356.210	0.50487	0.37284	4.3874	121.757	126.735
15	.	-1	4	5	15	362.708	0.49584	0.36140	4.6499	122.118	127.097
16	.	-1	4	5	15	367.535	0.48913	0.35290	4.8448	122.383	127.361
17	0.015193	-1	5	6	14	348.262	0.54819	0.38683	5.1286	121.926	127.900
18	0.021196	-1	5	6	14	369.019	0.52126	0.35029	5.9111	123.083	129.058
19	0.007110	-1	5	6	14	380.035	0.50697	0.33089	6.3264	123.672	129.646
20	.	-1	5	6	14	387.809	0.49689	0.31720	6.6194	124.077	130.051
21	0.015846	-1	6	7	13	371.377	0.55262	0.34613	7.0000	123.729	130.699

Square Root of Harvest (Box–Cox Transformation)

N = 20 Regression Models for Dependent Variable: SQRTRDRM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.114119	0.064903	8.0901	31.0433	4.29532	33.0348	MJ_INFL
1	0.053465	0.000880	9.7395	32.3678	4.58940	34.3593	ND_INFL
1	0.052455	-.000186	9.7669	32.3891	4.59430	34.3806	SO_INFL
1	0.042116	-.011099	10.0481	32.6062	4.64443	34.5976	MA_INFL
2	0.237645	0.147956	6.7310	30.0399	3.91381	33.0271	MJ_INFL JA_INFL
2	0.185165	0.089302	8.1581	31.3713	4.18324	34.3585	JF_INFL ND_INFL
2	0.179208	0.082644	8.3201	31.5170	4.21382	34.5042	MJ_INFL ND_INFL
2	0.166561	0.068509	8.6640	31.8228	4.27875	34.8100	JF_INFL SO_INFL
3	0.436011	0.330263	3.3368	26.0123	3.07640	29.9953	MJ_INFL JA_INFL SO_INFL
3	0.430605	0.323843	3.4838	26.2031	3.10589	30.1861	JF_INFL MJ_INFL ND_INFL
3	0.388519	0.273866	4.6282	27.6293	3.33546	31.6122	MJ_INFL JA_INFL ND_INFL
3	0.362282	0.242710	5.3417	28.4695	3.47857	32.4525	JF_INFL MA_INFL ND_INFL
4	0.463440	0.320357	4.5909	27.0152	3.12190	31.9939	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.455045	0.309723	4.8192	27.3257	3.17075	32.3044	JF_INFL MJ_INFL JA_INFL SO_INFL
4	0.449868	0.303166	4.9599	27.5148	3.20087	32.4935	MA_INFL MJ_INFL JA_INFL SO_INFL
4	0.447389	0.300026	5.0274	27.6047	3.21529	32.5834	JF_INFL MJ_INFL JA_INFL ND_INFL
5	0.498969	0.320030	5.6247	27.6450	3.12341	33.6194	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.478971	0.292890	6.1685	28.4277	3.24807	34.4021	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.469273	0.279727	6.4323	28.7966	3.30853	34.7710	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.468812	0.279102	6.4448	28.8140	3.31141	34.7884	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
6	0.521942	0.301300	7.0000	28.7063	3.20944	35.6764	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	SQRTRDRM	2.07251	3.43459	.	.	.0007104	.	.
2	MODEL1	PARMS	SQRTRDRM	2.14229	4.19752	.	.	.	.	.
3	MODEL1	PARMS	SQRTRDRM	2.14343	4.30399	.	.	.	.	.0008317
4	MODEL1	PARMS	SQRTRDRM	2.15509	4.12513	.	.0005616	.	.	.
5	MODEL1	PARMS	SQRTRDRM	1.97834	4.46189	.	.	.0010263	-.0022648	.
6	MODEL1	PARMS	SQRTRDRM	2.04530	5.67425	-.0016667	.	.	.	.
7	MODEL1	PARMS	SQRTRDRM	2.05276	2.27154	.	.	.0007475	.	.
8	MODEL1	PARMS	SQRTRDRM	2.06851	5.81203	-.0014927	.	.	.	.0019243
9	MODEL1	PARMS	SQRTRDRM	1.75397	3.28649	.	.	.0012300	-.0038130	.0018378
10	MODEL1	PARMS	SQRTRDRM	1.76235	3.51150	-.0024283	.	.0011012	.	.
11	MODEL1	PARMS	SQRTRDRM	1.82632	2.97692	.	.	.0012042	-.0031127	.
12	MODEL1	PARMS	SQRTRDRM	1.86509	3.85958	-.0025414	.0012729	.	.	.
13	MODEL1	PARMS	SQRTRDRM	1.76689	3.58103	-.0026670	.	.0010953	.	.0010797
14	MODEL1	PARMS	SQRTRDRM	1.78066	3.73533	-.0007895	.	.0012098	-.0030383	.0022066
15	MODEL1	PARMS	SQRTRDRM	1.78910	3.06795	.	.0004704	.0010136	-.0040747	.0019160
16	MODEL1	PARMS	SQRTRDRM	1.79312	3.45703	-.0017418	.	.0011929	-.0013065	.
17	MODEL1	PARMS	SQRTRDRM	1.76732	3.51973	-.0016988	.	.0012325	-.0019818	.0014109
18	MODEL1	PARMS	SQRTRDRM	1.80224	3.34058	-.0028410	.0004988	.0008553	.	.0010675
19	MODEL1	PARMS	SQRTRDRM	1.81894	3.51826	-.0007972	.0004767	.0009903	-.0032960	.0022896
20	MODEL1	PARMS	SQRTRDRM	1.81973	3.16466	-.0018459	.0005911	.0009225	-.0015071	.
21	MODEL1	PARMS	SQRTRDRM	1.79149	3.21784	-.0018060	.0006123	.0009530	-.0021998	.0014323

OBS	ND_INFL	SQRTRDRM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	4.29532	0.11412	0.06490	8.0901	31.0433	33.0348
2	.0006908	-1	1	2	18	4.58940	0.05346	0.00088	9.7395	32.3678	34.3593
3	.	-1	1	2	18	4.59430	0.05246	-0.00019	9.7669	32.3891	34.3806
4	.	-1	1	2	18	4.64443	0.04212	-0.01110	10.0481	32.6062	34.5976
5	.	-1	2	3	17	3.91381	0.23765	0.14796	6.7310	30.0399	33.0271
6	.0017403	-1	2	3	17	4.18324	0.18516	0.08930	8.1581	31.3713	34.3585
7	.0007640	-1	2	3	17	4.21382	0.17921	0.08264	8.3201	31.5170	34.5042
8	.	-1	2	3	17	4.27875	0.16656	0.06851	8.6640	31.8228	34.8100
9	.	-1	3	4	16	3.07640	0.43601	0.33026	3.3368	26.0123	29.9953
10	.0023278	-1	3	4	16	3.10589	0.43060	0.32384	3.4838	26.2031	30.1861
11	.0012281	-1	3	4	16	3.33546	0.38852	0.27387	4.6282	27.6293	31.6122
12	.0024532	-1	3	4	16	3.47857	0.36228	0.24271	5.3417	28.4695	32.4525
13	.0017912	-1	4	5	15	3.12190	0.46344	0.32036	4.5909	27.0152	31.9939
14	.	-1	4	5	15	3.17075	0.45504	0.30972	4.8192	27.3257	32.3044
15	.	-1	4	5	15	3.20087	0.44987	0.30317	4.9599	27.5148	32.4935
16	.0020805	-1	4	5	15	3.21529	0.44739	0.30003	5.0274	27.6047	32.5834
17	.0012515	-1	5	6	14	3.12341	0.49897	0.32003	5.6247	27.6450	33.6194
18	.0019486	-1	5	6	14	3.24807	0.47897	0.29289	6.1685	28.4277	34.4021
19	.	-1	5	6	14	3.30853	0.46927	0.27973	6.4323	28.7966	34.7710
20	.0022218	-1	5	6	14	3.31141	0.46881	0.27910	6.4448	28.8140	34.7884
21	.0013854	-1	6	7	13	3.20944	0.52194	0.30130	7.0000	28.7063	35.6764

Logged Inflows

N = 20 Regression Models for Dependent Variable: RED_DRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.126545	0.078020	9.1628	127.1	523.659	129.1	LGNDINFL
1	0.099400	0.049366	9.9448	127.7	539.933	129.7	LGMJINFL
1	0.069707	0.018024	10.8002	128.4	557.735	130.4	LGSOINFL
1	0.021681	-.032670	12.1838	129.4	586.528	131.4	LGMAINFL
2	0.251948	0.163942	7.5502	126.0	474.857	129.0	LGMJINFL LGNDINFL
2	0.185745	0.089951	9.4574	127.7	516.882	130.7	LGMJINFL LGSOINFL
2	0.177080	0.080266	9.7070	127.9	522.383	130.9	LGJFINFL LGNDINFL
2	0.174294	0.077152	9.7873	128.0	524.152	131.0	LGMAINFL LGNDINFL
3	0.493738	0.398814	2.5846	120.2	341.456	124.2	LGJFINFL LGMJINFL LGNDINFL
3	0.456863	0.355025	3.6469	121.6	366.328	125.6	LGMJINFL LGJAINFL LGNDINFL
3	0.396429	0.283259	5.3879	123.7	407.089	127.7	LGMJINFL LGJAINFL LGSOINFL
3	0.331718	0.206415	7.2521	125.8	450.734	129.7	LGJFINFL LGMAINFL LGNDINFL
4	0.511336	0.381026	4.0776	121.5	351.560	126.5	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.510206	0.379594	4.1102	121.5	352.373	126.5	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.506780	0.375254	4.2089	121.7	354.838	126.7	LGMJINFL LGJAINFL LGSOINFL LGNDINFL
4	0.494209	0.359331	4.5710	122.2	363.882	127.2	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
5	0.546977	0.385182	5.0509	122.0	349.199	128.0	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.515093	0.341912	5.9694	123.3	373.775	129.3	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.510216	0.335293	6.1099	123.5	377.535	129.5	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.509517	0.334344	6.1300	123.6	378.074	129.5	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.548742	0.340470	7.0000	123.9	374.595	130.9	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL	LGMJINFL	LGJAINFL	LGSOINFL
1	MODEL1	PARMS	RED_DRUM	22.8836	-97.131	.	.	.	.	.
2	MODEL1	PARMS	RED_DRUM	23.2365	-91.171	.	.	15.8692	.	.
3	MODEL1	PARMS	RED_DRUM	23.6164	-42.756	.	.	.	.	10.8721
4	MODEL1	PARMS	RED_DRUM	24.2183	-23.972	.	7.4093	.	.	.
5	MODEL1	PARMS	RED_DRUM	21.7912	-248.495	.	.	17.9213	.	.
6	MODEL1	PARMS	RED_DRUM	22.7350	-184.053	.	.	17.2170	.	12.1504
7	MODEL1	PARMS	RED_DRUM	22.8557	-29.606	-19.0670	.	.	.	.
8	MODEL1	PARMS	RED_DRUM	22.8944	-195.487	.	11.1980	.	.	.
9	MODEL1	PARMS	RED_DRUM	18.4785	-207.147	-49.4313	.	33.7526	.	.
10	MODEL1	PARMS	RED_DRUM	19.1397	-279.762	.	.	35.9695	-29.3173	.
11	MODEL1	PARMS	RED_DRUM	20.1764	-211.311	.	.	36.7131	-31.5784	24.6032
12	MODEL1	PARMS	RED_DRUM	21.2305	-164.875	-39.4277	23.6100	.	.	.
13	MODEL1	PARMS	RED_DRUM	18.7499	-232.970	-34.8132	.	36.9186	-12.7478	.
14	MODEL1	PARMS	RED_DRUM	18.7716	-213.335	-51.6564	.	34.6516	.	7.2616
15	MODEL1	PARMS	RED_DRUM	18.8371	-300.641	.	.	39.8033	-34.9870	13.3811
16	MODEL1	PARMS	RED_DRUM	19.0757	-211.019	-49.8873	1.7539	32.5782	.	.
17	MODEL1	PARMS	RED_DRUM	18.6869	-256.920	-30.2889	.	40.0763	-19.7533	11.4518
18	MODEL1	PARMS	RED_DRUM	19.3333	-247.854	-34.1853	5.1655	33.8868	-14.4666	.
19	MODEL1	PARMS	RED_DRUM	19.4303	-212.783	-51.5988	-0.2637	34.8326	.	7.2973
20	MODEL1	PARMS	RED_DRUM	19.4441	-312.119	.	4.4266	37.1182	-36.0534	13.0260
21	MODEL1	PARMS	RED_DRUM	19.3544	-266.625	-29.9607	3.5603	37.9137	-20.7761	11.1871

OBS	LGNDINFL	RED_DRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	17.9653	-1	1	2	18	523.659	0.12655	0.07802	9.1628	127.110	129.101
2	.	-1	1	2	18	539.933	0.09940	0.04937	9.9448	127.722	129.713
3	.	-1	1	2	18	557.735	0.06971	0.01802	10.8002	128.370	130.362
4	.	-1	1	2	18	586.528	0.02168	-0.03267	12.1838	129.377	131.369
5	19.8321	-1	2	3	17	474.857	0.25195	0.16394	7.5502	126.010	128.997
6	.	-1	2	3	17	516.882	0.18575	0.08995	9.4574	127.706	130.693
7	28.3079	-1	2	3	17	522.383	0.17708	0.08027	9.7070	127.918	130.905
8	20.0922	-1	2	3	17	524.152	0.17429	0.07715	9.7873	127.985	130.972
9	48.2945	-1	3	4	16	341.456	0.49374	0.39881	2.5846	120.202	124.184
10	31.7243	-1	3	4	16	366.328	0.45686	0.35502	3.6469	121.608	125.591
11	.	-1	3	4	16	407.089	0.39643	0.28326	5.3879	123.718	127.701
12	43.8367	-1	3	4	16	450.734	0.33172	0.20642	7.2521	125.755	129.738
13	45.0484	-1	4	5	15	351.560	0.51134	0.38103	4.0776	121.494	126.473
14	43.5928	-1	4	5	15	352.373	0.51021	0.37959	4.1102	121.540	126.519
15	22.9993	-1	4	5	15	354.838	0.50678	0.37525	4.2089	121.680	126.658
16	48.7527	-1	4	5	15	363.882	0.49421	0.35933	4.5710	122.183	127.162
17	35.8498	-1	5	6	14	349.199	0.54698	0.38518	5.0509	121.979	127.954
18	45.9602	-1	5	6	14	373.775	0.51509	0.34191	5.9694	123.340	129.314
19	43.5008	-1	5	6	14	377.535	0.51022	0.33529	6.1099	123.540	129.514
20	24.2180	-1	5	6	14	378.074	0.50952	0.33434	6.1300	123.568	129.543
21	36.6908	-1	6	7	13	374.595	0.54874	0.34047	7.0000	123.901	130.871

Logged Harvest

N = 20 Regression Models for Dependent Variable: LGRDDRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.118278	0.069294	6.1207	2.4158	1.02650	4.4073	MJ_INFL
1	0.084019	0.033132	6.9802	3.1782	1.06638	5.1697	MA_INFL
1	0.077532	0.026283	7.1429	3.3194	1.07394	5.3108	JF_INFL
1	0.064608	0.012641	7.4672	3.5976	1.08898	5.5891	JA_INFL
2	0.297590	0.214954	3.6221	-0.1313	0.86585	2.8559	MJ_INFL JA_INFL
2	0.263303	0.176632	4.4823	0.8219	0.90811	3.8091	MA_INFL JA_INFL
2	0.237869	0.148206	5.1204	1.5007	0.93946	4.4879	JF_INFL MJ_INFL
2	0.205255	0.111756	5.9386	2.3387	0.97967	5.3259	JF_INFL MA_INFL
3	0.390275	0.275952	3.2968	-0.9615	0.79857	3.0214	JF_INFL MA_INFL ND_INFL
3	0.388576	0.273934	3.3394	-0.9059	0.80079	3.0770	JF_INFL MJ_INFL ND_INFL
3	0.348307	0.226115	4.3497	0.3698	0.85354	4.3527	MJ_INFL JA_INFL SO_INFL
3	0.335037	0.210357	4.6826	0.7729	0.87092	4.7559	JF_INFL MJ_INFL SO_INFL
4	0.439998	0.290665	4.0493	-0.6629	0.78234	4.3158	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.402010	0.242546	5.0024	0.6498	0.83541	5.6285	JF_INFL MA_INFL SO_INFL ND_INFL
4	0.401109	0.241404	5.0250	0.6799	0.83667	5.6586	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.400330	0.240418	5.0445	0.7059	0.83776	5.6846	JF_INFL MA_INFL JA_INFL ND_INFL
5	0.458433	0.265016	5.5868	0.6676	0.81063	6.6420	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.451712	0.255895	5.7555	0.9143	0.82069	6.8887	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.444921	0.246679	5.9258	1.1605	0.83086	7.1349	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.421115	0.214370	6.5231	2.0004	0.86649	7.9748	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
6	0.481825	0.242667	7.0000	1.7846	0.83528	8.7547	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	LGRDDRUM	1.01316	2.20555	.	.	.00035438	.	.
2	MODEL1	PARMS	LGRDDRUM	1.03266	2.34864	.	.00038871	.	.	.
3	MODEL1	PARMS	LGRDDRUM	1.03631	3.86687	-.0004502	.	.	.	.
4	MODEL1	PARMS	LGRDDRUM	1.04354	3.65580	.	.	.	-.0007380	.
5	MODEL1	PARMS	LGRDDRUM	0.93051	2.81204	.	.	.00054091	-.0013371	.
6	MODEL1	PARMS	LGRDDRUM	0.95295	2.92176	.	.00066458	.	-.0013668	.
7	MODEL1	PARMS	LGRDDRUM	0.96926	3.05302	-.0005684	.	.00041942	.	.
8	MODEL1	PARMS	LGRDDRUM	0.98978	3.17968	-.0005762	.00049052	.	.	.
9	MODEL1	PARMS	LGRDDRUM	0.89363	2.80103	-.0013650	.00073105	.	.	.
10	MODEL1	PARMS	LGRDDRUM	0.89487	2.79176	-.0012330	.	.00053539	.	.
11	MODEL1	PARMS	LGRDDRUM	0.92387	2.52081	.	.	.00059136	-.0017207	.00045534
12	MODEL1	PARMS	LGRDDRUM	0.93323	2.98284	-.0010359	.	.00046788	.	.00075093
13	MODEL1	PARMS	LGRDDRUM	0.88450	2.57811	-.0013905	.00044469	.00032137	.	.
14	MODEL1	PARMS	LGRDDRUM	0.91401	2.82303	-.0014337	.00072749	.	.	.00031633
15	MODEL1	PARMS	LGRDDRUM	0.91470	2.81280	-.0013052	.	.00053358	.	.00032686
16	MODEL1	PARMS	LGRDDRUM	0.91529	2.78299	-.0011129	.00077704	.	-.0004943	.
17	MODEL1	PARMS	LGRDDRUM	0.90035	2.53250	-.0010476	.00048086	.00035149	-.0006771	.
18	MODEL1	PARMS	LGRDDRUM	0.90592	2.60014	-.0014591	.00044120	.00032130	.	.00031605
19	MODEL1	PARMS	LGRDDRUM	0.91151	2.67301	-.0006208	.00043212	.00037669	-.0013520	.00081730
20	MODEL1	PARMS	LGRDDRUM	0.93085	2.79026	-.0009492	.	.00058405	-.0007287	.00044862
21	MODEL1	PARMS	LGRDDRUM	0.91394	2.54979	-.0010346	.00048775	.00036141	-.0009023	.00046568

OBS	ND_INFL	LGRDDRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	1.02650	0.11828	0.06929	6.12067	2.41585	4.40731
2	.	-1	1	2	18	1.06638	0.08402	0.03313	6.98015	3.17822	5.16968
3	.	-1	1	2	18	1.07394	0.07753	0.02628	7.14292	3.31938	5.31084
4	.	-1	1	2	18	1.08898	0.06461	0.01264	7.46716	3.59764	5.58910
5	.	-1	2	3	17	0.86585	0.29759	0.21495	3.62208	-0.13134	2.85585
6	.	-1	2	3	17	0.90811	0.26330	0.17663	4.48229	0.82186	3.80906
7	.	-1	2	3	17	0.93946	0.23787	0.14821	5.12038	1.50070	4.48789
8	.	-1	2	3	17	0.97967	0.20526	0.11176	5.93859	2.33874	5.32593
9	.00094631	-1	3	4	16	0.79857	0.39027	0.27595	3.29680	-0.96152	3.02141
10	.00082248	-1	3	4	16	0.80079	0.38858	0.27393	3.33942	-0.90588	3.07705
11	.	-1	3	4	16	0.85354	0.34831	0.22611	4.34969	0.36978	4.35271
12	.	-1	3	4	16	0.87092	0.33504	0.21036	4.68261	0.77293	4.75586
13	.00095737	-1	4	5	15	0.78234	0.44000	0.29066	4.04934	-0.66289	4.31577
14	.00078806	-1	4	5	15	0.83541	0.40201	0.24255	5.00240	0.64980	5.62846
15	.00066005	-1	4	5	15	0.83667	0.40111	0.24140	5.02500	0.67992	5.65858
16	.00086001	-1	4	5	15	0.83776	0.40033	0.24042	5.04455	0.70591	5.68457
17	.00084018	-1	5	6	14	0.81063	0.45843	0.26502	5.58685	0.66765	6.64204
18	.00079926	-1	5	6	14	0.82069	0.45171	0.25590	5.75546	0.91432	6.88871
19	.	-1	5	6	14	0.83086	0.44492	0.24668	5.92583	1.16051	7.13491
20	.00046162	-1	5	6	14	0.86649	0.42112	0.21437	6.52309	2.00039	7.97479
21	.00056823	-1	6	7	13	0.83528	0.48182	0.24267	7.00000	1.78459	8.75471

Logged Harvest and Inflows

N = 20 Regression Models for Dependent Variable: LGRDDRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.111024	0.061636	10.3067	2.5797	1.03494	4.5712	LGMJINFL
1	0.097646	0.047515	10.7026	2.8785	1.05052	4.8699	LGMAINFL
1	0.069711	0.018028	11.5293	3.4882	1.08304	5.4797	LGJFINFL
1	0.047315	-.005612	12.1920	3.9640	1.10911	5.9555	LGJAINFL
2	0.340012	0.262366	5.5305	-1.3772	0.81355	1.6100	LGMJINFL LGJAINFL
2	0.305072	0.223315	6.5644	-0.3455	0.85662	2.6417	LGMAINFL LGJAINFL
2	0.265912	0.179549	7.7232	0.7509	0.90489	3.7381	LGJFINFL LGMJINFL
2	0.222740	0.131297	9.0008	1.8938	0.95811	4.8810	LGJFINFL LGMAINFL
3	0.466939	0.366991	3.7744	-3.6490	0.69816	0.3339	LGJFINFL LGMJINFL LGNDINFL
3	0.424885	0.317051	5.0189	-2.1303	0.75324	1.8526	LGJFINFL LGMAINFL LGNDINFL
3	0.401206	0.288932	5.7196	-1.3233	0.78425	2.6596	LGMJINFL LGJAINFL LGNDINFL
3	0.396290	0.283095	5.8651	-1.1598	0.79069	2.8231	LGMAINFL LGJAINFL LGNDINFL
4	0.514389	0.384893	4.3703	-3.5135	0.67842	1.4651	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
4	0.488059	0.351541	5.1494	-2.4575	0.71520	2.5212	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.484657	0.347233	5.2501	-2.3250	0.71995	2.6536	LGMAINFL LGMJINFL LGJAINFL LGNDINFL
4	0.467231	0.325160	5.7658	-1.6599	0.74430	3.3187	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
5	0.560593	0.403662	5.0030	-3.5132	0.65771	2.4612	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.518032	0.345900	6.2625	-1.6641	0.72142	4.3103	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.489488	0.307162	7.1071	-0.5134	0.76415	5.4610	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.487348	0.304259	7.1705	-0.4298	0.76735	5.5446	LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
6	0.560694	0.357938	7.0000	-1.5178	0.70815	5.4524	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL	LGMJINFL	LGJAINFL	LGSOINFL
1	MODEL1	PARMS	LGRDDRUM	1.01732	-2.62283	.	.	0.73906	.	.
2	MODEL1	PARMS	LGRDDRUM	1.02495	-2.07702	.	0.69291	.	.	.
3	MODEL1	PARMS	LGRDDRUM	1.04069	8.47713	-0.72950	.	.	.	.
4	MODEL1	PARMS	LGRDDRUM	1.05314	6.09943	.	.	.	-0.46112	.
5	MODEL1	PARMS	LGRDDRUM	0.90197	-0.01334	.	.	1.43486	-1.21296	.
6	MODEL1	PARMS	LGRDDRUM	0.92554	0.67963	.	1.33265	.	-1.14289	.
7	MODEL1	PARMS	LGRDDRUM	0.95126	3.59033	-1.14970	.	1.03877	.	.
8	MODEL1	PARMS	LGRDDRUM	0.97883	3.89636	-1.00948	0.89606	.	.	.
9	MODEL1	PARMS	LGRDDRUM	0.83556	-0.40894	-2.64281	.	1.58542	.	.
10	MODEL1	PARMS	LGRDDRUM	0.86789	-0.61395	-2.50265	1.49136	.	.	.
11	MODEL1	PARMS	LGRDDRUM	0.88558	-4.25921	.	.	1.68545	-1.53738	.
12	MODEL1	PARMS	LGRDDRUM	0.88921	-5.03751	.	1.73755	.	-1.59736	.
13	MODEL1	PARMS	LGRDDRUM	0.82366	-2.12307	-2.84473	0.77655	1.06548	.	.
14	MODEL1	PARMS	LGRDDRUM	0.84570	-1.65557	-1.93711	.	1.73826	-0.61540	.
15	MODEL1	PARMS	LGRDDRUM	0.84850	-7.16825	.	1.07026	1.06084	-1.83160	.
16	MODEL1	PARMS	LGRDDRUM	0.86273	-0.37264	-2.62975	.	1.58015	.	-0.04260
17	MODEL1	PARMS	LGRDDRUM	0.81100	-4.53744	-1.81555	1.00016	1.15125	-0.94821	.
18	MODEL1	PARMS	LGRDDRUM	0.84937	-2.08598	-2.80875	0.81896	1.01809	.	-0.15339
19	MODEL1	PARMS	LGRDDRUM	0.87415	-1.86690	-1.89719	.	1.76613	-0.67722	0.10105
20	MODEL1	PARMS	LGRDDRUM	0.87598	-7.32405	.	1.04848	1.11303	-1.88399	0.13779
21	MODEL1	PARMS	LGRDDRUM	0.84151	-4.58272	-1.80536	0.99628	1.16096	-0.96343	0.02699

OBS	LGNDINFL	LGRDDRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	18	1.03494	0.11102	0.06164	10.3067	2.57972	4.57119
2	.	-1	1	2	18	1.05052	0.09765	0.04752	10.7026	2.87846	4.86992
3	.	-1	1	2	18	1.08304	0.06971	0.01803	11.5293	3.48823	5.47969
4	.	-1	1	2	18	1.10911	0.04731	-0.00561	12.1920	3.96400	5.95547
5	.	-1	2	3	17	0.81355	0.34001	0.26237	5.5305	-1.37724	1.60996
6	.	-1	2	3	17	0.85662	0.30507	0.22332	6.5644	-0.34551	2.64169
7	.	-1	2	3	17	0.90489	0.26591	0.17955	7.7232	0.75089	3.73809
8	.	-1	2	3	17	0.95811	0.22274	0.13130	9.0008	1.89383	4.88102
9	1.52131	-1	3	4	16	0.69816	0.46694	0.36699	3.7744	-3.64898	0.33395
10	1.56339	-1	3	4	16	0.75324	0.42489	0.31705	5.0189	-2.13029	1.85263
11	0.62321	-1	3	4	16	0.78425	0.40121	0.28893	5.7196	-1.32332	2.65961
12	0.79814	-1	3	4	16	0.79069	0.39629	0.28309	5.8651	-1.15982	2.82311
13	1.72417	-1	4	5	15	0.67842	0.51439	0.38489	4.3703	-3.51354	1.46512
14	1.36461	-1	4	5	15	0.71520	0.48806	0.35154	5.1494	-2.45749	2.52117
15	0.86190	-1	4	5	15	0.71995	0.48466	0.34723	5.2501	-2.32504	2.65362
16	1.54890	-1	4	5	15	0.74430	0.46723	0.32516	5.7658	-1.65994	3.31872
17	1.54114	-1	5	6	14	0.65771	0.56059	0.40366	5.0030	-3.51318	2.46121
18	1.83457	-1	5	6	14	0.72142	0.51803	0.34590	6.2625	-1.66412	4.31027
19	1.28344	-1	5	6	14	0.76415	0.48949	0.30716	7.1071	-0.51340	5.46099
20	0.76720	-1	5	6	14	0.76735	0.48735	0.30426	7.1705	-0.42976	5.54464
21	1.51878	-1	6	7	13	0.70815	0.56069	0.35794	7.0000	-1.51777	5.45236

Regression—Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows*[c,d]	.	*.743*	*.553*	*.346*	*19.2712*	*2.045*

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*5963.560*	*6*	*993.927*	*2.676*	*.065*[b]
	Residual	*4827.906*	*13*	*371.377*		
	Total	*10791.466*	*19*			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.231	16.215		.138	.893	-32.800	37.262
	January-February Inflows	-1.714E-02	.015	-.467	-1.152	.270	-.049	.015
	March-April Inflows	2.989E-03	.008	.098	.359	.726	-.015	.021
	May-June Inflows	1.112E-02	.006	.476	1.810	.093	-.002	.024
	July-August Inflows	-2.089E-02	.022	-.317	-.955	.357	-.068	.026
	September-October Inflows	2.008E-02	.013	.497	1.566	.141	-.008	.048
	November-December Inflows	1.585E-02	.012	.477	1.273	.225	-.011	.043

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.209	4.782
	March-April Inflows	.459	2.179
	May-June Inflows	.498	2.007
	July-August Inflows	.312	3.208
	September-October Inflows	.342	2.928
	November-December Inflows	.245	4.083

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	6.382	1.000	.00	.00	.00
	2	.345	4.299	.00	.00	.05
	3	.102	7.901	.13	.01	.00
	4	6.710E-02	9.752	.35	.04	.06
	5	4.552E-02	11.841	.42	.04	.02
	6	4.212E-02	12.310	.07	.01	.86
	7	1.550E-02	20.292	.02	.90	.01

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.00	.00	.00
	2	.04	.00	.06	.04
	3	.03	.30	.00	.06
	4	.15	.03	.39	.00
	5	.20	.00	.44	.28
	6	.55	.03	.02	.04
	7	.03	.64	.08	.58

a. Dependent Variable: Red Drum Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*-2.9956*	*70.0328*	*31.0650*	*17.7164*	*20*
Std. Predicted Value	*-1.923*	*2.200*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*6.2043*	*16.7055*	*11.1218*	*2.5725*	*20*
Adjusted Predicted Value	*-31.9558*	*91.1519*	*34.0072*	*25.6672*	*20*
Residual	*-26.0503*	*34.8729*	*5.063E-15*	*15.9405*	*20*
Std. Residual	*-1.352*	*1.810*	*.000*	*.827*	*20*
Stud. Residual	*-2.073*	*2.259*	*-.050*	*1.116*	*20*
Deleted Residual	*-66.9519*	*54.3686*	*-2.9422*	*30.9495*	*20*
Stud. Deleted Residual	*-2.434*	*2.786*	*-.046*	*1.236*	*20*
Mahal. Distance	*1.019*	*13.328*	*5.700*	*3.071*	*20*
Cook's Distance	*.000*	*1.110*	*.184*	*.336*	*20*
Centered Leverage Value	*.054*	*.701*	*.300*	*.162*	*20*

a. Dependent Variable: Red Drum Harvest

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	15.41678	-12.81678	-21.22583	23.82583	-.88326	-.66508	-.85588	-.84650
1963	27.35030	-26.05030	-34.29780	35.59780	-.20968	-1.35178	-1.55107	-1.65078
1964	30.18570	-4.48570	-6.69500	32.39500	-.04963	-.23277	-.28437	-.27407
1965	21.45886	10.74114	13.97526	18.22474	-.54222	.55737	.63577	.62055
1966	21.71563	8.08437	10.58645	19.21355	-.52772	.41951	.48005	.46536
1967	27.59909	17.40091	23.01038	21.98962	-.19563	.90295	1.03834	1.04174
1968	32.75965	-11.55965	-18.64909	39.84909	.09565	-.59984	-.76189	-.74891
1969	37.24027	.85973	1.10965	36.99035	.34856	.04461	.05068	.04870
1970	40.64504	-5.34504	-8.76620	44.06620	.54074	-.27736	-.35520	-.34293
1971	34.34389	-16.24389	-25.46847	43.56847	.18508	-.84291	-1.05545	-1.06050
1972	30.11862	3.48138	4.37001	29.22999	-.05342	.18065	.20240	.19477
1973	35.16845	14.43155	16.10037	33.49963	.23162	.74887	.79098	.77893
1974	49.34289	-14.44289	-21.88520	56.78520	1.03169	-.74946	-.92256	-.91689
1975	70.03282	9.46718	17.29161	62.20839	2.19953	.49126	.66393	.64898
1976	62.62714	34.87286	54.36861	43.13139	1.78152	1.80959	2.25949	*2.78569
1977	48.03556	-23.83556	-66.95193	91.15193	.95790	-1.23685	-2.07294	-2.43413
1978	13.99584	.90416	1.08000	13.82000	-.96347	.04692	.05128	.04927
1979	-2.99564	21.69564	50.65581	-31.95581	-1.92255	1.12581	1.72026	1.88062
1980	5.39755	7.70245	12.34134	.75866	-1.44879	.39969	.50593	.49094
1981	20.86157	-14.86157	-59.79470	65.79470	-.57593	-.77118	-1.54688	-1.64531

PRE_1 Predicted value of harvest

RES_1 Ordinary residual; observed harvest minus predicted harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of harvest

ZRE_1 Z-score of the residual

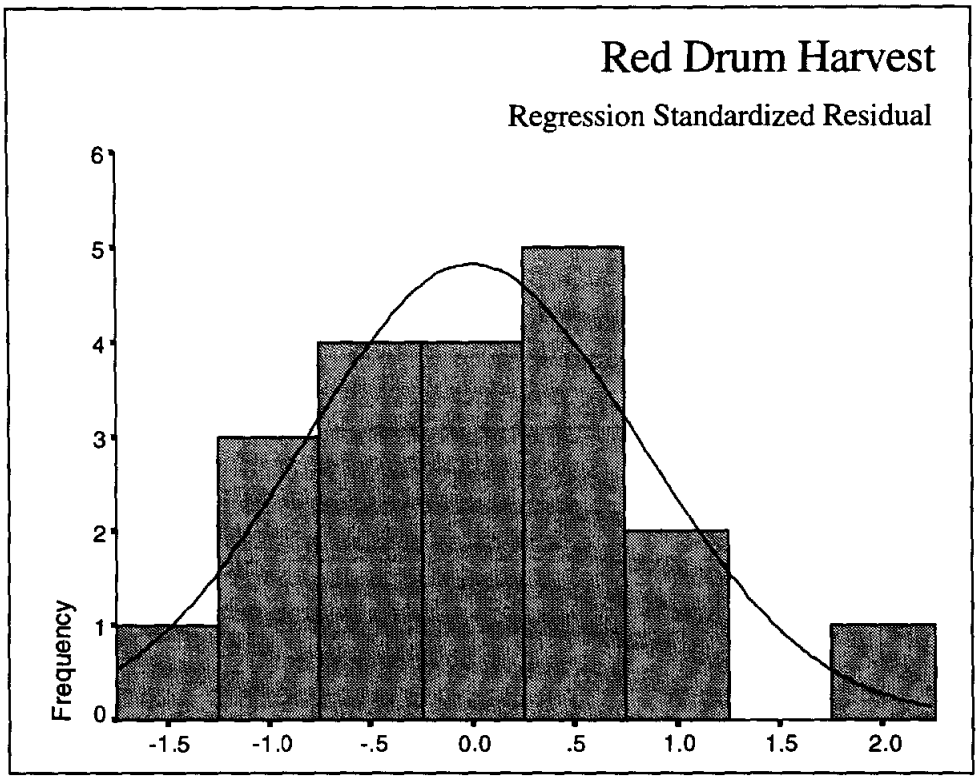
SRE_1 Studentized residual

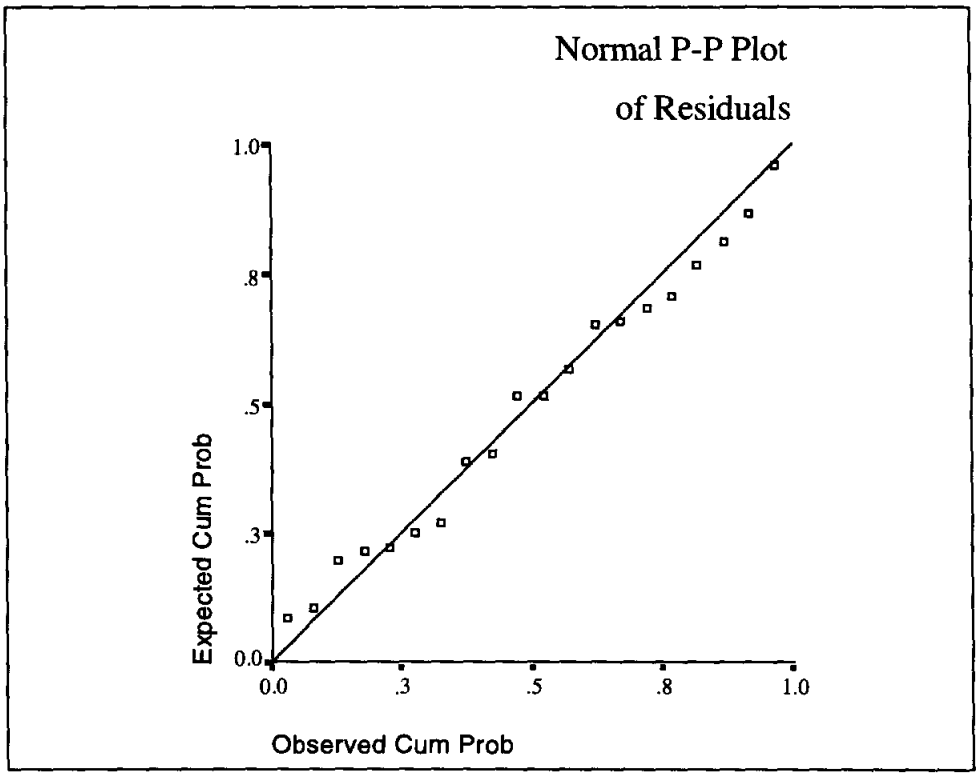
SDR_1 Studentized deleted residuals

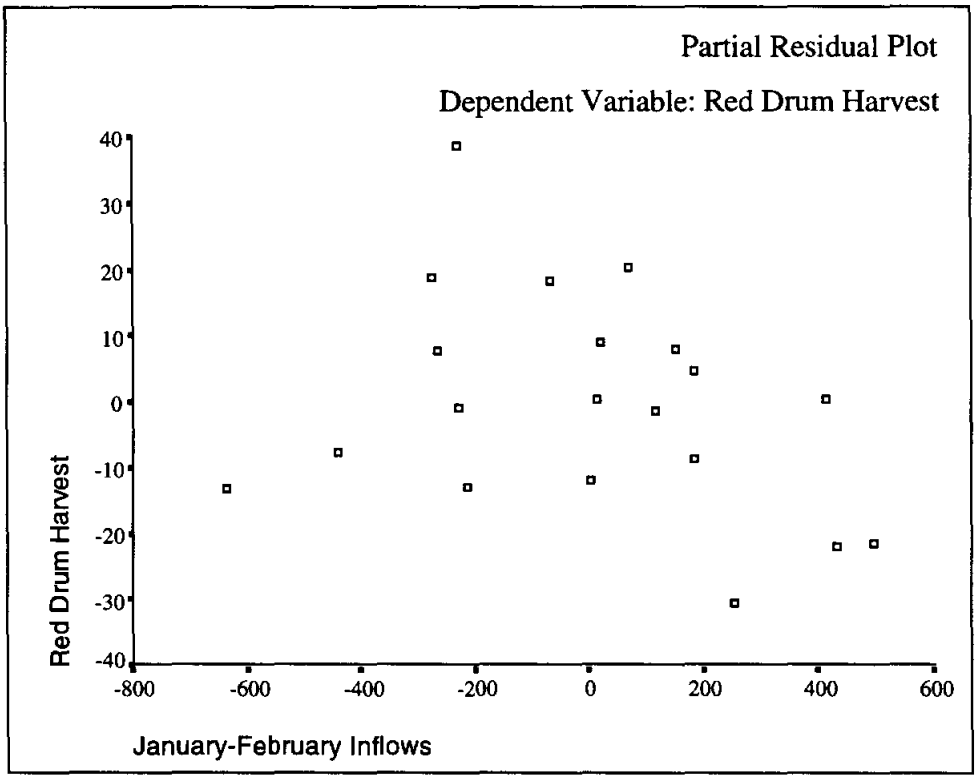
[1]Values greater than 3 are flagged.

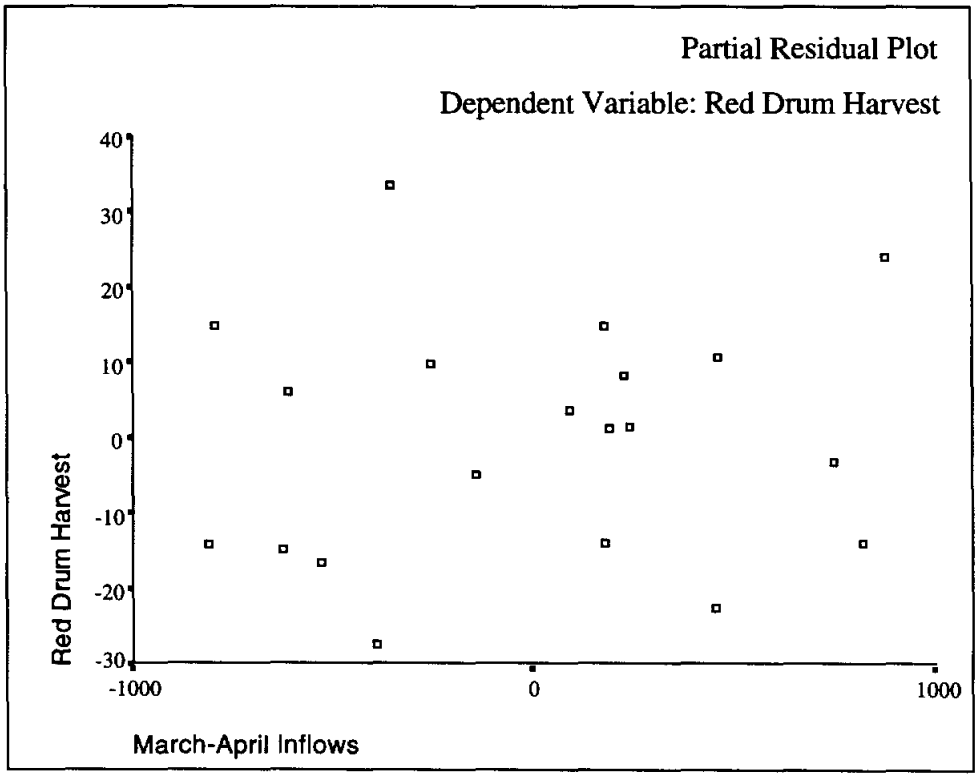
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{12,0.01} = 2.681$.

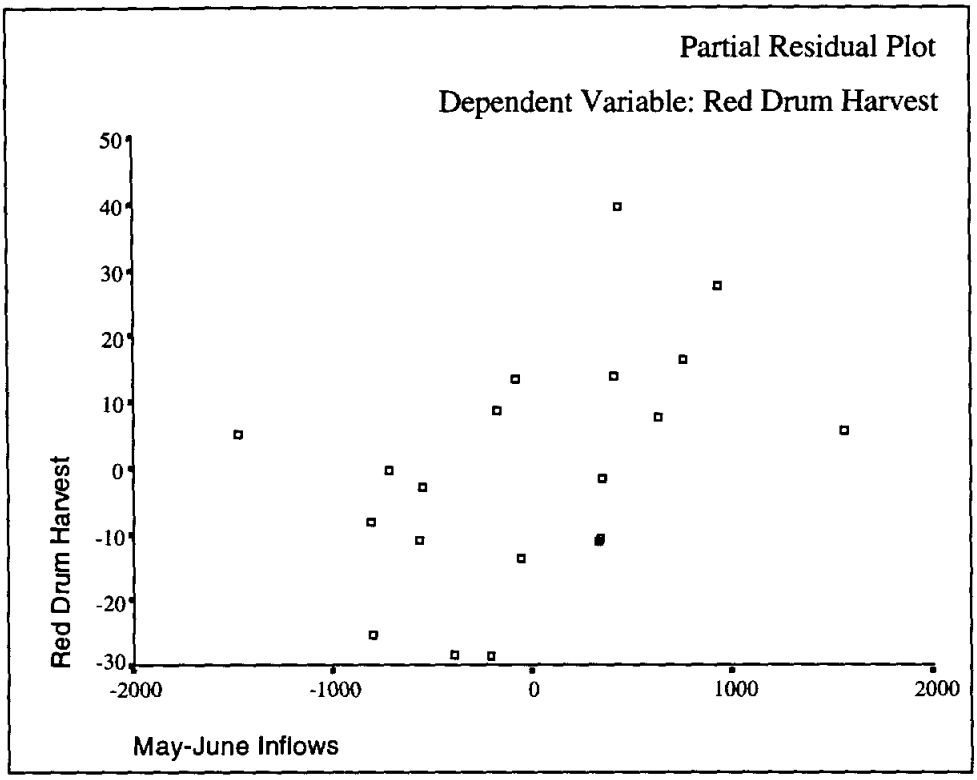
Graphics

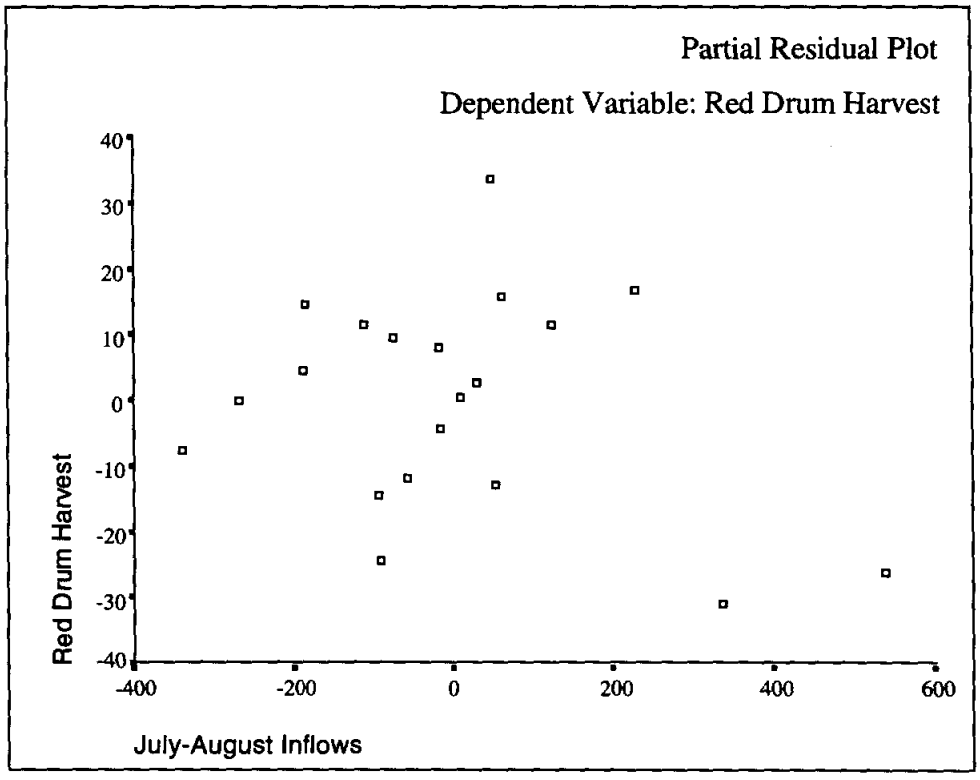

Red Drum Harvest
Regression Standardized Residual
Frequency
6
5
4
3
2
1
0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0

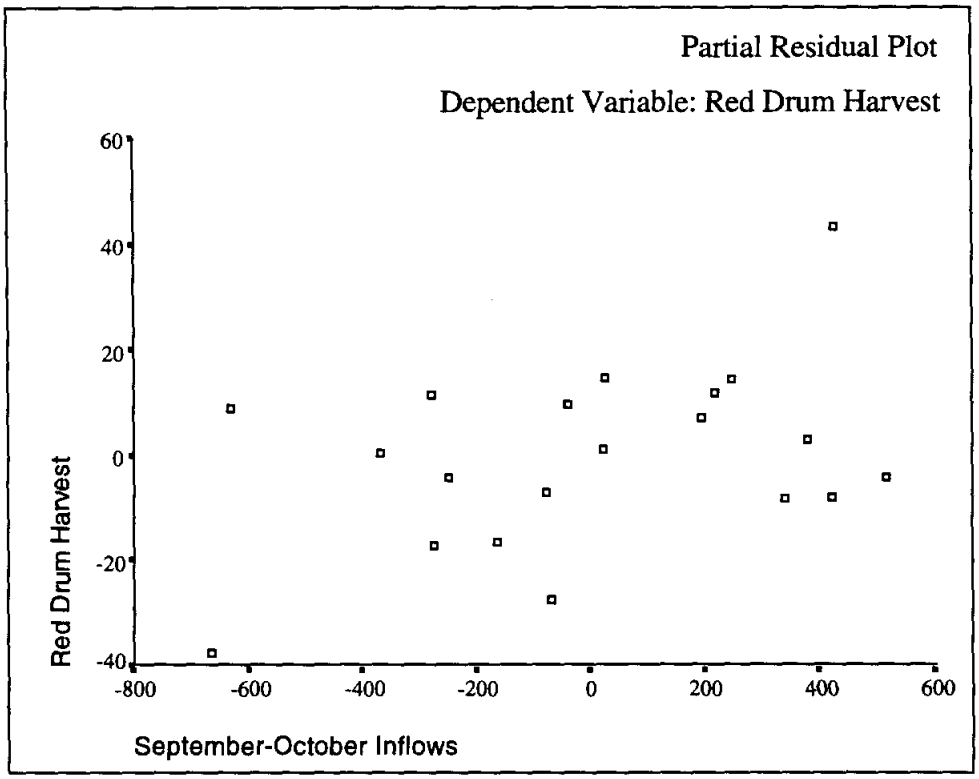

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob

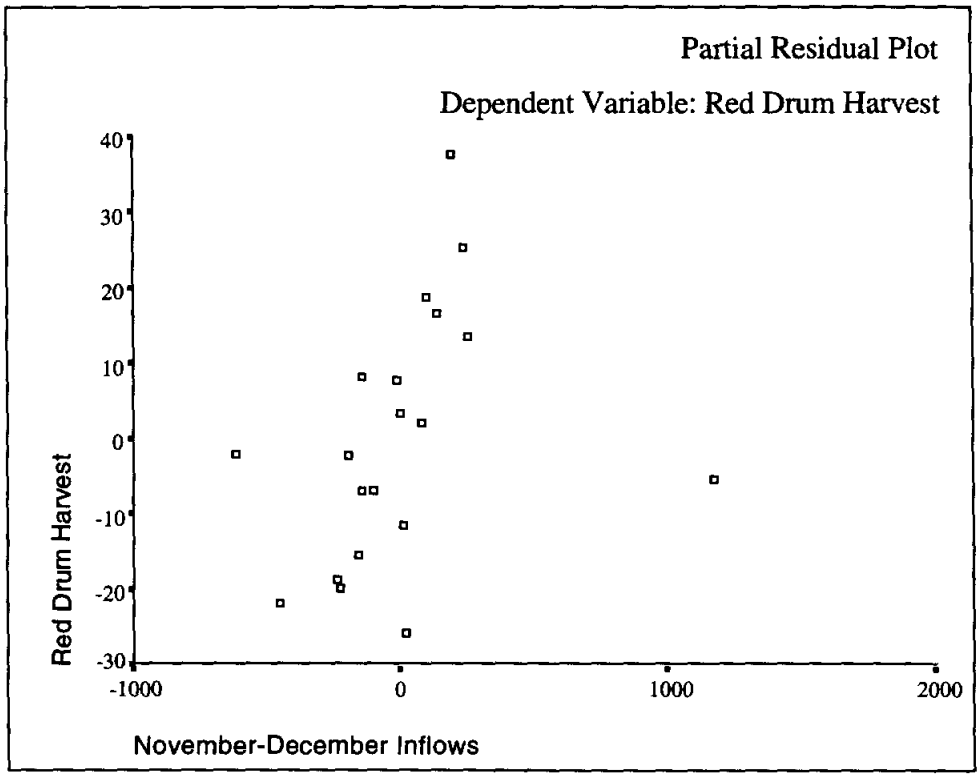

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-40
-800
-600
-400
-200
0
200
400
600
January-February Inflows

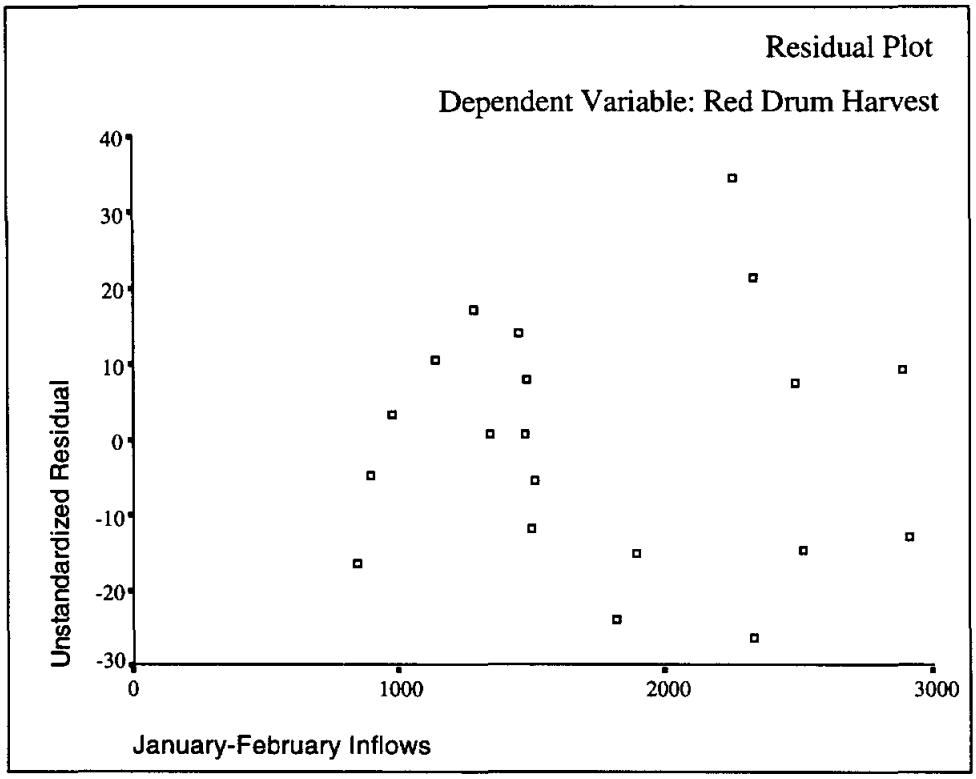

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-1000
0
1000
March-April Inflows

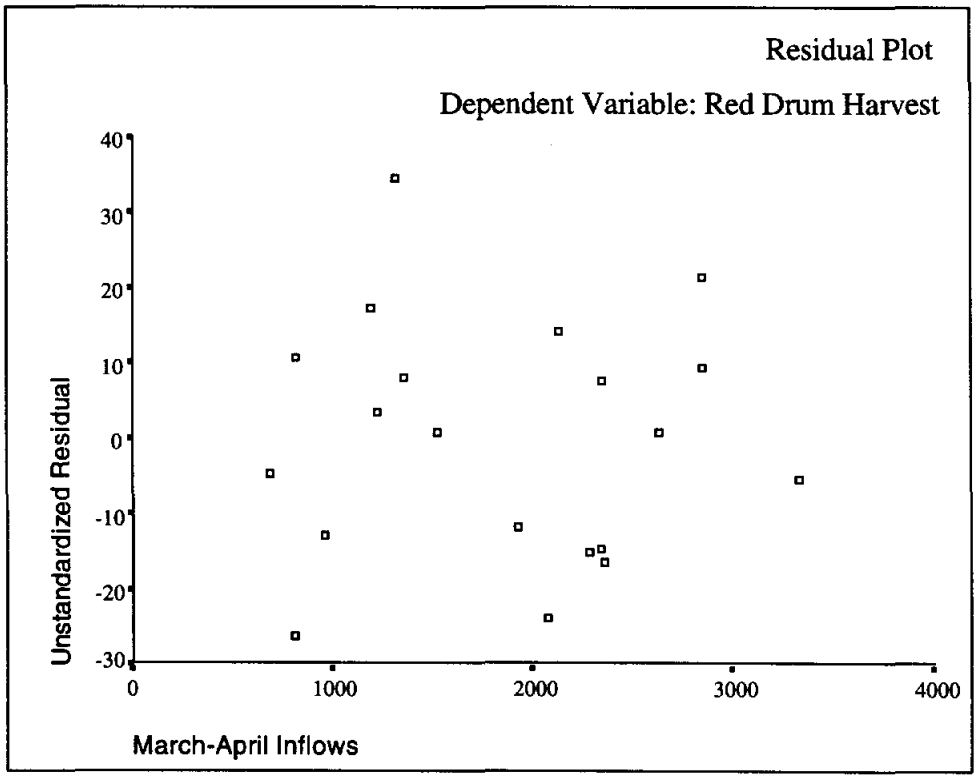

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
50
40
30
20
10
0
-10
-20
-30
-2000
-1000
0
1000
2000
May-June Inflows

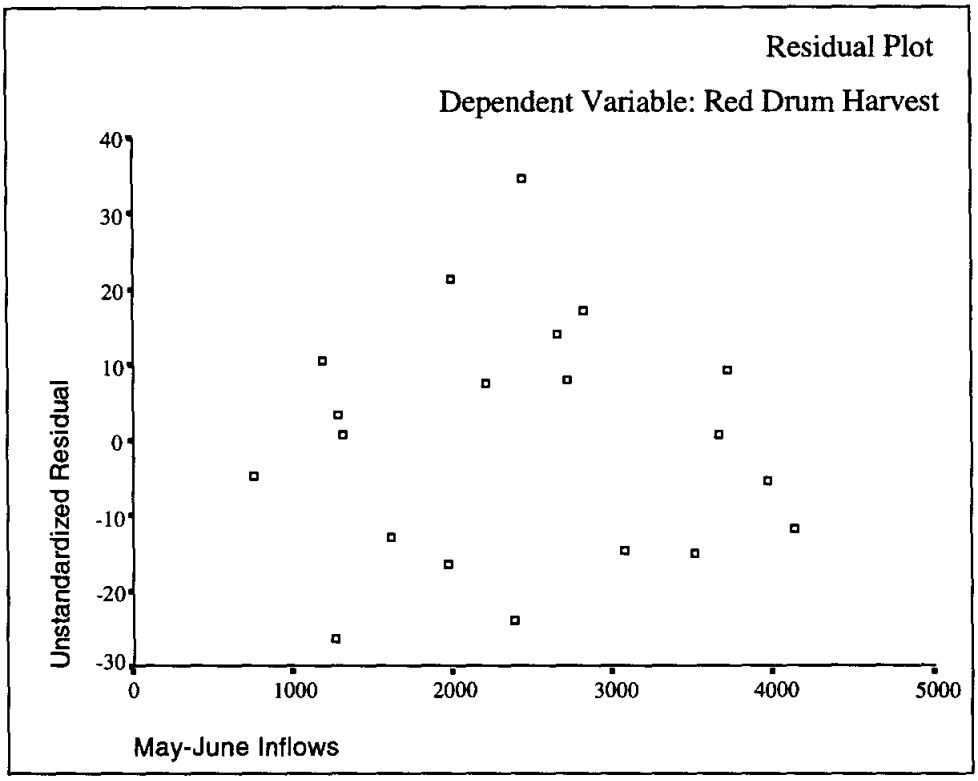

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-40
-400
-200
0
200
400
600
July-August Inflows

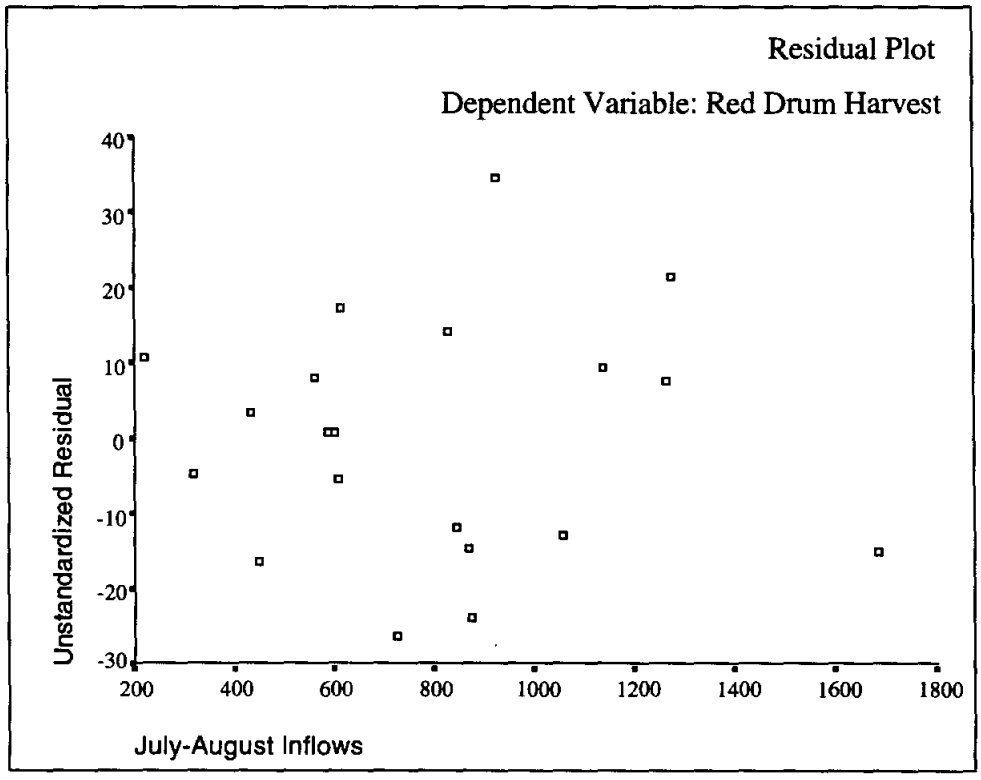

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-800
-600
-400
-200
0
200
400
600
September-October Inflows

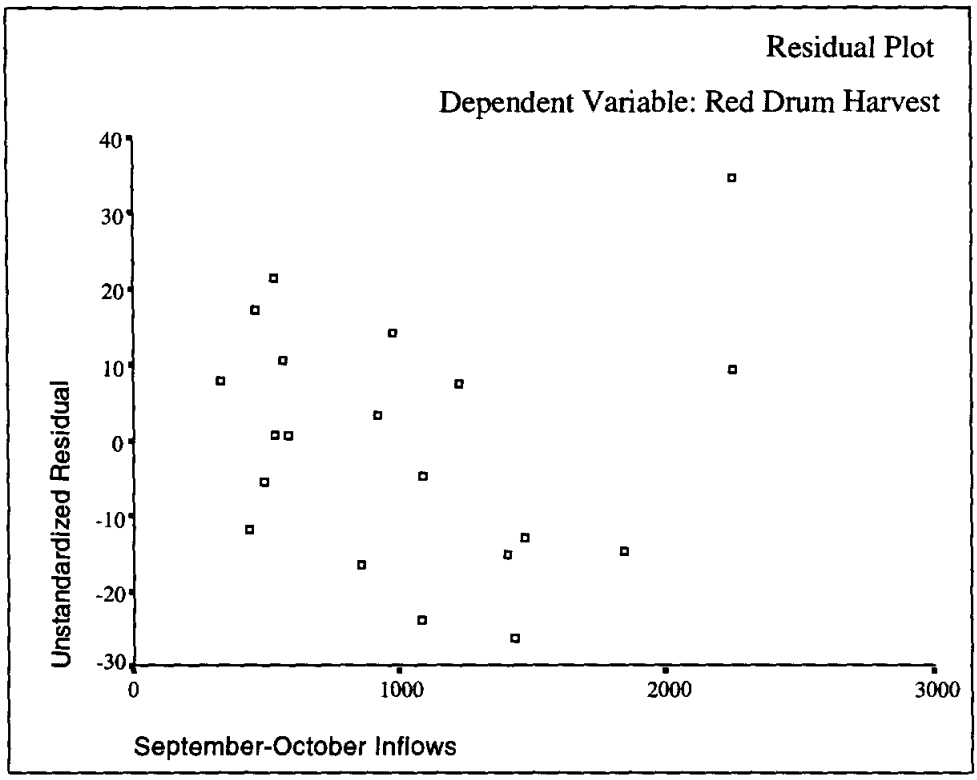

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
40
30
20
10
0
-10
-20
-30
-1000
0
1000
2000
November-December Inflows

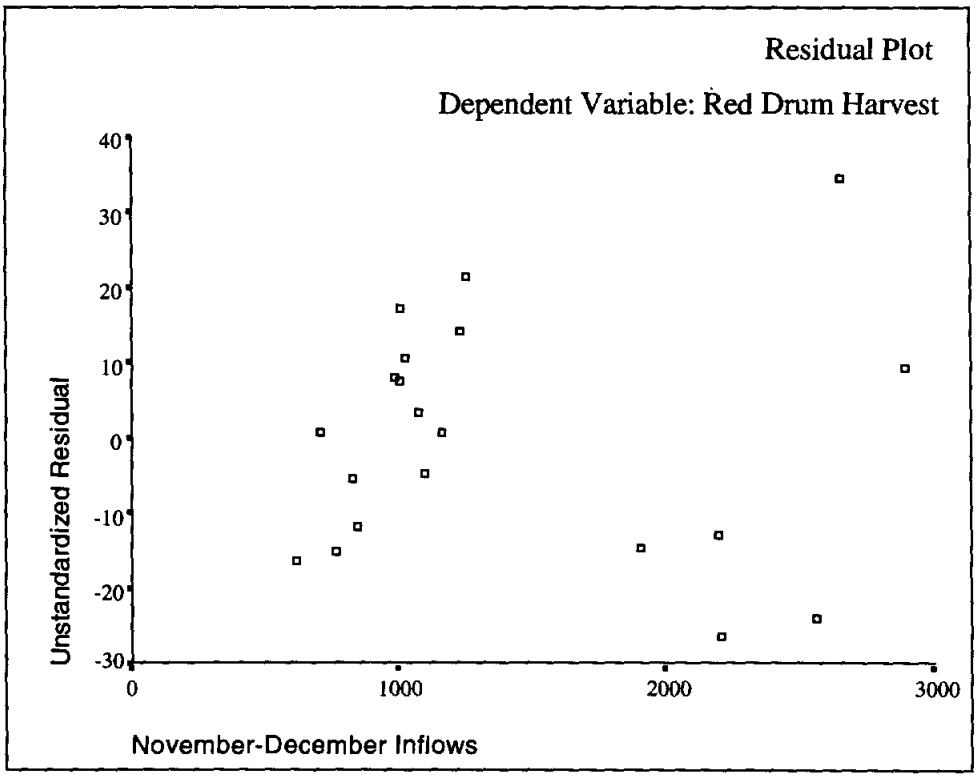

Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
January-February Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
March-April Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
4000
5000
May-June Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
200
400
600
800
1000
1200
1400
1600
1800
July-August Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
September-October Inflows


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
40
30
20
10
0
-10
-20
-30
0
1000
2000
3000
November-December Inflows

Prediction Intervals for Red Drum Harvest

YEAR	RED_DRUM	LICI_1	UICI_1
1962	2.60	-53.17494	84.00850
1963	1.30	-37.30365	92.00426
1964	25.70	-36.76069	97.13208
1965	32.20	-42.95882	85.87654
1966	29.80	-42.83088	86.26213
1967	45.00	-37.14114	92.33932
1968	21.20	-35.43737	100.95668
1969	38.10	-27.01519	101.49572
1970	35.30	-27.80151	109.09159
1971	18.10	-33.40814	102.09591
1972	33.60	-33.56064	93.79788
1973	49.60	-25.81589	96.15279
1974	34.90	-17.85643	116.54220
1975	79.50	.07112	139.99451
1976	97.50	-5.03502	130.28929
1977	24.20	-26.39513	122.46625
1978	14.90	-48.60170	76.59337
1979	18.70	-75.77160	69.78033
1980	13.10	-62.69397	73.48907
1981	6.00	-55.96335	97.68650

RED_DRUM	Red drum harvest
LICI_1	Lower limit for 99% prediction interval for red drum harvest
UICI_1	Upper limit for 99% prediction interval for red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.57724	.06866	.34617	.4742	.0008
1963	3.61888	.10881	.19047	.8225	.0034
1964	5.31987	.00569	.27999	.6210	.0000
1965	3.44693	.01739	.18142	.8408	.0000
1966	3.54060	.01019	.18635	.8309	.0000
1967	3.68182	.04965	.19378	.8156	.0003
1968	6.27283	.05086	.33015	.5083	.0003
1969	3.32923	.00011	.17522	.8530	.0000
1970	6.46508	.01154	.34027	.4866	.0000
1971	5.93173	.09037	.31220	.5477	.0019
1972	2.91360	.00149	.15335	.8929	.0000
1973	1.01937	.01034	.05365	.9945	.0000
1974	5.51117	.06265	.29006	.5978	.0006
1975	7.64748	.05204	.40250	.3647	.0003
1976	5.86311	.40773	.30858	.5558	.1191
1977	11.28581	1.11043	*.59399	.1266	*.5878
1978	2.14343	.00007	.11281	.9515	.0000
1979	9.91239	.56431	*.52170	.1936	.2278
1980	6.19176	.02202	.32588	.5175	.0000
1981	13.32768	1.03351	*.70146	.0645	*.5461

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 − F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.68566	.02856	-.41889	.29254
1963	-.92885	-.17082	-.37372	.32037
1964	-.19234	-.15911	.05869	.02025
1965	.34051	.26253	.08250	-.07716
1966	.25889	.07996	.07541	-.14072
1967	.59147	.23792	-.06236	-.41063
1968	-.58650	-.00407	-.00260	.33385
1969	.02626	-.00060	.00504	.00461
1970	-.27436	.06775	-.06262	-.14244
1971	-.79917	-.33900	.21700	-.47288
1972	.09840	.07982	-.04448	.00891
1973	.26488	.06956	-.17320	.06377
1974	-.65818	.23967	-.37630	-.08835
1975	.58999	-.40554	.01356	.17615
1976	*2.08285	-.23380	-.61489	-.52669
1977	*-3.27381	.35216	*2.00381	-.80804
1978	.02173	.01298	.00062	.00567
1979	*2.17278	-.18289	.15944	*1.09412
1980	.38099	-.00910	.19900	.06181
1981	*-2.86087	-.16622	*1.12035	.75288

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for January-February inflows
SDFBETA_2 Standardized dfbeta for March-April inflows

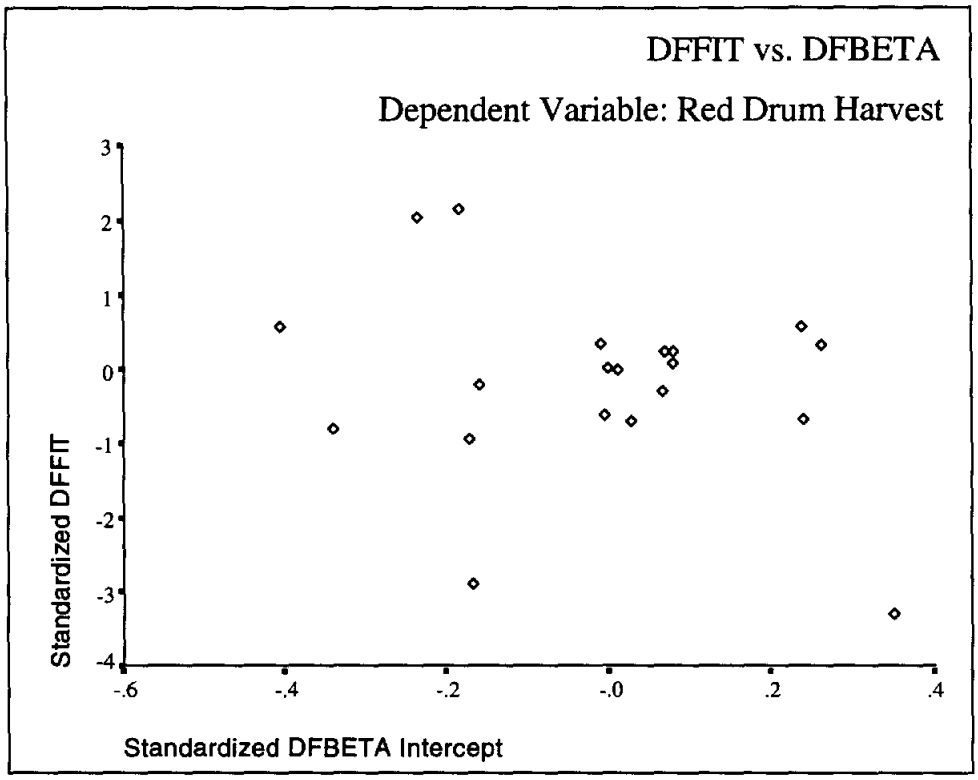
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.0.

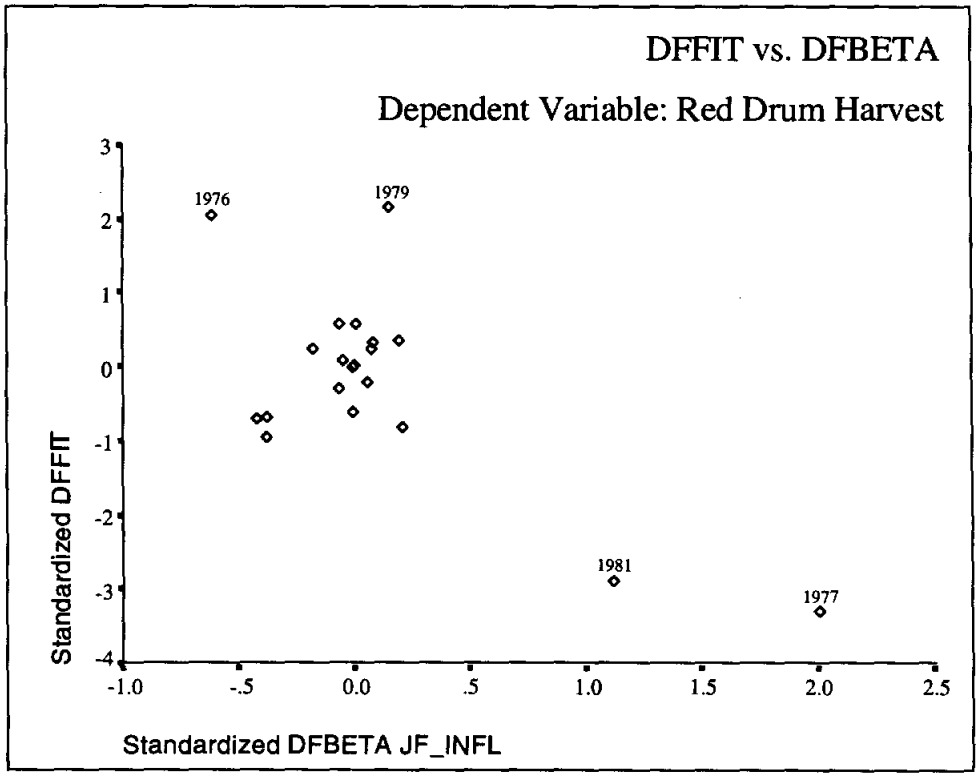
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.01997	.07029	.11863	.10876
1963	.12215	.19391	.08365	-.02722
1964	.05962	.00582	-.08455	.03020
1965	-.03918	-.14889	-.01771	-.06551
1966	.12963	-.04454	-.12958	-.00224
1967	.35884	.08483	-.22005	.07807
1968	-.47293	-.05843	.17282	-.00803
1969	.01126	-.01168	.00084	-.00675
1970	-.04974	.13344	.02193	.02664
1971	.33726	.13834	-.37290	.18963
1972	-.03806	.00740	.02839	.00082
1973	-.01970	.11667	.01393	.07576
1974	-.12379	.43433	-.38906	.33129
1975	.11472	-.11007	.14566	.14844
1976	.48900	.19039	.98383	.44391
1977	.50549	*-1.56058	*1.80273	*-3.11090
1978	-.01380	.00062	-.00889	.00296
1979	*-1.35134	.74586	*-1.20267	.45238
1980	-.14155	-.01292	.09054	-.24663
1981	-.35890	*-2.02076	-.75059	.50544

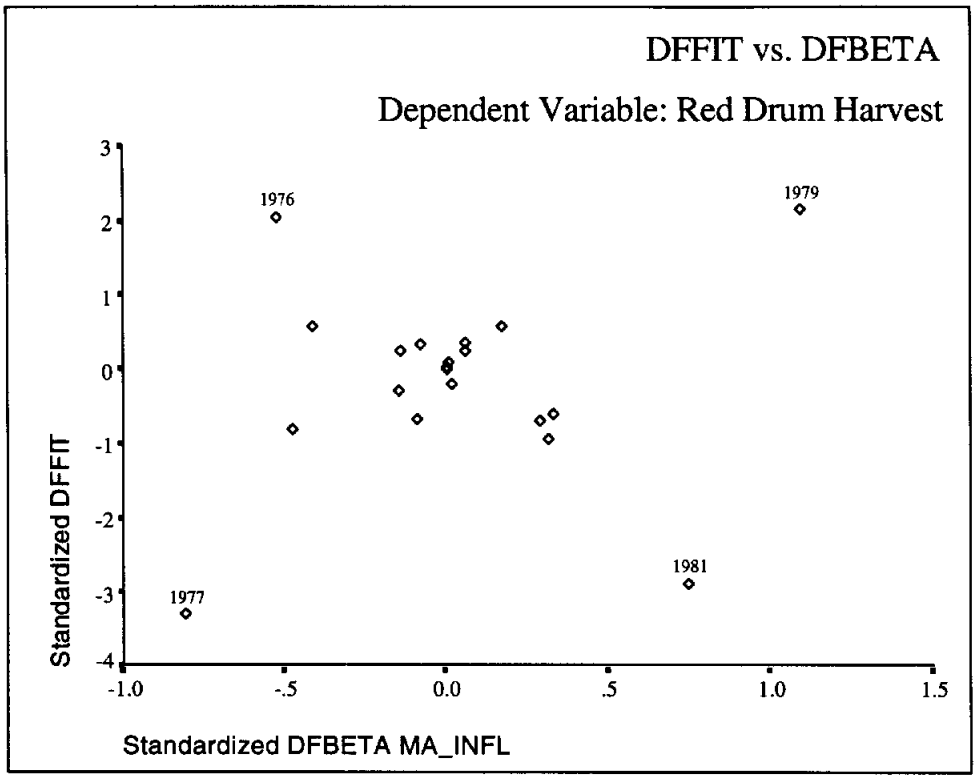
SDFBETA_3 Standardized dfbeta for May-June inflows
SDFBETA_4 Standardized dfbeta for July-August inflows
SDFBETA_5 Standardized dfbeta for September-October inflows
SDFBETA_6 Standardized dfbeta for November-December inflows

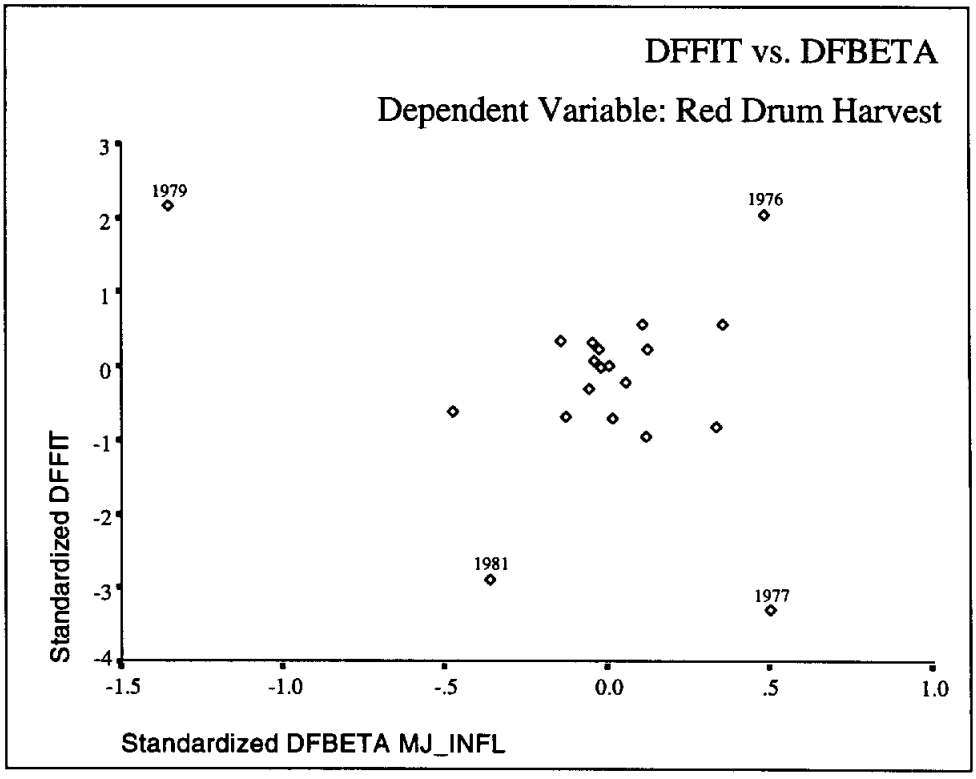
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

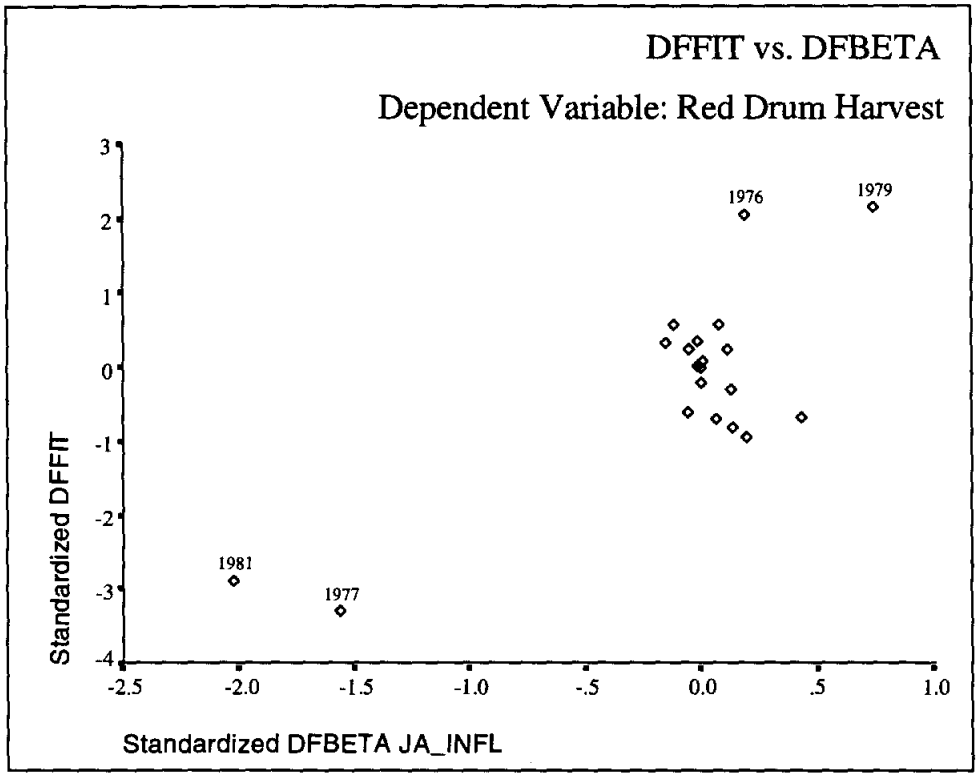
Graphics

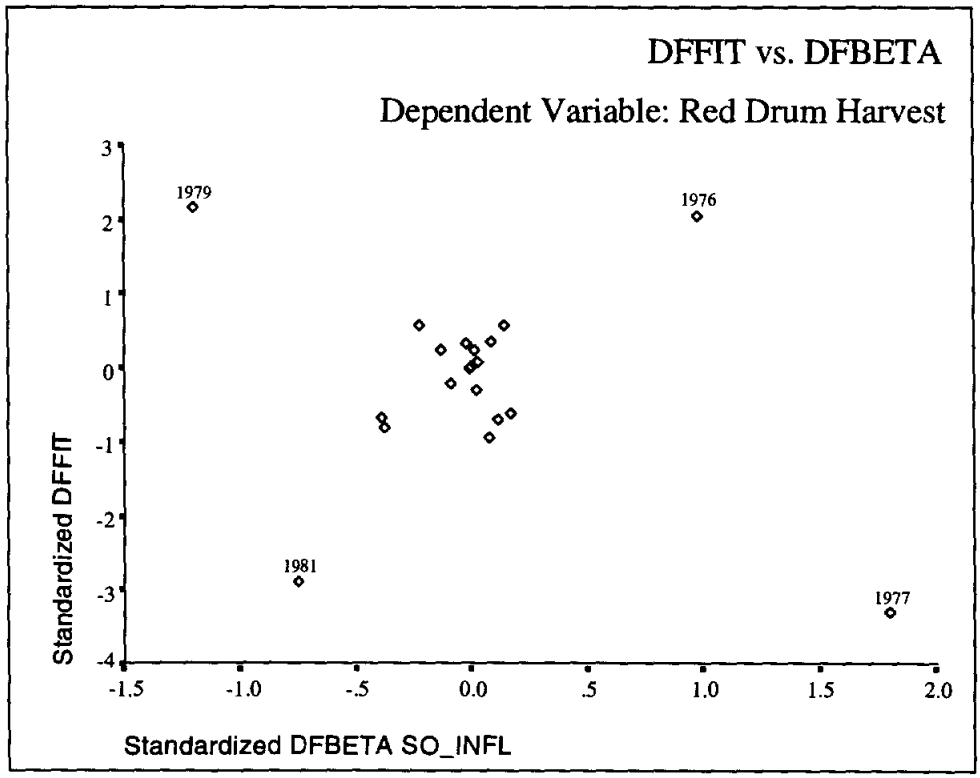

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Intercept

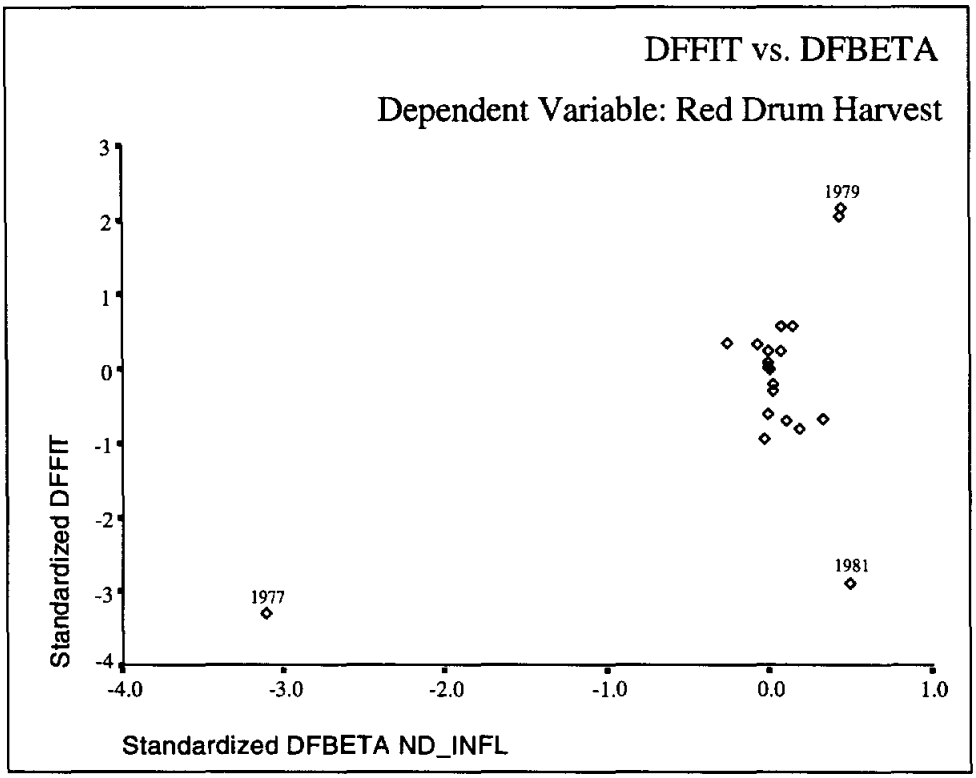

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
1976
1979
1981
1977
3
2
1
0
-1
-2
-3
-4
-1.0
-.5
0.0
.5
1.0
1.5
2.0
2.5
Standardized DFBETA JF_INFL


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA MA_INFL
1976
1979
1977
1981
3
2
1
0
-1
-2
-3
-4
-1.0
-.5
0.0
.5
1.0
1.5


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA MJ_INFL
1979
1976
1981
1977
3
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA JA_INFL
1976
1979
1981
1977
3
2
1
0
-1
-2
-3
-4
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA SO_INFL
1979
1976
1981
1977
3
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1981
1977
-4.0
-3.0
-2.0
-1.0
0.0
1.0
Standardized DFBETA ND_INFL

Regression—Square Root of Harvest (Box–Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows*[c,d]	.	.722	.522	.301	1.7915	1.732

a. Dependent Variable: Square Root of Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	45.553	6	7.592	2.366	.091[b]
	Residual	41.723	13	3.209		
	Total	87.275	19			

a. Dependent Variable: Square Root of Red Drum Harvest

b. Independent Variables: (Constant), November-December Inflows, May-June Inflows, July-August Inflows, March-April Inflows, September-October Inflows, January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.218	1.507		2.135	.052	-.039	6.474
	January-February Inflows	-1.806E-03	.001	-.547	-1.305	.214	-.005	.001
	March-April Inflows	6.123E-04	.001	.224	.790	.443	-.001	.002
	May-June Inflows	9.530E-04	.001	.453	1.668	.119	.000	.002
	July-August Inflows	-2.200E-03	.002	-.371	-1.081	.299	-.007	.002
	September-October Inflows	1.432E-03	.001	.394	1.202	.251	-.001	.004
	November-December Inflows	1.385E-03	.001	.464	1.197	.253	-.001	.004

a. Dependent Variable: Square Root of Red Drum Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	January-February Inflows	.209	4.782
	March-April Inflows	.459	2.179
	May-June Inflows	.498	2.007
	July-August Inflows	.312	3.208
	September-October Inflows	.342	2.928
	November-December Inflows	.245	4.083

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	January-February Inflows	March-April Inflows
1	1	6.382	1.000	.00	.00	.00
	2	.345	4.299	.00	.00	.05
	3	.102	7.901	.13	.01	.00
	4	6.710E-02	9.752	.35	.04	.06
	5	4.552E-02	11.841	.42	.04	.02
	6	4.212E-02	12.310	.07	.01	.86
	7	1.550E-02	20.292	.02	.90	.01

a. Dependent Variable: Square Root of Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		May-June Inflows	July-August Inflows	September-October Inflows	November-December Inflows
1	1	.00	.00	.00	.00
	2	.04	.00	.06	.04
	3	.03	.30	.00	.06
	4	.15	.03	.39	.00
	5	.20	.00	.44	.28
	6	.55	.03	.02	.04
	7	.03	.64	.08	.58

a. Dependent Variable: Square Root of Red Drum Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*2.3574*	*8.0354*	*5.1673*	*1.5484*	*20*
Std. Predicted Value	*-1.815*	*1.852*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*.5768*	*1.5530*	*1.0339*	*.2391*	*20*
Adjusted Predicted Value	*-.2681*	*9.8330*	*5.4211*	*2.2241*	*20*
Residual	*-3.0846*	*2.7278*	*1.066E-15*	*1.4819*	*20*
Std. Residual	*-1.722*	*1.523*	*.000*	*.827*	*20*
Stud. Residual	*-1.976*	*1.901*	*-.046*	*1.096*	*20*
Deleted Residual	*-5.8946*	*4.5924*	*-.2538*	*2.7860*	*20*
Stud. Deleted Residual	*-2.269*	*2.150*	*-.057*	*1.178*	*20*
Mahal. Distance	*1.019*	*13.328*	*5.700*	*3.071*	*20*
Cook's Distance	*.000*	*1.162*	*.168*	*.300*	*20*
Centered Leverage Value	*.054*	*.701*	*.300*	*.162*	*20*

a. Dependent Variable: Square Root of Red Drum Harvest

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	2.91148	-1.29902	-2.15131	3.76376	-1.45690	-.72511	-.93314	-.92815
1963	4.22475	-3.08458	-4.06115	5.20133	-.60874	-1.72179	-1.97564	-2.26910
1964	5.14413	-.07461	-.11136	5.18088	-.01498	-.04165	-.05088	-.04889
1965	4.54788	1.12663	1.46585	4.20866	-.40006	.62888	.71733	.70325
1966	4.57585	.88309	1.15640	4.30254	-.38199	.49293	.56408	.54871
1967	5.02894	1.67926	2.22060	4.48760	-.08937	.93736	1.07790	1.08525
1968	5.56711	-.96276	-1.55321	6.15756	.25819	-.53741	-.68259	-.66789
1969	6.32280	-.15029	-.19397	6.36649	.74625	-.08389	-.09530	-.09160
1970	6.82081	-.87943	-1.44232	7.38370	1.06788	-.49089	-.62866	-.61340
1971	6.11003	-1.85562	-2.90938	7.16379	.60883	-1.03579	-1.29697	-1.33548
1972	5.30408	.49247	.61818	5.17837	.08832	.27490	.30799	.29699
1973	5.72162	1.32110	1.47387	5.56885	.35798	.73743	.77890	.76644
1974	6.40527	-.49764	-.75408	6.66170	.79950	-.27778	-.34194	-.33001
1975	8.03539	.88089	1.60893	7.30735	1.85229	.49171	.66453	.64959
1976	7.14640	2.72781	4.25280	5.62141	1.27815	1.52265	1.90121	2.14978
1977	6.66864	-1.74929	-4.91360	9.83295	.96960	-.97644	-1.63650	-1.76453
1978	3.89512	-.03507	-.04189	3.90194	-.82163	-.01957	-.02139	-.02055
1979	2.35744	1.96691	4.59241	-.26806	-1.81471	1.09792	1.67764	1.82095
1980	2.64419	.97520	1.56253	2.05687	-1.62952	.54435	.68904	.67444
1981	3.91454	-1.46505	-5.89456	8.34405	-.80908	-.81779	-1.64036	-1.76977

PRE_1 Predicted value of the square root of harvest

RES_1 Ordinary residual; observed square root of harvest minus predicted square root of harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of square root of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of the square root of harvest

ZRE_1 Z-score of the residual

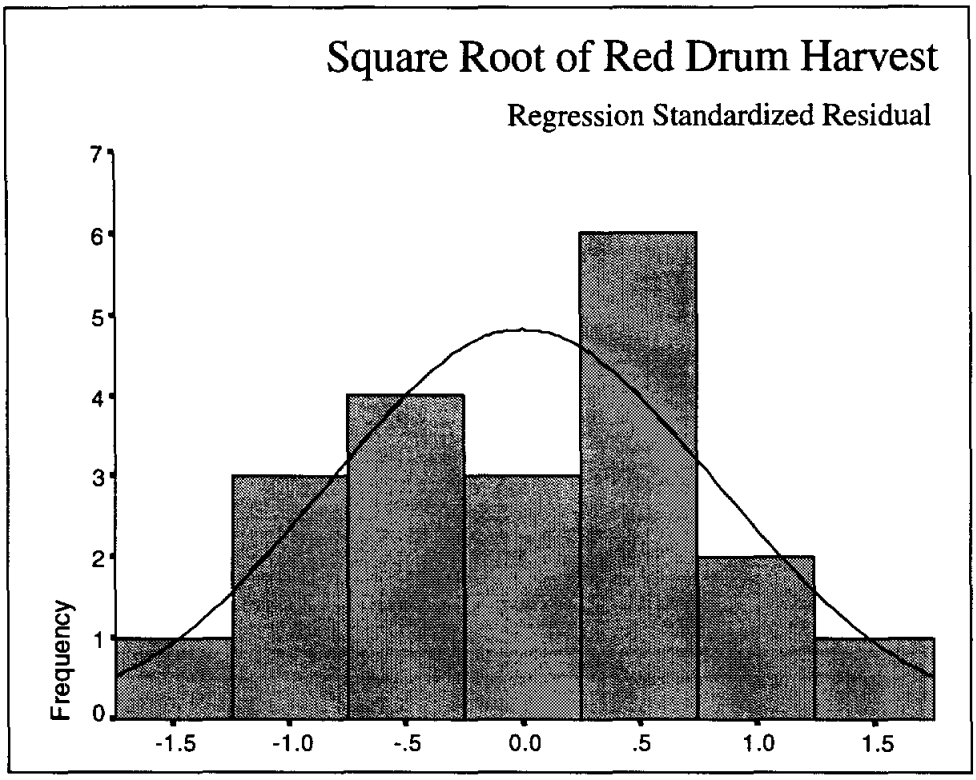
SRE_1 Studentized residual

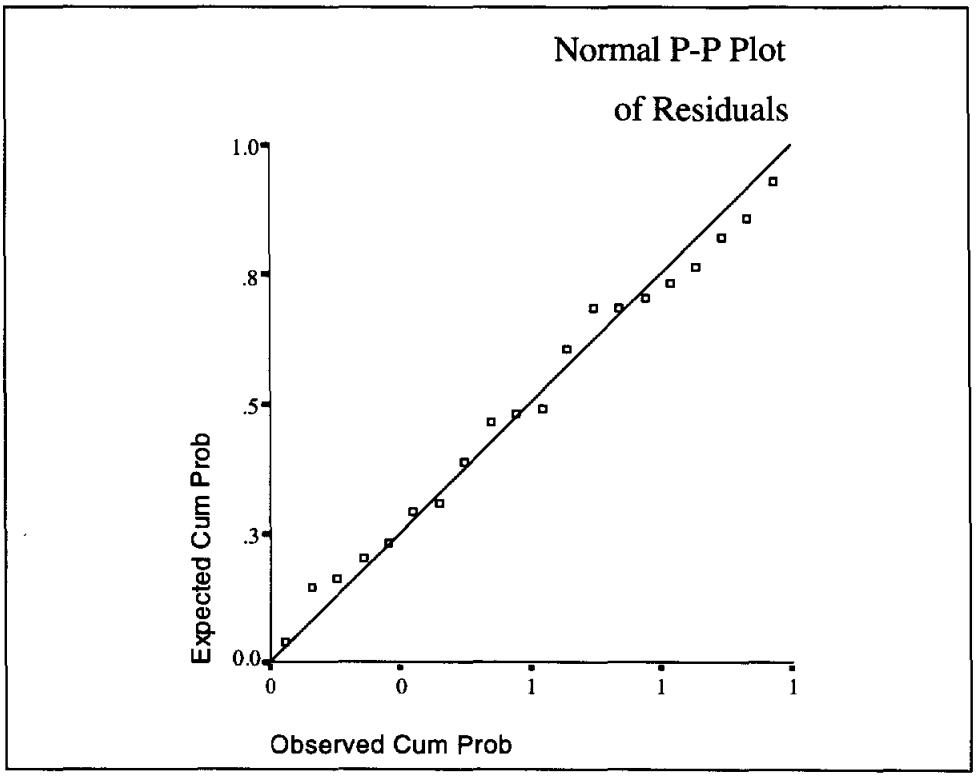
SDR_1 Studentized deleted residuals

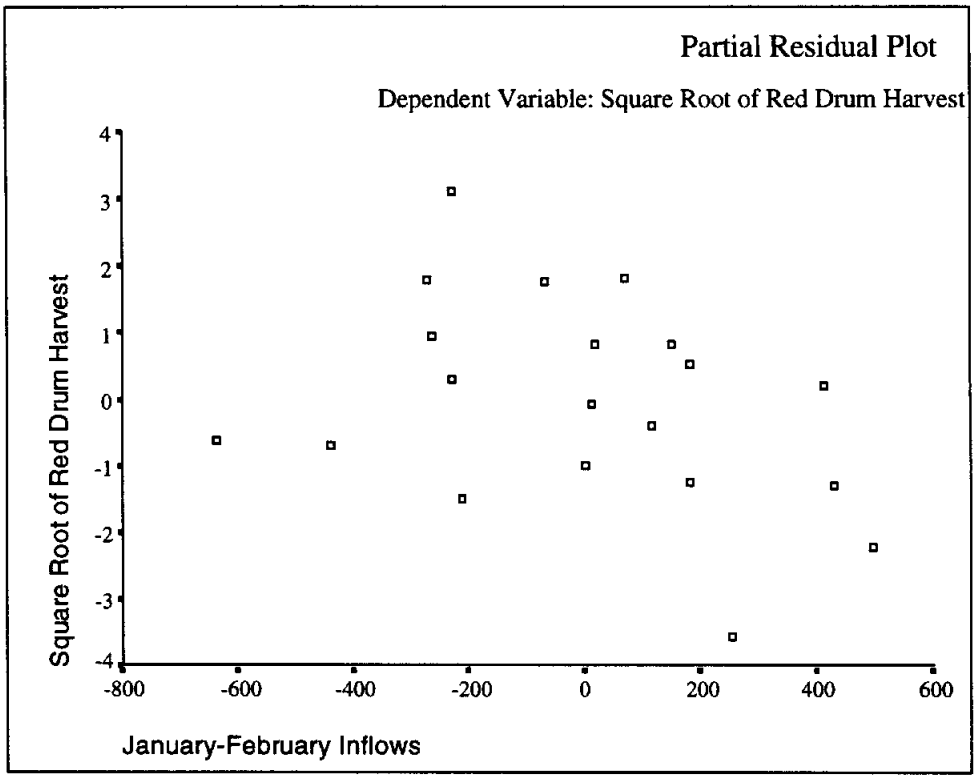
[1]Values greater than 3 are flagged.

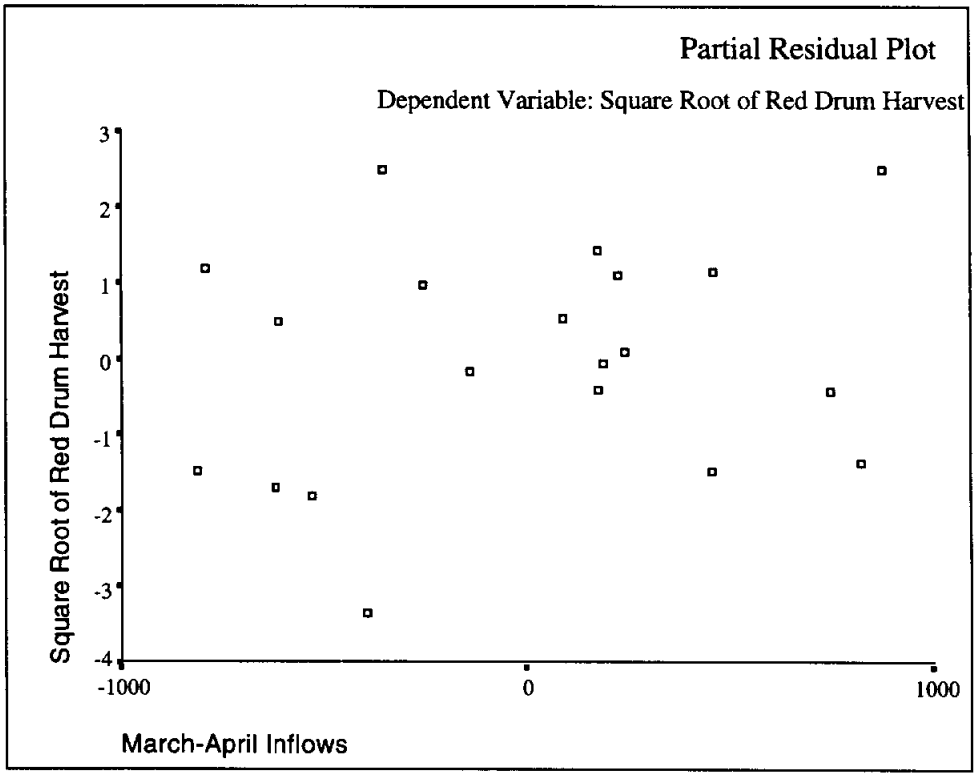
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{12,0.01} = 2.681$.

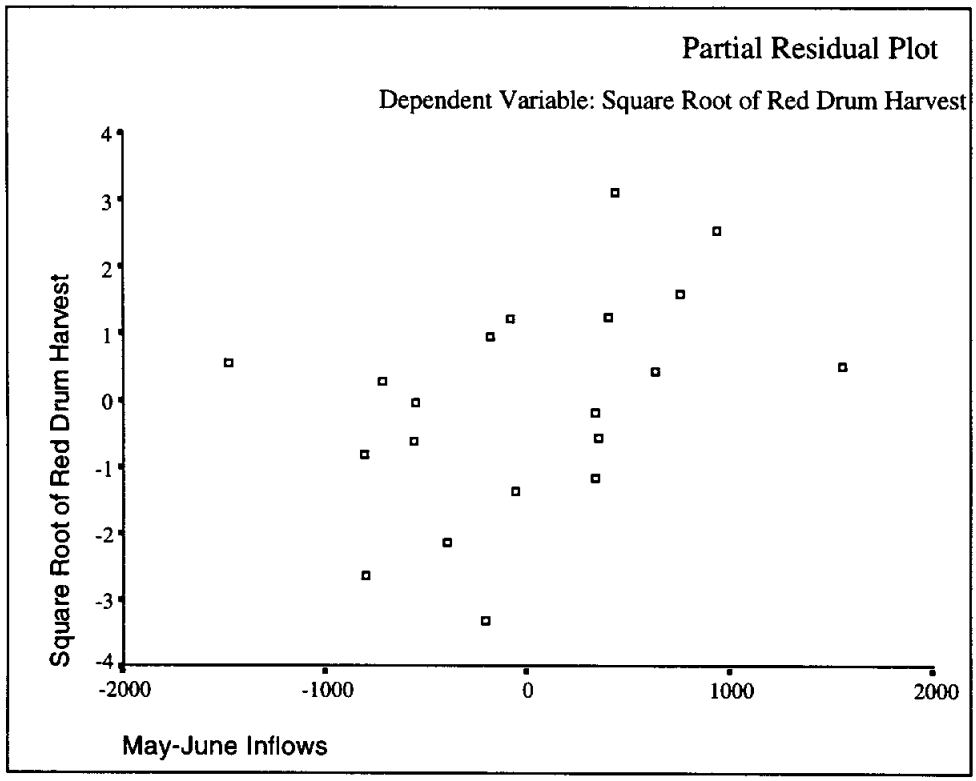
Graphics

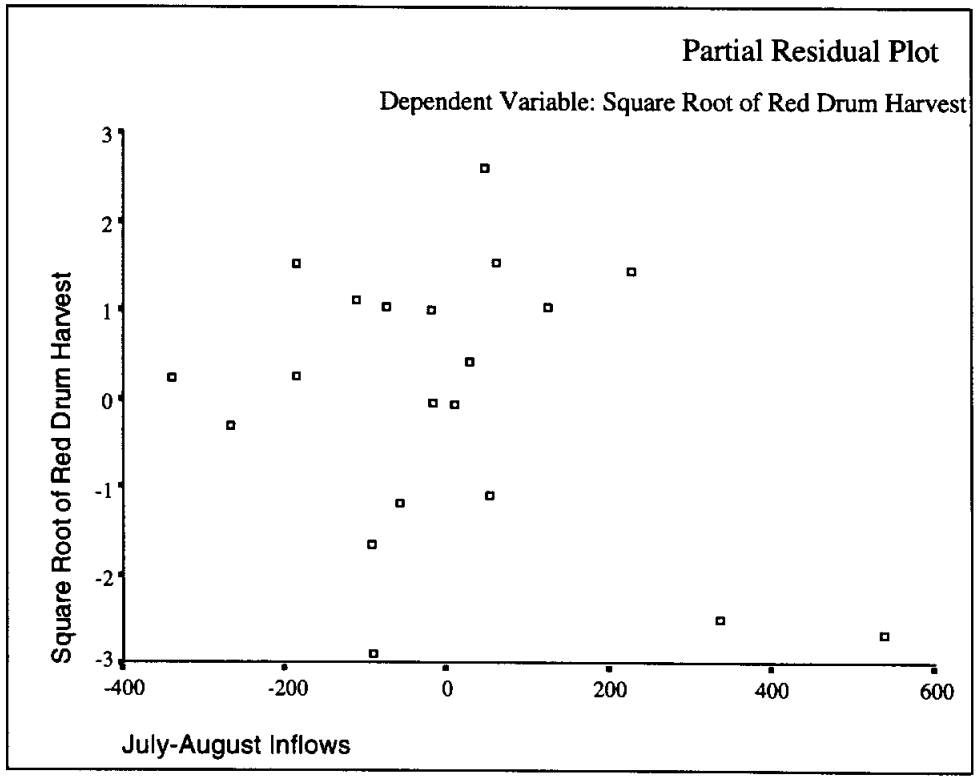

Square Root of Red Drum Harvest
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

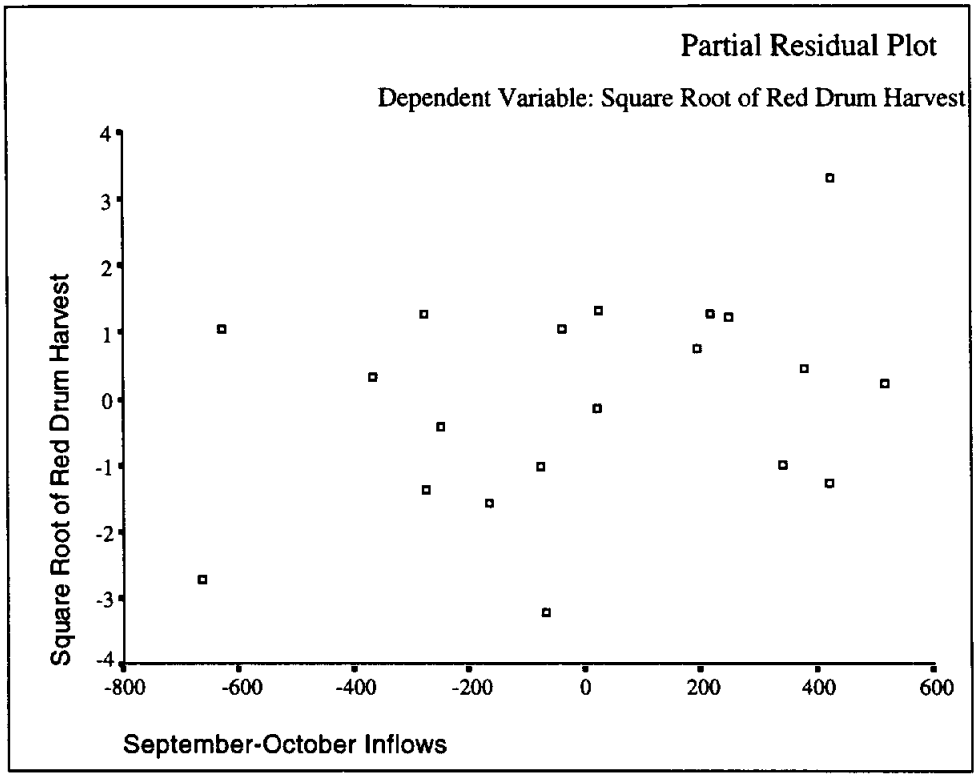

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0
0
1
1
1
Observed Cum Prob

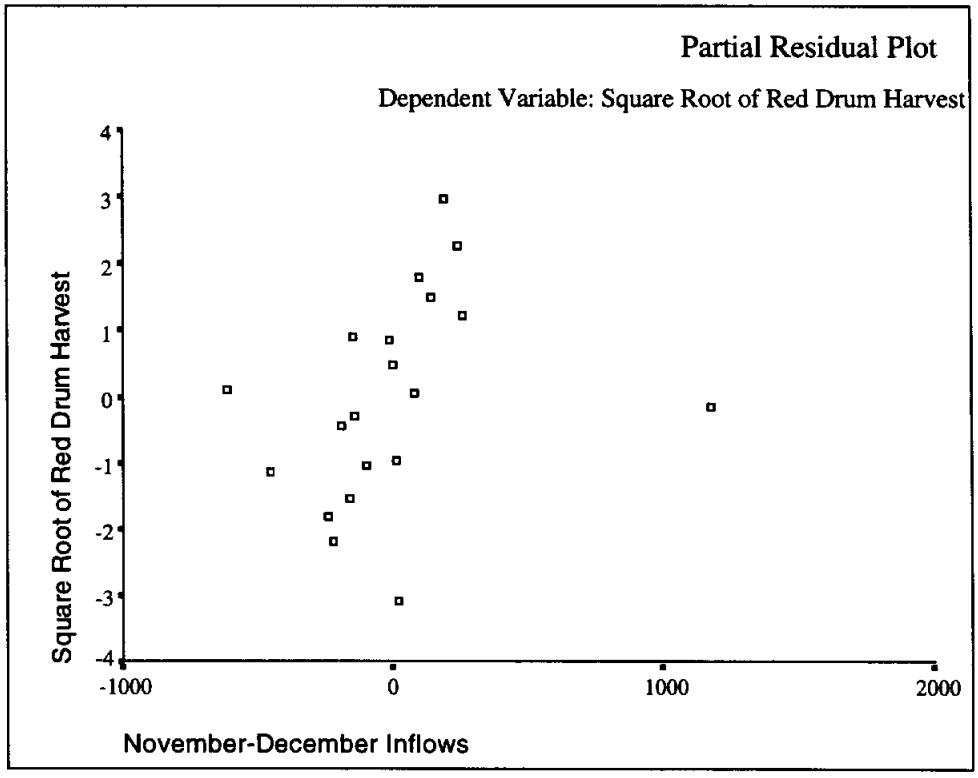

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-800
-600
-400
-200
0
200
400
600
January-February Inflows

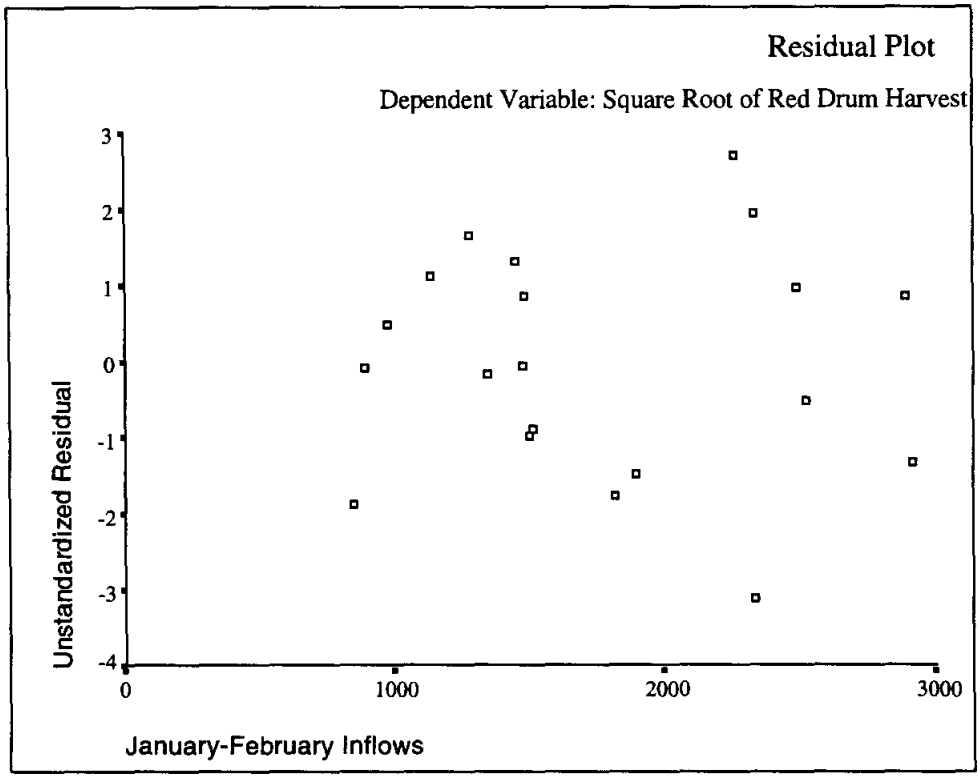

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
3
2
1
0
-1
-2
-3
-4
-1000
0
1000
March-April Inflows

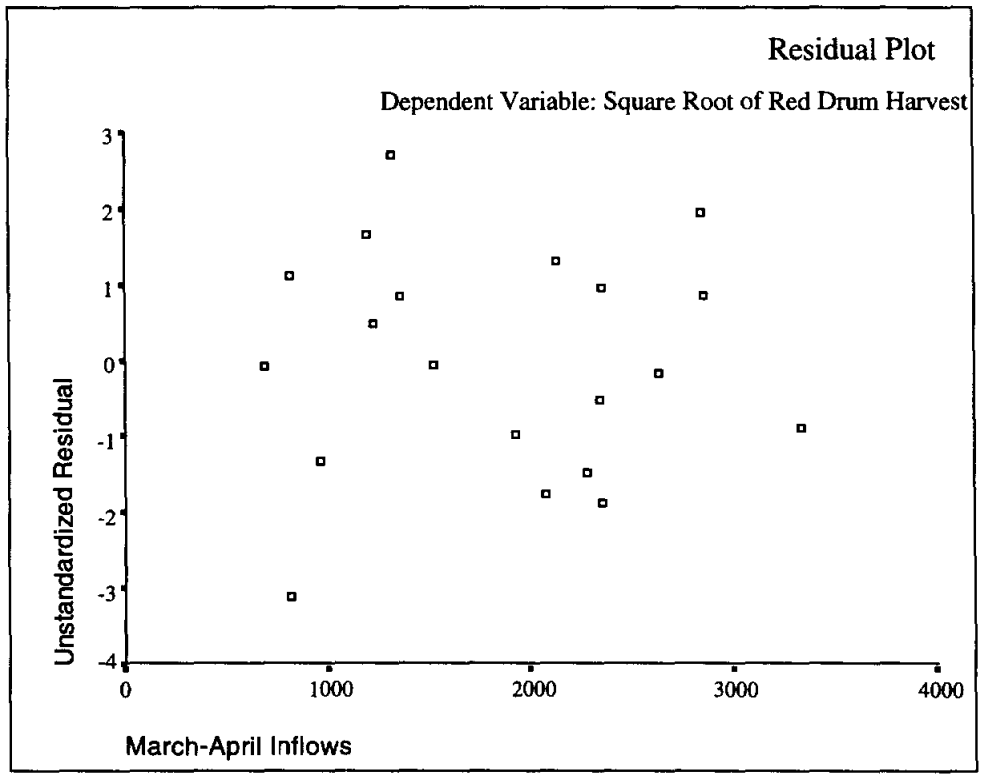

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-2000
-1000
0
1000
2000
May-June Inflows

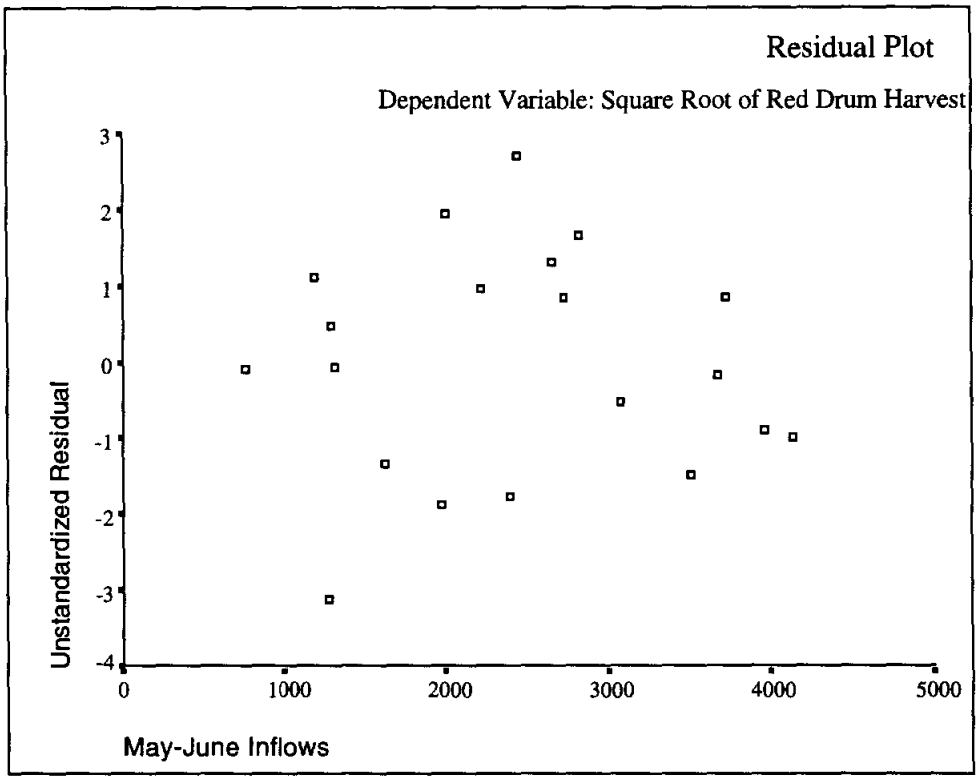

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
3
2
1
0
-1
-2
-3
-400
-200
0
200
400
600
July-August Inflows

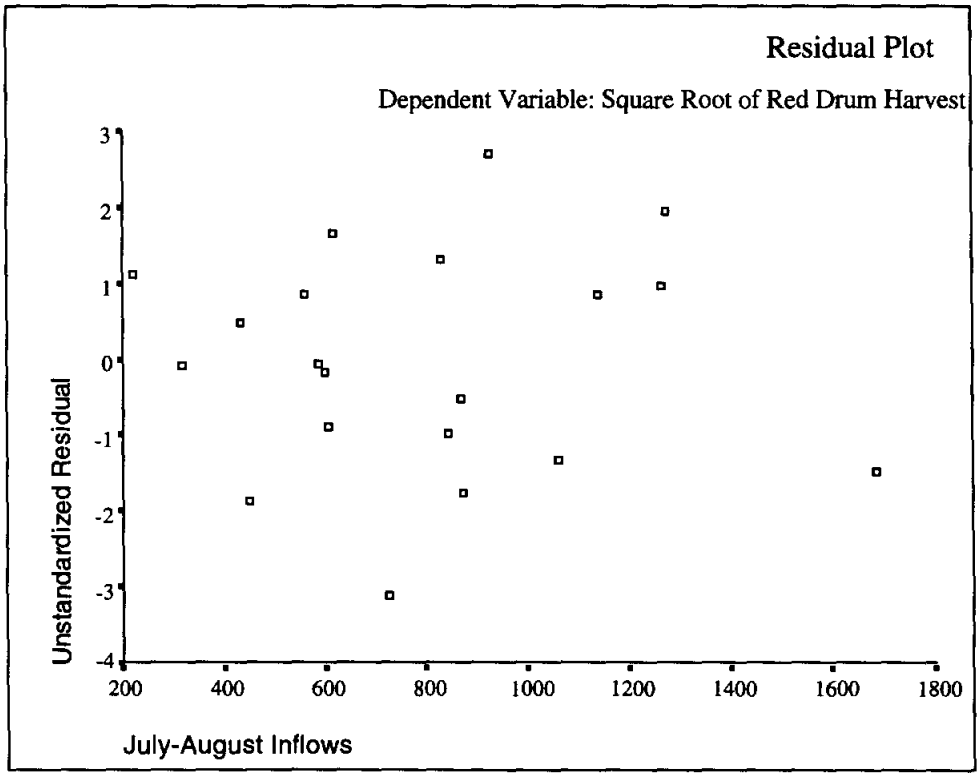

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-800
-600
-400
-200
0
200
400
600
September-October Inflows

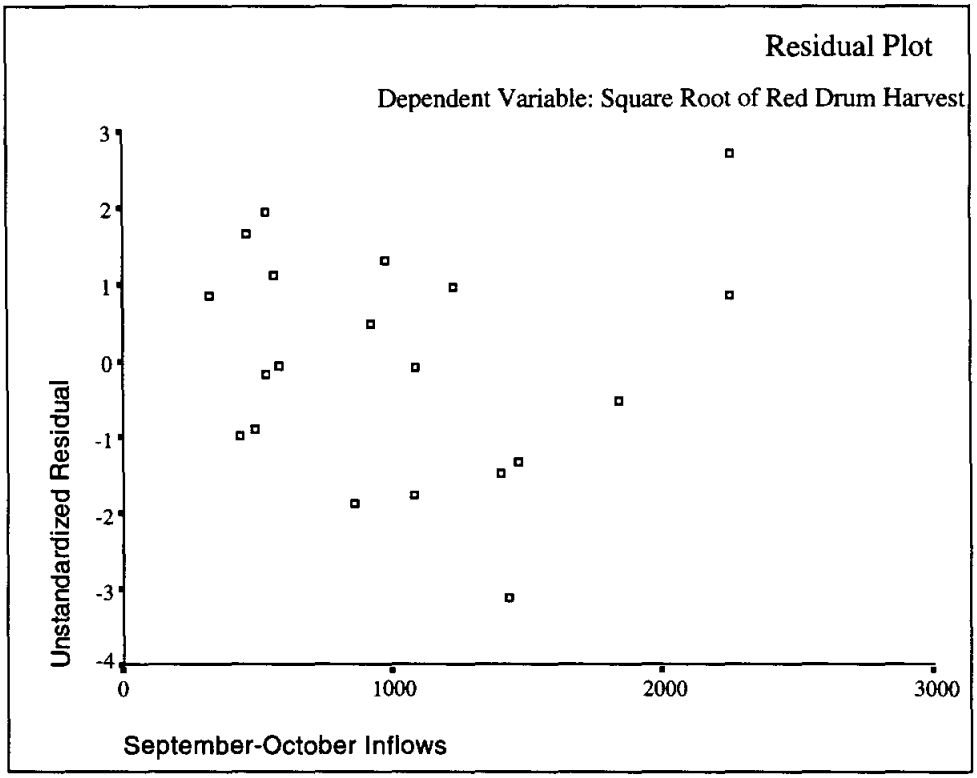

Partial Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Square Root of Red Drum Harvest
4
3
2
1
0
-1
-2
-3
-4
-1000
0
1000
2000
November-December Inflows

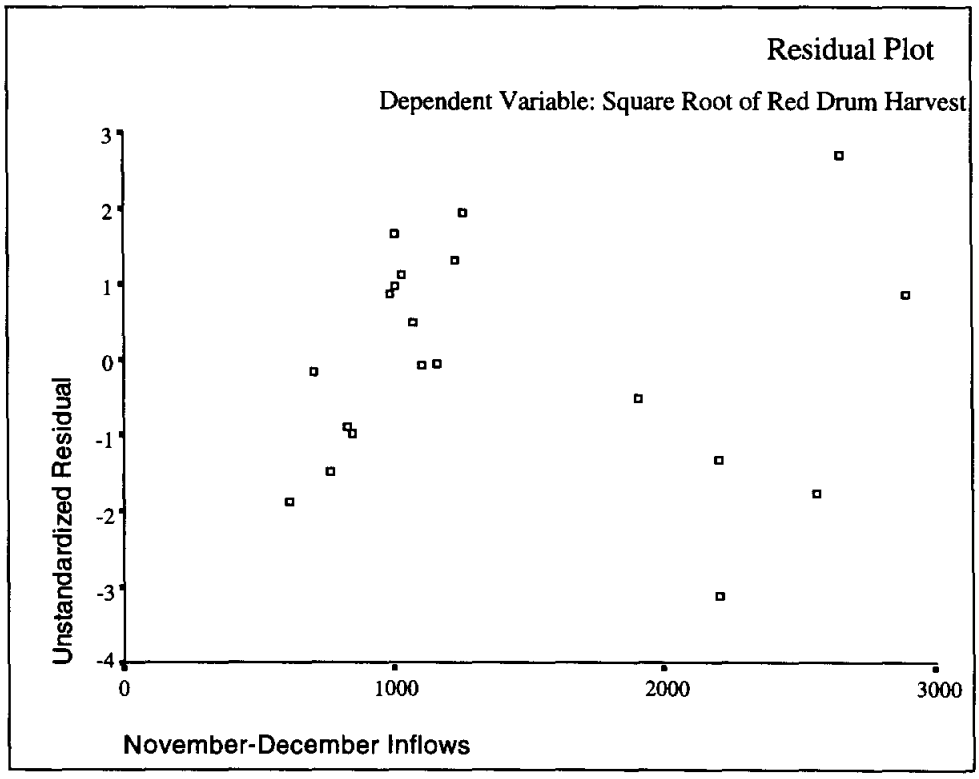

Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
January-February Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
4000
March-April Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
4000
5000
May-June Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
200
400
600
800
1000
1200
1400
1600
1800
July-August Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
September-October Inflows


Residual Plot
Dependent Variable: Square Root of Red Drum Harvest
Unstandardized Residual
3
2
1
0
-1
-2
-3
-4
0
1000
2000
3000
November-December Inflows

Prediction Intervals for Square Root of Red Drum Harvest

YEAR	SQRTRDRM	LICI_1	UICI_1
1962	1.61	-3.46497	9.28792
1963	1.14	-1.78563	10.23513
1964	5.07	-1.07936	11.36762
1965	5.67	-1.44054	10.53629
1966	5.46	-1.42454	10.57624
1967	6.71	-.98946	11.04734
1968	4.60	-.77265	11.90686
1969	6.17	.34947	12.29614
1970	5.94	.45786	13.18376
1971	4.25	-.18836	12.40841
1972	5.80	-.61569	11.22385
1973	7.04	.05238	11.39087
1974	5.91	.15826	12.65227
1975	8.92	1.53159	14.53919
1976	9.87	.85637	13.43643
1977	4.92	-.25061	13.58789
1978	3.86	-1.92409	9.71433
1979	4.32	-4.40798	9.12286
1980	3.62	-3.68575	8.97414
1981	2.45	-3.22728	11.05637

SQRTRDRM	Square root of red drum harvest
LICI_1	Lower limit for 99% prediction interval for square root of red drum harvest
UICI_1	Upper limit for 99% prediction interval for square root of red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	6.57724	.08161	.34617	.4742	.0014
1963	3.61888	.17653	.19047	.8225	.0143
1964	5.31987	.00018	.27999	.6210	.0000
1965	3.44693	.02213	.18142	.8408	.0000
1966	3.54060	.01407	.18635	.8309	.0000
1967	3.68182	.05351	.19378	.8156	.0004
1968	6.27283	.04082	.33015	.5083	.0001
1969	3.32923	.00038	.17522	.8530	.0000
1970	6.46508	.03614	.34027	.4866	.0001
1971	5.93173	.13646	.31220	.5477	.0067
1972	2.91360	.00346	.15335	.8929	.0000
1973	1.01937	.01002	.05365	.9945	.0000
1974	5.51117	.00861	.29006	.5978	.0000
1975	7.64748	.05214	.40250	.3647	.0003
1976	5.86311	.28868	.30858	.5558	.0532
1977	11.28581	.69207	*.59399	.1266	.3217
1978	2.14343	.00001	.11281	.9515	.0000
1979	9.91239	.53669	*.52170	.1936	.2077
1980	6.19176	.04085	.32588	.5175	.0001
1981	13.32768	1.16220	*.70146	.0645	*.6140

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.75180	.03131	-.45930	.32076
1963	*-1.27676	-.23481	-.51370	.44037
1964	-.03431	-.02838	.01047	.00361
1965	.38589	.29752	.09350	-.08744
1966	.30526	.09428	.08892	-.16593
1967	.61618	.24786	-.06497	-.42778
1968	-.52304	-.00363	-.00232	.29773
1969	-.04939	.00113	-.00948	-.00866
1970	-.49074	.12118	-.11200	-.25478
1971	*-1.00639	-.42690	.27327	-.59549
1972	.15005	.12172	-.06783	.01359
1973	.26063	.06845	-.17042	.06275
1974	-.23690	.08626	-.13544	-.03180
1975	.59055	-.40592	.01357	.17631
1976	*1.60739	-.18043	-.47453	-.40646
1977	*-2.37321	.25529	*1.45258	-.58576
1978	-.00906	-.00541	-.00026	-.00236
1979	*2.10383	-.17709	.15438	*1.05940
1980	.52340	-.01250	.27339	.08491
1981	*-3.07728	-.17879	*1.20510	.80983

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for January-February inflows
SDFBETA_2 Standardized dfbeta for March-April inflows

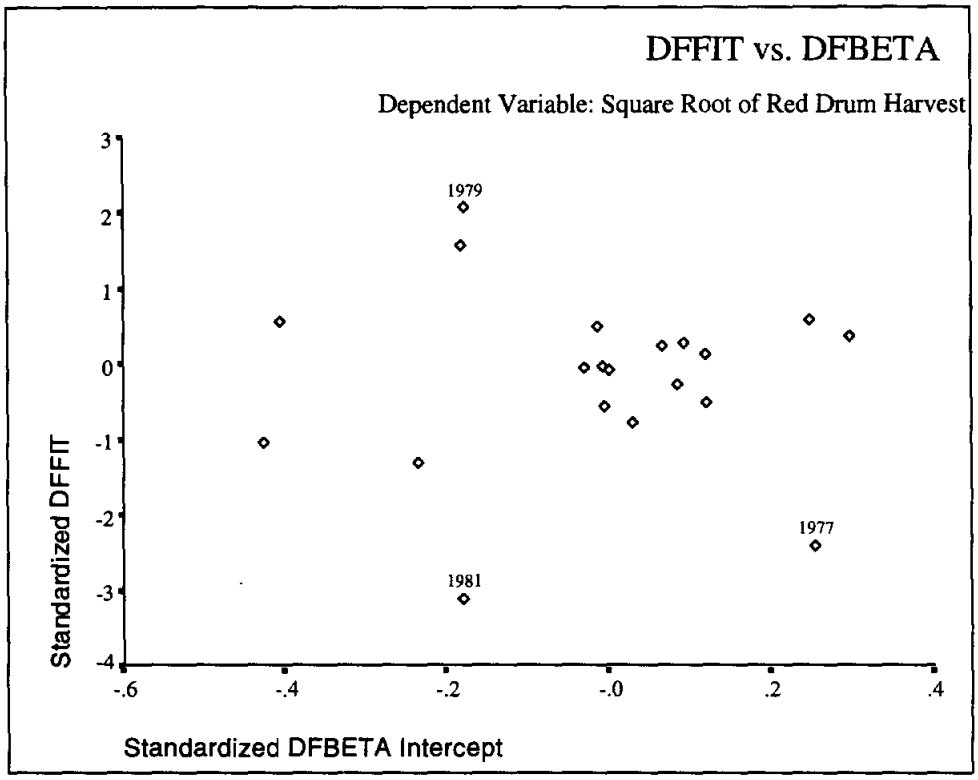
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

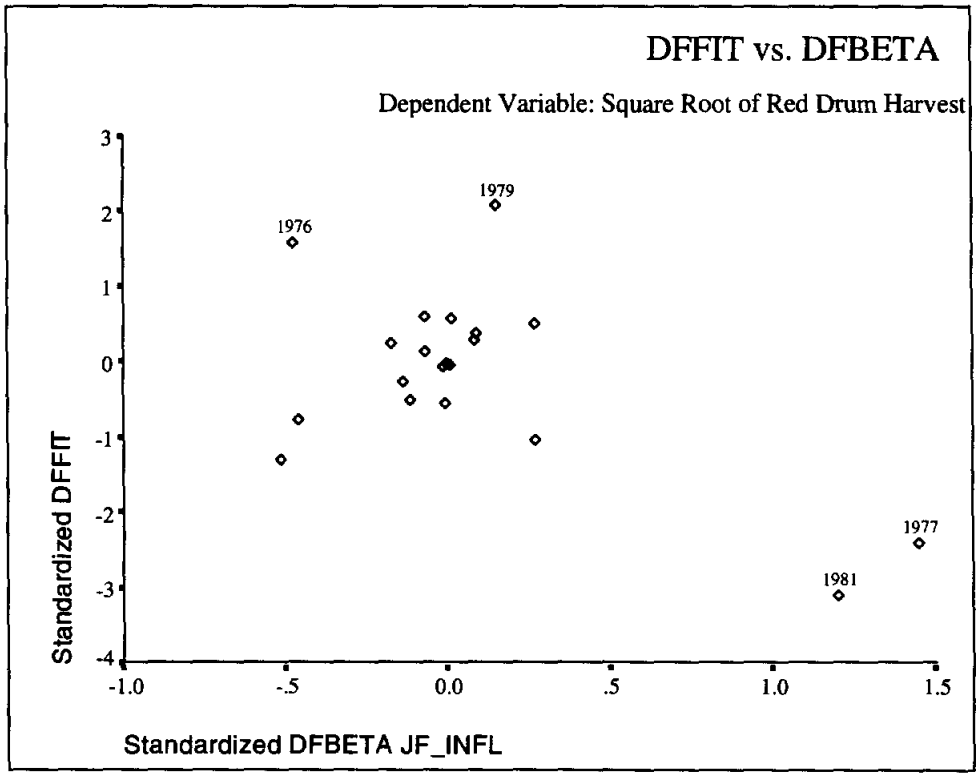
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.02189	.07707	.13008	.11925
1963	.16791	.26654	.11498	-.03741
1964	.01064	.00104	-.01508	.00539
1965	-.04440	-.16873	-.02008	-.07424
1966	.15285	-.05252	-.15278	-.00264
1967	.37382	.08838	-.22924	.08133
1968	-.42177	-.05211	.15412	-.00716
1969	-.02118	.02197	-.00158	.01269
1970	-.08897	.23868	.03923	.04764
1971	.42471	.17421	-.46960	.23879
1972	-.05803	.01128	.04329	.00125
1973	-.01938	.11480	.01371	.07455
1974	-.04456	.15633	-.14003	.11924
1975	.11483	-.11017	.14579	.14858
1976	.37737	.14693	.75924	.34258
1977	.36643	*-1.13128	*1.30682	*-2.25512
1978	.00576	-.00026	.00371	-.00124
1979	*-1.30845	.72219	*-1.16450	.43802
1980	-.19446	-.01774	.12438	-.33881
1981	-.38605	*-2.17362	-.80737	.54367

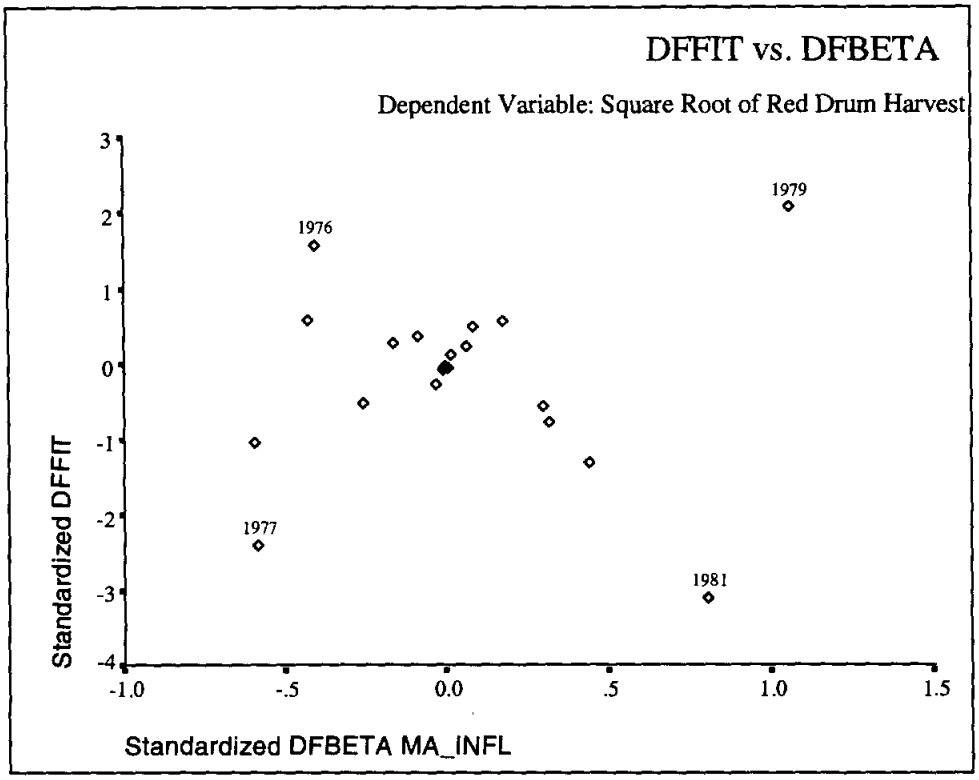
SDFBETA_3 Standardized dfbeta for May-June inflows
SDFBETA_4 Standardized dfbeta for July-August inflows
SDFBETA_5 Standardized dfbeta for September-October inflows
SDFBETA_6 Standardized dfbeta for November-December inflows

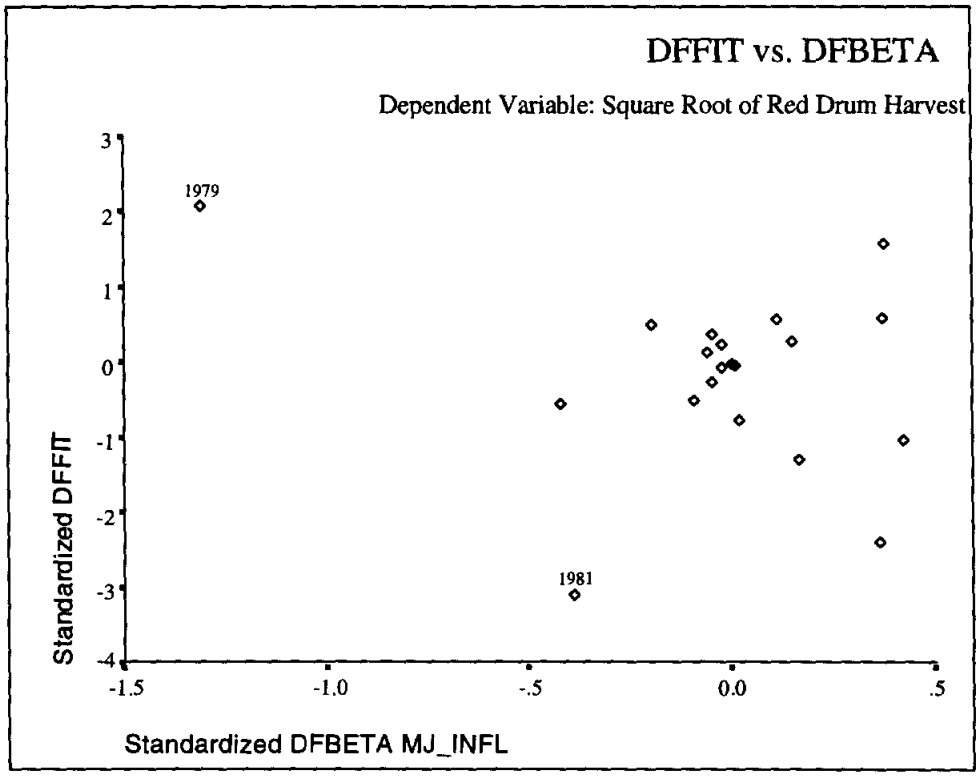
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

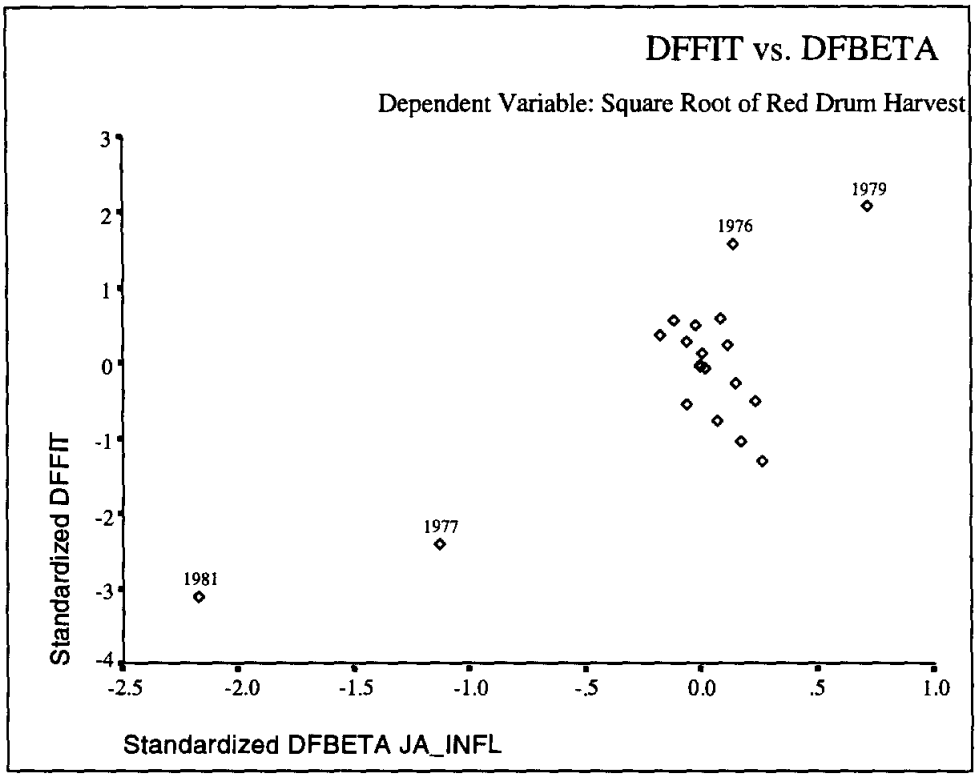
Graphics

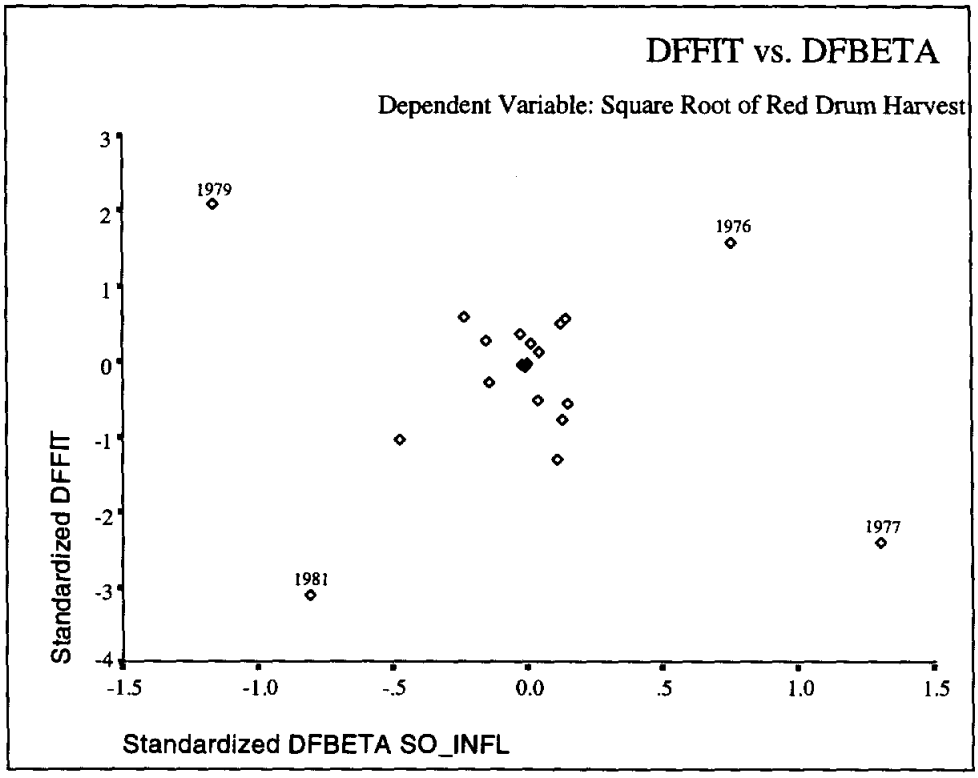

DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1977
1981
-.6
-.4
-.2
-.0
.2
.4
Standardized DFBETA Intercept

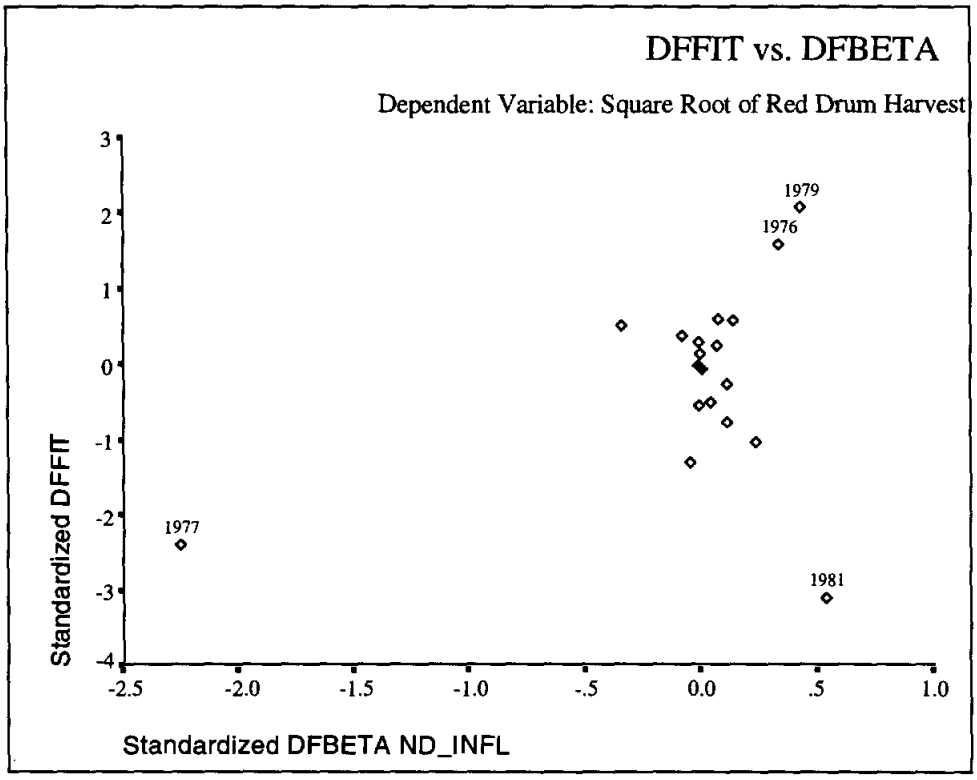

DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1976
1977
1981
-1.0
-.5
0.0
.5
1.0
1.5
Standardized DFBETA JF_INFL


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
Standardized DFBETA MA_INFL
1979
1976
1977
1981
3
2
1
0
-1
-2
-3
-4
-1.0
-.5
0.0
.5
1.0
1.5


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
Standardized DFBETA MJ_INFL
1979
1981
3
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
Standardized DFBETA JA_INFL
1979
1976
1977
1981
3
2
1
0
-1
-2
-3
-4
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
Standardized DFBETA SO_INFL
1979
1976
1977
1981
3
2
1
0
-1
-2
-3
-4
-1.5
-1.0
-.5
0.0
.5
1.0
1.5


DFFIT vs. DFBETA
Dependent Variable: Square Root of Red Drum Harvest
Standardized DFFIT
3
2
1
0
-1
-2
-3
-4
1979
1976
1977
1981
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
Standardized DFBETA ND_INFL

Regression—Logged Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.741*	*.549*	*.340*	*19.3544*	*2.332*

a. Dependent Variable: Red Drum Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*5921.734*	*6*	*986.956*	*2.635*	*.068*[b]
	Residual	*4869.731*	*13*	*374.595*		
	Total	*10791.466*	*19*			

a. Dependent Variable: Red Drum Harvest

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-266.625	121.818		-2.189	.047	-529.797	-3.453
	Ln(January-February Inflows)	-29.961	28.184	-.478	-1.063	.307	-90.849	30.928
	Ln(March-April Inflows)	3.560	15.785	.071	.226	.825	-30.542	37.663
	Ln(May-June Inflows)	37.914	15.694	.753	2.416	.031	4.009	71.819
	Ln(July-August Inflows)	-20.776	19.721	-.432	-1.054	.311	-63.381	21.828
	Ln(September-October Inflows)	11.187	11.362	.272	.985	.343	-13.360	35.734
	Ln(November-December Inflows)	36.691	17.969	.727	2.042	.062	-2.130	75.511

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	.172	5.821
	Ln(March-April Inflows)	.353	2.835
	Ln(May-June Inflows)	.357	2.801
	Ln(July-August Inflows)	.207	4.841
	Ln(September-October Inflows)	.456	2.193
	Ln(November-December Inflows)	.274	3.647

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	18.23396	-15.63396	-23.18255	25.78255	-.72680	-.80777	-.98364	-.98231
1963	22.81565	-21.51565	-29.63809	30.93809	-.46727	-1.11166	-1.30473	-1.34468
1964	20.23608	5.46392	9.35511	16.34489	-.61339	.28231	.36940	.35678
1965	28.28304	3.91696	8.15321	24.04679	-.15758	.20238	.29198	.28145
1966	26.51046	3.28954	4.75194	25.04806	-.25799	.16996	.20428	.19658
1967	34.36060	10.63940	15.73500	29.26500	.18668	.54971	.66852	.65362
1968	32.22602	-11.02602	-15.63035	36.83035	.06576	-.56969	-.67829	-.66352
1969	34.76771	3.33229	4.28856	33.81144	.20974	.17217	.19532	.18793
1970	39.69072	-4.39072	-6.36425	41.66425	.48859	-.22686	-.27312	-.26317
1971	31.04086	-12.94086	-21.71221	39.81221	-.00137	-.66862	-.86607	-.85719
1972	30.51363	3.08637	4.04838	29.55162	-.03123	.15947	.18263	.17570
1973	40.04624	9.55376	11.14134	38.45866	.50873	.49362	.53306	.51784
1974	51.52706	-16.62706	-23.81049	58.71049	1.15905	-.85908	-1.02804	-1.03049
1975	67.35464	12.14536	20.24751	59.25249	2.05558	.62752	.81023	.79888
1976	57.07281	40.42719	56.82145	40.67855	1.47318	2.08878	2.47635	*3.27339
1977	56.15067	-31.95067	-58.59424	82.79424	1.42095	-1.65082	-2.23556	*-2.73761
1978	10.91336	3.98664	5.25811	9.64189	-1.14147	.20598	.23656	.22777
1979	1.09804	17.60196	41.95314	-23.25314	-1.69744	.90945	1.40405	1.46457
1980	3.61815	9.48185	15.25595	-2.15595	-1.55469	.48991	.62142	.60611
1981	14.84030	-8.84030	-20.83243	26.83243	-.91903	-.45676	-.70117	-.68677

PRE_1 Predicted value of harvest

RES_1 Ordinary residual; observed harvest minus predicted harvest

DRE_1 Deleted residual; residual obtained when the model is fitted without that observation

ADJ_1 Adjusted predicted value; predicted value of harvest when the model is fitted without that observation

ZPR_1 Z-score of the predicted value of harvest

ZRE_1 Z-score of the residual

SRE_1 Studentized residual

SDR_1 Studentized deleted residuals

[1]Values greater than 3 are flagged.

[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{12,0.01} = 2.681$.

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	*6.984*	*1.000*	*.00*	*.00*	*.00*
	2	*9.020E-03*	*27.826*	*.00*	*.00*	*.03*
	3	*2.966E-03*	*48.524*	*.14*	*.00*	*.00*
	4	*2.173E-03*	*56.697*	*.00*	*.03*	*.09*
	5	*9.164E-04*	*87.299*	*.53*	*.01*	*.00*
	6	*7.542E-04*	*96.232*	*.16*	*.00*	*.87*
	7	*2.920E-04*	*154.662*	*.17*	*.96*	*.01*

a. Dependent Variable: Red Drum Harvest

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	*.00*	*.00*	*.00*	*.00*
	2	*.03*	*.00*	*.12*	*.02*
	3	*.00*	*.19*	*.04*	*.03*
	4	*.00*	*.04*	*.63*	*.09*
	5	*.52*	*.08*	*.01*	*.19*
	6	*.45*	*.01*	*.10*	*.19*
	7	*.00*	*.67*	*.10*	*.47*

a. Dependent Variable: Red Drum Harvest

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*1.0980*	*67.3546*	*31.0650*	*17.6542*	*20*
Std. Predicted Value	*-1.697*	*2.056*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*7.3060*	*14.7455*	*11.3000*	*1.8968*	*20*
Adjusted Predicted Value	*-23.2531*	*82.7942*	*31.2027*	*22.3343*	*20*
Residual	*-31.9507*	*40.4272*	*-5.1781E-14*	*16.0094*	*20*
Std. Residual	*-1.651*	*2.089*	*.000*	*.827*	*20*
Stud. Residual	*-2.236*	*2.476*	*-.004*	*1.046*	*20*
Deleted Residual	*-58.5942*	*56.8214*	*-.1377*	*26.0041*	*20*
Stud. Deleted Residual	*-2.738*	*3.273*	*.009*	*1.213*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.001*	*.595*	*.097*	*.160*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Red Drum Harvest

Case Values for Residuals Diagnostics

YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	18.23396	-15.63396	-23.18255	25.78255	-.72680	-.80777	-.98364	-.98231
1963	22.81565	-21.51565	-29.63809	30.93809	-.46727	-1.11166	-1.30473	-1.34468
1964	20.23608	5.46392	9.35511	16.34489	-.61339	.28231	.36940	.35678
1965	28.28304	3.91696	8.15321	24.04679	-.15758	.20238	.29198	.28145
1966	26.51046	3.28954	4.75194	25.04806	-.25799	.16996	.20428	.19658
1967	34.36060	10.63940	15.73500	29.26500	.18668	.54971	.66852	.65362
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1970	39.69072	-4.39072	-6.36425	41.66425	.48859	-.22686	-.27312	-.26317
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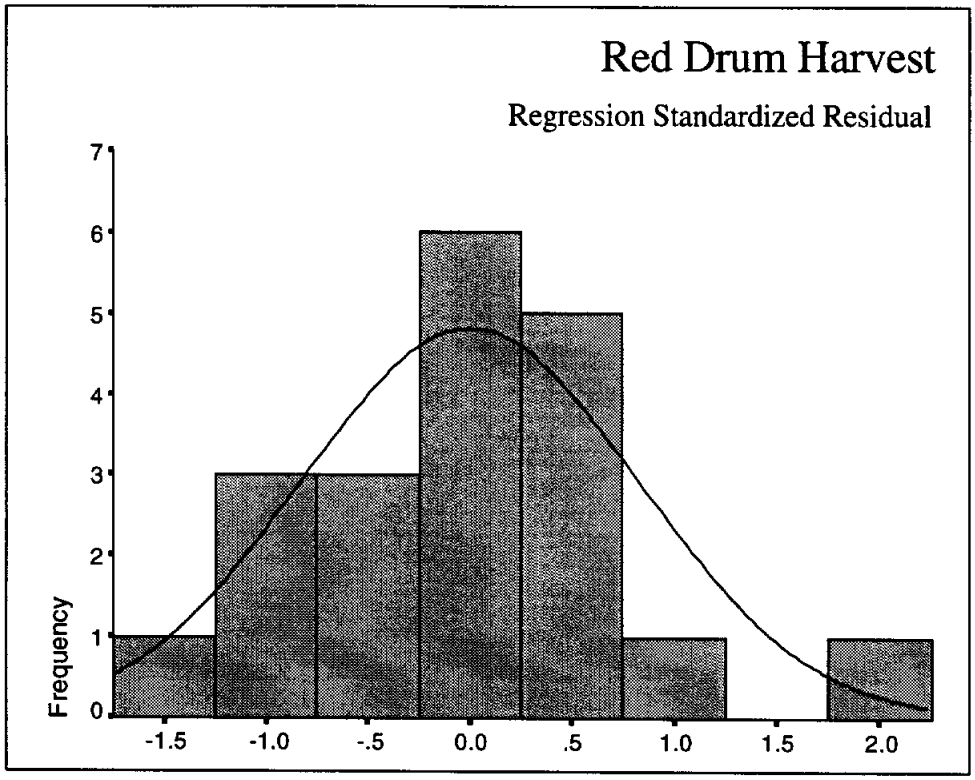
1972	30.51363	3.08637	4.04838	29.55162	-.03123	.15947	.18263	.17570
1973	40.04624	9.55376	11.14134	38.45866	.50873	.49362	.53306	.51784
1974	51.52706	-16.62706	-23.81049	58.71049	1.15905	-.85908	-1.02804	-1.03049
1975	67.35464	12.14536	20.24751	59.25249	2.05558	.62752	.81023	.79888
1976	57.07281	40.42719	56.82145	40.67855	1.47318	2.08878	2.47635	*3.27339
1977	56.15067	-31.95067	-58.59424	82.79424	1.42095	-1.65082	-2.23556	*-2.73761
1978	10.91336	3.98664	5.25811	9.64189	-1.14147	.20598	.23656	.22777
1979	1.09804	17.60196	41.95314	-23.25314	-1.69744	.90945	1.40405	1.46457
1980	3.61815	9.48185	15.25595	-2.15595	-1.55469	.48991	.62142	.60611
1981	14.84030	-8.84030	-20.83243	26.83243	-.91903	-.45676	-.70117	-.68677

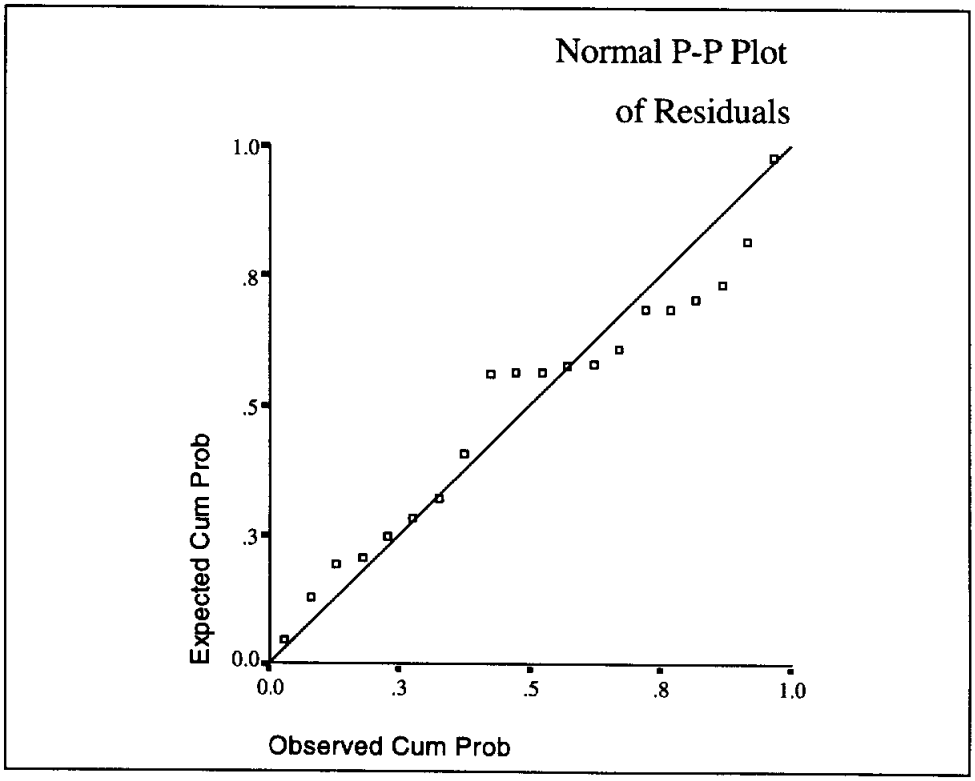
PRE_1	Predicted value of harvest
RES_1	Ordinary residual; observed harvest minus predicted harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

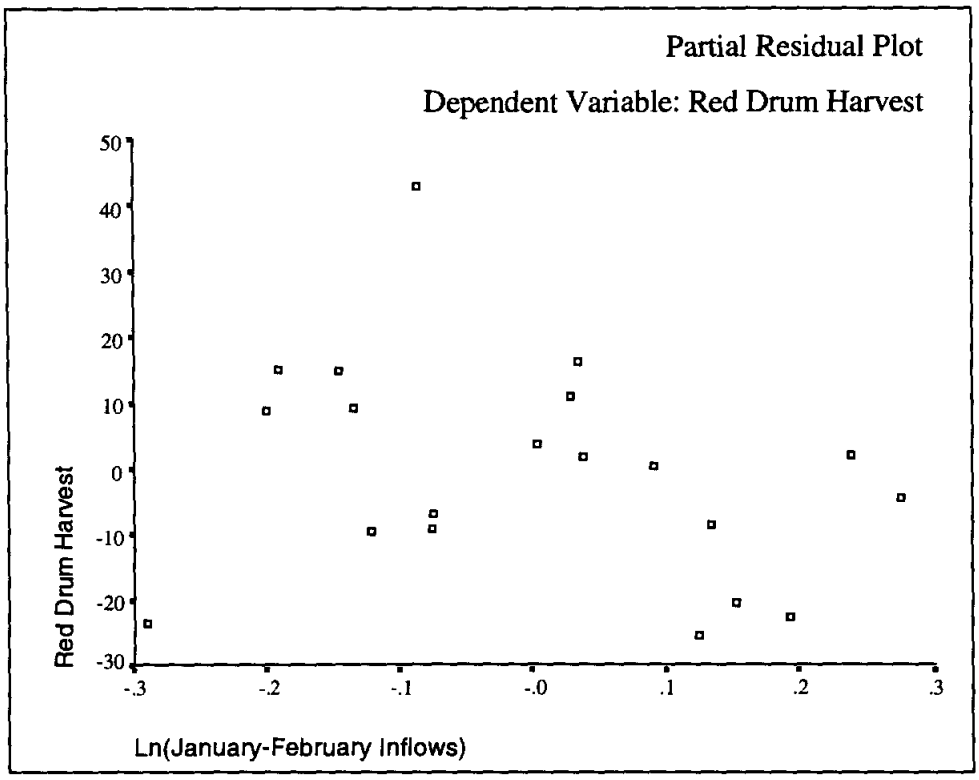
[1]Values greater than 3 are flagged.

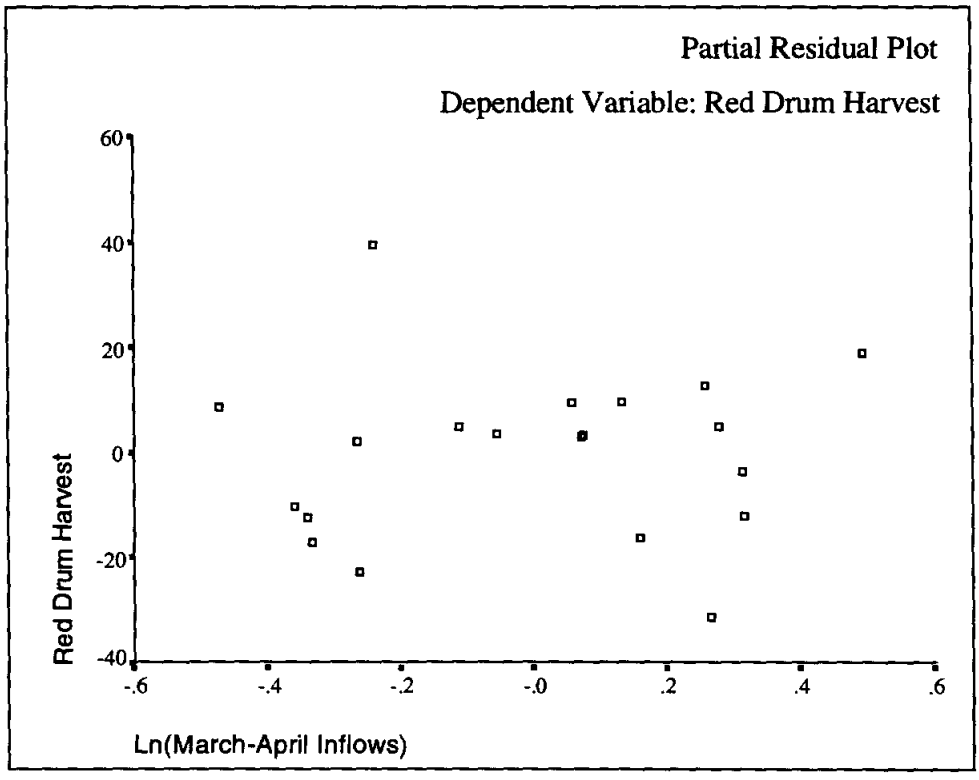
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{12,0.01} = 2.681$.

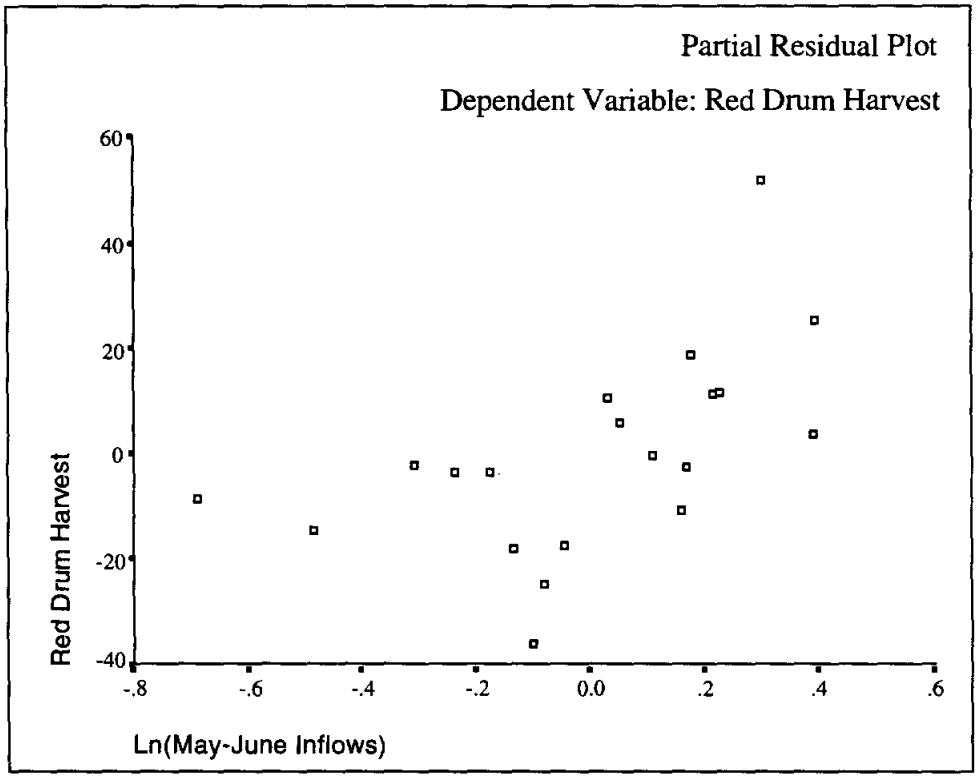
Graphics

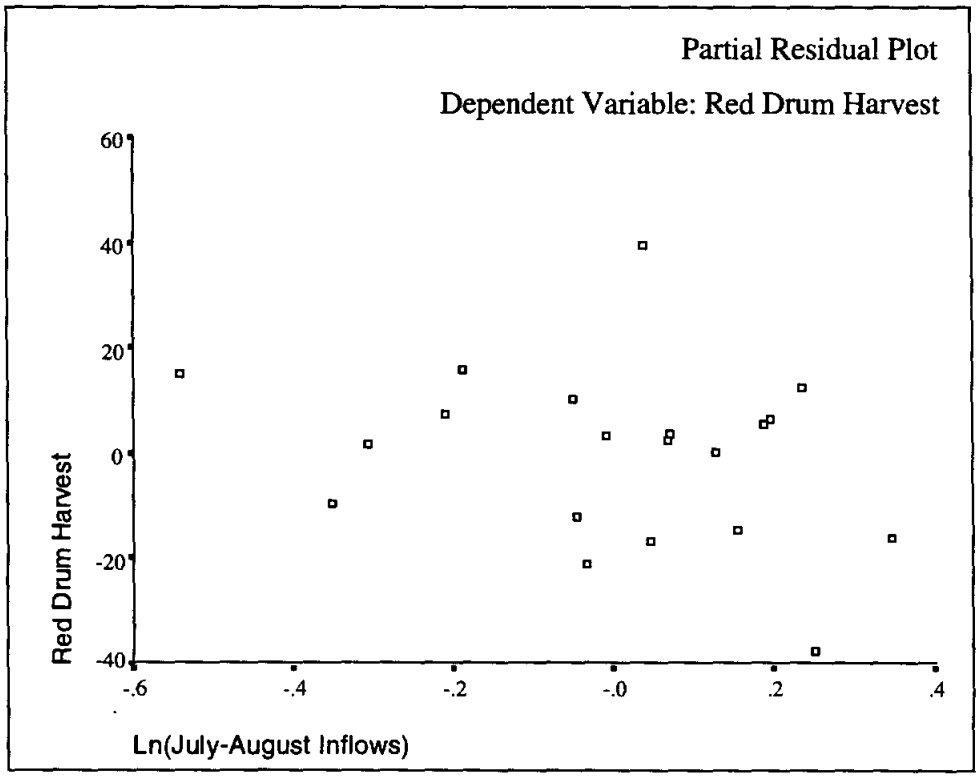

Red Drum Harvest
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5
2.0

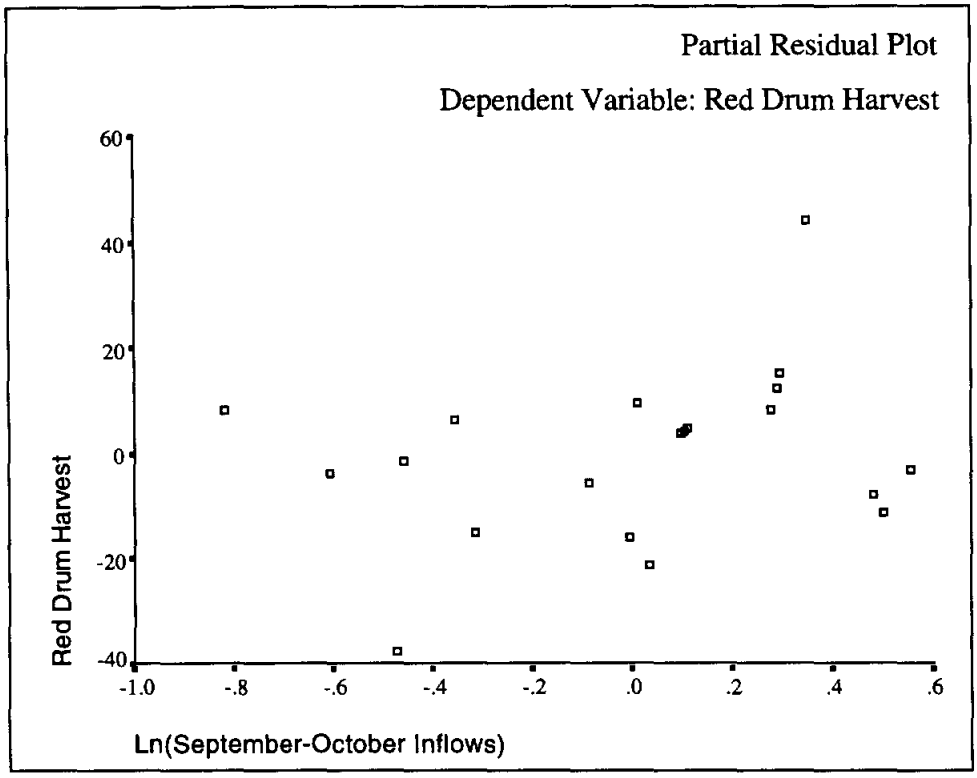

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob

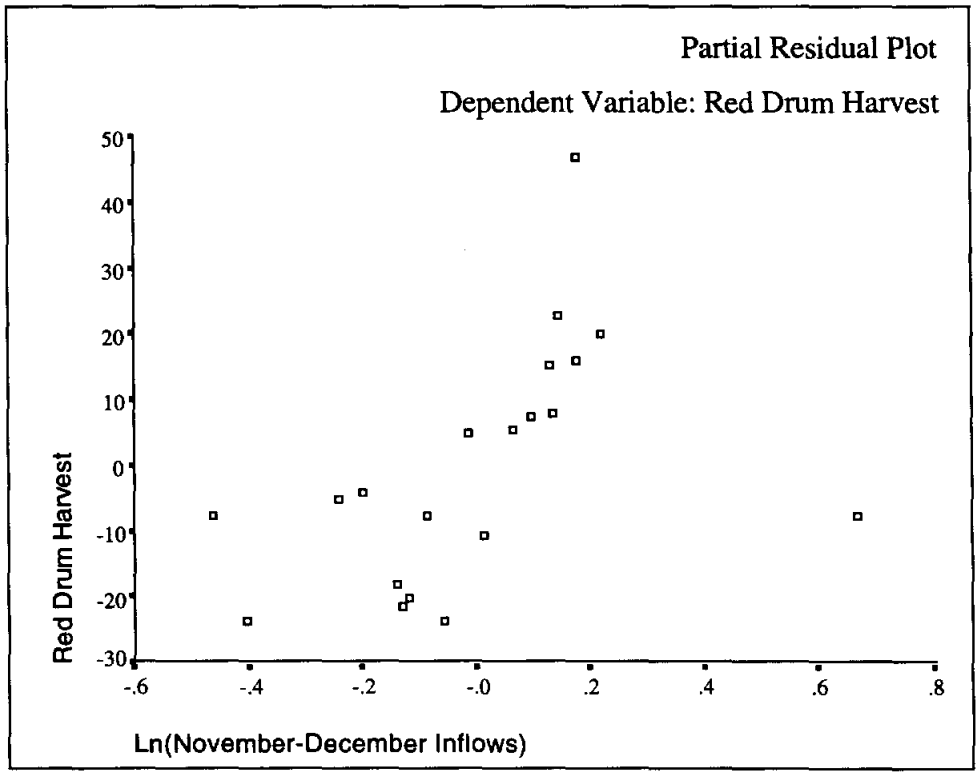

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
50
40
30
20
10
0
-10
-20
-30
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

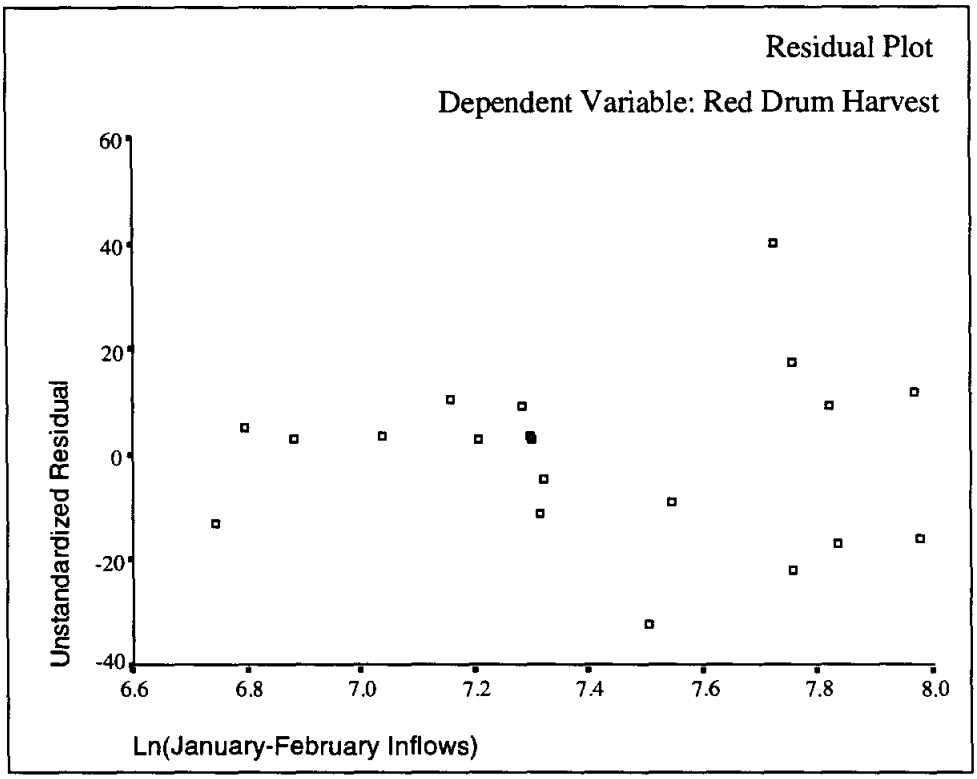

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

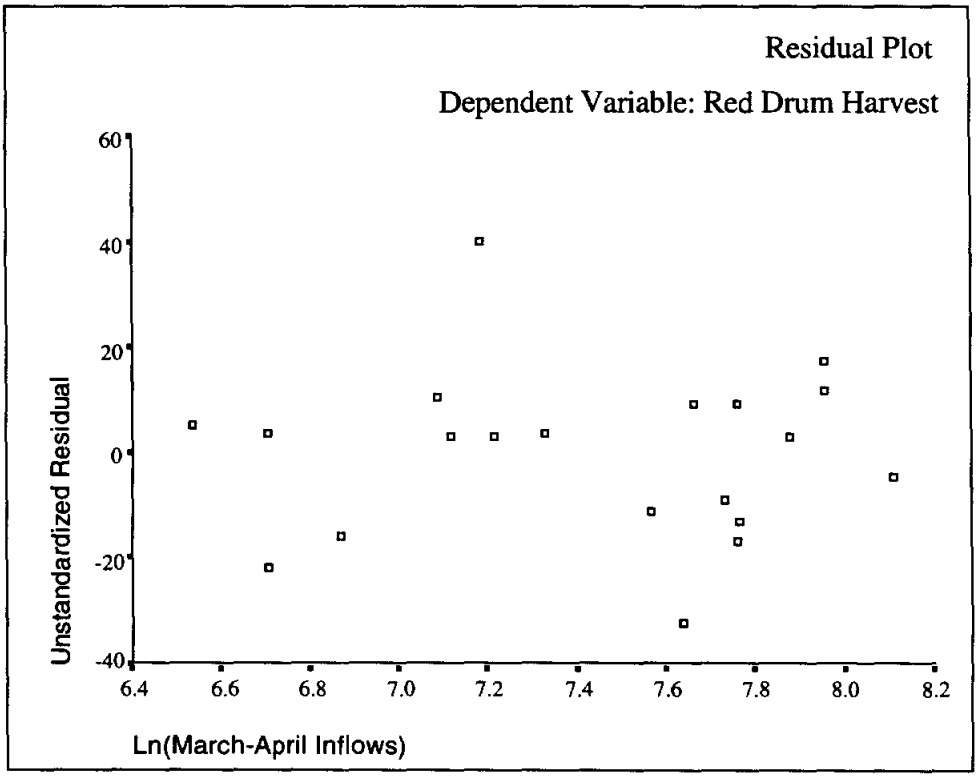

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(May-June Inflows)

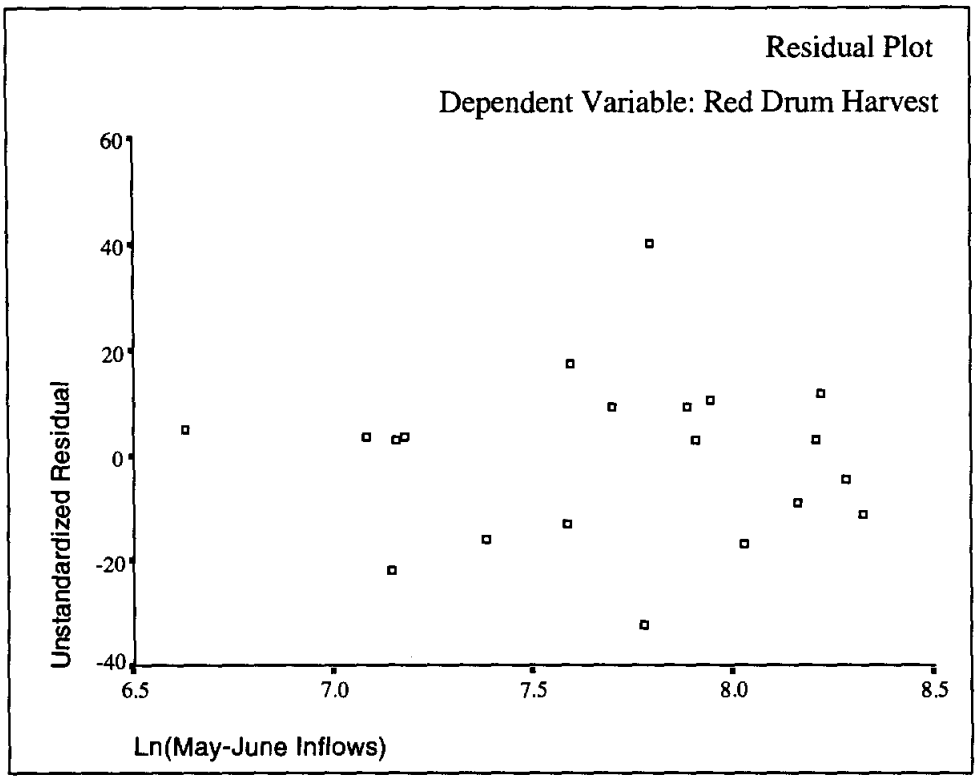

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-.6
-.4
-.2
-.0
.2
.4
Ln(July-August Inflows)

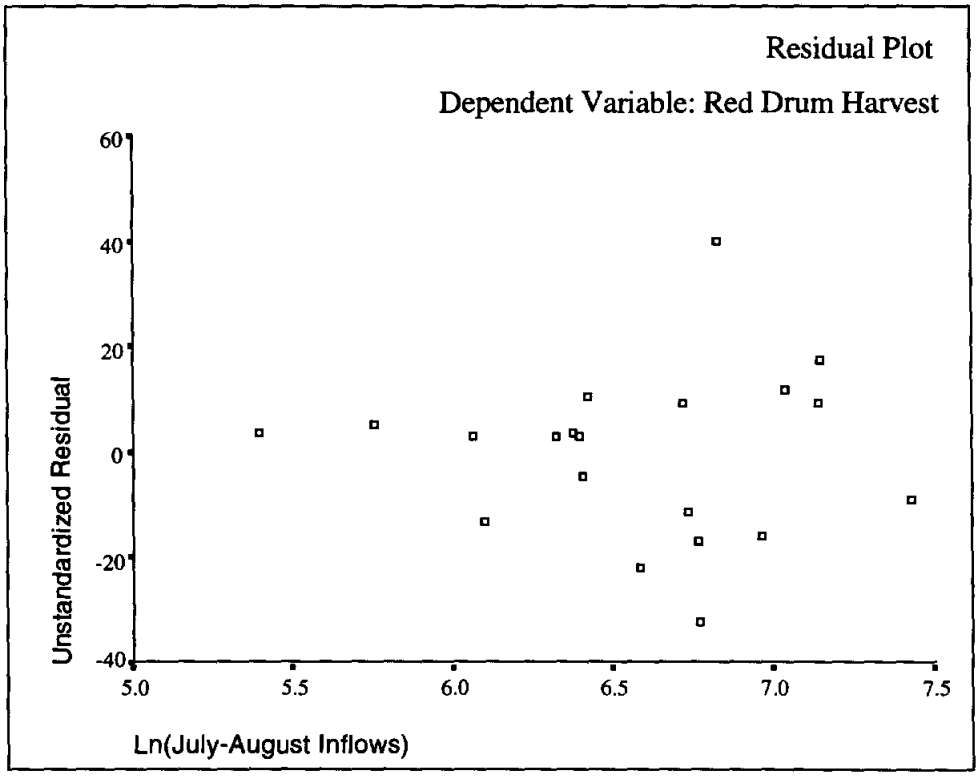

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
60
40
20
0
-20
-40
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

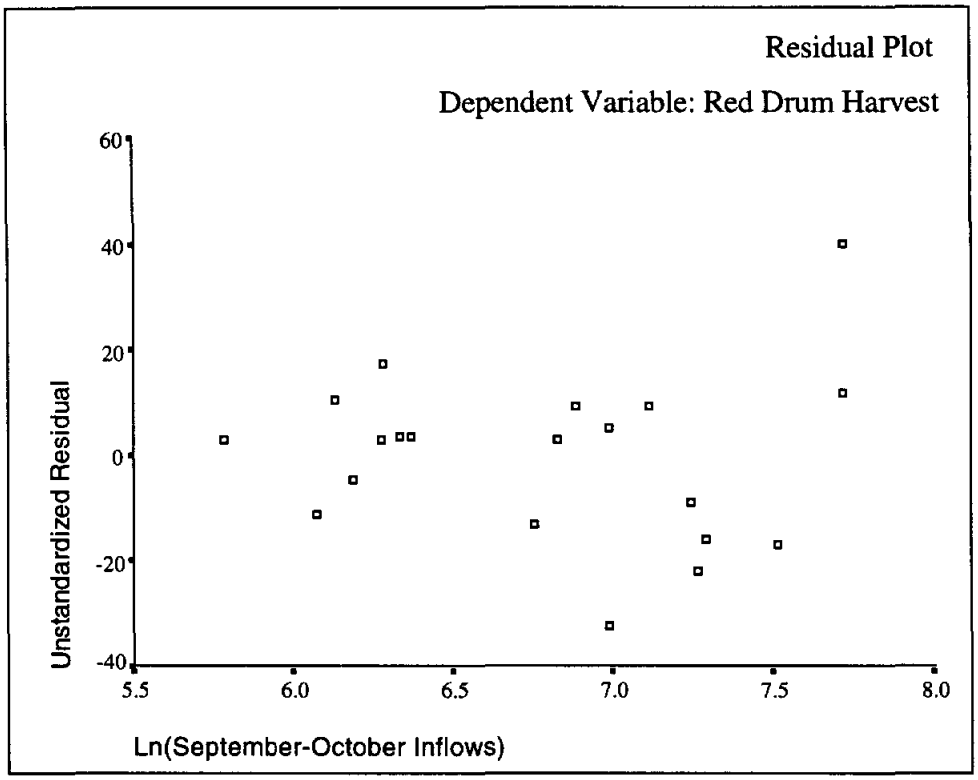

Partial Residual Plot
Dependent Variable: Red Drum Harvest
Red Drum Harvest
50
40
30
20
10
0
-10
-20
-30
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

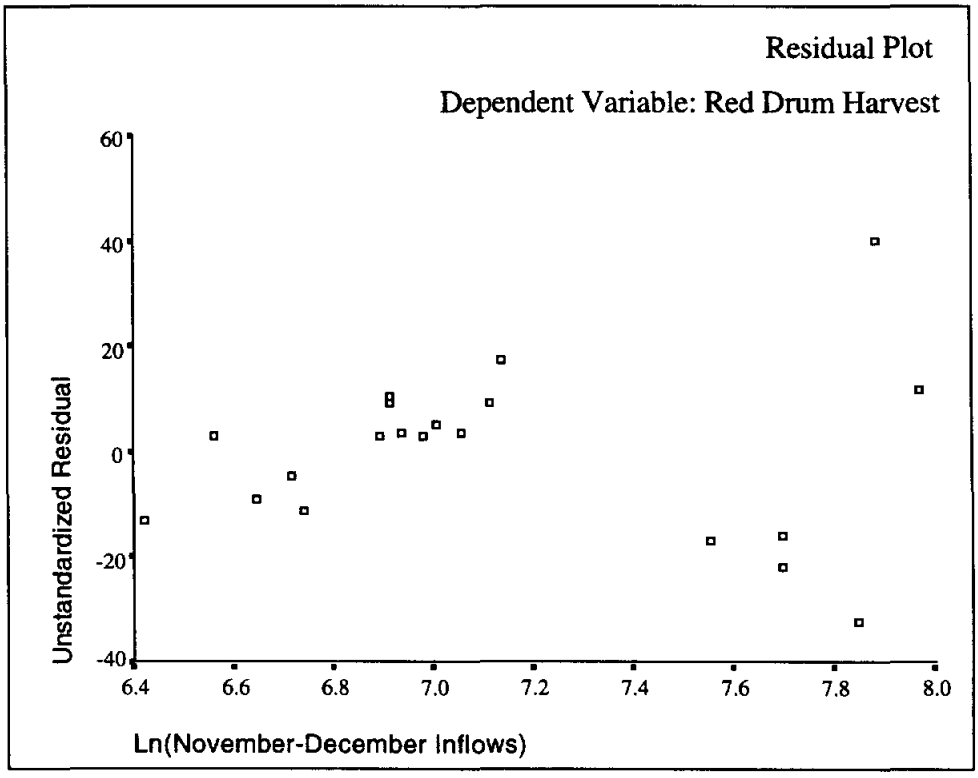

Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Red Drum Harvest
Unstandardized Residual
60
40
20
0
-20
-40
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for Red Drum Harvest

YEAR	RED_DRUM	LICI_1	UICI_1
1962	2.60	-48.89105	85.35896
1963	1.30	-42.99095	88.62225
1964	25.70	-49.13819	89.61034
1965	32.20	-43.58527	100.15135
1966	29.80	-40.16064	93.18156
1967	45.00	-32.71941	101.44060
1968	21.20	-34.10847	98.56051
1969	38.10	-29.70641	99.24182
1970	35.30	-27.04023	106.42167
1971	18.10	-38.03978	100.12151
1972	33.60	-34.34546	95.37273
1973	49.60	-22.27020	102.36269
1974	34.90	-14.98948	118.04360
1975	79.50	-1.63179	136.34107
1976	97.50	-9.10640	123.25201
1977	24.20	-14.16696	126.46830
1978	14.90	-54.05520	75.88191
1979	18.70	-72.19525	74.39134
1980	13.10	-64.83226	72.06855
1981	6.00	-58.34184	88.02243

RED_DRUM	Red drum harvest harvest
LICI_1	Lower limit for 99% prediction interval for red drum harvest
UICI_1	Upper limit for 99% prediction interval for red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.06674	.27562	.6311	.0007
1963	4.25703	.09181	.22405	.7497	.0020
1964	6.95291	.01388	.36594	.4338	.0000
1965	8.92203	.01317	.46958	.2583	.0000
1966	4.89722	.00265	.25775	.6725	.0000
1967	5.20293	.03058	.27384	.6352	.0001
1968	4.64695	.02745	.24458	.7030	.0000
1969	3.28664	.00156	.17298	.8573	.0000
1970	4.94185	.00479	.26010	.6671	.0000
1971	6.72566	.07263	.35398	.4580	.0010
1972	3.56496	.00149	.18763	.8283	.0000
1973	1.75740	.00675	.09249	.9720	.0000
1974	4.78215	.06523	.25169	.6865	.0007
1975	6.65295	.06256	.35016	.4659	.0006
1976	4.53192	.35526	.23852	.7169	.0875
1977	7.68955	.59537	.40471	.3608	.2506
1978	3.64440	.00255	.19181	.8197	.0000
1979	10.07832	.38961	*.53044	.1842	.1078
1980	6.24115	.03359	.32848	.5119	.0001
1981	9.98730	.09527	*.52565	.1893	.0023

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds $(2p + 1)/n$ or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with $p + 1$ degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with $p + 1$ numerator degrees of freedom and $n - p - 1$ denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.68257	.01248	-.26573	.32399
1963	-.82620	-.06165	-.28702	.33626
1964	.30109	.20980	-.09096	-.04235
1965	.29270	.04020	.16303	-.01820
1966	.13107	.02500	.01332	-.05076
1967	.45234	.17023	-.16818	-.30588
1968	-.42878	-.06436	.08652	.21768
1969	.10068	-.01461	.02827	.01309
1970	-.17643	.06962	-.06187	-.08134
1971	-.70571	-.19497	.19514	-.28541
1972	.09809	.05645	-.05877	.01217
1973	.21109	.01446	-.15469	.02677
1974	-.67733	.50653	-.34634	-.16112
1975	.65249	-.55182	.04389	.21771
1976	*2.08452	-.68984	-.48772	-.75533
1977	*-2.49993	.53844	*1.56785	-.80477
1978	.12863	.04301	.00154	.05966
1979	*1.72263	-.01180	.11263	.91143
1980	.47299	-.04072	.26709	.08397
1981	-.79989	-.15728	.11314	.30930

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

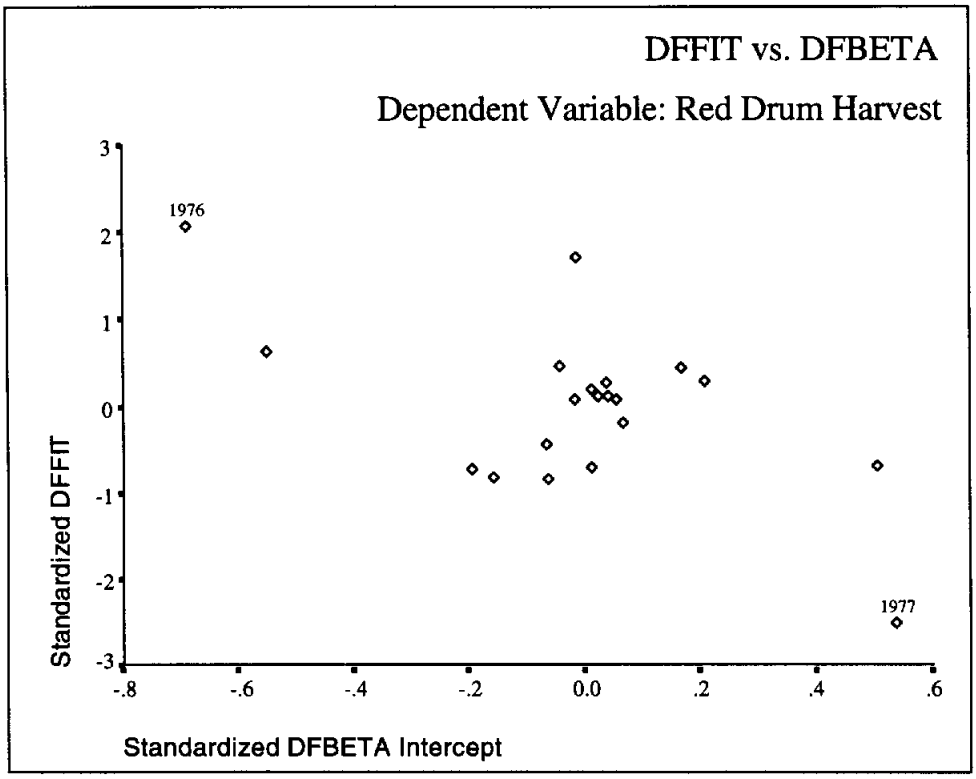
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

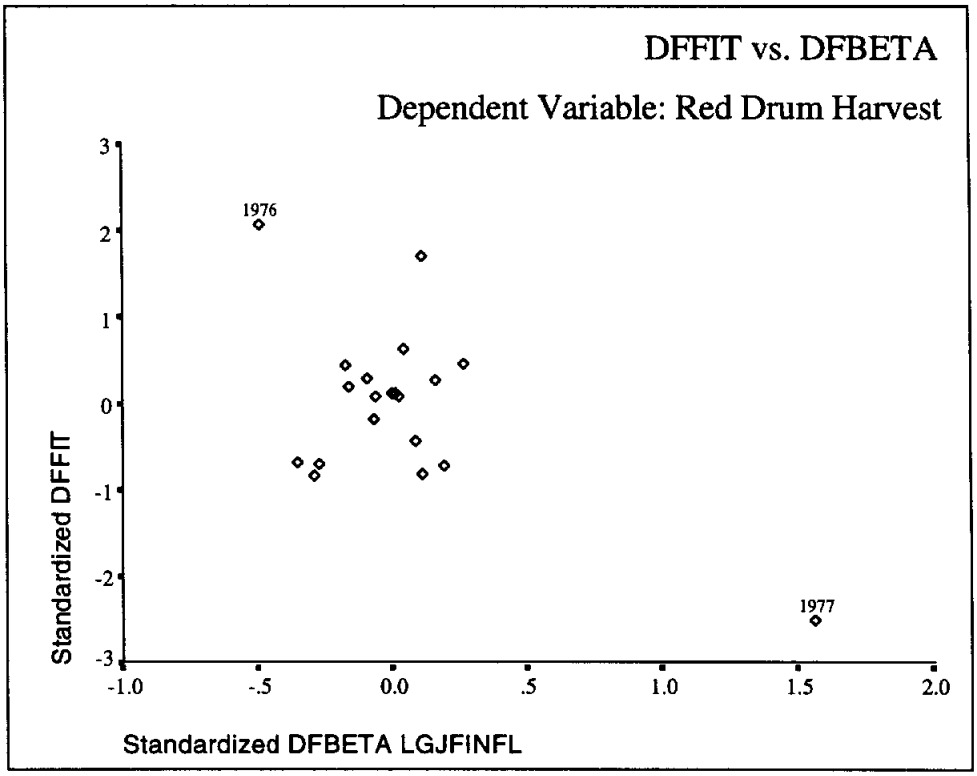
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.04134	-.05667	.00465	.13128
1963	.09944	.05176	-.03229	.08015
1964	-.08894	.03455	.07620	-.00577
1965	.01768	-.22389	.02672	-.09060
1966	.04343	-.00197	-.08402	.01435
1967	.25388	.15904	-.16524	.09735
1968	-.24986	-.12546	.14643	-.01061
1969	.03731	-.04567	.01308	-.03943
1970	-.02897	.09870	.01550	.02491
1971	.11955	.05179	-.31297	.14320
1972	-.02831	.02620	.01171	.02568
1973	.01525	.10790	.00408	.09217
1974	-.16234	.44236	-.36390	.14609
1975	.14901	-.19697	.17902	.21227
1976	.94943	.15051	.79594	.64388
1977	.29625	-.95045	*1.02722	*-2.29493
1978	-.10235	.01875	-.07058	.02405
1979	*-1.26280	.54251	*-1.08674	.30754
1980	-.19074	-.03790	.13143	-.32840
1981	-.14415	-.37285	-.34398	.39390

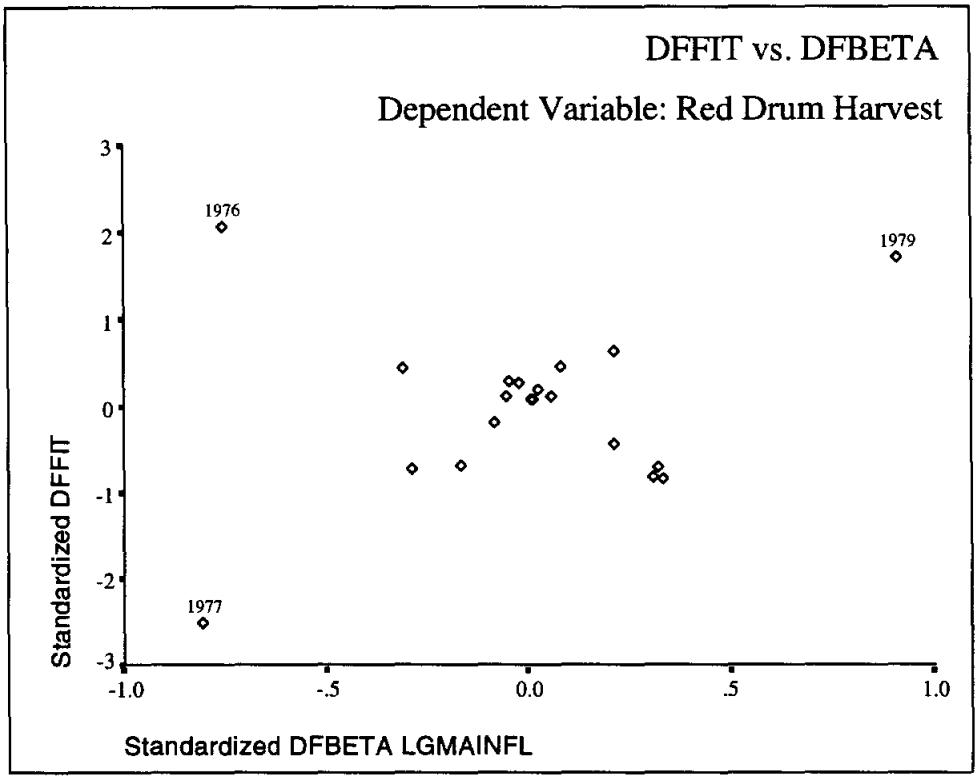
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

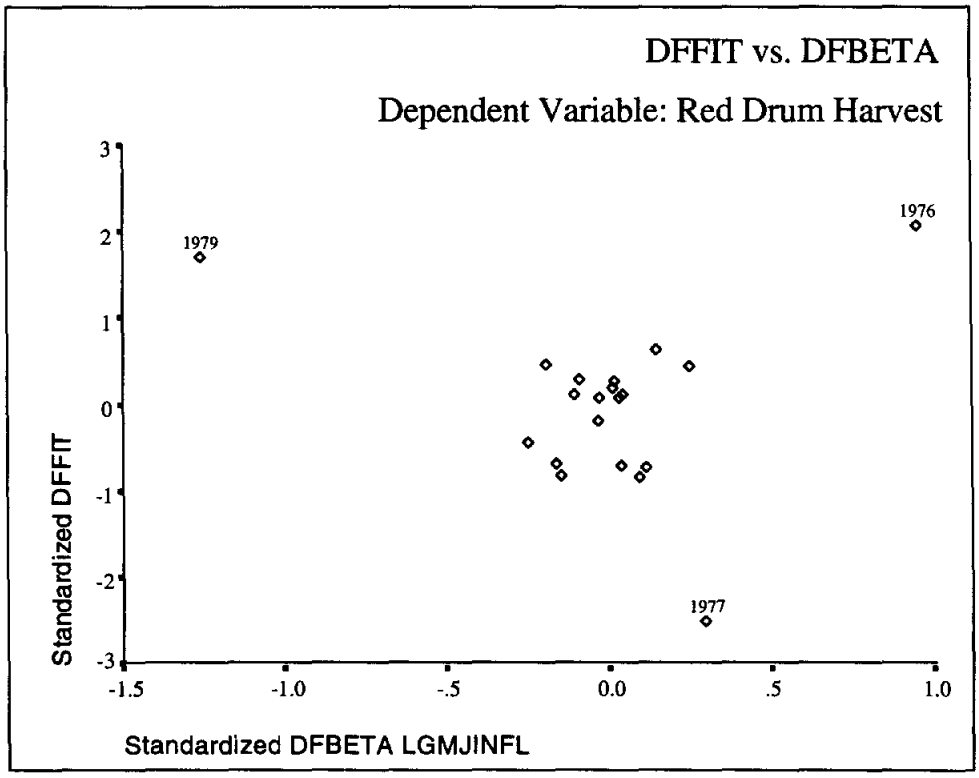
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

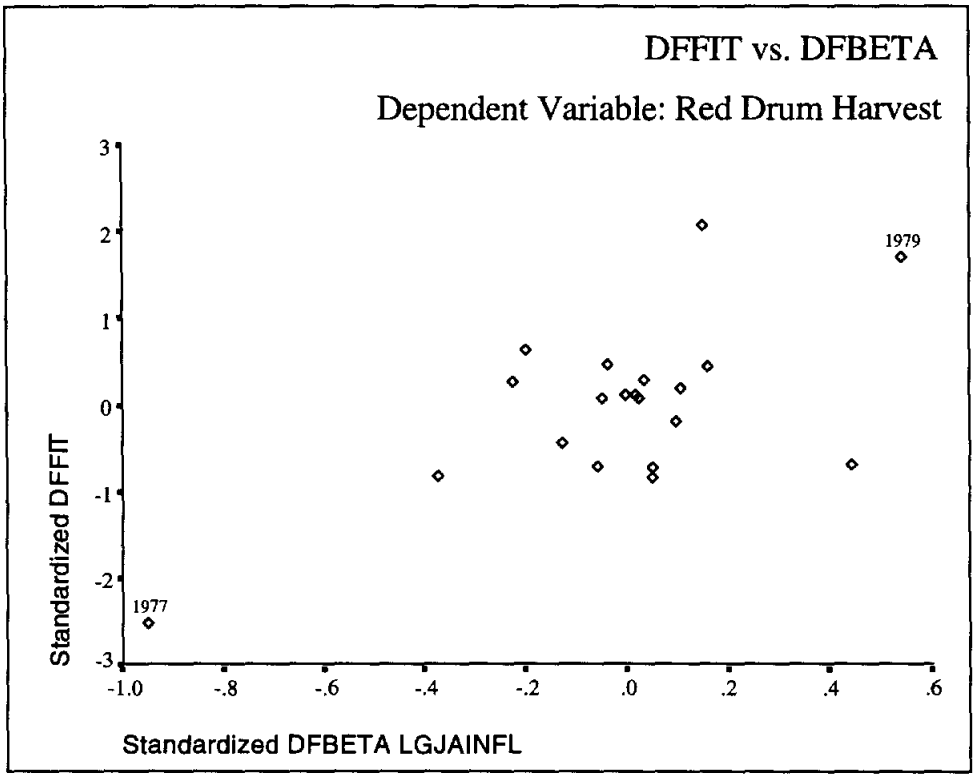
Graphics

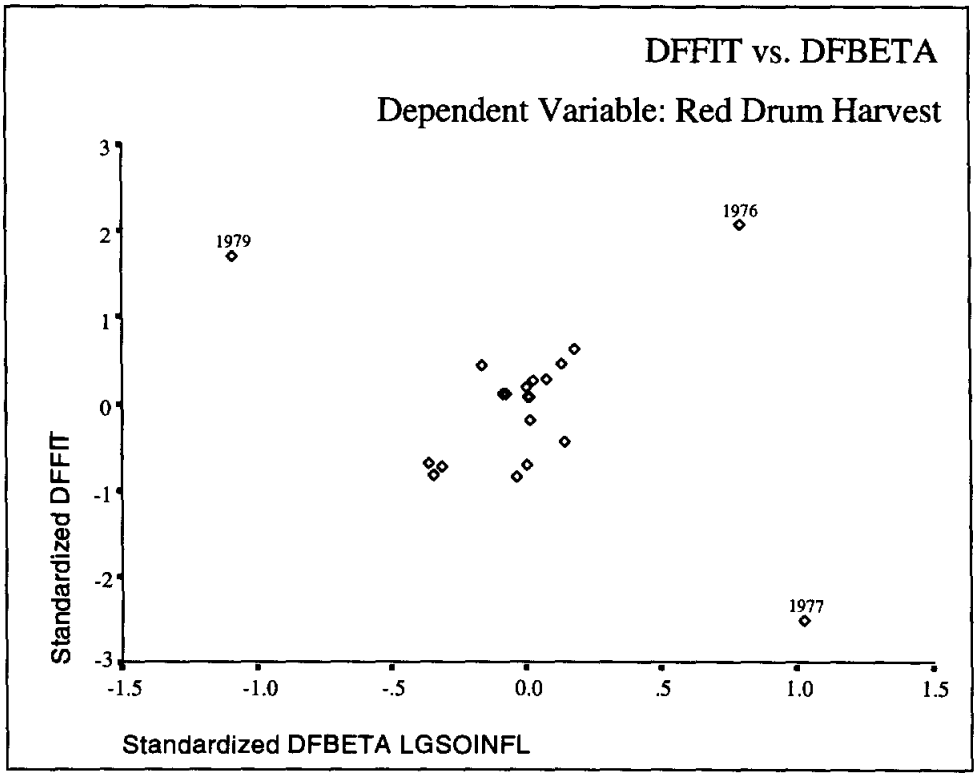

DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA Intercept
1976
1977
3
2
1
0
-1
-2
-3
-.8
-.6
-.4
-.2
0.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA LGJFINFL
1976
1977
3
2
1
0
-1
-2
-3
-1.0
-.5
0.0
.5
1.0
1.5
2.0


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA LGMAINFL
1976
1979
1977
3
2
1
0
-1
-2
-3
-1.0
-.5
0.0
.5
1.0


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA LGMJINFL
1979
1976
1977
3
2
1
0
-1
-2
-3
-1.5
-1.0
-.5
0.0
.5
1.0


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA LGJAINFL
1979
1977
3
2
1
0
-1
-2
-3
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA LGSOINFL
1979
1976
1977
3
2
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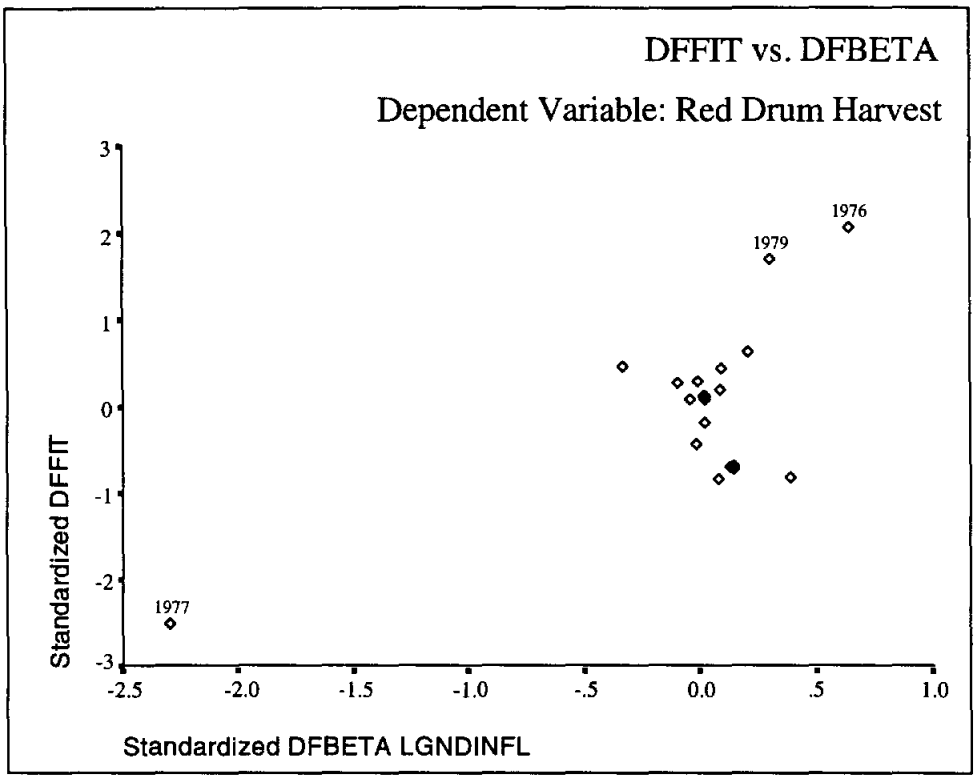
0
-1
-2
-3
-1.5
-1.0
-.5
0.0
.5
1.0
1.5


DFFIT vs. DFBETA
Dependent Variable: Red Drum Harvest
Standardized DFFIT
Standardized DFBETA LGNDINFL
1976
1979
1977
3
2
1
0
-1
-2
-3
-2.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0

Regression—Logged Harvest and Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	*Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)*[c,d]	.	*.749*	*.561*	*.358*	*.8415*	*1.852*

a. Dependent Variable: Ln(Red Drum Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	*11.750*	*6*	*1.958*	*2.765*	*.059*[b]
	Residual	*9.206*	*13*	*.708*		
	Total	*20.956*	*19*			

a. Dependent Variable: Ln(Red Drum Harvest)

b. Independent Variables: (Constant), Ln(November-December Inflows), Ln(May-June Inflows), Ln(July-August Inflows), Ln(September-October Inflows), Ln(March-April Inflows), Ln(January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-4.583	5.297		-.865	.403	-16.025	6.860
	Ln(January-February Inflows)	-1.805	1.225	-.653	-1.473	.164	-4.453	.842
	Ln(March-April Inflows)	.996	.686	.449	1.452	.170	-.486	2.479
	Ln(May-June Inflows)	1.161	.682	.523	1.701	.113	-.313	2.635
	Ln(July-August Inflows)	-.963	.857	-.454	-1.124	.282	-2.816	.889
	Ln(September-October Inflows)	2.699E-02	.494	.015	.055	.957	-1.040	1.094
	Ln(November-December Inflows)	1.519	.781	.682	1.944	.074	-.169	3.207

a. Dependent Variable: Ln(Red Drum Harvest)

Collinearity Diagnostics

Model		Collinearity Statistics	
		Tolerance	VIF
1	Ln(January-February Inflows)	.172	5.821
	Ln(March-April Inflows)	.353	2.835
	Ln(May-June Inflows)	.357	2.801
	Ln(July-August Inflows)	.207	4.841
	Ln(September-October Inflows)	.456	2.193
	Ln(November-December Inflows)	.274	3.647

Collinearity Diagnostics[a]

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions		
				(Constant)	Ln(January-February Inflows)	Ln(March-April Inflows)
1	1	6.984	1.000	.00	.00	.00
	2	9.020E-03	27.826	.00	.00	.03
	3	2.966E-03	48.524	.14	.00	.00
	4	2.173E-03	56.697	.00	.03	.09
	5	9.164E-04	87.299	.53	.01	.00
	6	7.542E-04	96.232	.16	.00	.87
	7	2.920E-04	154.662	.17	.96	.01

a. Dependent Variable: Ln(Red Drum Harvest)

Collinearity Diagnostics[a]

Model	Dimension	Variance Proportions			
		Ln(May-June Inflows)	Ln(July-August Inflows)	Ln(September-October Inflows)	Ln(November-December Inflows)
1	1	.00	.00	.00	.00
	2	.03	.00	.12	.02
	3	.00	.19	.04	.03
	4	.00	.04	.63	.09
	5	.52	.08	.01	.19
	6	.45	.01	.10	.19
	7	.00	.67	.10	.47

a. Dependent Variable: Ln(Red Drum Harvest)

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	*1.6142*	*4.0977*	*3.0699*	*.7864*	*20*
Std. Predicted Value	*-1.851*	*1.307*	*.000*	*1.000*	*20*
Standard Error of Predicted Value	*.3177*	*.6411*	*.4913*	*8.247E-02*	*20*
Adjusted Predicted Value	*1.3105*	*4.8494*	*3.0557*	*.9531*	*20*
Residual	*-1.6742*	*1.2868*	*5.407E-15*	*.6961*	*20*
Std. Residual	*-1.990*	*1.529*	*.000*	*.827*	*20*
Stud. Residual	*-2.335*	*1.813*	*.006*	*1.032*	*20*
Deleted Residual	*-2.3063*	*1.8086*	*1.428E-02*	*1.0993*	*20*
Stud. Deleted Residual	*-2.944*	*2.015*	*-.022*	*1.138*	*20*
Mahal. Distance	*1.757*	*10.078*	*5.700*	*2.212*	*20*
Cook's Distance	*.000*	*.294*	*.087*	*.100*	*20*
Centered Leverage Value	*.092*	*.530*	*.300*	*.116*	*20*

a. Dependent Variable: Ln(Red Drum Harvest)

Case Values for Residuals Diagnostics

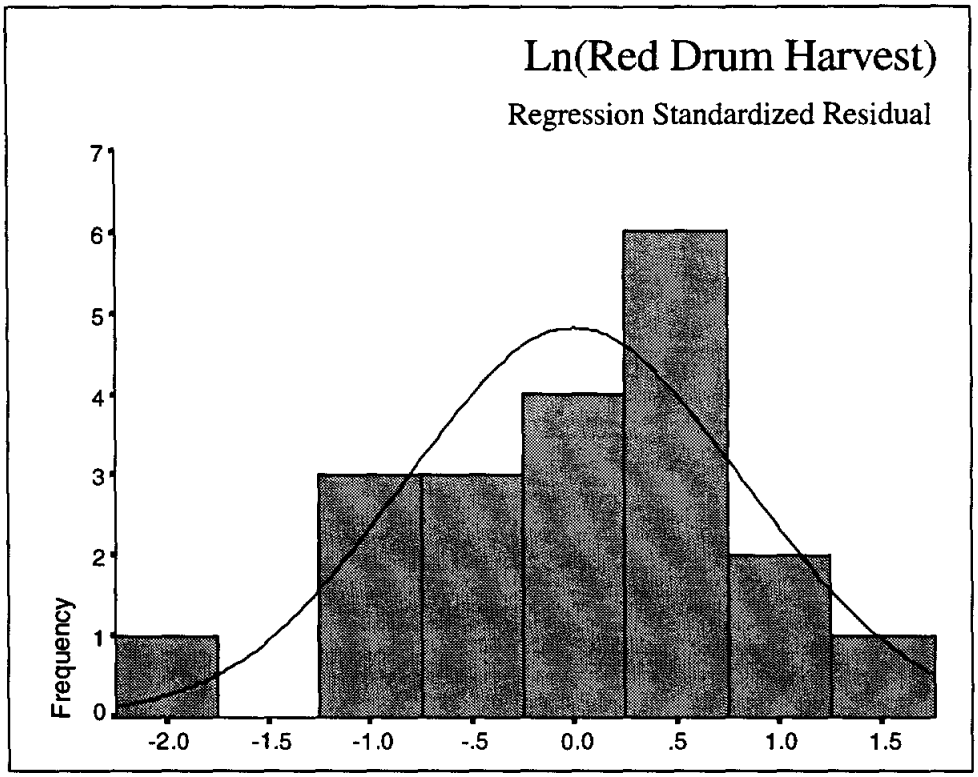
YEAR	PRE_1	RES_1	DRE_1	ADJ_1	ZPR_1	ZRE_1	SRE_1[1]	SDR_1[2]
1962	1.61423	-.65872	-.97677	1.93228	-1.85114	-.78278	-.95320	-.94959
1963	1.93659	-1.67422	-2.30626	2.56863	-1.44121	-1.98954	-2.33507	*-2.94435
1964	2.64471	.60178	1.03035	2.21614	-.54074	.71512	.93573	.93092
1965	3.12574	.34623	.72067	2.75129	.07096	.41143	.59359	.57819
1966	3.14073	.25378	.36660	3.02790	.09002	.30158	.36247	.35002
1967	3.26563	.54103	.80015	3.00651	.24885	.64293	.78187	.76951
1968	3.32886	-.27486	-.38964	3.44364	.32926	-.32662	-.38889	-.37582
1969	3.75439	-.11417	-.14694	3.78715	.87037	-.13567	-.15392	-.14801
1970	4.09767	-.53379	-.77372	4.33760	1.30691	-.63432	-.76369	-.75076
1971	3.84322	-.94730	-1.58939	4.48530	.98333	-1.12571	-1.45814	-1.53179
1972	3.33768	.17684	.23196	3.28256	.34048	.21015	.24068	.23176
1973	3.58280	.32119	.37457	3.52943	.65218	.38168	.41218	.39862
1974	3.48818	.06430	.09208	3.46040	.53186	.07641	.09144	.08788
1975	4.04030	.33546	.55924	3.81651	1.23395	.39864	.51471	.49963
1976	3.29309	1.28676	1.80857	2.77128	.28378	1.52910	1.81282	2.01490
1977	4.09319	-.90684	-1.66304	4.84940	1.30121	-1.07762	-1.45933	-1.53329
1978	2.63354	.06782	.08945	2.61191	-.55494	.08059	.09256	.08895
1979	2.28631	.64222	1.53068	1.39784	-.99650	.76317	1.17821	1.19774
1980	1.78816	.78445	1.26215	1.31046	-1.62996	.93219	1.18243	1.20255
1981	2.10372	-.31196	-.73515	2.52691	-1.22868	-.37072	-.56909	-.55370

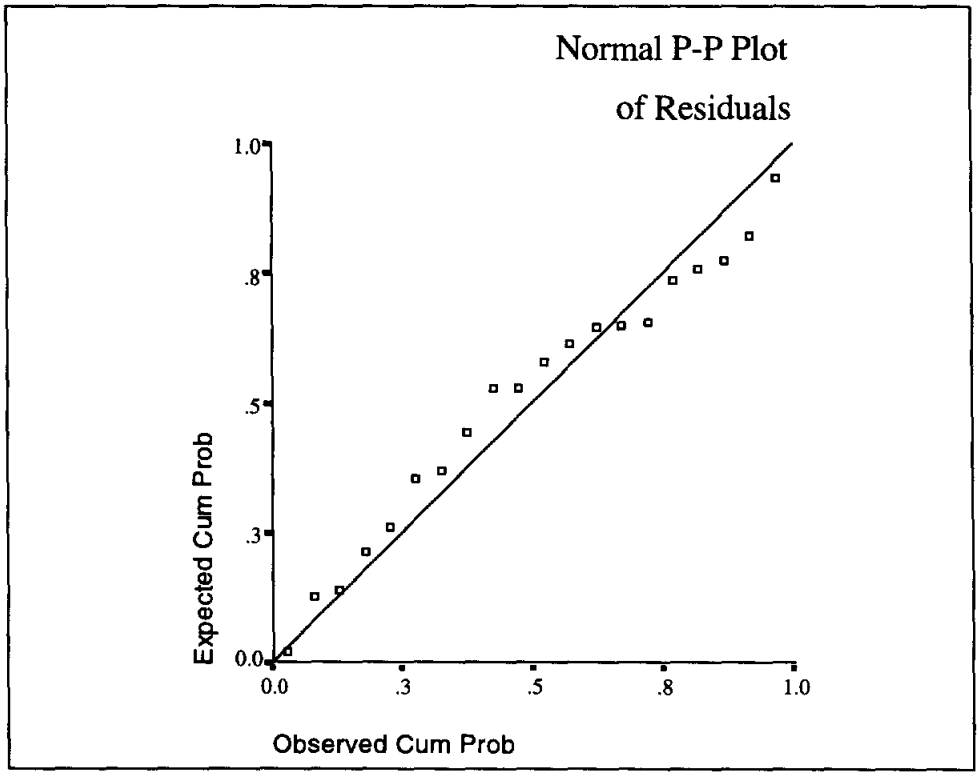
PRE_1	Predicted value of the natural log of harvest
RES_1	Ordinary residual; observed log harvest minus predicted log harvest
DRE_1	Deleted residual; residual obtained when the model is fitted without that observation
ADJ_1	Adjusted predicted value; predicted value of the log of harvest when the model is fitted without that observation
ZPR_1	Z-score of the predicted value of the log of harvest
ZRE_1	Z-score of the residual
SRE_1	Studentized residual
SDR_1	Studentized deleted residuals

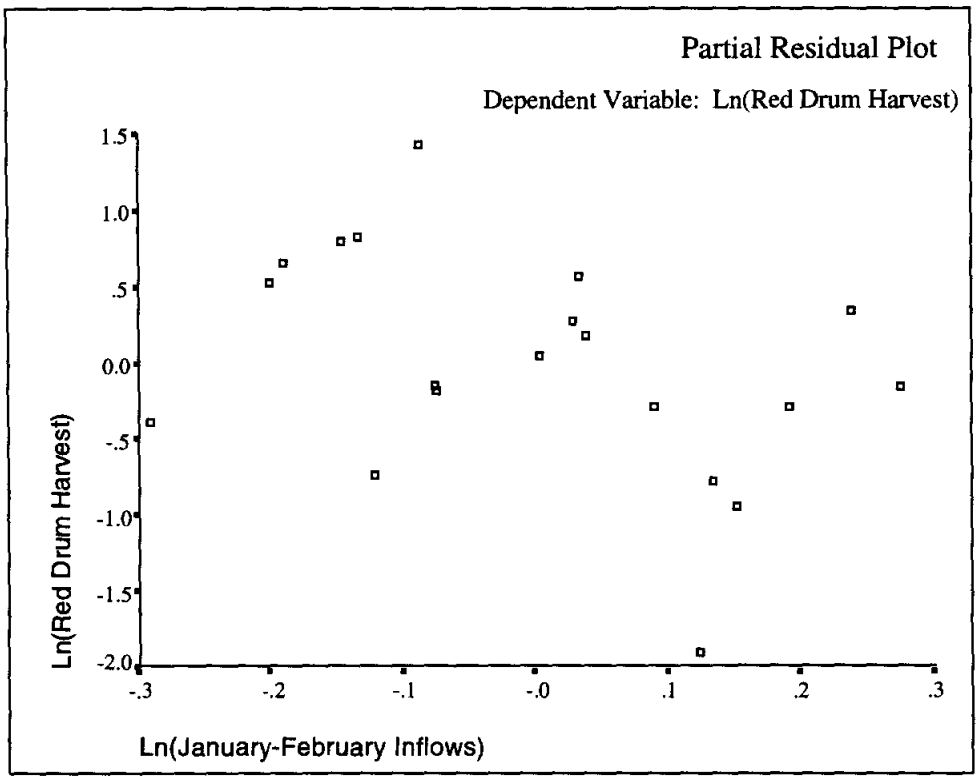
[1]Values greater than 3 are flagged.

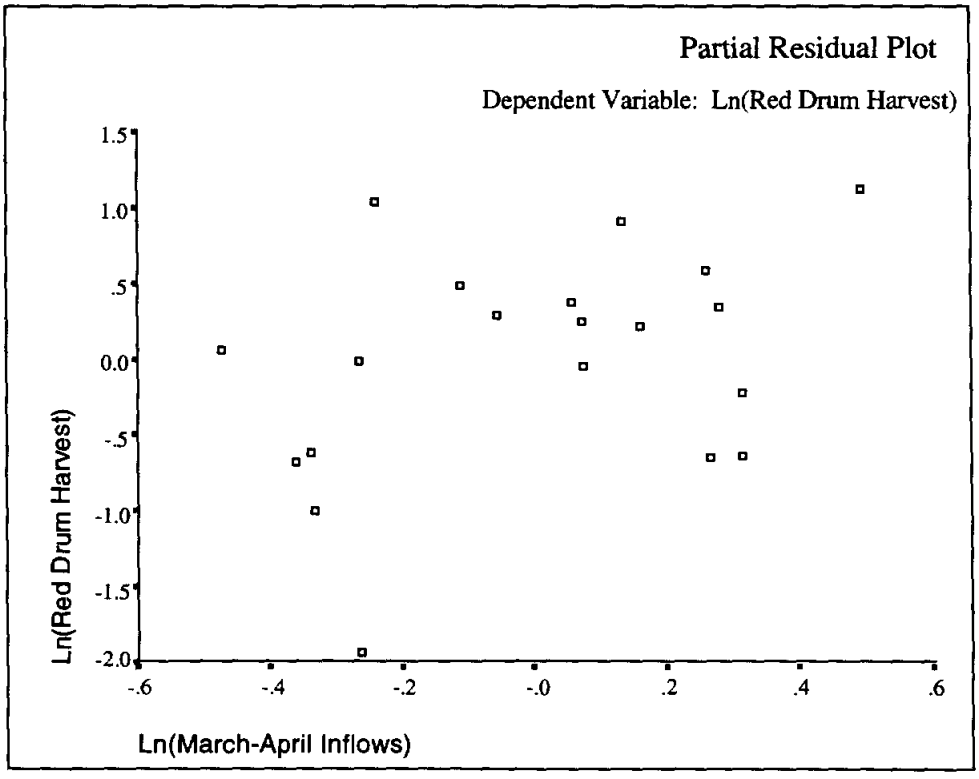
[2]This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{12,0.01} = 2.681$.

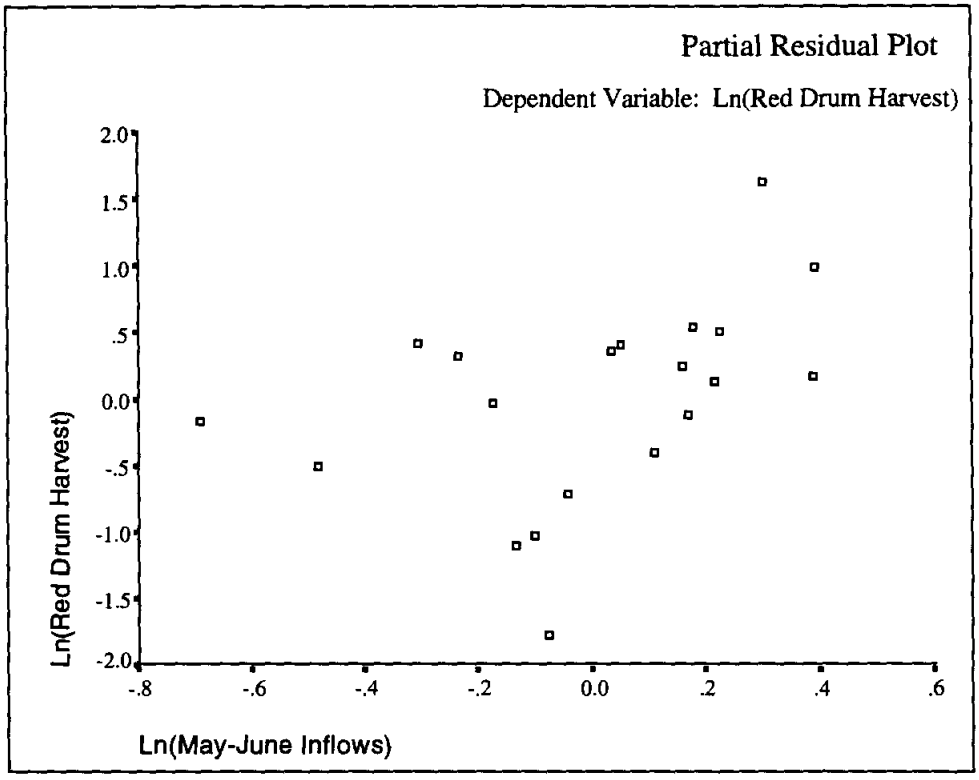
Graphics

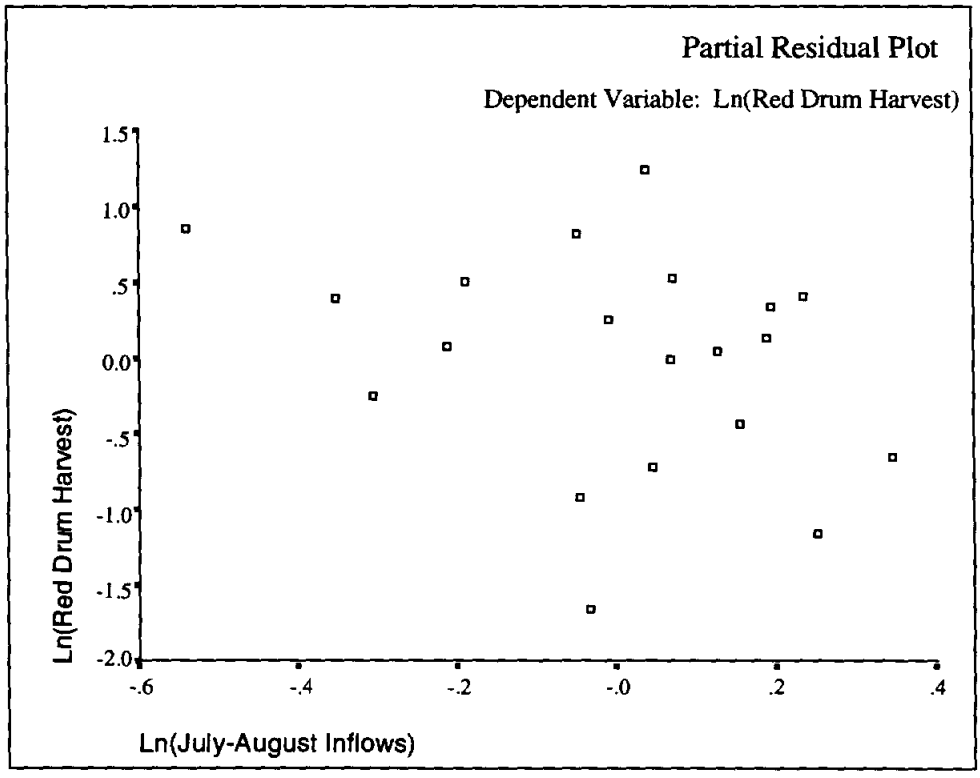

Ln(Red Drum Harvest)
Regression Standardized Residual
Frequency
7
6
5
4
3
2
1
0
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1.5

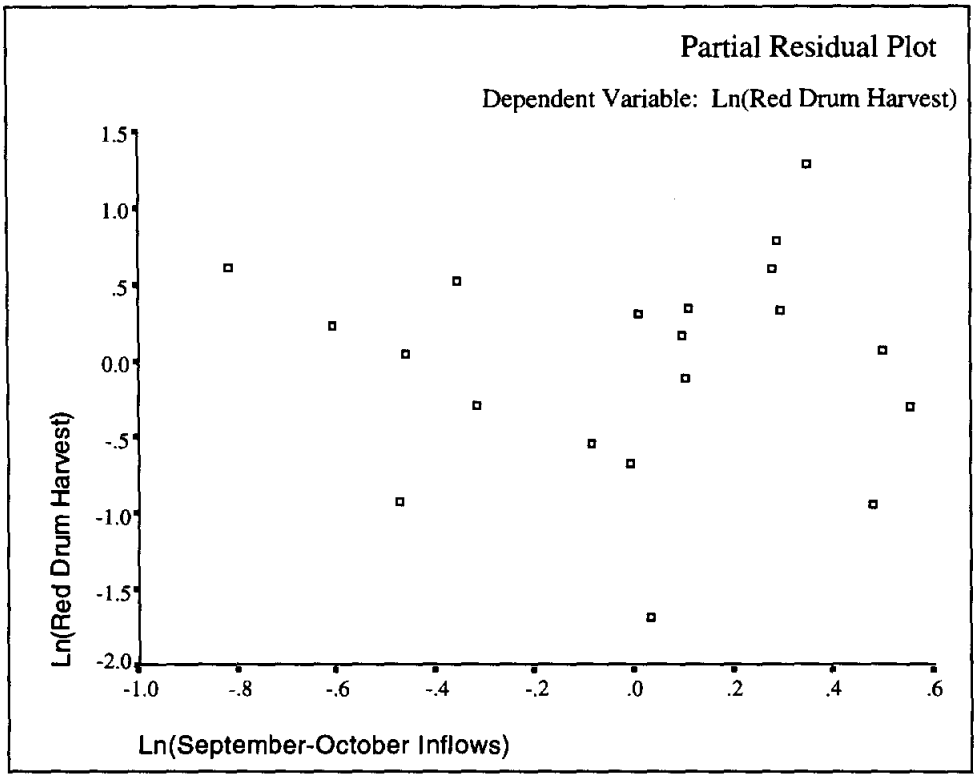

Normal P-P Plot
of Residuals
Expected Cum Prob
1.0
.8
.5
.3
0.0
0.0
.3
.5
.8
1.0
Observed Cum Prob

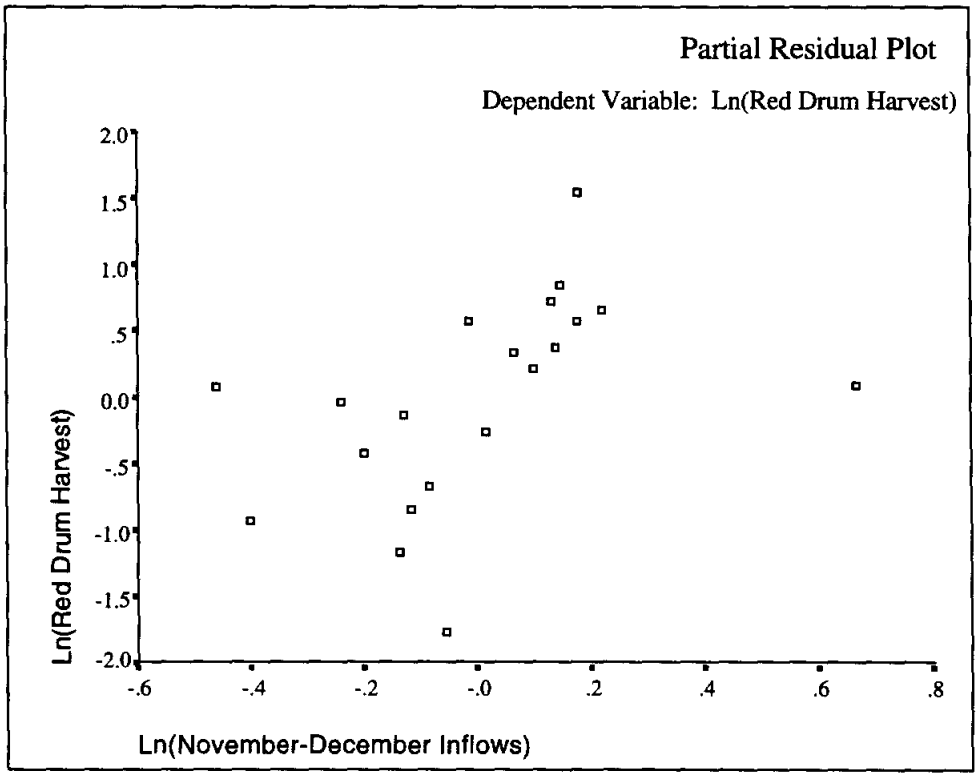

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.3
-.2
-.1
-.0
.1
.2
.3
Ln(January-February Inflows)

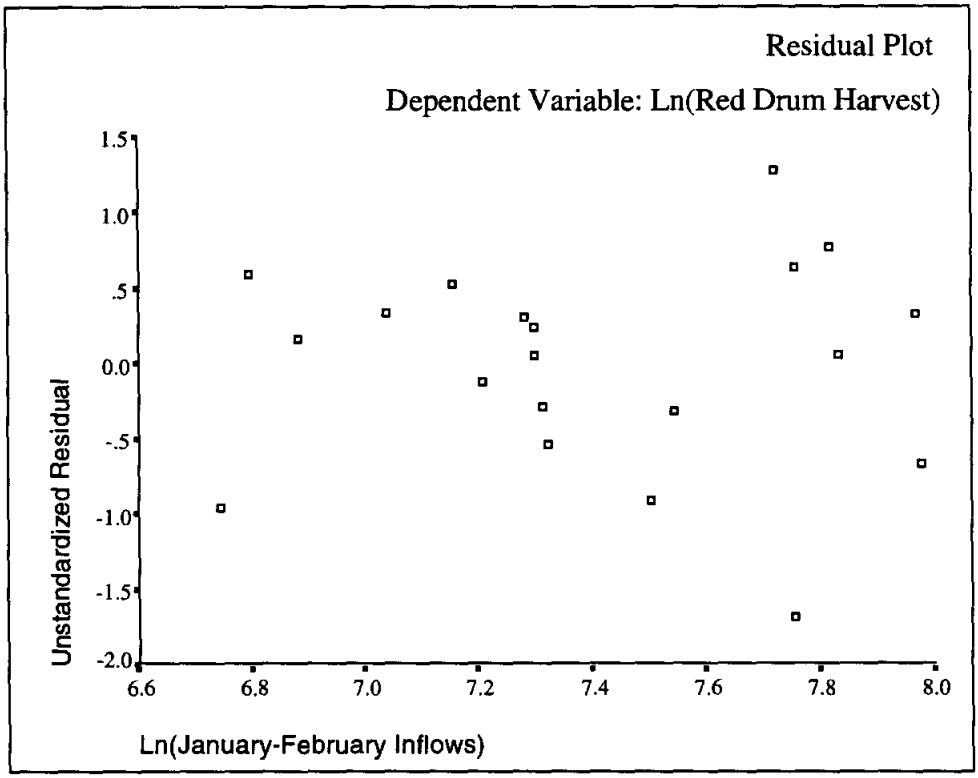

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
Ln(March-April Inflows)

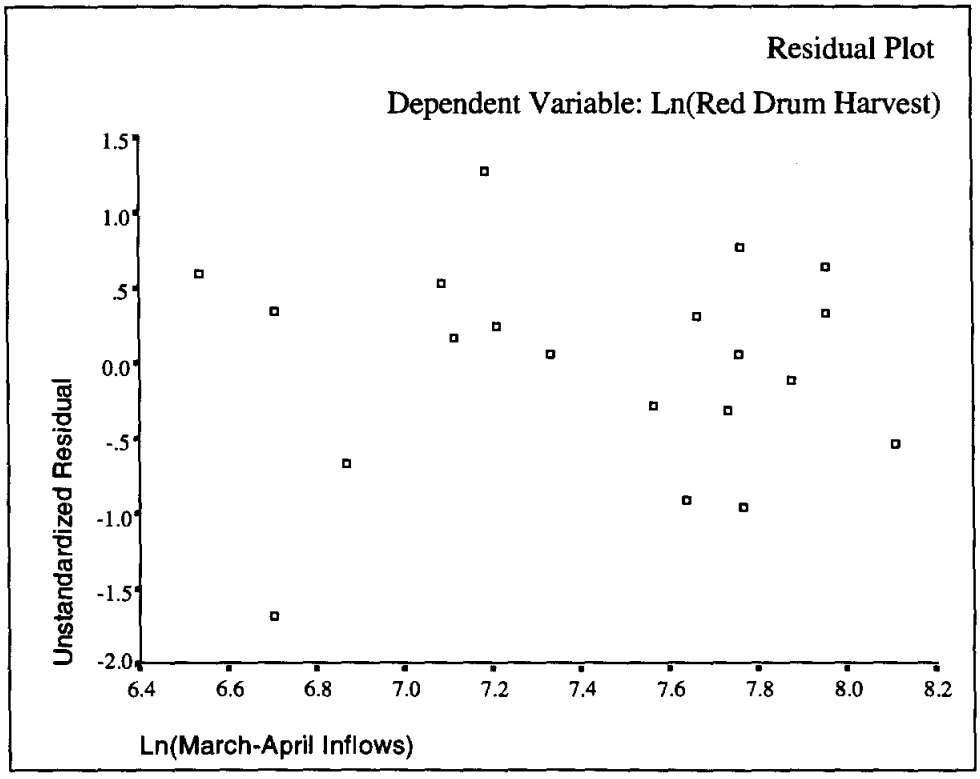

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
Ln(May-June Inflows)

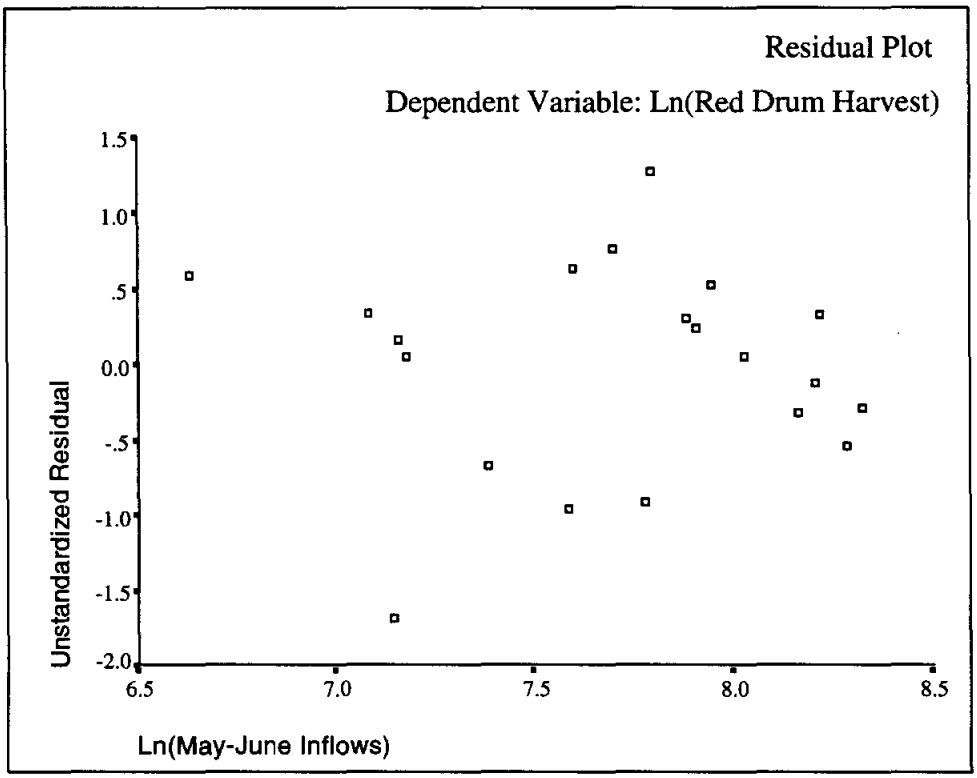

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
Ln(July-August Inflows)

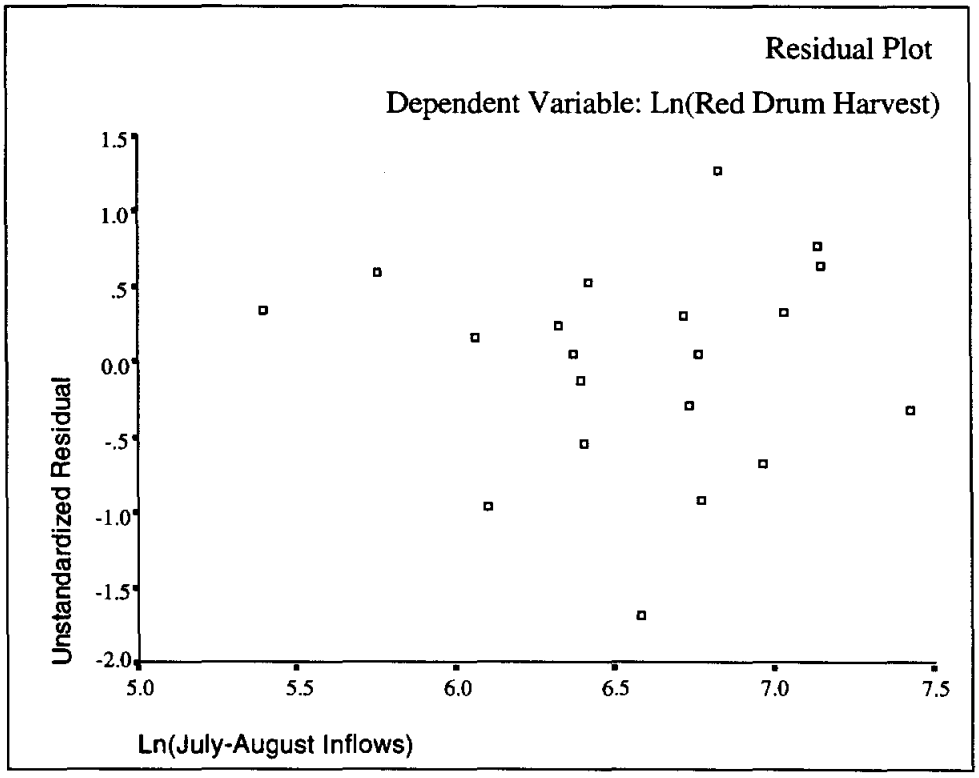

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
Ln(September-October Inflows)

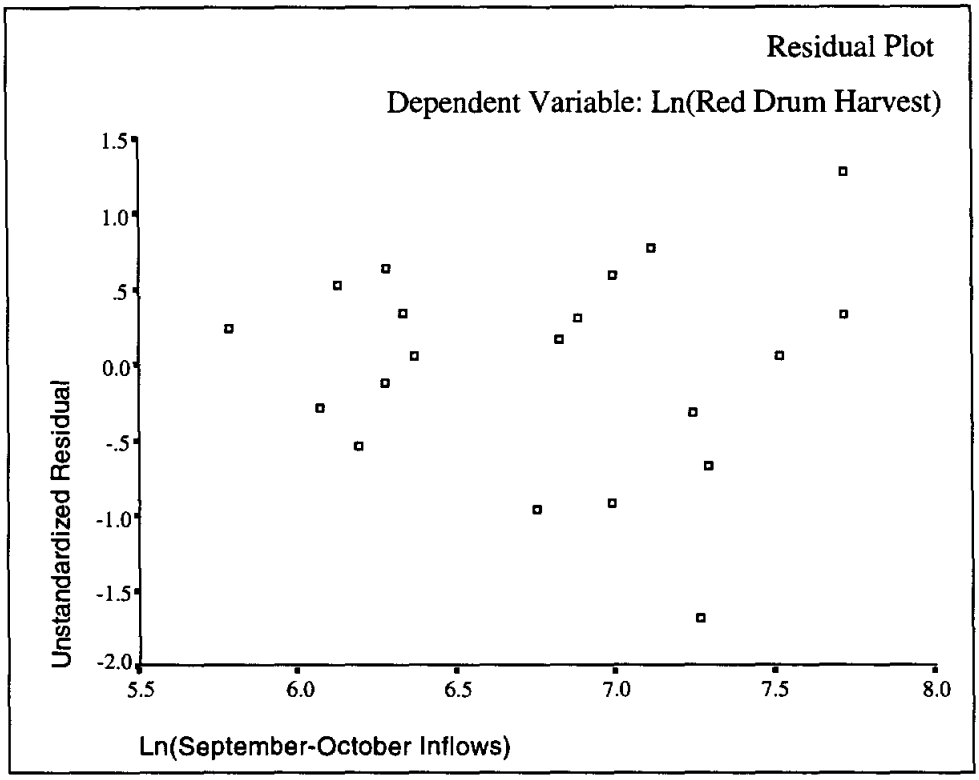

Partial Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Ln(Red Drum Harvest)
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
.8
Ln(November-December Inflows)

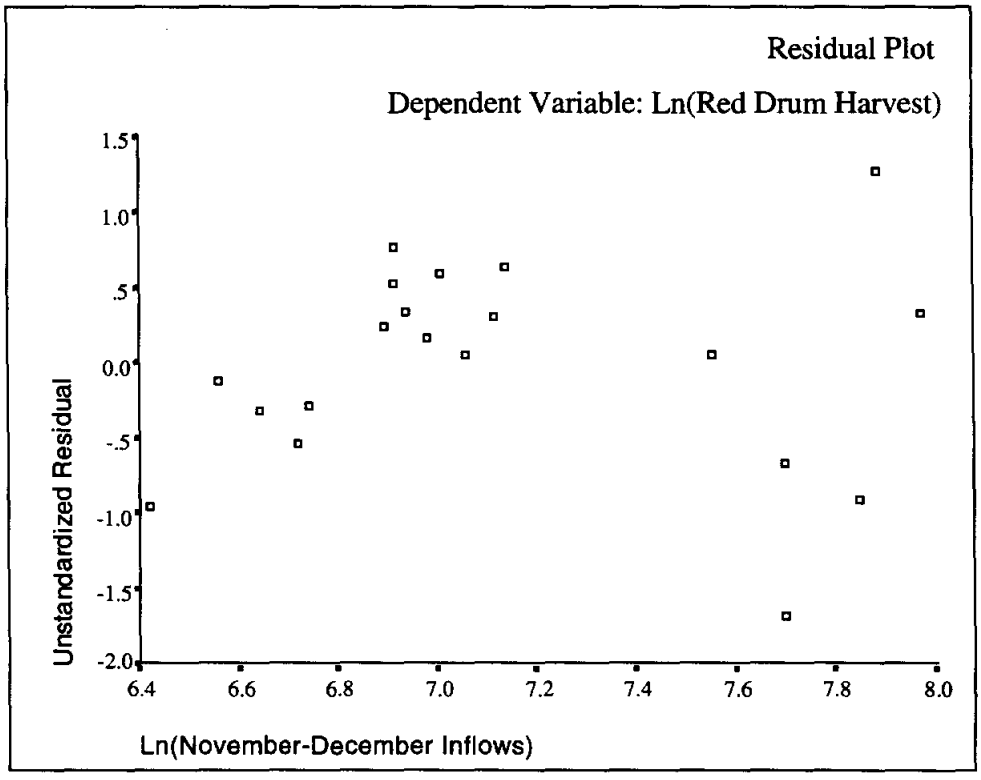

Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(January-February Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
8.2
Ln(March-April Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.5
7.0
7.5
8.0
8.5
Ln(May-June Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.0
5.5
6.0
6.5
7.0
7.5
Ln(July-August Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
5.5
6.0
6.5
7.0
7.5
8.0
Ln(September-October Inflows)


Residual Plot
Dependent Variable: Ln(Red Drum Harvest)
Unstandardized Residual
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
6.4
6.6
6.8
7.0
7.2
7.4
7.6
7.8
8.0
Ln(November-December Inflows)

Prediction Intervals for the Natural Log of Red Drum Harvest

YEAR	LGRDDRUM	LICI_1	UICI_1
1962	.96	-1.30431	4.53276
1963	.26	-.92463	4.79780
1964	3.25	-.37162	5.66104
1965	3.47	.00097	6.25051
1966	3.39	.24193	6.03953
1967	3.81	.34905	6.18221
1968	3.05	.44470	6.21302
1969	3.64	.95111	6.55766
1970	3.56	1.19627	6.99908
1971	2.90	.83965	6.84678
1972	3.51	.51767	6.15770
1973	3.90	.87334	6.29226
1974	3.55	.59611	6.38026
1975	4.38	1.04083	7.03976
1976	4.58	.41568	6.17051
1977	3.19	1.03584	7.15054
1978	2.70	-.19123	5.45832
1979	2.93	-.90042	5.47303
1980	2.57	-1.18800	4.76432
1981	1.79	-1.07817	5.28562

LGRDDRUM Natural log of red drum harvest

LICI_1 Lower limit for 99% prediction interval for the natural log of red drum harvest

UICI_1 Upper limit for 99% prediction interval for the natural log of red drum harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH_1	COO_1	LEV_1[1]	MAHA_PV[2]	COOK_PV[3]
1962	5.23669	.06267	.27562	0.6311	0.0006
1963	4.25703	.29406	.22405	0.7497	0.0557
1964	6.95291	.08908	.36594	0.4338	0.0018
1965	8.92203	.05444	.46958	0.2583	0.0004
1966	4.89722	.00834	.25775	0.6725	0.0000
1967	5.20293	.04183	.27384	0.6352	0.0002
1968	4.64695	.00902	.24458	0.7030	0.0000
1969	3.28664	.00097	.17298	0.8573	0.0000
1970	4.94185	.03745	.26010	0.6671	0.0001
1971	6.72566	.20587	.35398	0.4580	0.0219
1972	3.56496	.00258	.18763	0.8283	0.0000
1973	1.75740	.00403	.09249	0.9720	0.0000
1974	4.78215	.00052	.25169	0.6865	0.0000
1975	6.65295	.02525	.35016	0.4659	0.0000
1976	4.53192	.19038	.23852	0.7169	0.0176
1977	7.68955	.25370	.40471	0.3608	0.0383
1978	3.64440	.00039	.19181	0.8197	0.0000
1979	10.07832	.27435	*.53044	0.1842	0.0468
1980	6.24115	.12163	.32848	0.5119	0.0048
1981	9.98730	.06276	*.52565	0.1893	0.0006

MAH_1	Mahalanobis distance
COO_1	Cook's distance
LEV_1	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1]This is flagged if it exceeds (2p + 1)/n or 0.5, whichever is smaller.

[2]MAHA_PV = 1 – F(MAH_1), where F is the CDF of a Chi-squared random variable with p + 1 degrees of freedom. Small values indicate a problem.

[3]COOK_PV = F(COO_1), where F is the CDF of an F-ratio random variable with p + 1 numerator degrees of freedom and n – p – 1 denominator degrees of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFITS	SDFBETA_0	SDFBETA_1	SDFBETA_2
1962	-.65983	.01206	-.25688	.31319
1963	*-1.80907	-.13498	-.62846	.73629
1964	.78560	.54740	-.23734	-.11051
1965	.60130	.08258	.33491	-.03739
1966	.23338	.04451	.02372	-.09039
1967	.53254	.20042	-.19800	-.36012
1968	-.24286	-.03646	.04901	.12329
1969	-.07929	.01151	-.02226	-.01031
1970	-.50334	.19860	-.17651	-.23204
1971	*-1.26110	-.34841	.34871	-.51002
1972	.12939	.07446	-.07752	.01605
1973	.16250	.01113	-.11908	.02060
1974	.05776	-.04320	.02954	.01374
1975	.40808	-.34511	.02745	.13616
1976	*1.28311	-.42462	-.30021	-.46494
1977	*-1.40017	.30157	.87813	-.45074
1978	.05024	.01680	.00060	.02330
1979	*1.40878	-.00965	.09211	.74537
1980	.93842	-.08079	.52991	.16660
1981	-.64490	-.12680	.09122	.24937

SDFFITS Standardized dffits value
SDFBETA_0 Standardized dfbeta for the intercept term
SDFBETA_1 Standardized dfbeta for logged January-February inflows
SDFBETA_2 Standardized dfbeta for logged March-April inflows

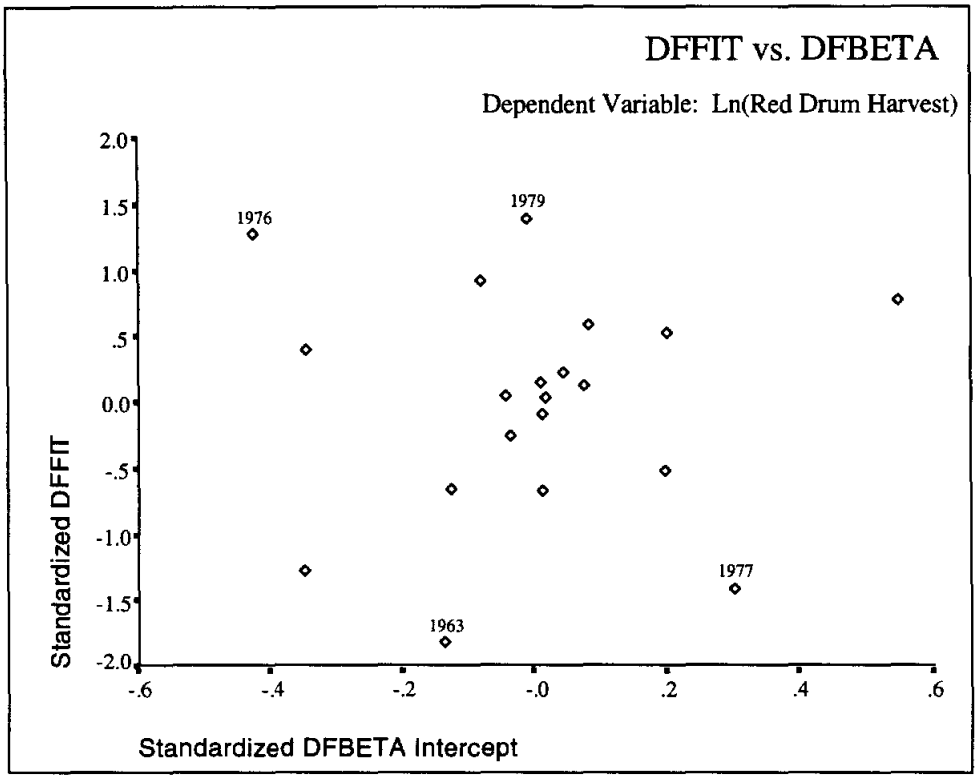
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

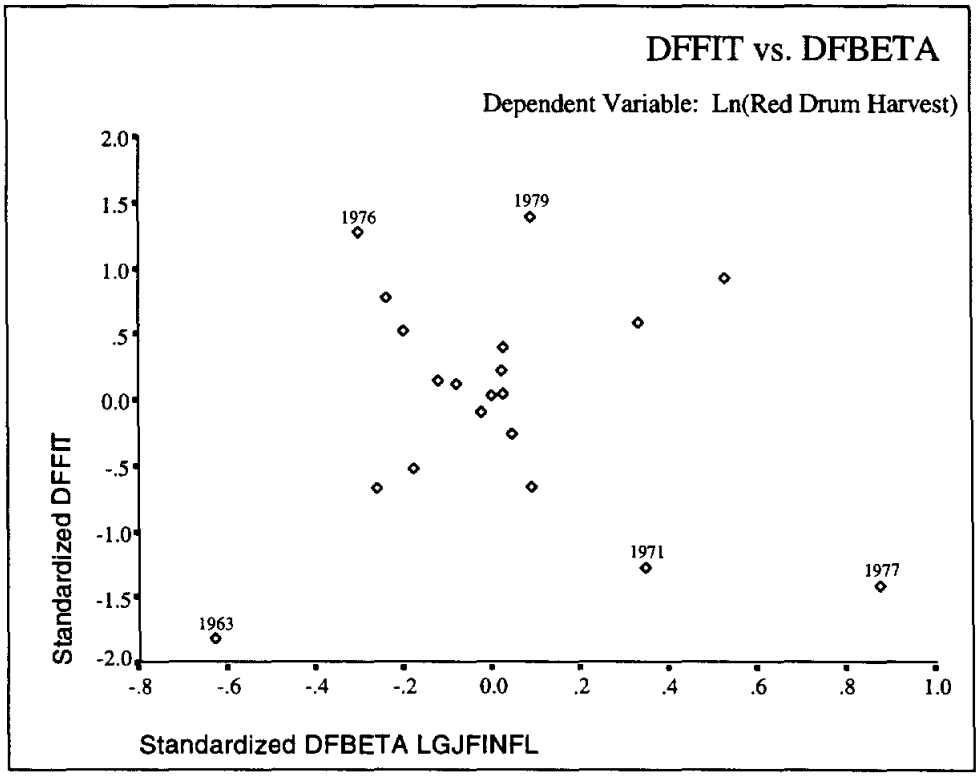
YEAR	SDFBETA_3	SDFBETA_4	SDFBETA_5	SDFBETA_6
1962	.03996	-.05478	.00450	.12691
1963	.21773	.11334	-.07070	.17551
1964	-.23206	.09014	.19883	-.01505
1965	.03632	-.45995	.05489	-.18613
1966	.07732	-.00351	-.14960	.02555
1967	.29890	.18724	-.19453	.11461
1968	-.14152	-.07106	.08294	-.00601
1969	-.02938	.03597	-.01030	.03105
1970	-.08266	.28157	.04423	.07107
1971	.21363	.09254	-.55928	.25589
1972	-.03734	.03456	.01544	.03387
1973	.01174	.08306	.00314	.07095
1974	.01385	-.03773	.03103	-.01246
1975	.09319	-.12319	.11196	.13275
1976	.58441	.09265	.48994	.39634
1977	.16592	-.53233	.57533	*-1.28535
1978	-.03997	.00732	-.02756	.00939
1979	*-1.03273	.44367	-.88874	.25151
1980	-.37843	-.07520	.26077	-.65156
1981	-.11622	-.30060	-.27733	.31757

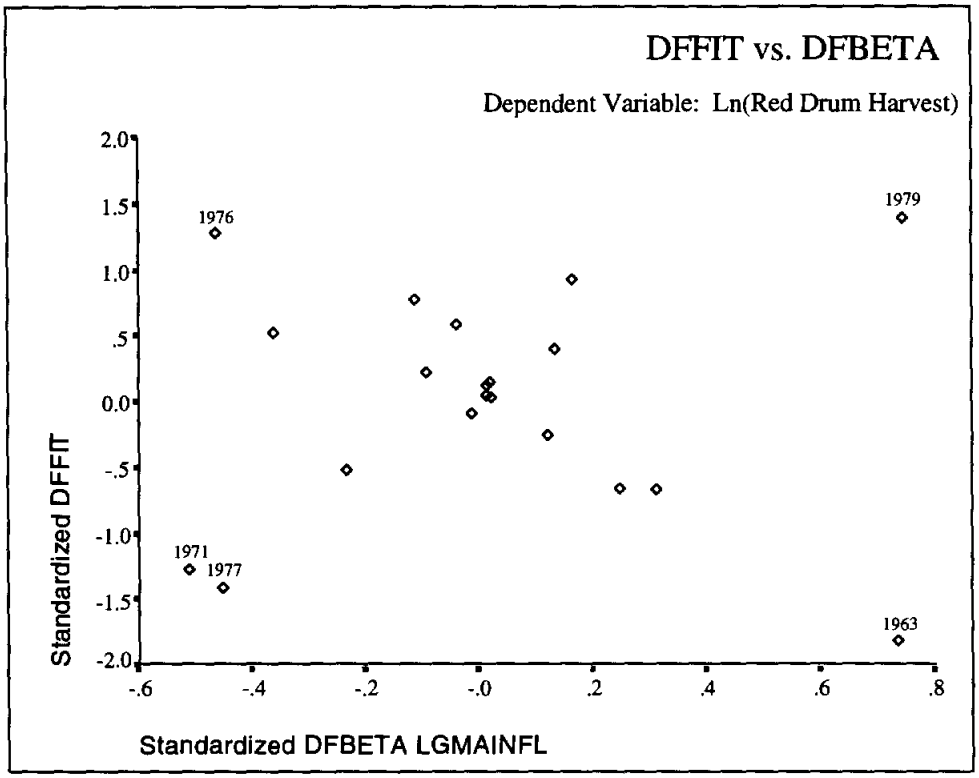
SDFBETA_3 Standardized dfbeta for logged May-June inflows
SDFBETA_4 Standardized dfbeta for logged July-August inflows
SDFBETA_5 Standardized dfbeta for logged September-October inflows
SDFBETA_6 Standardized dfbeta for logged November-December inflows

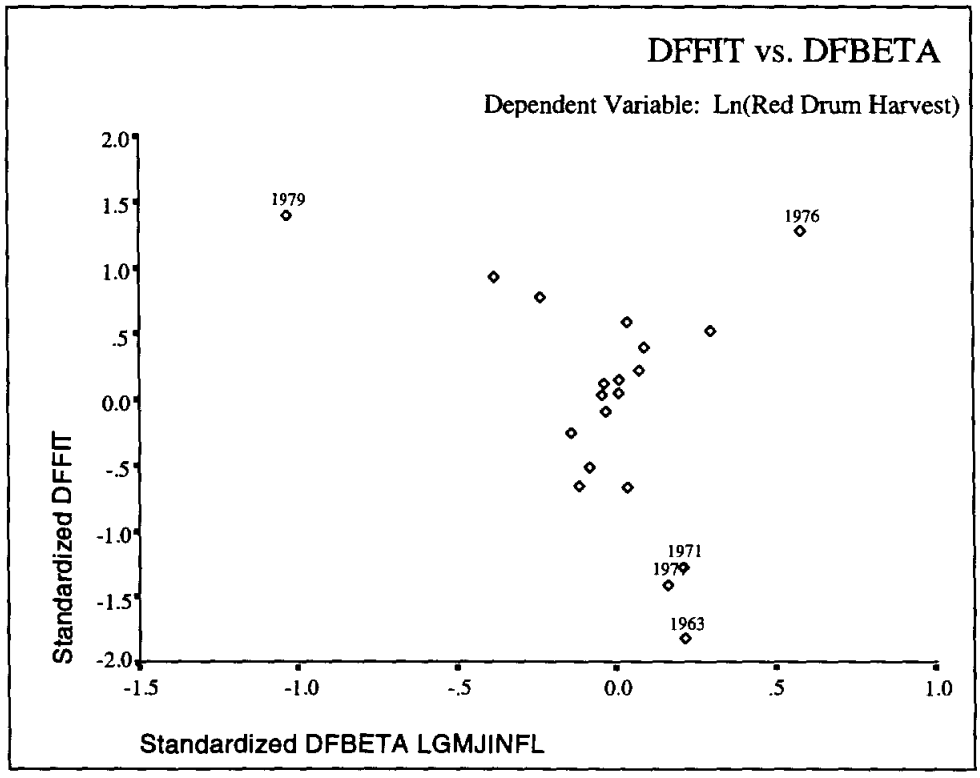
*Items are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

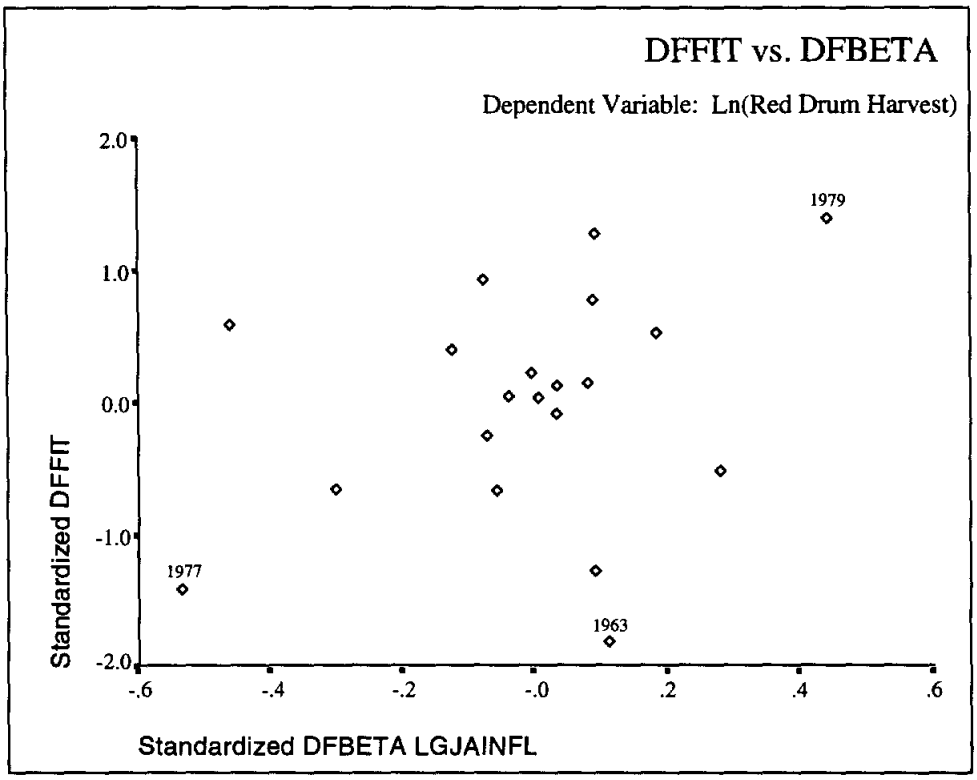
Graphics

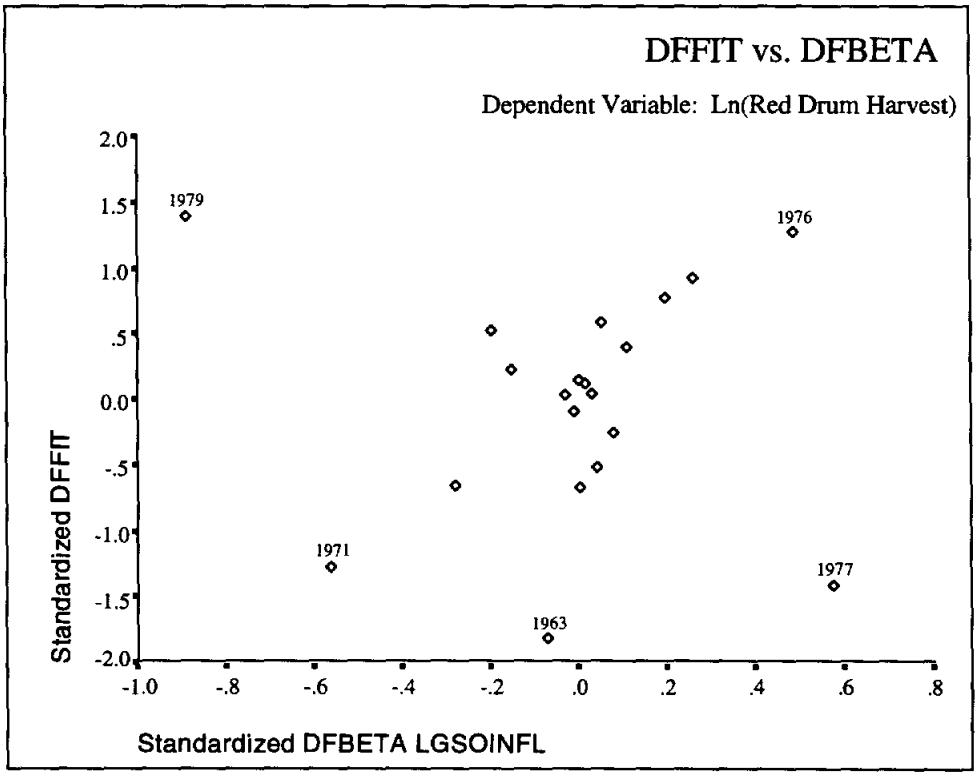

DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1976
1979
1977
1963
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA Intercept

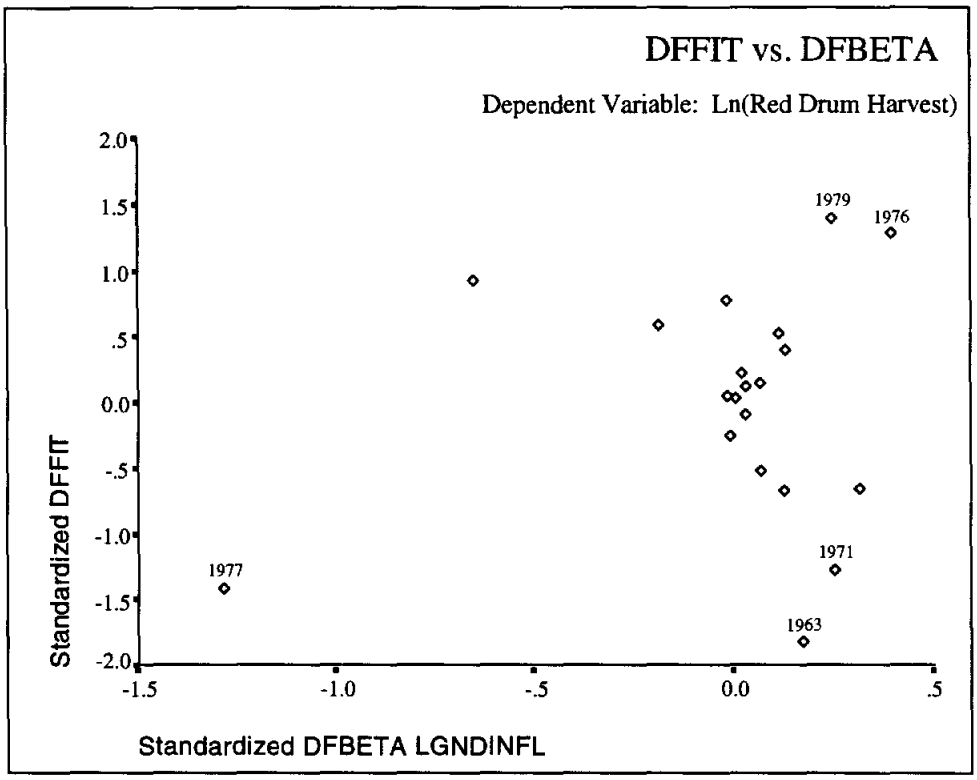

DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1976
1979
1971
1977
1963
-.8
-.6
-.4
-.2
0.0
.2
.4
.6
.8
1.0
Standardized DFBETA LGJFINFL


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
Standardized DFBETA LGMAINFL
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-.6
-.4
-.2
-.0
.2
.4
.6
.8
1976
1979
1971
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
Standardized DFBETA LGMJINFL
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
-1.5
-1.0
-.5
0.0
.5
1.0
1979
1976
1971
1977
1963


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.0
0.0
-1.0
-2.0
1979
1977
1963
-.6
-.4
-.2
-.0
.2
.4
.6
Standardized DFBETA LGJAINFL


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1979
1976
1971
1977
1963
-1.0
-.8
-.6
-.4
-.2
.0
.2
.4
.6
.8
Standardized DFBETA LGSOINFL


DFFIT vs. DFBETA
Dependent Variable: Ln(Red Drum Harvest)
Standardized DFFIT
2.0
1.5
1.0
.5
0.0
-.5
-1.0
-1.5
-2.0
1979
1976
1977
1971
1963
-1.5
-1.0
-.5
0.0
.5
Standardized DFBETA LGNDINFL

Examining Subsets of the Data

Untransformed Data: 1977, 1979, and 1981 Omitted

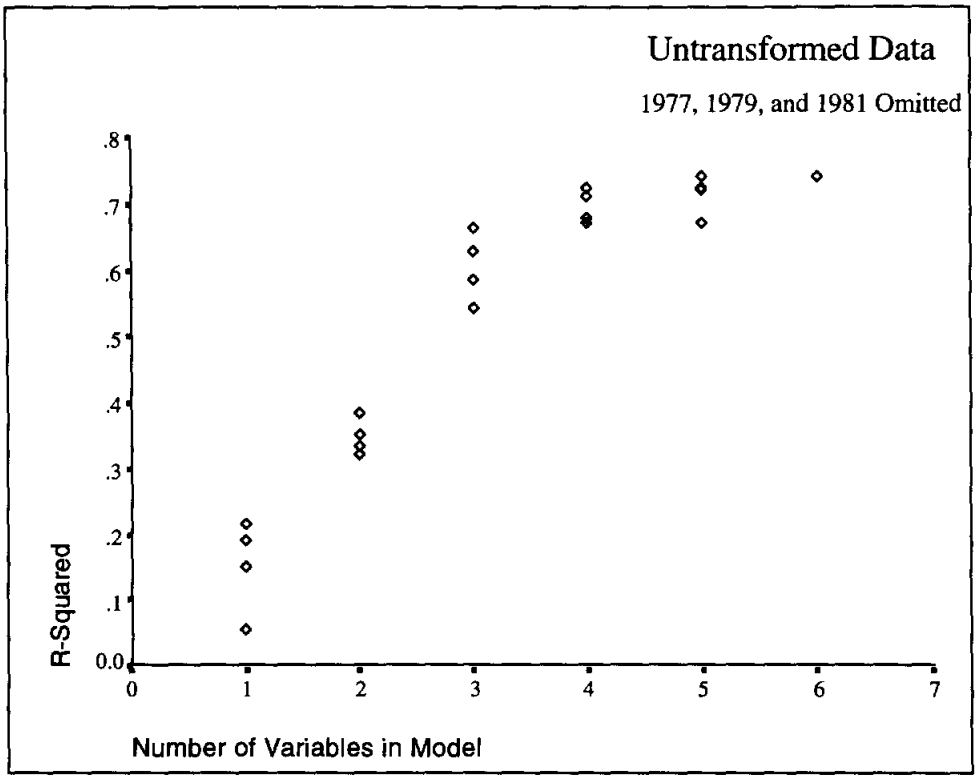
N = 17 Regression Models for Dependent Variable: RED_DRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.217280	0.165099	17.5314	108.0	513.870	109.7	SO_INFL
1	0.193525	0.139760	18.4580	108.5	529.465	110.2	ND_INFL
1	0.150944	0.094340	20.1190	109.4	557.421	111.0	MJ_INFL
1	0.057845	-.004965	23.7505	111.1	618.542	112.8	MA_INFL
2	0.385340	0.297532	12.9759	105.9	432.359	108.4	MJ_INFL SO_INFL
2	0.353098	0.260683	14.2336	106.7	455.039	109.2	MJ_INFL ND_INFL
2	0.335613	0.240700	14.9157	107.2	467.338	109.7	JF_INFL ND_INFL
2	0.322155	0.225320	15.4406	107.5	476.805	110.0	JF_INFL SO_INFL
3	0.666441	0.589465	4.0111	97.4855	252.678	100.8	JF_INFL MJ_INFL ND_INFL
3	0.629754	0.544312	5.4421	99.2594	280.469	102.6	JF_INFL MJ_INFL SO_INFL
3	0.588641	0.493713	7.0458	101.0	311.613	104.4	JF_INFL MA_INFL ND_INFL
3	0.544310	0.439151	8.7750	102.8	345.195	106.1	MJ_INFL JA_INFL SO_INFL
4	0.725777	0.634370	3.6966	96.1555	225.040	100.3	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.713777	0.618369	4.1647	96.8837	234.889	101.0	JF_INFL MJ_INFL JA_INFL ND_INFL
4	0.681298	0.575064	5.4316	98.7109	261.542	102.9	JF_INFL MA_INFL MJ_INFL ND_INFL
4	0.673616	0.564822	5.7312	99.1158	267.846	103.3	JF_INFL MA_INFL MJ_INFL SO_INFL
5	0.743623	0.627088	5.0005	97.0116	229.522	102.0	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.726383	0.602012	5.6729	98.1179	244.956	103.1	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.723628	0.598004	5.7804	98.2883	247.423	103.3	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
5	0.673626	0.525275	7.7308	101.1	292.187	106.1	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
6	0.743635	0.589816	7.0000	99.0108	252.463	104.8	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	RED_DRUM	22.6687	14.3353	.	.	.	.	0.018537
2	MODEL1	PARMS	RED_DRUM	23.0101	12.3470	.	.	.	.	.
3	MODEL1	PARMS	RED_DRUM	23.6098	12.0353	.	.	0.008998	.	.
4	MODEL1	PARMS	RED_DRUM	24.8705	20.5683	.	0.007450	.	.	.
5	MODEL1	PARMS	RED_DRUM	20.7933	-9.2845	.	.	0.009504	.	0.019273
6	MODEL1	PARMS	RED_DRUM	21.3316	-10.3817	.	.	0.009255	.	.
7	MODEL1	PARMS	RED_DRUM	21.6180	26.9144	-0.022486	.	.	.	.
8	MODEL1	PARMS	RED_DRUM	21.8359	29.3788	-0.017194	.	.	.	0.032575
9	MODEL1	PARMS	RED_DRUM	15.8959	0.4445	-0.035828	.	0.014298	.	.
10	MODEL1	PARMS	RED_DRUM	16.7472	4.7658	-0.027943	.	0.013688	.	0.042410
11	MODEL1	PARMS	RED_DRUM	17.6526	2.1535	-0.036443	0.017318	.	.	.
12	MODEL1	PARMS	RED_DRUM	18.5794	-2.2920	.	.	0.015220	-0.050130	0.033437
13	MODEL1	PARMS	RED_DRUM	15.0013	1.2974	-0.037485	.	0.014826	.	0.021963
14	MODEL1	PARMS	RED_DRUM	15.3261	0.8569	-0.055035	.	0.012099	0.044411	.
15	MODEL1	PARMS	RED_DRUM	16.1723	-2.3444	-0.037757	0.006136	0.011065	.	.
16	MODEL1	PARMS	RED_DRUM	16.3660	8.4010	-0.029483	-0.010248	0.019815	.	0.044627
17	MODEL1	PARMS	RED_DRUM	15.1500	1.3753	-0.049896	.	0.013239	0.029582	0.016898
18	MODEL1	PARMS	RED_DRUM	15.6511	2.0519	-0.037126	-0.001524	0.015667	.	0.023553
19	MODEL1	PARMS	RED_DRUM	15.7297	-1.4473	-0.055674	0.005025	0.009559	0.042238	.
20	MODEL1	PARMS	RED_DRUM	17.0935	8.4315	-0.029699	-0.010278	0.019794	0.000621	0.044634
21	MODEL1	PARMS	RED_DRUM	15.8891	1.4809	-0.049795	-0.000214	0.013364	0.029460	0.017142

OBS	ND_INFL	RED_DRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	15	513.870	0.21728	0.16510	17.5314	107.986	109.652
2	0.015433	-1	1	2	15	529.465	0.19353	0.13976	18.4580	108.494	110.160
3	.	-1	1	2	15	557.421	0.15094	0.09434	20.1190	109.369	111.035
4	.	-1	1	2	15	618.542	0.05784	-0.00497	23.7505	111.137	112.804
5	.	-1	2	3	14	432.359	0.38534	0.29753	12.9759	105.877	108.376
6	0.015778	-1	2	3	14	455.039	0.35310	0.26068	14.2336	106.746	109.245
7	0.032986	-1	2	3	14	467.338	0.33561	0.24070	14.9157	107.199	109.699
8	.	-1	2	3	14	476.805	0.32215	0.22532	15.4406	107.540	110.040
9	0.043934	-1	3	4	13	252.678	0.66644	0.58947	4.0111	97.486	100.818
10	.	-1	3	4	13	280.469	0.62975	0.54431	5.4421	99.259	102.592
11	0.046304	-1	3	4	13	311.613	0.58864	0.49371	7.0458	101.049	104.382
12	.	-1	3	4	13	345.195	0.54431	0.43915	8.7750	102.789	106.122
13	0.027889	-1	4	5	12	225.040	0.72578	0.63437	3.6966	96.156	100.322
14	0.048694	-1	4	5	12	234.889	0.71378	0.61837	4.1647	96.884	101.050
15	0.046178	-1	4	5	12	261.542	0.68130	0.57506	5.4316	98.711	102.877
16	.	-1	4	5	12	267.846	0.67362	0.56482	5.7312	99.116	103.282
17	0.034760	-1	5	6	11	229.522	0.74362	0.62709	5.0005	97.012	102.011
18	0.026170	-1	5	6	11	244.956	0.72638	0.60201	5.6729	98.118	103.117
19	0.050298	-1	5	6	11	247.423	0.72363	0.59800	5.7804	98.288	103.288
20	.	-1	5	6	11	292.187	0.67363	0.52527	7.7308	101.115	106.115
21	0.034490	-1	6	7	10	252.463	0.74363	0.58982	7.0000	99.011	104.843

Scree Plots


Untransformed Data
1977, 1979, and 1981 Omitted
R-Squared
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.2
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0.0
0
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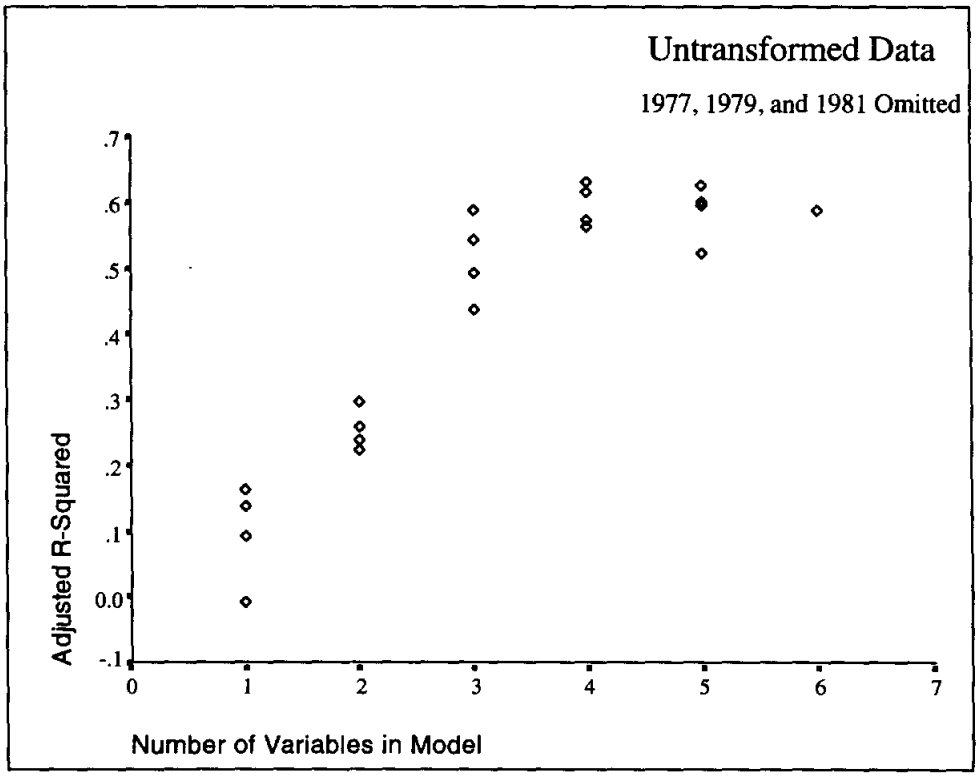
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
Adjusted R-Squared
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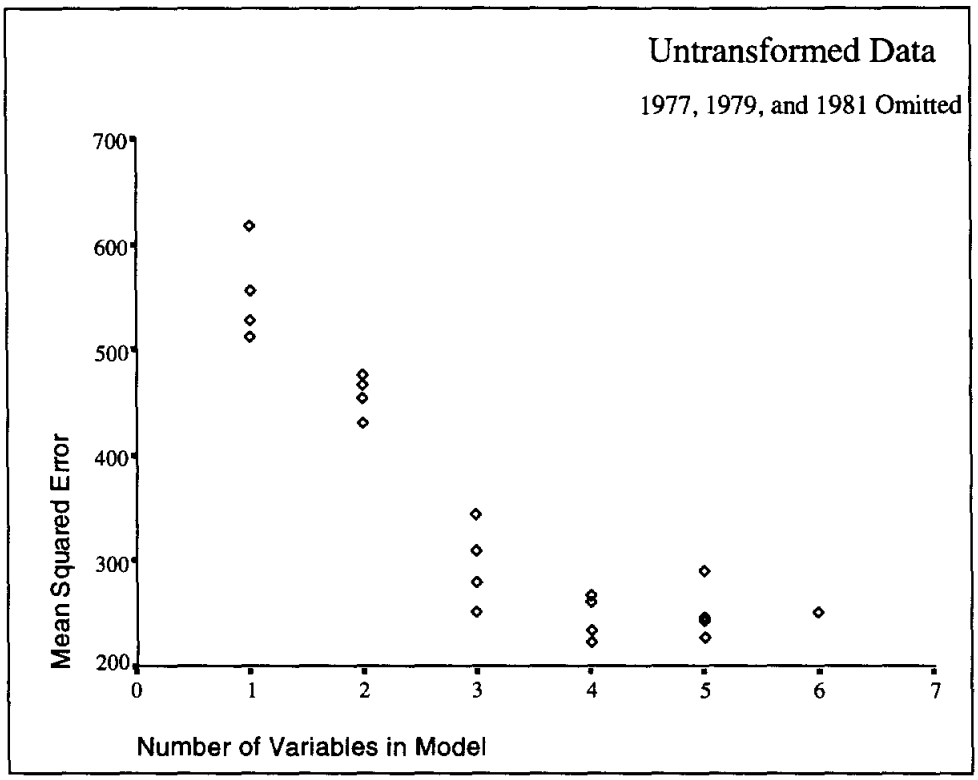
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
Mean Squared Error
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400
300
200
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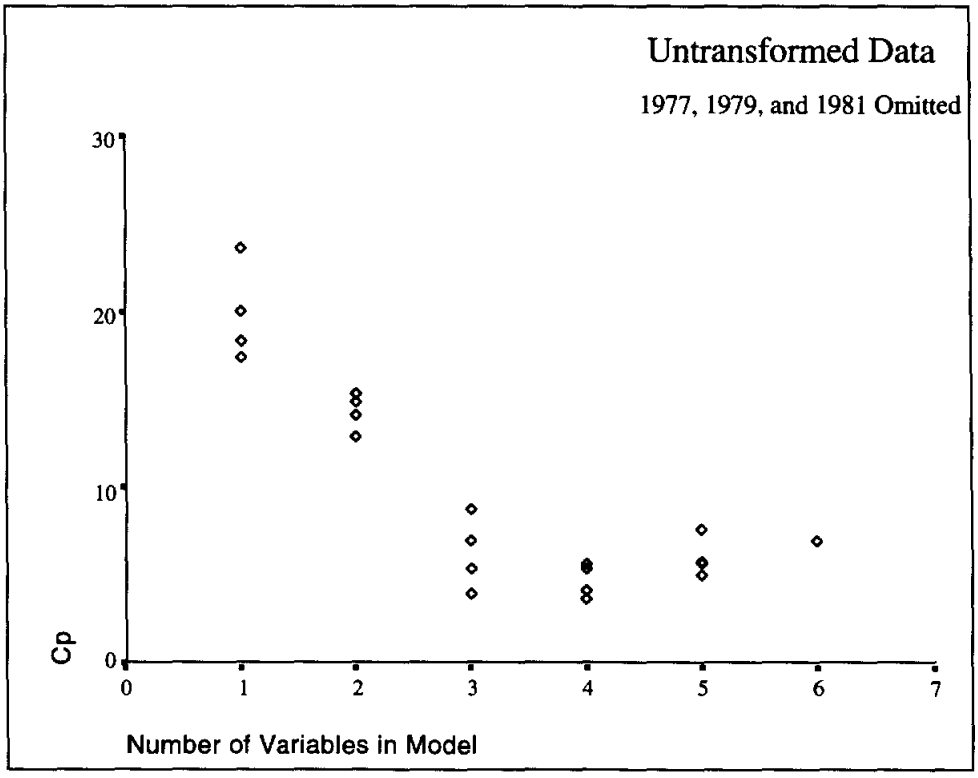
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
Cp
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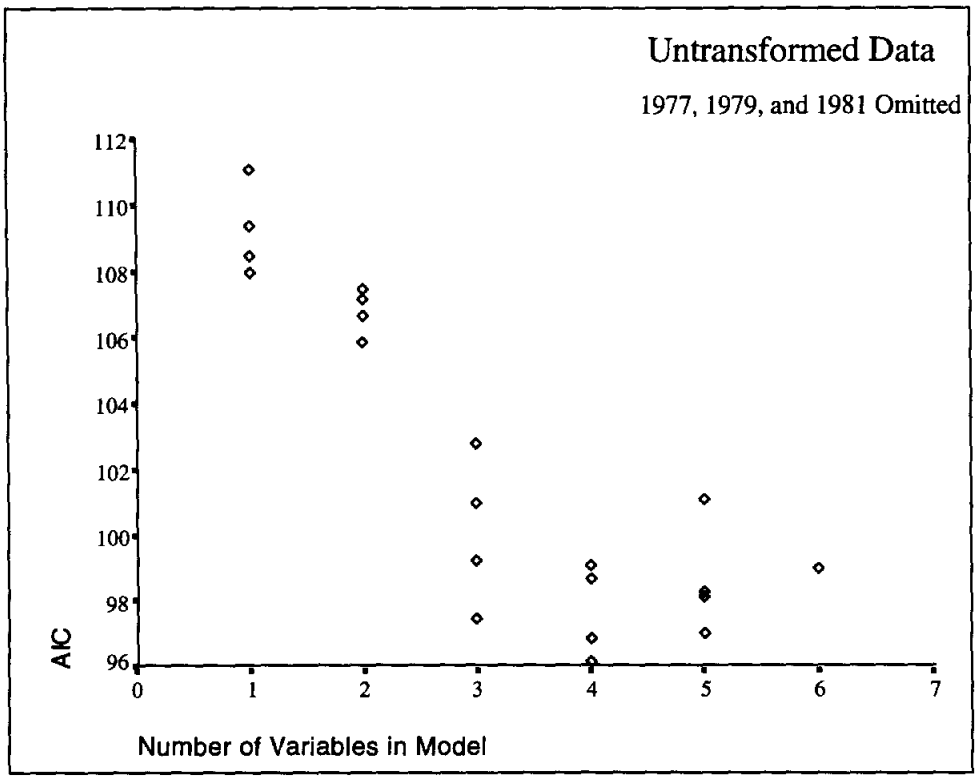
20
10
0
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
AIC
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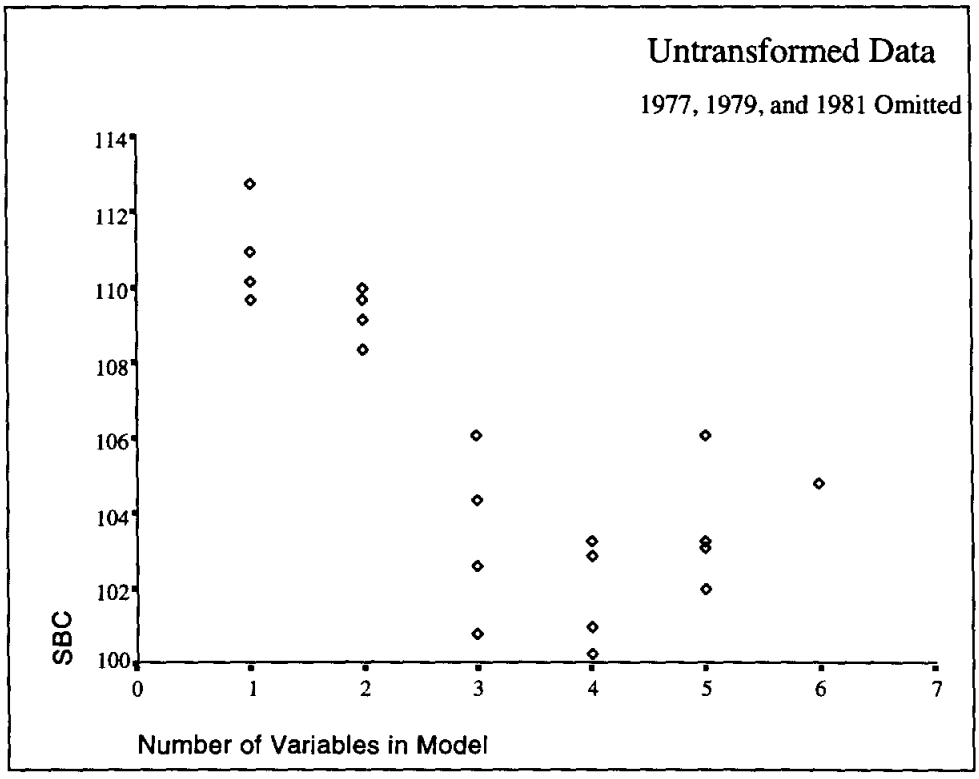
110
108
106
104
102
100
98
96
0
1
2
3
4
5
6
7
Number of Variables in Model


Untransformed Data
1977, 1979, and 1981 Omitted
SBC
114
112
110
108
106
104
102
100
0
1
2
3
4
5
6
7
Number of Variables in Model

Square Root of Harvest (Box–Cox Transformation): 1977, 1979, and 1981 Omitted

N = 17 Regression Models for Dependent Variable: SQRTRDRM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.194057	0.140328	12.4310	26.2891	4.20505	27.9555	MJ_INFL
1	0.100376	0.040401	15.3871	28.1585	4.69384	29.8249	MA_INFL
1	0.075778	0.014164	16.1632	28.6171	4.82218	30.2835	SO_INFL
1	0.044452	-.019251	17.1517	29.1837	4.98563	30.8502	ND_INFL
2	0.281344	0.178679	11.6767	26.3404	4.01746	28.8400	MJ_INFL SO_INFL
2	0.243229	0.135119	12.8794	27.2189	4.23053	29.7186	MJ_INFL ND_INFL
2	0.235418	0.126192	13.1259	27.3935	4.27420	29.8931	JF_INFL SO_INFL
2	0.218946	0.107367	13.6456	27.7558	4.36628	30.2555	JF_INFL MJ_INFL
3	0.630426	0.545139	2.6617	17.0349	2.22493	20.3677	JF_INFL MJ_INFL SO_INFL
3	0.595565	0.502234	3.7617	18.5672	2.43480	21.9001	JF_INFL MJ_INFL ND_INFL
3	0.515057	0.403148	6.3020	21.6534	2.91948	24.9863	JF_INFL MA_INFL ND_INFL
3	0.497868	0.381992	6.8444	22.2455	3.02296	25.5784	MJ_INFL JA_INFL SO_INFL
4	0.675220	0.566960	3.2482	16.8384	2.11820	21.0045	JF_INFL MJ_INFL SO_INFL ND_INFL
4	0.650889	0.534519	4.0160	18.0665	2.27688	22.2326	JF_INFL MA_INFL MJ_INFL SO_INFL
4	0.632093	0.509458	4.6091	18.9580	2.39947	23.1241	JF_INFL MJ_INFL JA_INFL ND_INFL
4	0.631212	0.508282	4.6369	18.9987	2.40522	23.1647	JF_INFL MJ_INFL JA_INFL SO_INFL
5	0.683079	0.539024	5.0002	18.4220	2.25485	23.4213	JF_INFL MJ_INFL JA_INFL SO_INFL ND_INFL
5	0.675503	0.528004	5.2393	18.8236	2.30875	23.8229	JF_INFL MA_INFL MJ_INFL SO_INFL ND_INFL
5	0.650889	0.492203	6.0160	20.0665	2.48387	25.0658	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL
5	0.649279	0.489861	6.0668	20.1447	2.49533	25.1440	JF_INFL MA_INFL MJ_INFL JA_INFL ND_INFL
6	0.683086	0.492938	7.0000	20.4216	2.48027	26.2541	JF_INFL MA_INFL MJ_INFL JA_INFL SO_INFL ND_INFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	JF_INFL	MA_INFL	MJ_INFL	JA_INFL	SO_INFL
1	MODEL1	PARMS	SQRTRDRM	2.05062	3.20447	.	.	.0009096	.	.
2	MODEL1	PARMS	SQRTRDRM	2.16653	3.85272	.	0.0008749	.	.	.
3	MODEL1	PARMS	SQRTRDRM	2.19595	4.37343	.	.	.	.	.0009759
4	MODEL1	PARMS	SQRTRDRM	2.23285	4.48031	.	.	.	.	.
5	MODEL1	PARMS	SQRTRDRM	2.00436	2.04464	.	.	.0009371	.	.0010485
6	MODEL1	PARMS	SQRTRDRM	2.05683	2.21886	.	.	.0009208	.	.
7	MODEL1	PARMS	SQRTRDRM	2.06741	6.02803	-.0018912	.	.	.	.0025199
8	MODEL1	PARMS	SQRTRDRM	2.08956	3.93518	-.0005150	.	.0009755	.	.
9	MODEL1	PARMS	SQRTRDRM	1.49162	3.54155	-.0029771	.	.0013828	.	.0035135
10	MODEL1	PARMS	SQRTRDRM	1.56039	3.24228	-.0033869	.	.0013975	.	.
11	MODEL1	PARMS	SQRTRDRM	1.70865	3.35806	-.0034759	0.0017286	.	.	.
12	MODEL1	PARMS	SQRTRDRM	1.73867	2.77215	.	.	.0015318	-.0052156	.0025221
13	MODEL1	PARMS	SQRTRDRM	1.45540	3.33036	-.0035580	.	.0014521	.	.0022685
14	MODEL1	PARMS	SQRTRDRM	1.50893	3.76290	-.0030708	-.0006240	.0017559	.	.0036485
15	MODEL1	PARMS	SQRTRDRM	1.54902	3.27457	-.0048910	.	.0012253	0.0034779	.
16	MODEL1	PARMS	SQRTRDRM	1.55088	3.52641	-.0028136	.	.0014132	-.0004805	.0035140
17	MODEL1	PARMS	SQRTRDRM	1.50161	3.33498	-.0042923	.	.0013582	0.0017500	.0019689
18	MODEL1	PARMS	SQRTRDRM	1.51946	3.37634	-.0035362	-.0000929	.0015033	.	.0023654
19	MODEL1	PARMS	SQRTRDRM	1.57603	3.76279	-.0030700	-.0006239	.0017560	-.0000022	.0036485
20	MODEL1	PARMS	SQRTRDRM	1.57966	3.00326	-.0049663	0.0005917	.0009263	0.0032220	.
21	MODEL1	PARMS	SQRTRDRM	1.57489	3.34259	-.0042850	-.0000154	.0013672	0.0017413	.0019864

OBS	ND_INFL	SQRTRDRM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	15	4.20505	0.19406	0.14033	12.4310	26.2891	27.9555
2	.	-1	1	2	15	4.69384	0.10038	0.04040	15.3871	28.1585	29.8249
3	.	-1	1	2	15	4.82218	0.07578	0.01416	16.1632	28.6171	30.2835
4	.0006594	-1	1	2	15	4.98563	0.04445	-0.01925	17.1517	29.1837	30.8502
5	.	-1	2	3	14	4.01746	0.28134	0.17868	11.6767	26.3404	28.8400
6	.0006937	-1	2	3	14	4.23053	0.24323	0.13512	12.8794	27.2189	29.7186
7	.	-1	2	3	14	4.27420	0.23542	0.12619	13.1259	27.3935	29.8931
8	.	-1	2	3	14	4.36628	0.21895	0.10737	13.6456	27.7558	30.2555
9	.	-1	3	4	13	2.22493	0.63043	0.54514	2.6617	17.0349	20.3677
10	.0033554	-1	3	4	13	2.43480	0.59557	0.50223	3.7617	18.5672	21.9001
11	.0036146	-1	3	4	13	2.91948	0.51506	0.40315	6.3020	21.6534	24.9863
12	.	-1	3	4	13	3.02296	0.49787	0.38199	6.8444	22.2455	25.5784
13	.0016981	-1	4	5	12	2.11820	0.67522	0.56696	3.2482	16.8384	21.0045
14	.	-1	4	5	12	2.27688	0.65089	0.53452	4.0160	18.0665	22.2326
15	.0037281	-1	4	5	12	2.39947	0.63209	0.50946	4.6091	18.9580	23.1241
16	.	-1	4	5	12	2.40522	0.63121	0.50828	4.6369	18.9987	23.1647
17	.0021046	-1	5	6	11	2.25485	0.68308	0.53902	5.0002	18.4220	23.4213
18	.0015934	-1	5	6	11	2.30875	0.67550	0.52800	5.2393	18.8236	23.8229
19	.	-1	5	6	11	2.48387	0.65089	0.49220	6.0160	20.0665	25.0658
20	.0039171	-1	5	6	11	2.49533	0.64928	0.48986	6.0668	20.1447	25.1440
21	.0020852	-1	6	7	10	2.48027	0.68309	0.49294	7.0000	20.4216	26.2541

Logged Inflows: 1976, 1977, and 1979 Omitted

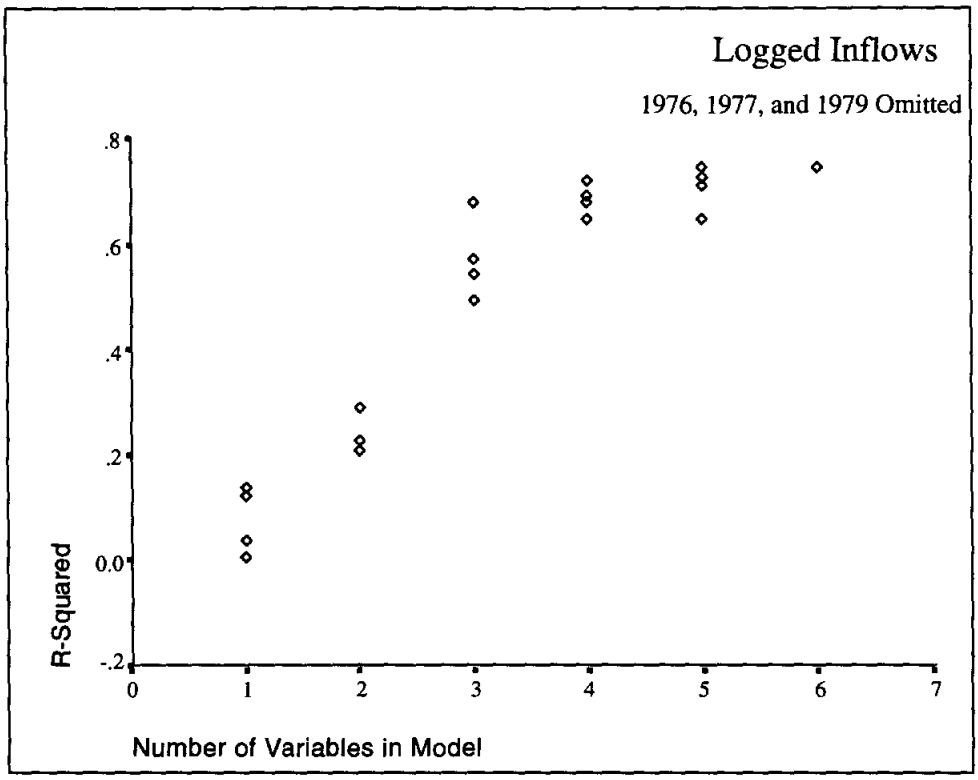
N = 17 Regression Models for Dependent Variable: RED_DRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.141742	0.084525	21.2332	101.3	345.978	102.9	LGMJINFL
1	0.125846	0.067569	21.8672	101.6	352.386	103.2	LGMAINFL
1	0.039857	-.024153	25.2971	103.2	387.050	104.8	LGNDINFL
1	0.008494	-.057606	26.5480	103.7	399.693	105.4	LGJAINFL
2	0.290838	0.189529	17.2862	100.0	306.295	102.5	LGMJINFL LGJAINFL
2	0.229198	0.119083	19.7449	101.4	332.918	103.9	LGMAINFL LGJAINFL
2	0.211482	0.098836	20.4515	101.8	340.570	104.3	LGMAINFL LGNDINFL
2	0.211168	0.098478	20.4640	101.8	340.705	104.3	LGMJINFL LGNDINFL
3	0.680958	0.607333	3.7256	88.4377	148.397	91.7706	LGJFINFL LGMJINFL LGNDINFL
3	0.574907	0.476809	7.9556	93.3165	197.726	96.6493	LGJFINFL LGMAINFL LGNDINFL
3	0.548415	0.444203	9.0123	94.3442	210.048	97.6771	LGMJINFL LGJAINFL LGNDINFL
3	0.496698	0.380552	11.0751	96.1875	234.103	99.5203	LGMAINFL LGJAINFL LGNDINFL
4	0.723821	0.631761	4.0159	87.9851	139.166	92.1511	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
4	0.695819	0.594426	5.1328	89.6268	153.276	93.7929	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.683113	0.577484	5.6396	90.3225	159.678	94.4886	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.650372	0.533830	6.9455	91.9940	176.176	96.1601	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
5	0.749182	0.635174	5.0043	88.3476	137.876	93.3469	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.729894	0.607118	5.7737	89.6071	148.479	94.6064	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.713788	0.583691	6.4161	90.5917	157.333	95.5910	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.650467	0.491588	8.9418	93.9894	192.140	98.9887	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
6	0.749291	0.598865	7.0000	90.3403	151.598	96.1727	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL	LGMJINFL	LGJAINFL	LGSOINFL
1	MODEL1	PARMS	RED_DRUM	18.6005	-81.256	.	.	14.2293	.	.
2	MODEL1	PARMS	RED_DRUM	18.7720	-75.521	.	14.0305	.	.	.
3	MODEL1	PARMS	RED_DRUM	19.6736	-34.547	.	.	.	.	.
4	MODEL1	PARMS	RED_DRUM	19.9923	51.177	.	.	.	-3.5167	.
5	MODEL1	PARMS	RED_DRUM	17.5013	-44.178	.	.	24.7874	-18.1853	.
6	MODEL1	PARMS	RED_DRUM	18.2460	-39.009	.	21.6959	.	-14.3239	.
7	MODEL1	PARMS	RED_DRUM	18.4545	-191.376	.	16.8711	.	.	.
8	MODEL1	PARMS	RED_DRUM	18.4582	-177.742	.	.	15.8488	.	.
9	MODEL1	PARMS	RED_DRUM	12.1819	-198.741	-62.1200	.	38.0069	.	.
10	MODEL1	PARMS	RED_DRUM	14.0615	-203.974	-50.9383	34.0343	.	.	.
11	MODEL1	PARMS	RED_DRUM	14.4930	-229.041	.	.	35.8131	-31.0721	.
12	MODEL1	PARMS	RED_DRUM	15.3004	-240.956	.	34.4127	.	-27.3168	.
13	MODEL1	PARMS	RED_DRUM	11.7968	-234.131	-64.1316	14.6342	27.5098	.	.
14	MODEL1	PARMS	RED_DRUM	12.3805	-210.441	-50.4995	.	39.9440	-9.4661	.
15	MODEL1	PARMS	RED_DRUM	12.6364	-201.380	-63.3789	.	38.5301	.	2.1978
16	MODEL1	PARMS	RED_DRUM	13.2731	-225.386	-50.0298	37.0364	.	.	-12.9940
17	MODEL1	PARMS	RED_DRUM	11.7421	-254.315	-48.9947	16.5677	28.6906	-12.5471	.
18	MODEL1	PARMS	RED_DRUM	12.1852	-237.430	-62.1057	18.1757	23.9251	.	-4.3869
19	MODEL1	PARMS	RED_DRUM	12.5432	-227.827	-46.5706	.	43.1198	-16.1929	7.5574
20	MODEL1	PARMS	RED_DRUM	13.8615	-226.308	-49.0032	37.1735	.	-0.8314	-12.7939
21	MODEL1	PARMS	RED_DRUM	12.3125	-254.647	-48.6747	16.0847	29.3128	-13.0804	0.7000

OBS	LGNDINFL	RED_DRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	15	345.978	0.14174	0.08452	21.2332	101.261	102.927
2	.	-1	1	2	15	352.386	0.12585	0.06757	21.8672	101.573	103.239
3	8.9133	-1	1	2	15	387.050	0.03986	-0.02415	25.2971	103.168	104.834
4	.	-1	1	2	15	399.693	0.00849	-0.05761	26.5480	103.714	105.381
5	.	-1	2	3	14	306.295	0.29084	0.18953	17.2862	100.017	102.516
6	.	-1	2	3	14	332.918	0.22920	0.11908	19.7449	101.434	103.933
7	13.4529	-1	2	3	14	340.570	0.21148	0.09884	20.4515	101.820	104.320
8	11.9184	-1	2	3	14	340.705	0.21117	0.09848	20.4640	101.827	104.326
9	55.6263	-1	3	4	13	148.397	0.68096	0.60733	3.7256	88.438	91.771
10	50.4664	-1	3	4	13	197.726	0.57491	0.47681	7.9556	93.316	96.649
11	26.0806	-1	3	4	13	210.048	0.54841	0.44420	9.0123	94.344	97.677
12	27.2957	-1	3	4	13	234.103	0.49670	0.38055	11.0751	96.187	99.520
13	58.8530	-1	4	5	12	139.166	0.72382	0.63176	4.0159	87.985	92.151
14	51.7646	-1	4	5	12	153.276	0.69582	0.59443	5.1328	89.627	93.793
15	54.6394	-1	4	5	12	159.678	0.68311	0.57748	5.6396	90.323	94.489
16	61.8510	-1	4	5	12	176.176	0.65037	0.53383	6.9455	91.994	96.160
17	54.1608	-1	5	6	11	137.876	0.74918	0.63517	5.0043	88.348	93.347
18	61.6037	-1	5	6	11	148.479	0.72989	0.60712	5.7737	89.607	94.606
19	45.6270	-1	5	6	11	157.333	0.71379	0.58369	6.4161	90.592	95.591
20	61.3409	-1	5	6	11	192.140	0.65047	0.49159	8.9418	93.989	98.989
21	53.5224	-1	6	7	10	151.598	0.74929	0.59887	7.0000	90.340	96.173

Scree Plots


Logged Inflows
1976, 1977, and 1979 Omitted
R-Squared
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.6
.4
.2
0.0
-.2
0
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2
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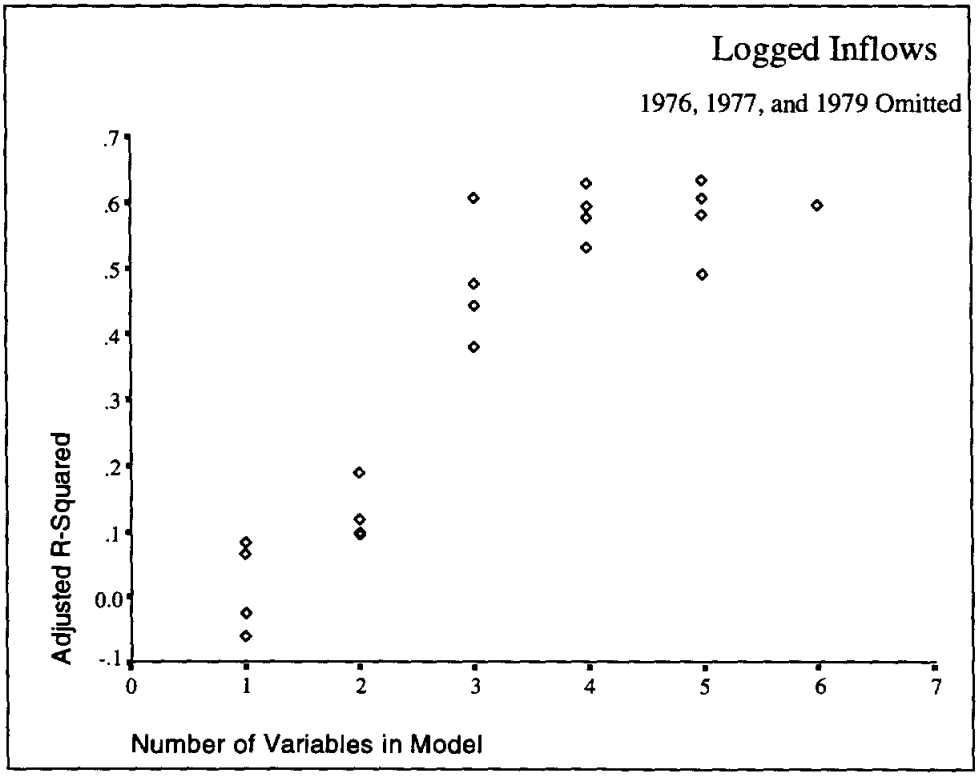
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
Adjusted R-Squared
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.6
.5
.4
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.2
.1
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-.1
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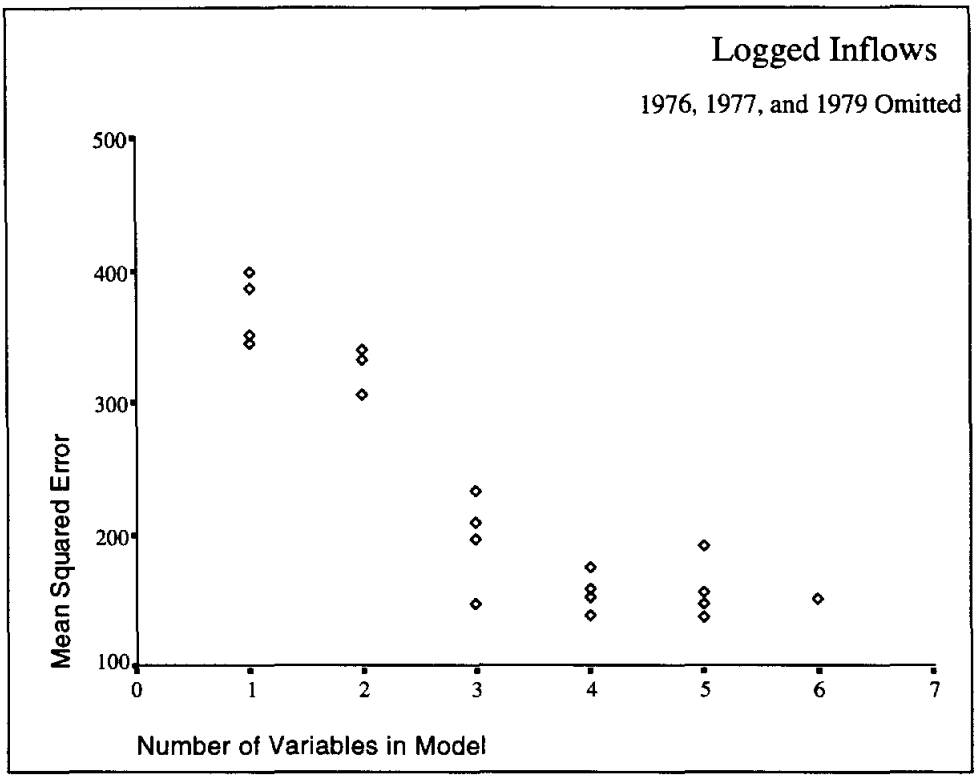
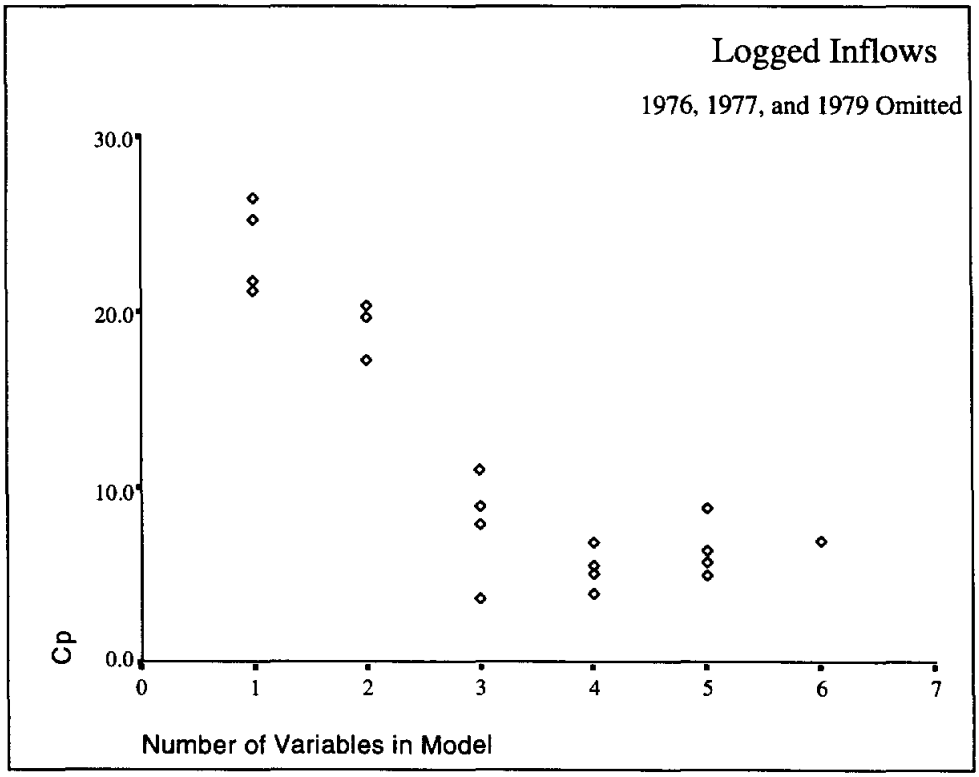
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
Mean Squared Error
500
400
300
200
100
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
Cp
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20.0
10.0
0.0
0
1
2
3
4
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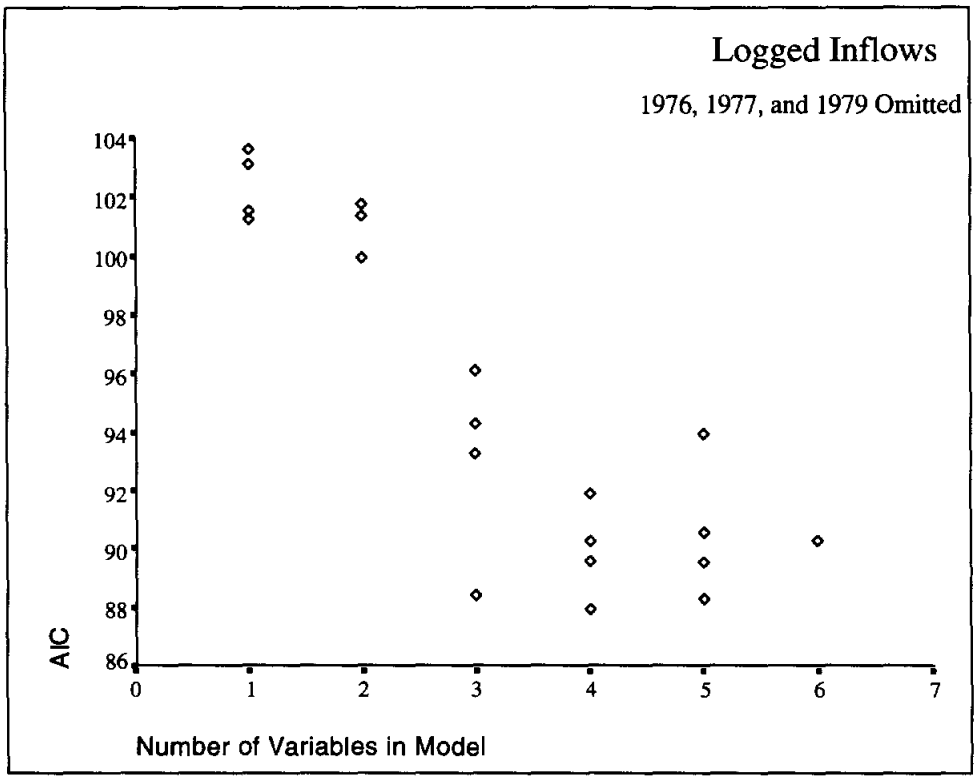
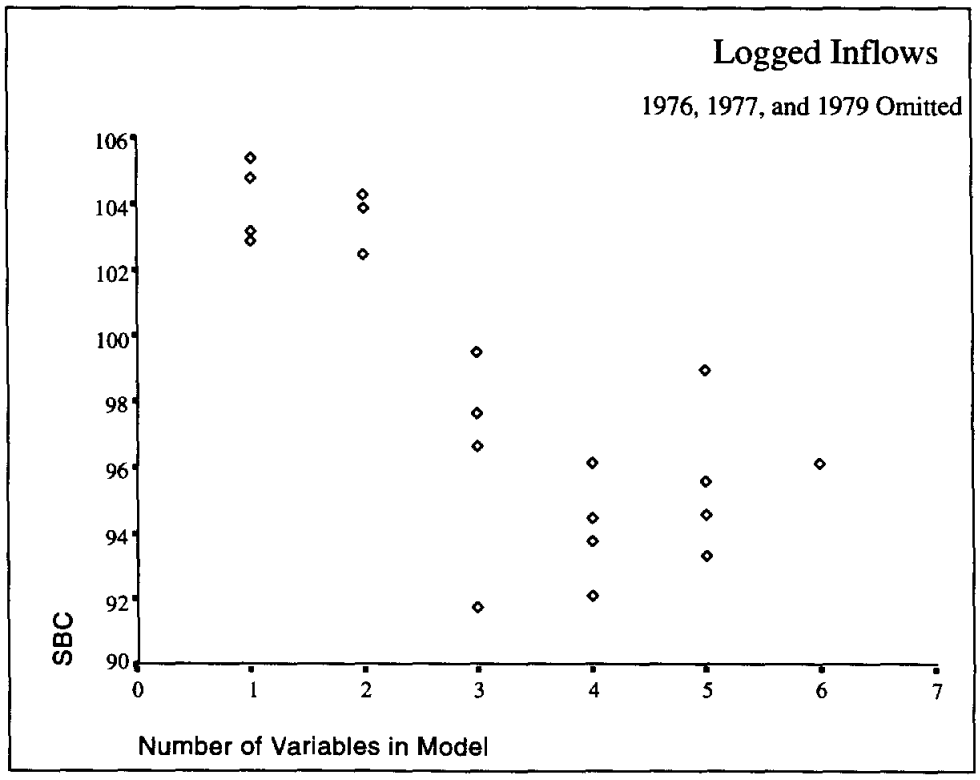
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
AIC
104
102
100
98
96
94
92
90
88
86
0
1
2
3
4
5
6
7
Number of Variables in Model


Logged Inflows
1976, 1977, and 1979 Omitted
SBC
106
104
102
100
98
96
94
92
90
0
1
2
3
4
5
6
7
Number of Variables in Model

All Variables Logged: 1963, 1977, and 1979 Omitted

N = 17 Regression Models for Dependent Variable: LGRDDRUM

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.068790	0.006710	19.2060	-2.3472	0.780203	-0.6808	LGJAINFL
1	0.046288	-.017293	19.9842	-1.9413	0.799056	-0.2749	LGNDINFL
1	0.043746	-.020004	20.0721	-1.8960	0.801185	-0.2296	LGMJINFL
1	0.024309	-.040737	20.7443	-1.5540	0.817471	0.1125	LGJFINFL
2	0.292395	0.191309	13.4726	-5.0154	0.635205	-2.5157	LGMJINFL LGJAINFL
2	0.224248	0.113427	15.8294	-3.4523	0.696379	-0.9526	LGJFINFL LGNDINFL
2	0.186611	0.070412	17.1311	-2.6469	0.730166	-0.1472	LGMAINFL LGJAINFL
2	0.170450	0.051943	17.6900	-2.3124	0.744673	0.1872	LGJAINFL LGNDINFL
3	0.630836	0.545645	3.7676	-14.0764	0.356884	-10.7435	LGJFINFL LGMJINFL LGNDINFL
3	0.542505	0.436929	6.8225	-10.4294	0.442277	-7.0966	LGMJINFL LGJAINFL LGNDINFL
3	0.520858	0.410287	7.5711	-9.6435	0.463203	-6.3106	LGJFINFL LGMAINFL LGNDINFL
3	0.500697	0.385474	8.2684	-8.9428	0.482694	-5.6100	LGMJINFL LGJAINFL LGSOINFL
4	0.675116	0.566821	4.2361	-14.2485	0.340250	-10.0824	LGJFINFL LGMJINFL LGJAINFL LGNDINFL
4	0.655554	0.540738	4.9127	-13.2545	0.360737	-9.0884	LGJFINFL LGMAINFL LGMJINFL LGNDINFL
4	0.631512	0.508682	5.7442	-12.1075	0.385917	-7.9414	LGJFINFL LGMJINFL LGSOINFL LGNDINFL
4	0.599992	0.466656	6.8343	-10.7122	0.418927	-6.5461	LGJFINFL LGMAINFL LGSOINFL LGNDINFL
5	0.710547	0.578978	5.0107	-14.2116	0.330702	-9.2123	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGNDINFL
5	0.687194	0.545010	5.8184	-12.8925	0.357383	-7.8933	LGJFINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL
5	0.669576	0.519383	6.4278	-11.9610	0.377512	-6.9617	LGJFINFL LGMAINFL LGMJINFL LGSOINFL LGNDINFL
5	0.604191	0.424278	8.6891	-8.8916	0.452214	-3.8923	LGJFINFL LGMAINFL LGJAINFL LGSOINFL LGNDINFL
6	0.710858	0.537373	7.0000	-12.2298	0.363381	-6.3973	LGJFINFL LGMAINFL LGMJINFL LGJAINFL LGSOINFL LGNDINFL

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LGJFINFL	LGMAINFL	LGMJINFL	LGJAINFL	LGSOINFL
1	MODEL1	PARMS	LGRDDRUM	0.88329	6.17952	.	.	.	-0.45117	.
2	MODEL1	PARMS	LGRDDRUM	0.89390	0.27569	.	.	.	.	.
3	MODEL1	PARMS	LGRDDRUM	0.89509	0.33683	.	.	0.37479	.	.
4	MODEL1	PARMS	LGRDDRUM	0.90414	5.83082	-0.35219	.	.	.	.
5	MODEL1	PARMS	LGRDDRUM	0.79700	2.01365	.	.	1.07868	-1.09195	.
6	MODEL1	PARMS	LGRDDRUM	0.83449	4.43497	-1.31928	.	.	.	.
7	MODEL1	PARMS	LGRDDRUM	0.85450	2.83405	.	0.78091	.	-0.82746	.
8	MODEL1	PARMS	LGRDDRUM	0.86294	2.77700	.	.	.	-0.64166	.
9	MODEL1	PARMS	LGRDDRUM	0.59740	-2.28189	-2.99100	.	1.49212	.	.
10	MODEL1	PARMS	LGRDDRUM	0.66504	-5.14863	.	.	1.47165	-1.64139	.
11	MODEL1	PARMS	LGRDDRUM	0.68059	-2.91573	-2.58292	1.31867	.	.	.
12	MODEL1	PARMS	LGRDDRUM	0.69476	-3.22162	.	.	1.72776	-2.00203	0.90707
13	MODEL1	PARMS	LGRDDRUM	0.58331	-3.47531	-2.11853	.	1.65490	-0.73494	.
14	MODEL1	PARMS	LGRDDRUM	0.60061	-3.64481	-3.10981	0.51365	1.15883	.	.
15	MODEL1	PARMS	LGRDDRUM	0.62122	-2.25940	-2.96240	.	1.47960	.	-0.05531
16	MODEL1	PARMS	LGRDDRUM	0.64725	-4.14408	-2.57237	1.47298	.	.	-0.60124
17	MODEL1	PARMS	LGRDDRUM	0.57507	-5.27258	-2.15283	0.62098	1.27237	-0.82704	.
18	MODEL1	PARMS	LGRDDRUM	0.59781	-4.00807	-1.95841	.	1.77570	-0.99251	0.28167
19	MODEL1	PARMS	LGRDDRUM	0.61442	-4.10559	-3.01066	0.73162	0.95193	.	-0.28925
20	MODEL1	PARMS	LGRDDRUM	0.67247	-4.48198	-2.27041	1.51263	.	-0.24852	-0.53772
21	MODEL1	PARMS	LGRDDRUM	0.60281	-5.27351	-2.12125	0.58714	1.31563	-0.86982	0.05227

OBS	LGNDINFL	LGRDDRUM	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	15	0.78020	0.06879	0.00671	19.2060	-2.3472	-0.6808
2	0.41936	-1	1	2	15	0.79906	0.04629	-0.01729	19.9842	-1.9413	-0.2749
3	.	-1	1	2	15	0.80119	0.04375	-0.02000	20.0721	-1.8960	-0.2296
4	.	-1	1	2	15	0.81747	0.02431	-0.04074	20.7443	-1.5540	0.1125
5	.	-1	2	3	14	0.63520	0.29240	0.19131	13.4726	-5.0154	-2.5157
6	1.20666	-1	2	3	14	0.69638	0.22425	0.11343	15.8294	-3.4523	-0.9526
7	.	-1	2	3	14	0.73017	0.18661	0.07041	17.1311	-2.6469	-0.1472
8	0.65789	-1	2	3	14	0.74467	0.17045	0.05194	17.6900	-2.3124	0.1872
9	2.26702	-1	3	4	13	0.35688	0.63084	0.54564	3.7676	-14.0764	-10.7435
10	1.09142	-1	3	4	13	0.44228	0.54250	0.43693	6.8225	-10.4294	-7.0966
11	2.17894	-1	3	4	13	0.46320	0.52086	0.41029	7.5711	-9.6435	-6.3106
12	.	-1	3	4	13	0.48269	0.50070	0.38547	8.2684	-8.9428	-5.6100
13	2.02642	-1	4	5	12	0.34025	0.67512	0.56682	4.2361	-14.2485	-10.0824
14	2.40889	-1	4	5	12	0.36074	0.65555	0.54074	4.9127	-13.2545	-9.0884
15	2.30083	-1	4	5	12	0.38592	0.63151	0.50868	5.7442	-12.1075	-7.9414
16	2.75692	-1	4	5	12	0.41893	0.59999	0.46666	6.8343	-10.7122	-6.5461
17	2.16779	-1	5	6	11	0.33070	0.71055	0.57898	5.0107	-14.2116	-9.2123
18	1.76993	-1	5	6	11	0.35738	0.68719	0.54501	5.8184	-12.8925	-7.8933
19	2.64590	-1	5	6	11	0.37751	0.66958	0.51938	6.4278	-11.9610	-6.9617
20	2.61664	-1	5	6	11	0.45221	0.60419	0.42428	8.6891	-8.8916	-3.8923
21	2.11249	-1	6	7	10	0.36338	0.71086	0.53737	7.0000	-12.2298	-6.3973

Crab Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Rita Miranda-López

Department of Statistics
Texas A&M University

August 1996

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Table of Contents

Summary Report 1

Description of the Problem 1

Constructing Models -General Discussion 1

Detecting Influential Points and Outliers 1

Variable Selection 2

Multicollinearity 2

Other Procedures 2

How the Final Model Was Chosen 2

Selecting the Data Set Used 2

Selecting the Pointsto be Omitted 3

Selecting the Final Candidate Models 5

Selecting the Final Models 5

Exploring the Data 15

Listing of Data 15

Summary Information for Individual Variables 16

50, 90 and 95 % Prediction Ellipses and 95% Confidence Ellipses 44

Box-Cox Analysis 50

Model Choice Diagnostics 51

Untransformed Data 51

Logged Inflows 53

Squared Root Inflows 55

Logged Inflows and Squared Root Inflows 57

All Variables Logged 59

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Logged the others Inflows 61

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Squared Root others Inflows 63

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Squared Root Mar-Apr Inflows, and Logged others Inflows 65

Regression –Untransformed Data 67

ANOVA and Parameter Estimates 67

Collinearity Diagnostics 68

Residuals Diagnostics 69

Summary Information 69

Case Values for Residuals Diagnostics 70

Graphics 71

Prediction Intervals for Crab Harvest 74
Outlier and Influential Point Detection 75
Calculated Quantities 75
Graphics 77
Regression – Logged Inflows Data 78
ANOVA and Parameter Estimates 78
Collinearity Diagnostics 79
Residuals Diagnostics 80
Summary Information 80
Case Values for Residuals Diagnostics 81
Graphics 82
Prediction Intervals for Crab Harvest 85
Outlier and Influential Point Detection 86
Calculated Quantities 86
Graphics 88
Regression – Squared Root Inflows 89
ANOVA and Parameter Estimates 89
Collinearity Diagnostics 90
Residuals Diagnostics 91
Summary Information 91
Case Values for Residuals Diagnostics 92
Graphics 93
Prediction Intervals for Crab Harvest 96
Outlier and Influential Point Detection 97
Calculated Quantities 97
Graphics 99
Regression – Logged Inflows and Squared Root Inflows 100
ANOVA and Parameter Estimates 100
Collinearity Diagnostics 101
Residuals Diagnostics 102
Summary Information 102
Case Values for Residuals Diagnostics 103
Graphics 104
Prediction Intervals for Crab Harvest 107
Outlier and Influential Point Detection 108
Calculated Quantities 108
Graphics 110

Regression – All Variables Logged 111
ANOVA and Parameter Estimates 111
Collinearity Diagnostics 112
Residuals Diagnostics 113
Summary Information 113
Case Values for Residuals Diagnostics 114
Graphics 115
Prediction Intervals for Crab Harvest 118
Outlier and Influential Point Detection 119
Calculated Quantities 119
Graphics 121
Regression – Untransformed Harvest, January-February and May-June Inflows, and Squared Root others Inflows 122
ANOVA and Parameter Estimates 122
Collinearity Diagnostics 123
Residuals Diagnostics 124
Summary Information 124
Case Values for Residuals Diagnostics 125
Graphics 126
Prediction Intervals for Crab Harvest 129
Outlier and Influential Point Detection 130
Calculated Quantities 130
Graphics 132
Examining Subsets of the Data 133
Untransformed Data: 1962 Omitted 133
Untransformed Data: 1987 Omitted 135
Untransformed Data: 1962 and 1987 Omitted 137
Untransformed Data: 1969 and 1974 Omitted 139
Untransformed Data: 1986 and 1987 Omitted 141
Untransformed Data: 1962, 1969 and 1974 Omitted 143
Untransformed Data: 1969, 1974 and 1987 Omitted 145
Untransformed Data: 1962, 1969, 1974, 1986 and 1987 Omitted 147
Squared Root Inflows Data: 1962 and 1987 Omitted 149
Untransformed and Squared Root Inflows Data 151
Scree Plots 153

Summary Report

Description of the Problem[1]

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of crab.

Constructing Models - General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 50, 90 and 95 % prediction ellipses and 95% confidence ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values for Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standarized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

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[1]The following discussion, prepared by Jacqueline Kiffe, was taken from *Seatrout Harvests in Galveston Bay: A Regression Analysis,* by F. Michael Speed, Sr. And Jacqueline Kiffe.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less than 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. The Box-Cox procedure was performed to find if a transformation to normallity was suggested. The log transform was suggested for some variables, and the squared root for others. At this point, there were several data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Harvest untransformed, and natural log of inflow variables
3. Harvest untransformed, and squared root of inflow variables
4. Harvest untransformed, and squared root of Jan-Feb, Mar-Apr, May-Jun Inflows, natural log of Jul-Aug, Sept-Oct and Nov-Dec inflows
5. All Variables Logged.
6. Harvest, Jan-Feb, May-Jun Inflows untransformed, logged others inflows
7. Harvest, Jan-Feb, May-Jun Inflows untransformed, squared root others inflows
8. Harvest, Jan-Feb, May-Jun Inflows untransformed, squared root Mar-April, logged the others inflows

Data Set	R^2	Adjusted R^2
1	**0.639**	**0.524**
2	0.521	0.369
3	**0.592**	**0.463**
4	0.539	0.393
5	0.507	0.351
6	0.538	0.393
7	**0.601**	**0.483**
8	0.552	0.410

Selecting the Points to be Omitted. Data sets 1, 3, and 7 presented the highest R^2 values. Therefore, the full regression with all diagnostics was performed only for the three models, each one contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model.

The observations flagged as potentially influential are given in the summary table below, for each model.

Year	Variable
1962	Harvest
1969	March-April Inflows
1971	Ln (January-February Inflows)
1974	November-December Inflows
1983	July-August Inflows
1986	Harvest
	November-December Inflows

Summary of points flagged by Boxplots

Year	Variable
1969	Mar-Apr vs. Sept-Oct Inflows
1974	Harvest vs. Sept-Oct Inflows
	Jan-Feb vs. Sept-Oct Inflows
	Mar-Apr vs. Sept-Oct Inflows
	May-Jun vs. Sept-Oct Inflows
	Jul-Aug vs. Sept-Oct Inflows
	Mar-Apr vs. Nov-Dec Inflows
	Sept-Oct vs. Nov-Dec Inflows
1983	Jan-Feb vs. Jul-Aug Inflows
	Mar-Apr vs. Jul-Aug Inflows
	May-Jun vs. Jul-Aug Inflows
	Jul-Aug vs. Sept-Oct Inflows
1986	Harvest vs. Nov-Dec Inflows

Summary of points flagged by 95% Prediction Ellipses

Data Set 1

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
*1962	1						1		2
*1969	1						1		2
*1974	1						1		2
1982							1		1
1983	1								1
*1986	2								2
*1987			1				1		2

Data Set 3

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
*1962	1						1		2
1969							1		1
1970							1		1
1974							1		1
1982							1		1
1986	1								1
*1987			1				1		2

Data set 7

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
*1962	1						1		2
1969							1		1
1970							1		1
1974							1		1
1977							1		1
1986	1								1
*1987			1				1		2

Summary of Points flagged by diagnostic measures

Key to Abbreviations:

BOX Box plot
SRE Studentized residual
SDR Studentized deleted residual
LEV Leverage value
MAH Mahalanobis distance
COO Cook's distance
SDF Standardized Dffits value
SDB Standardized Dfbeta value

Selecting the Final Candidate Models. For Data Set 1 (untransformed data), the observations to be omitted are 1969 and 1974. For Data Sets 3 (squared root of inflows) and 7 (some untransformed and others squared root inflows), the observations 1962 and 1987 will be omitted

	Observations omitted	R^2	Adjusted R^2
Data Set 1	1962	0.597	0.462
	1987	0.715	0.620
	1962 & 1987	0.698	0.591
	1969 & 1974	0.759	0.674
	1986 & 1987	0.730	0.635
	1962, 1969 & 1974	0.734	0.635
	1969, 1974 & 1987	0.819	0.751
	1962, 1969, 1974, 1986 & 1987	0.814	0.734
Data Set 3	1962 and 1987	0.648	0.524
Data Set 7	1962 and 1987	0.668	0.551

Selecting the Final Models. Regression was performed using each of these three models, and the deleted residuals were calculated. It needs to be mentioned that Model 1 does not completely meet the assumption of normality as Model 7 does. However, It seems that Model 1, untransformed data, performs better from the point of view of prediction, and could be considered as the final choice.

Data Set	Best Candidate Model (Inflows)	R^2	Adjusted R^2	C_p	Deleted Residuals	Prob>F
1	Jan-Feb, Mar-Apr, May-Jun, Sept-Oct, Nov-Dec	0.815	0.760	5.42	(- 713.87 , 741.42)	0.000
3	SQRT (Mar-Apr), SQRT (May-Jun), SQRT (Jul-Aug), SQRT (Nov-Dec)	0.623	0.544	4.20	(- 904.43 , 1161.68)	0.001
7	SQRT (Mar-Apr), May-Jun, SQRT (Jul-Aug), SQRT (Nov-Dec)	0.638	0.562	4.52	(- 890.82 , 1149.063)	0.000

Model 1:

Crab Harvest = 751.228 - 0.276*(January-February Inflows) + 0.846*(March-April Inflows)
- 0.184*(May-June Inflows) - 0.475*(September-October Inflows)
+ 0.600*(November-December Inflows)

Model 3:

Crab Harvest = 480.128 + 38.994*SQRT(March-April Inflows) - 12.893*SQRT(May-June Inflows)
- 21.752*SQRT(July-August Inflows) + 22.828*SQRT(November-December Inflows)

Model 7:

Crab Harvest = 219.226 + 39.532*SQRT(Mach-April Inflows) - 0.147*(May-June Inflows)
- 22.195*SQRT(July-August Inflows) + 22.699*SQRT(November-December Inflows)

Untransformed Data

Summary Information

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Nov-Dec Inflows, Mar-Apr Inflows, May-Jun Inflows, Jan-Feb Inflows, Sept-Oct Inflows[c,d]	.	.903	.815	.760	298.1370	1.813

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), Nov-Dec Inflows, Mar-Apr Inflows, May-Jun Inflows, Jan-Feb Inflows, Sept-Oct Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6637882	5	1327576	14.936	.000[b]
	Residual	1511056	17	88885.7		
	Total	8148939	22			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), Nov-Dec Inflows, Mar-Apr Inflows, May-Jun Inflows, Jan-Feb Inflows, Sept-Oct Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	751.228	220.649		3.405	.003	285.701	1216.756
	Jan-Feb Inflows	-.276	.105	-.326	-2.613	.018	-.498	-.053
	Mar-Apr Inflows	.846	.106	1.114	8.001	.000	.623	1.070
	May-Jun Inflows	-.184	.064	-.331	-2.872	.011	-.319	-.049
	Sept-Oct Inflows	-.475	.143	-.473	-3.310	.004	-.777	-.172
	Nov-Dec Inflows	.600	.095	.802	6.294	.000	.399	.801

a. Dependent Variable: CRAB

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	710.1958	2605.443	1639.72	549.2922	23
Std. Predicted Value	-1.692	1.758	.000	1.000	23
Standard Error of Predicted Value	82.2191	198.3782	149.1354	31.4517	23
Adjusted Predicted Value	810.2377	2648.966	1639.29	532.7179	23
Residual	-586.7430	479.0525	-3.E-14	262.0770	23
Std. Residual	-1.968	1.607	.000	.879	23
Stud. Residual	-2.198	1.856	.000	1.040	23
Deleted Residual	-731.8687	741.4173	.4295	371.3925	23
Stud. Deleted Residual	-2.520	2.017	-.010	1.107	23
Mahal. Distance	.717	8.784	4.783	2.258	23
Cook's Distance	.000	.456	.075	.118	23
Centered Leverage Value	.033	.399	.217	.103	23

a. Dependent Variable: CRAB

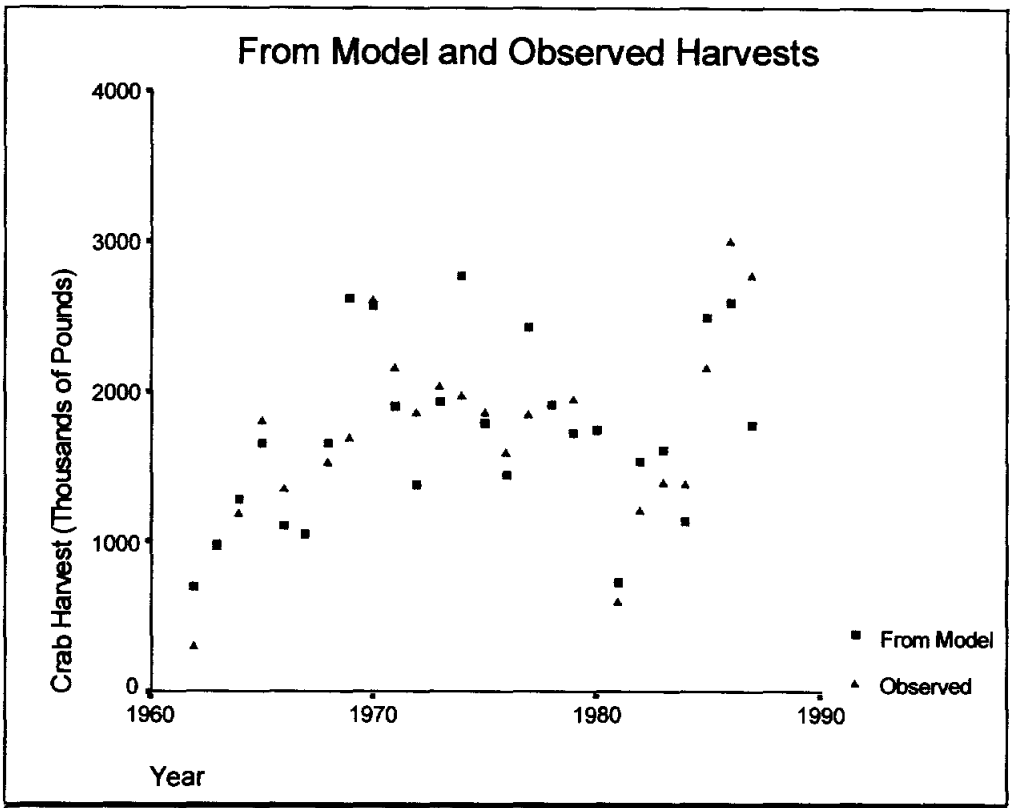
Tests of Normality

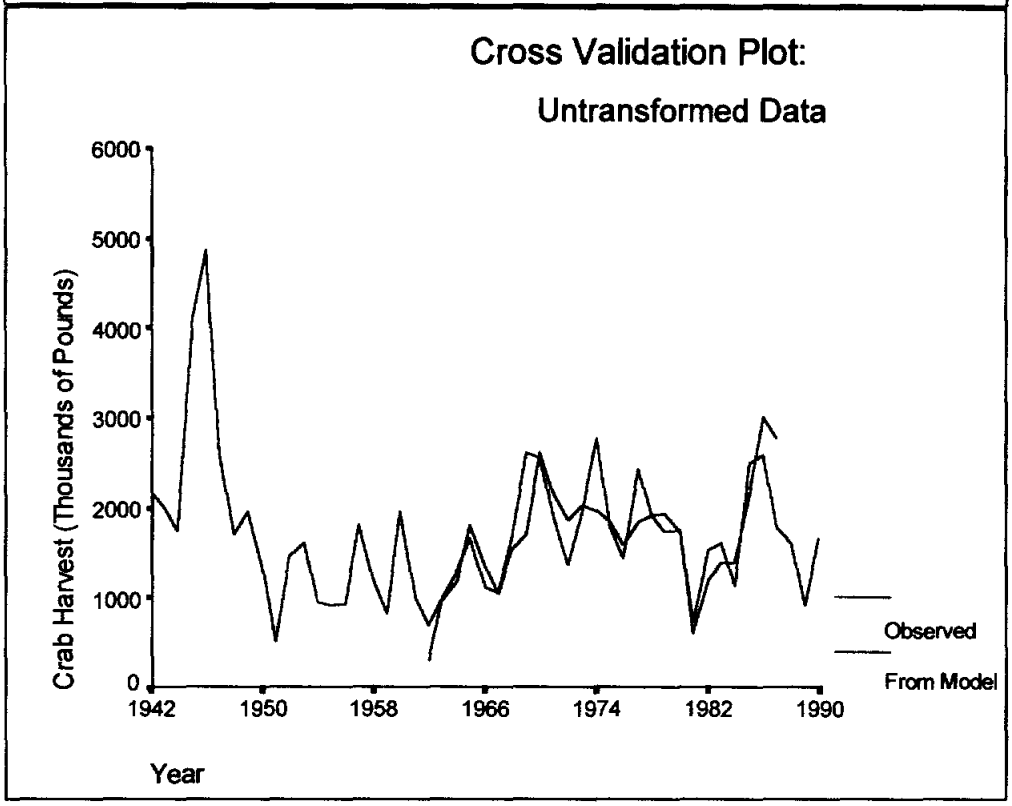
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRAB	.106	23	.200*	.980	23	.883
Jan-Feb Inflows	.178	23	.058	.955	23	.417
Mar-Apr Inflows	.170	23	.083	.927	23	.097
May-Jun Inflows	.162	23	.119	.921	23	.076
Sept-Oct Inflows	.205	23	.013	.917	23	.062
Nov-Dec Inflows	.179	23	.054	.874	23	.010**

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction


From Model and Observed Harvests
Crab Harvest (Thousands of Pounds)
4000
3000
2000
1000
0
1960
1970
1980
1990
Year
From Model
Observed


Cross Validation Plot:
Untransformed Data
Crab Harvest (Thousands of Pounds)
6000
5000
4000
3000
2000
1000
0
1942
1950
1958
1966
1974
1982
1990
Year
Observed
From Model

Squared Root Inflows Data

Summary Information

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), SQRT (May-Jun Inflows)[c,d]	.	.789	.623	.544	355.7150	1.775

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), SQRT (May-Jun Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3976430	4	994107	7.856	.001[b]
	Residual	2404130	19	126533		
	Total	6380560	23			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), SQRT (May-Jun Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	480.128	411.242		1.168	.257	-380.611	1340.867		
	SQRT (Mar-Apr Inflows)	38.994	8.209	.800	4.750	.000	21.812	56.175	.700	1.429
	SQRT (May-Jun Inflows)	-12.893	7.587	-.316	-1.699	.106	-28.773	2.987	.574	1.743
	SQRT (Jul-Aug Inflows)	-21.752	9.960	-.370	-2.184	.042	-42.597	-.906	.692	1.446
	SQRT (Nov-Dec Inflows)	22.828	6.968	.478	3.276	.004	8.243	37.413	.931	1.074

a. Dependent Variable: CRAB

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1116.783	2581.655	1712.12	415.7983	24
Std. Predicted Value	-1.432	2.091	.000	1.000	24
Standard Error of Predicted Value	98.6433	206.7975	159.6020	30.4448	24
Adjusted Predicted Value	1131.264	2887.331	1713.49	439.8818	24
Residual	-598.7549	837.1177	-4.E-13	323.3070	24
Std. Residual	-1.683	2.353	.000	.909	24
Stud. Residual	-2.069	2.772	-.001	1.052	24
Deleted Residual	-904.4313	1161.679	-1.3647	435.1929	24
Stud. Deleted Residual	-2.288	3.497	.020	1.175	24
Mahal. Distance	.810	6.815	3.833	1.730	24
Cook's Distance	.000	.596	.075	.148	24
Centered Leverage Value	.035	.296	.167	.075	24

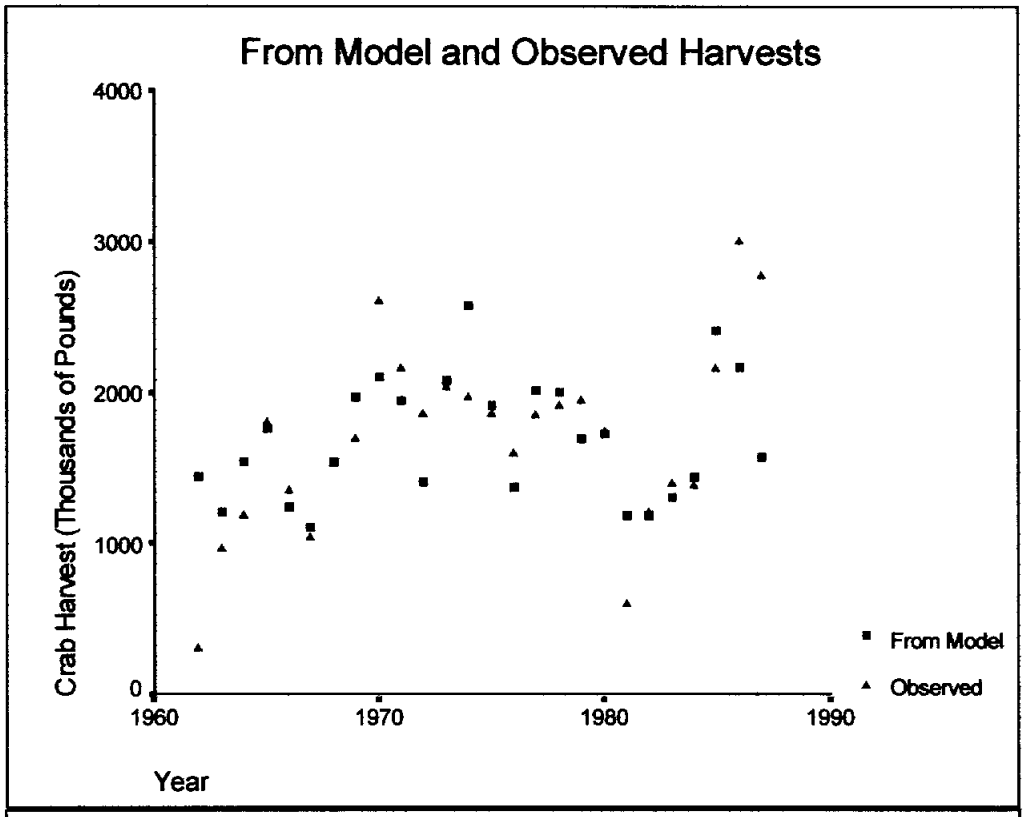
a. Dependent Variable: CRAB

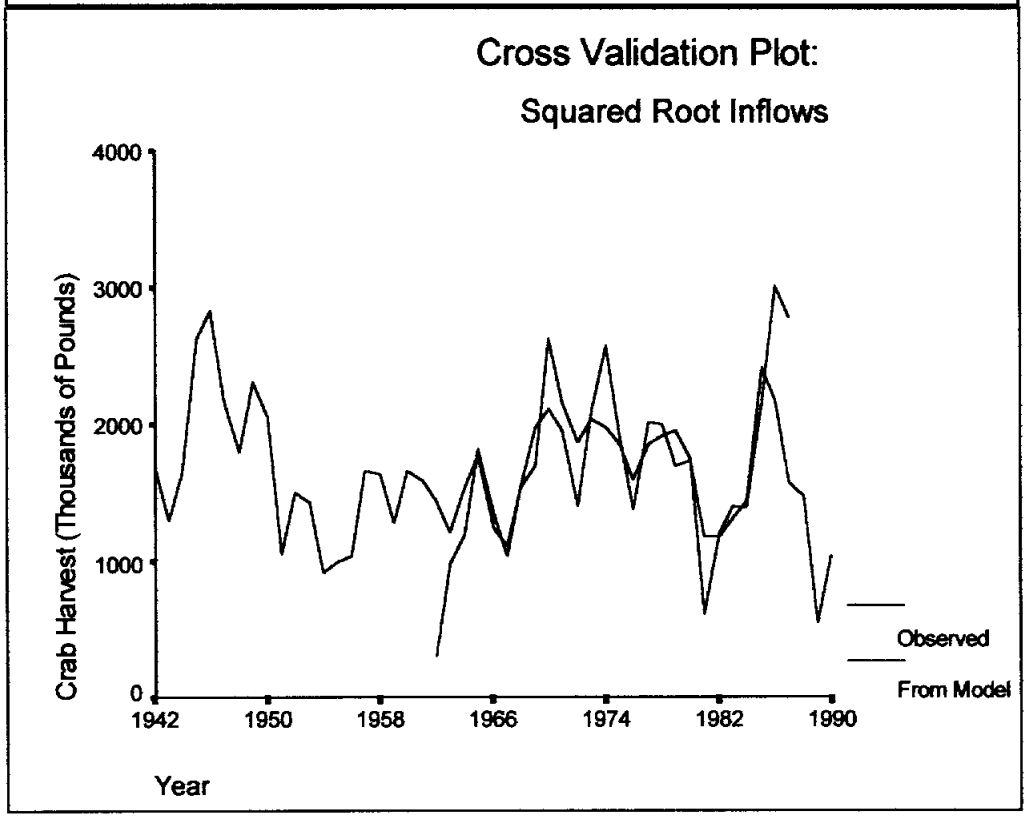
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRAB	.110	24	.200*	.976	24	.780
SQRT (Mar-Apr Inflows)	.139	24	.200*	.955	24	.404
SQRT (May-Jun Inflows)	.184	24	.035	.936	24	.176
SQRT (Jul-Aug Inflows)	.114	24	.200*	.960	24	.461
SQRT (Nov-Dec Inflows)	.141	24	.200*	.911	24	.042

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


From Model and Observed Harvests
4000
3000
2000
1000
0
Crab Harvest (Thousands of Pounds)
1960
1970
1980
1990
Year
From Model
Observed


Cross Validation Plot:
Squared Root Inflows
4000
3000
2000
1000
0
Crab Harvest (Thousands of Pounds)
1942
1950
1958
1966
1974
1982
1990
Year
Observed
From Model

Untransformed and Squared Root Inflows Data

Summary Information

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows[c,d]	.	.799	.638	.562	348.5928	1.766

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4071738	4	1017934	8.377	.000[b]
	Residual	2308822	19	121517		
	Total	6380560	23			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRt (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.	95% Confidence Interval for B Lower Bound	95% Confidence Interval for B Upper Bound	Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)	219.226	401.35		.546	.591	-620.808	1059.260		
	SQRT (Mar-Apr Inflows)	39.532	7.989	.811	4.948	.000	22.811	56.254	.709	1.410
	May-Jun Inflows	-.147	.075	-.340	-1.947	.066	-.305	.011	.623	1.605
	SQRT (Jul-Aug Inflows)	-22.195	9.502	-.377	-2.336	.031	-42.083	-2.308	.730	1.370
	SQRT (Nov-Dec Inflows)	22.699	6.821	.475	3.328	.004	8.422	36.975	.933	1.072

a. Dependent Variable: CRAB

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1122.854	2572.278	1712.12	420.7518	24
Std. Predicted Value	-1.401	2.044	.000	1.000	24
Standard Error of Predicted Value	94.3874	217.0104	156.0606	31.6686	24
Adjusted Predicted Value	1118.849	2873.718	1713.14	444.4088	24
Residual	-589.3783	834.0538	-2.E-13	316.8337	24
Std. Residual	-1.691	2.393	.000	.909	24
Stud. Residual	-2.079	2.808	-.001	1.050	24
Deleted Residual	-890.8176	1149.063	-1.0171	424.3412	24
Stud. Deleted Residual	-2.302	3.574	.022	1.178	24
Mahal. Distance	.728	7.955	3.833	1.878	24
Cook's Distance	.000	.596	.073	.148	24
Centered Leverage Value	.032	.346	.167	.082	24

a. Dependent Variable: CRAB

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
CRAB	.110	24	.200*	.976	24	.780
SQRT (Mar-Apr Inflows)	.139	24	.200*	.955	24	.404
May-June Inflows	.139	24	.200*	.945	24	.282
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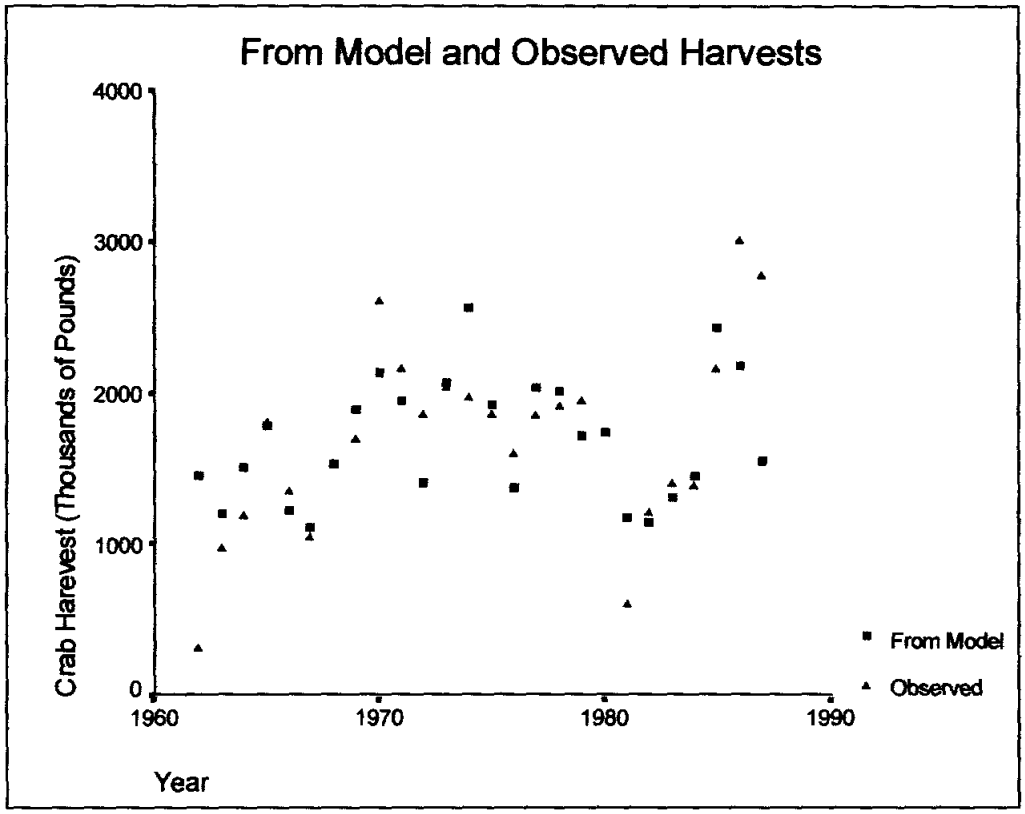
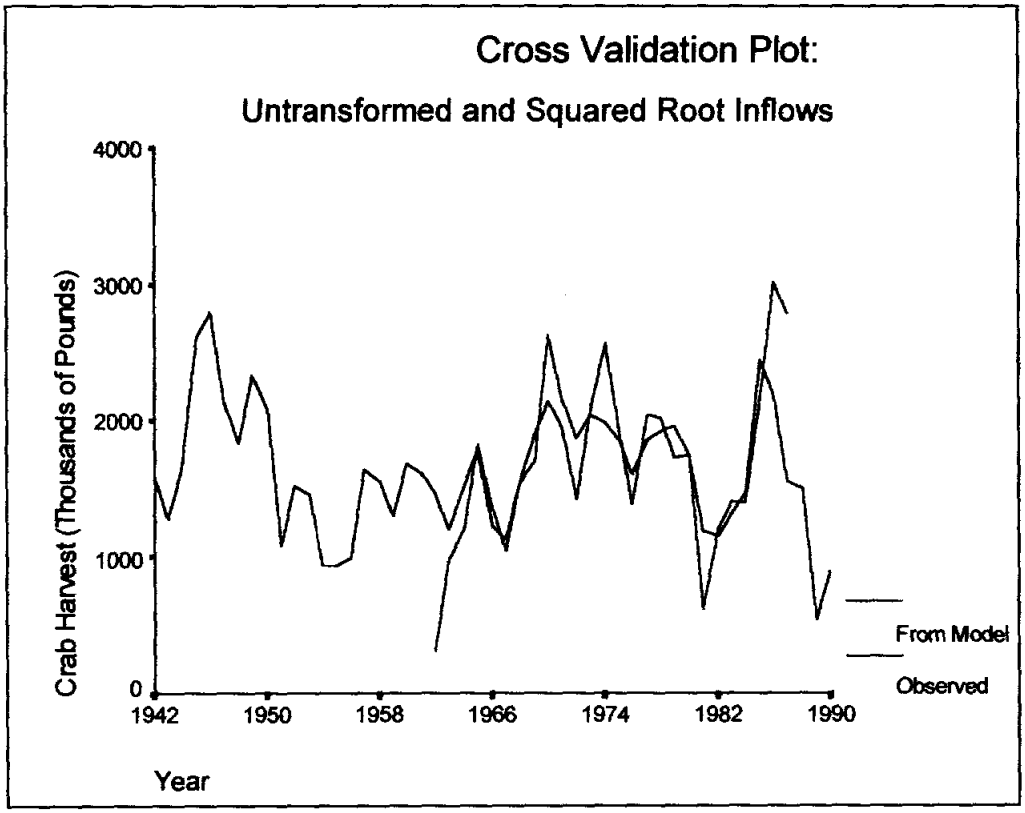
SQRT (Nov-Dec Inflows)	.141	24	.200*	.911	24	.042

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction


From Model and Observed Harvests
Crab Harevest (Thousands of Pounds)
4000
3000
2000
1000
0
1960
1970
1980
1990
Year
From Model
Observed


Cross Validation Plot:
Untransformed and Squared Root Inflows
Crab Harvest (Thousands of Pounds)
4000
3000
2000
1000
0
1942
1950
1958
1966
1974
1982
1990
Year
From Model
Observed

Exploring the Data

Listing of Data

Obs.	YEAR	CRAB	JF_LAG	MA_LAG	MJ_LAG	JA_LAG	SO_LAG	ND_LAG
1	1962	311.30	2954.20	1045.00	1507.05	985.43	1571.22	1519.35
2	1963	977.50	915.25	503.40	916.45	367.34	552.67	847.05
3	1964	1195.60	977.03	709.20	620.95	208.60	357.73	837.60
4	1965	1817.90	1159.28	1048.65	1390.30	229.70	424.64	1343.55
5	1966	1357.80	1796.50	1506.80	3868.55	732.35	395.08	812.45
6	1967	1047.90	1191.97	1280.87	3075.70	802.31	522.30	628.35
7	1968	1542.60	1193.37	1910.42	3503.55	656.56	536.00	891.47
8	1969	1705.70	1896.15	3669.45	5140.75	709.21	476.12	782.52
9	1970	2622.00	1207.70	3388.15	2824.15	446.00	1011.38	491.33
10	1971	2160.80	443.30	1490.24	948.92	425.88	1187.93	1265.65
11	1972	1870.10	1088.25	510.89	1119.91	445.71	656.82	1708.29
12	1973	2047.00	2116.37	3049.16	3859.81	1019.84	2393.69	1737.41
13	1974	1982.90	2766.28	3164.87	3633.59	1081.86	3097.29	3763.55
14	1975	1863.50	3240.49	1594.75	2713.05	909.19	1270.46	2834.55
15	1976	1599.50	1719.70	1508.26	2901.65	1104.96	642.39	1235.49
16	1977	1859.40	1159.13	1992.32	1636.66	685.40	594.52	1518.63
17	1978	1920.90	2068.95	1908.49	1027.73	401.86	445.47	879.19
18	1979	1953.70	2496.04	2675.62	2305.49	1705.39	1608.58	1001.19
19	1980	1749.10	2677.83	3231.60	2983.10	1701.37	1901.76	781.13
20	1981	610.20	1407.75	1056.13	3306.17	1019.45	1665.50	1487.45
21	1982	1216.10	856.42	990.37	4067.47	1572.64	1332.93	2629.44
22	1983	1407.60	2023.75	1736.94	3035.88	2302.66	1175.47	1801.08
23	1984	1396.60	1963.01	1585.36	1671.18	1820.12	2018.63	1445.47
24	1985	2167.90	1863.89	1977.23	1291.46	575.53	1690.87	2729.59
25	1986	3018.60	2059.82	1721.08	3138.40	734.34	1473.80	3736.27
26	1987	2786.90	1778.48	1363.56	3793.13	1058.29	1018.77	2602.39

CRAB	Crab harvest (thousands of pounds)
JF_LAG	Lagged January-February inflows (thousands of acre-feet)
MA_LAG	Lagged March-April inflows (thousands of acre-feet)
MJ_LAG	Lagged May-June inflows (thousands of acre-feet)
JA_LAG	Lagged July-August inflows (thousands of acre-feet)
SO_LAG	Lagged September-October inflows (thousands of acre-feet)
ND_LAG	Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Crab Harvest	.108	26	.200*	.978	26	.814
January-February Inflows	.155	26	.112	.963	26	.475
March-April Inflows	.181	26	.028	.919	26	.048
May-June Inflows	.150	26	.139	.942	26	.218
July-August Inflows	.166	26	.063	.915	26	.040
September-October Inflows	.183	26	.025	.902	26	.019
November-December Inflows	.184	26	.024	.865	26	.010**
Ln (January-February Inflows)	.150	26	.137	.948	26	.289
Ln (March-April Inflows)	.112	26	.200*	.950	26	.307
Ln (May-June Inflows)	.214	26	.004	.912	26	.035
Ln (July-August Inflows)	.092	26	.200*	.970	26	.620
Ln (September-October Inflows)	.151	26	.132	.938	26	.168
Ln (November-December Inflows)	.128	26	.200*	.959	26	.425
SQRT (January-February Inflows)	.137	26	.200*	.973	26	.686
SQRT (March-April Inflows)	.137	26	.200*	.954	26	.366
SQRT (May-June Inflows)	.175	26	.039	.936	26	.133
SQRT (July-August Inflows)	.119	26	.200*	.967	26	.542
SQRT (September-October Inflows)	.175	26	.040	.935	26	.130
SQRT (November-December Inflows)	.133	26	.200*	.924	26	.065

*. This is a lower bound of the true significance.

**. This is a lower bound of the true significance.

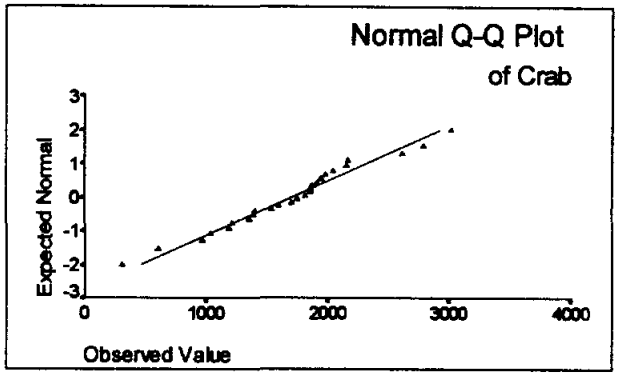
a. This is a lower bound of the true significance.

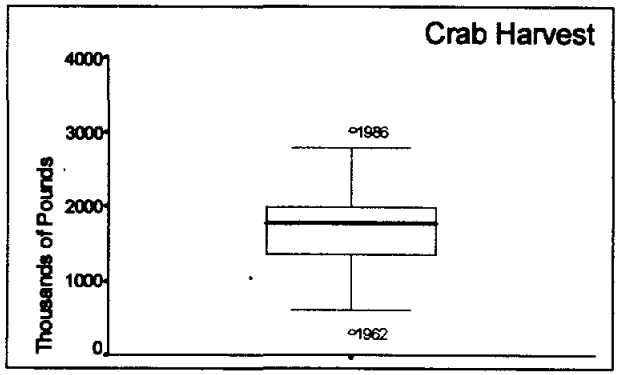
Descriptives

			Statistic	Std. Error
Crab Harvest	Mean		1699.58	120.8554
	95% Confidence Interval for Mean	Lower Bound	1450.67	
		Upper Bound	1948.49	
	5% Trimmed Mean		1702.57	
	Median		1783.50	
	Variance		379757	
	Std. Deviation		616.2441	
	Minimum		311.30	
	Maximum		3018.60	
	Range		2707.30	
	Interquartile Range		676.5500	
	Skewness		-.053	.456
	Kurtosis		.482	.887

Extreme Values

			Case Number	YEAR	Value
Crab Harvest	Highest	1	25	1986	3018.60
		2	26	1987	2786.90
		3	9	1970	2622.00
		4	24	1985	2167.90
		5	10	1971	2160.80
	Lowest	1	1	1962	311.30
		2	20	1981	610.20
		3	2	1963	977.50
		4	6	1967	1047.90
		5	3	1964	1195.60





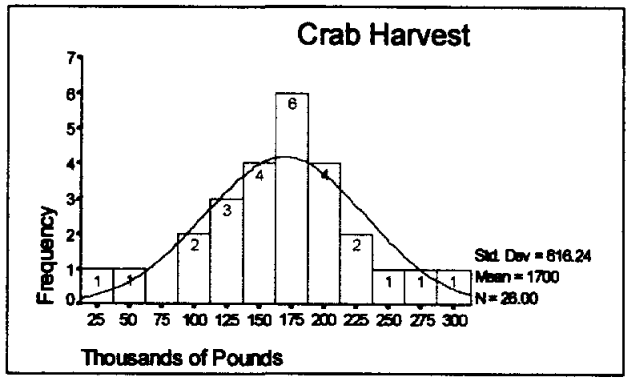


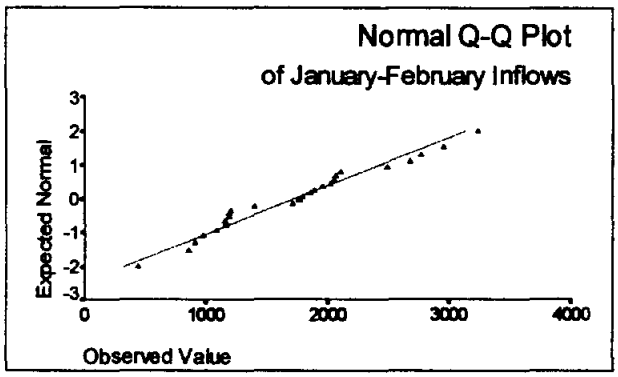
Fig. 1.1a. Exploratory Plots of Crab Harvest.

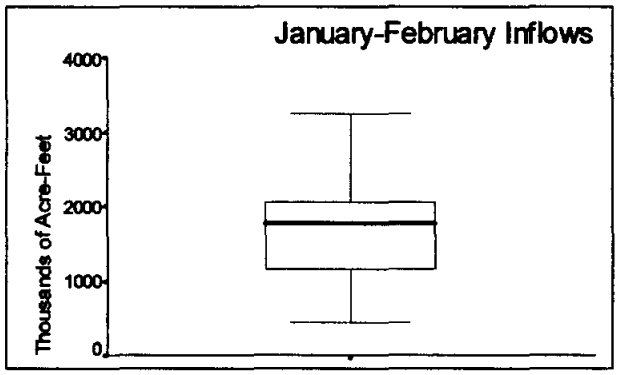
Descriptives

			Statistic	Std. Error
January-February Inflows	Mean		1731.57	139.0755
	95% Confidence Interval for Mean	Lower Bound	1445.14	
		Upper Bound	2018.00	
	5% Trimmed Mean		1717.69	
	Median		1787.49	
	Variance		502892	
	Std. Deviation		709.1485	
	Minimum		443.30	
	Maximum		3240.49	
	Range		2797.19	
	Interquartile Range		921.5675	
	Skewness		.356	.456
	Kurtosis		-.477	.887

Extreme Values

			Case Number	YEAR	Value
January-February Inflows	Highest	1	14	1975	3240.49
		2	1	1962	2954.20
		3	13	1974	2766.28
		4	19	1980	2677.83
		5	18	1979	2496.04
	Lowest	1	10	1971	443.30
		2	21	1982	856.42
		3	2	1963	915.25
		4	3	1964	977.03
		5	11	1972	1088.25





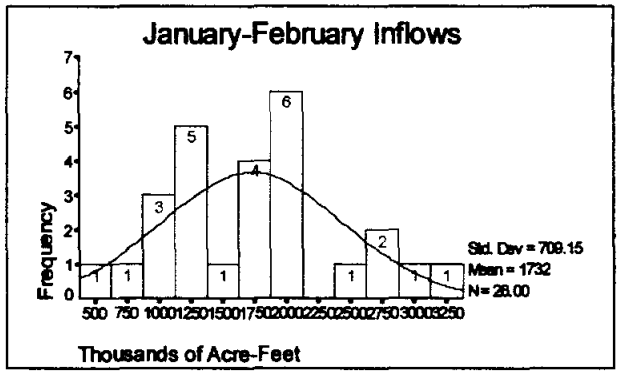


Fig. 1.2a. Exploratory Plots of January-February Inflows.

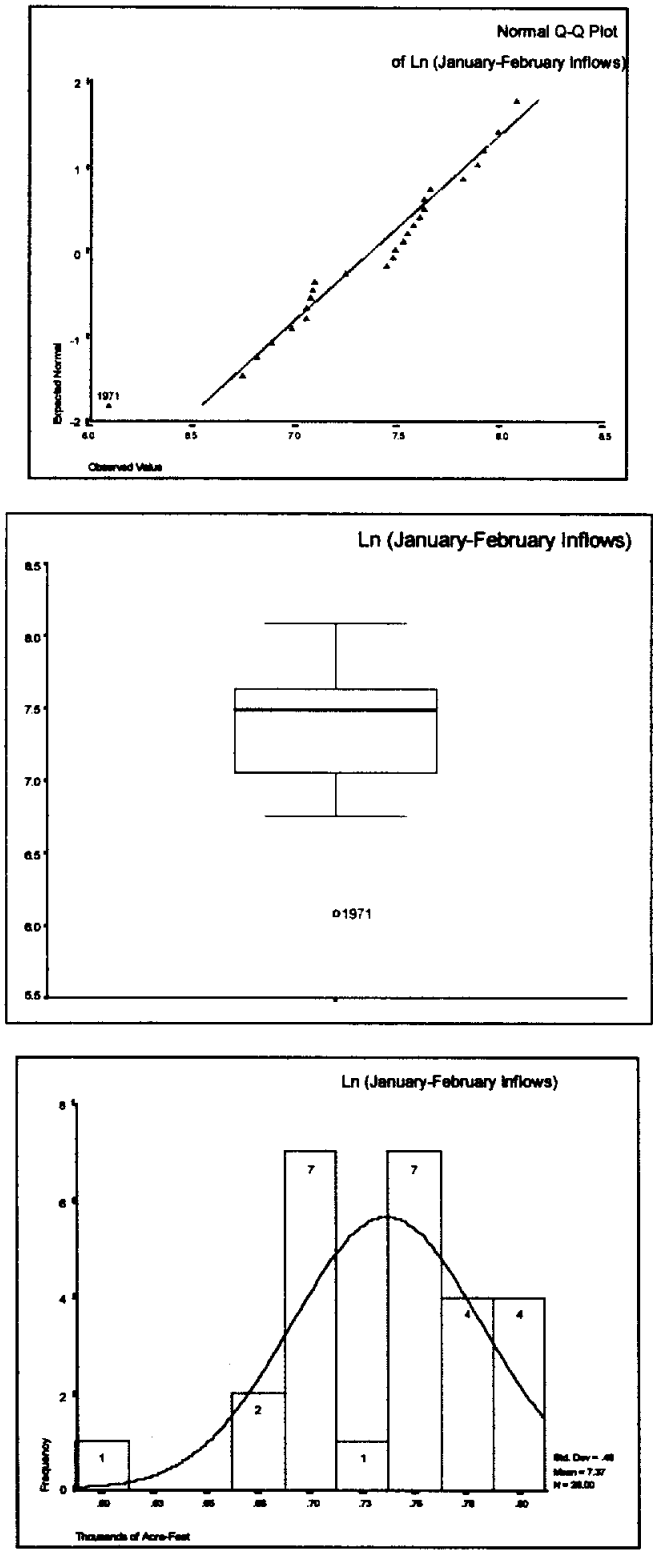


Fig. 1.2b. Exploratory Plots of Transformed January-February Inflows

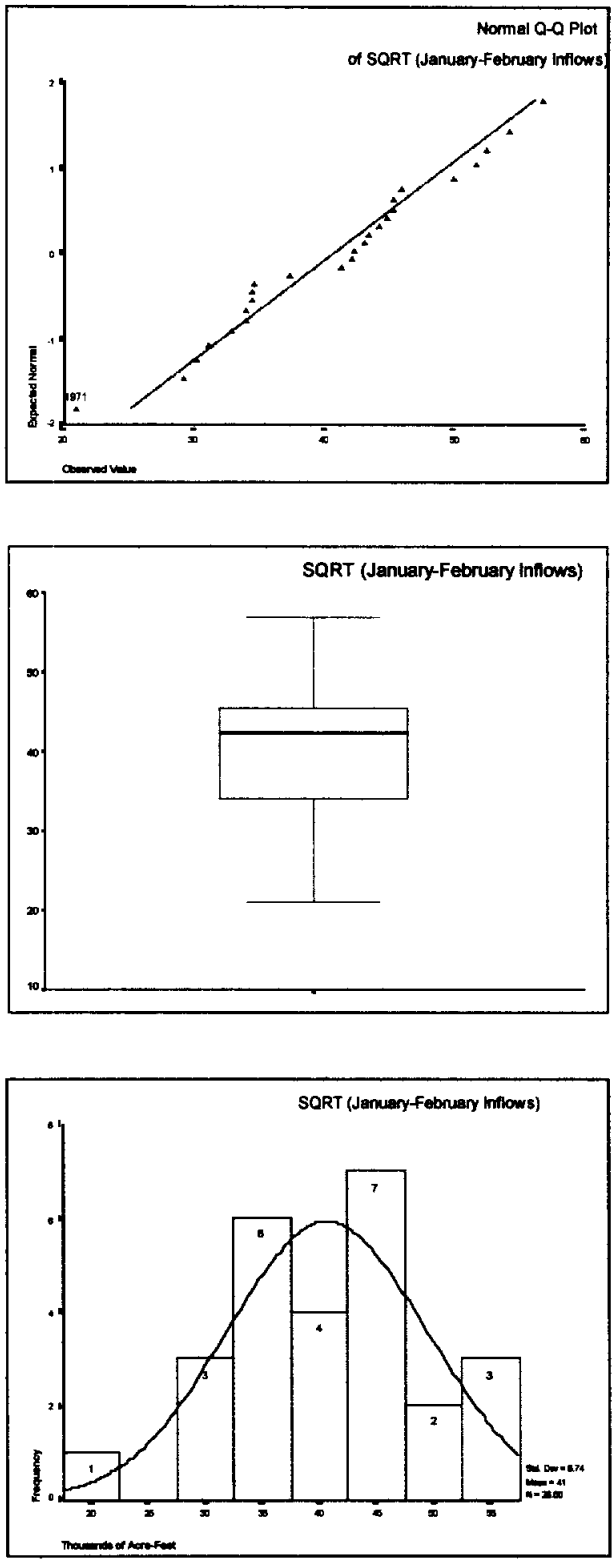


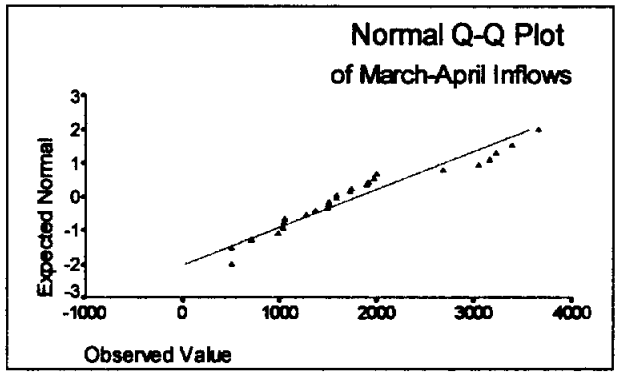
Fig. 1.2c. Exploratory Plots of Transformed January-February Inflows.

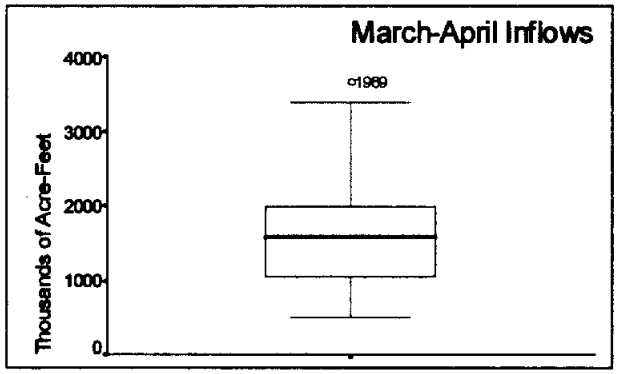
Descriptives

			Statistic	Std. Error
March-April Inflows	Mean		1793.03	175.6272
	95% Confidence Interval for Mean	Lower Bound	1431.32	
		Upper Bound	2154.74	
	5% Trimmed Mean		1763.94	
	Median		1590.05	
	Variance		801968	
	Std. Deviation		895.5268	
	Minimum		503.40	
	Maximum		3669.45	
	Range		3166.05	
	Interquartile Range		1108.88	
	Skewness		.684	.456
	Kurtosis		-.383	.887

Extreme Values

			Case Number	YEAR	Value
March-April Inflows	Highest	1	8	1969	3669.45
		2	9	1970	3388.15
		3	19	1980	3231.60
		4	13	1974	3164.87
		5	12	1973	3049.16
	Lowest	1	2	1963	503.40
		2	11	1972	510.89
		3	3	1964	709.20
		4	21	1982	990.37
		5	1	1962	1045.00





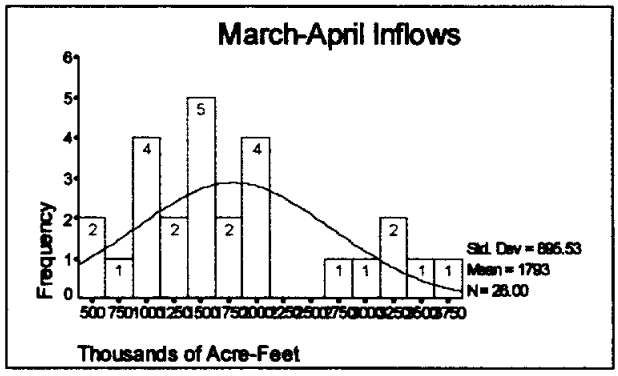
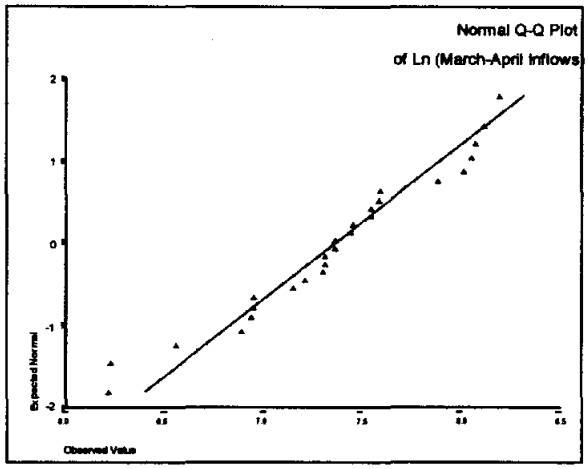
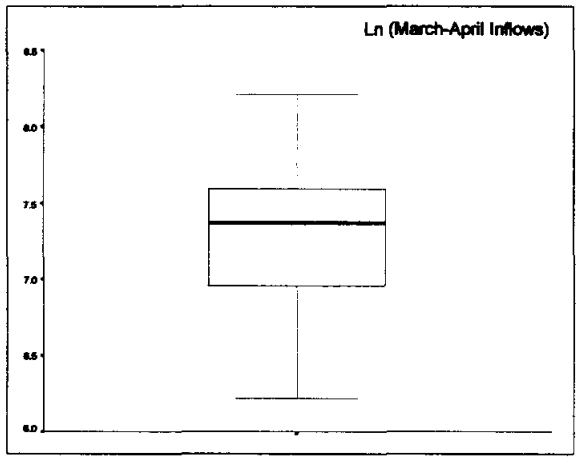


Fig. 1.3a. Exploratory Plots of March-April Inflows.





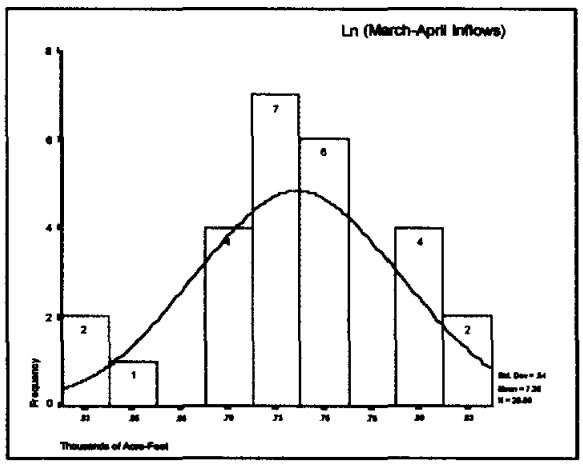


Fig. 1.3b. Exploratory Plots of Transformed March-April Inflows.

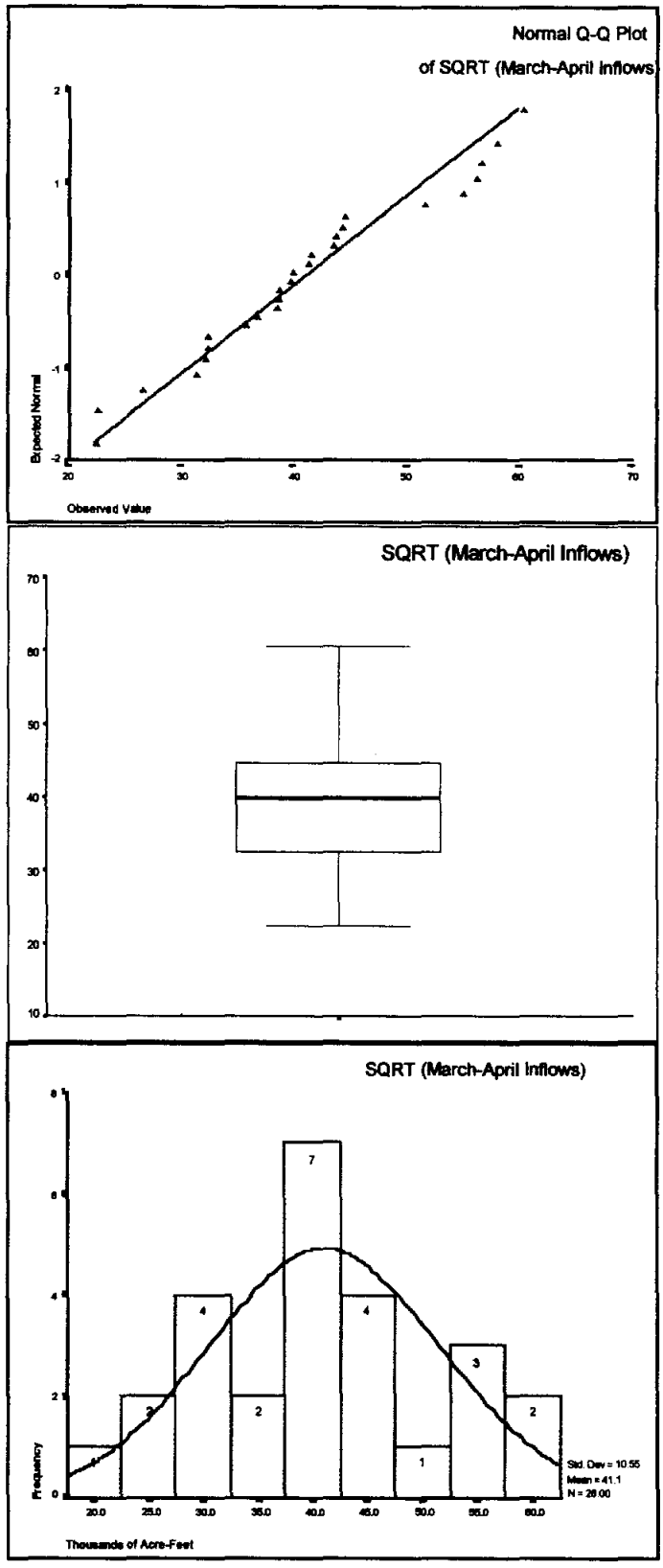


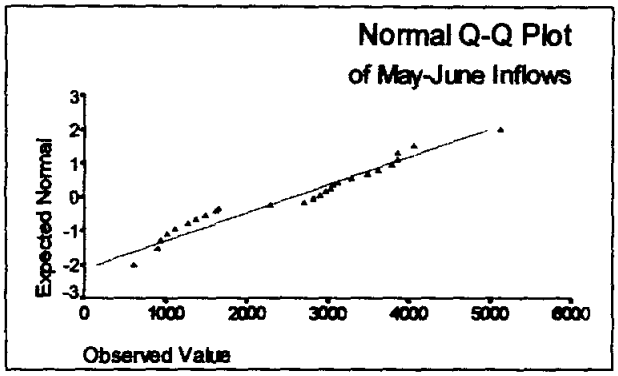
Fig. 1.3c. Exploratory Plots of Transformed March-April Inflows.

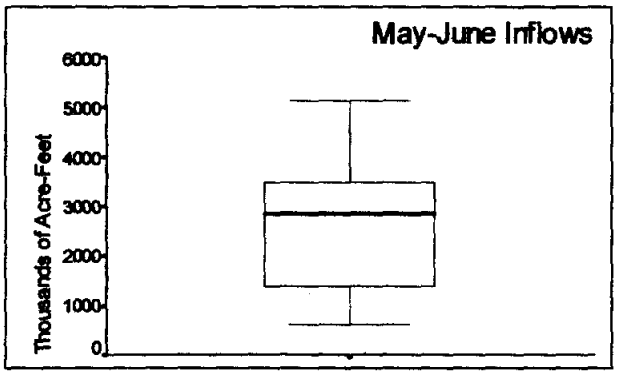
Descriptives

			Statistic	Std. Error
May-June Inflows	Mean		2549.27	238.3907
	95% Confidence Interval for Mean	Lower Bound	2058.29	
		Upper Bound	3040.24	
	5% Trimmed Mean		2522.40	
	Median		2862.90	
	Variance		1477583	
	Std. Deviation		1215.56	
	Minimum		620.95	
	Maximum		5140.75	
	Range		4519.80	
	Interquartile Range		2170.47	
	Skewness		.057	.456
	Kurtosis		-.940	.887

Extreme Values

			Case Number	YEAR	Value
May-June Inflows	Highest	1	8	1969	5140.75
		2	21	1982	4067.47
		3	5	1966	3868.55
		4	12	1973	3859.81
		5	26	1987	3793.13
	Lowest	1	3	1964	620.95
		2	2	1963	916.45
		3	10	1971	948.92
		4	17	1978	1027.73
		5	11	1972	1119.91





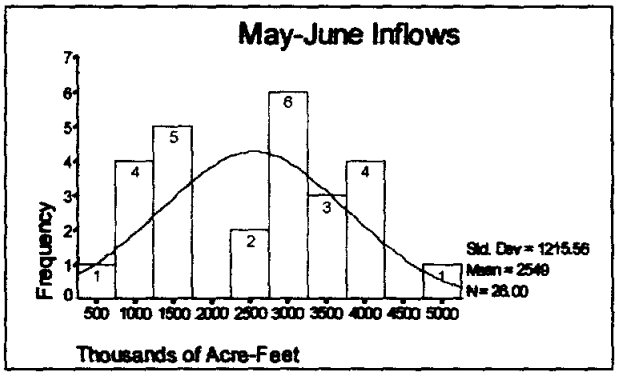


Fig. 1.4a. Exploratory Plots of May-June Inflows.

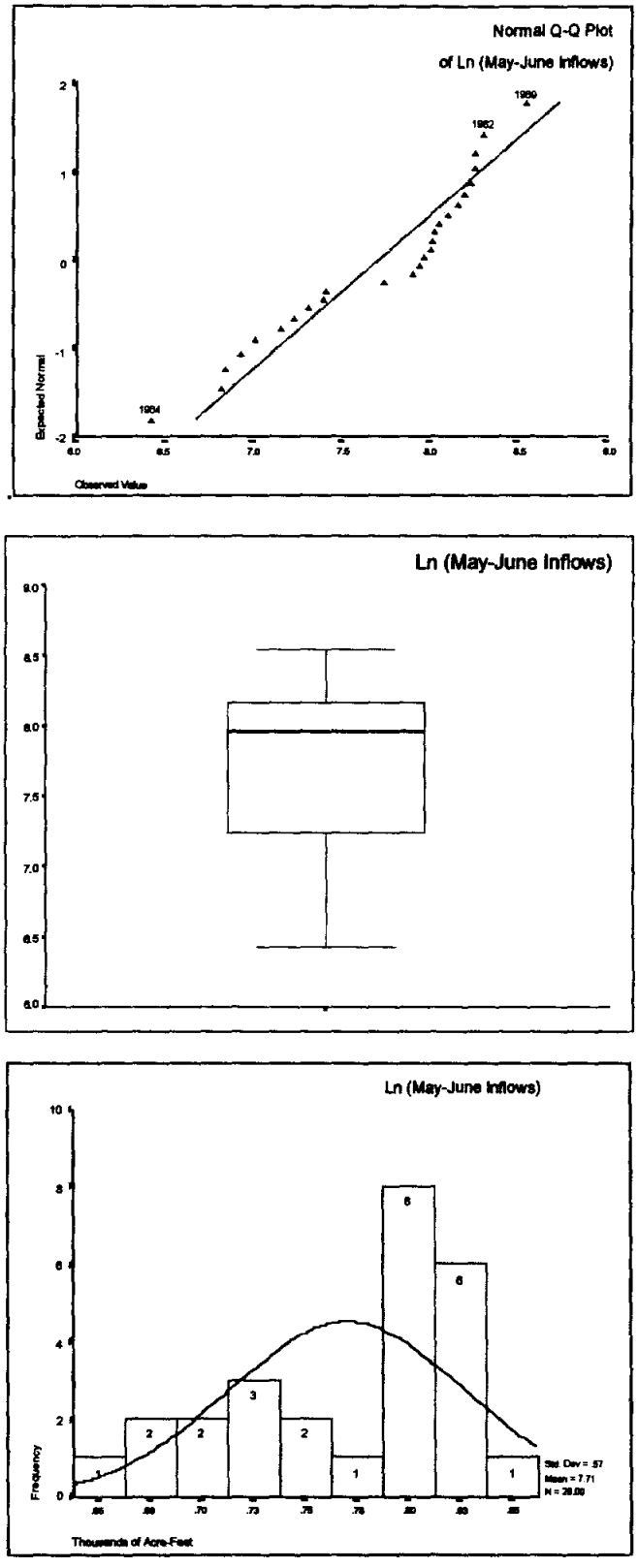


Fig. 1.4b. Exploratory Plots of Transformed May-June Inflows.

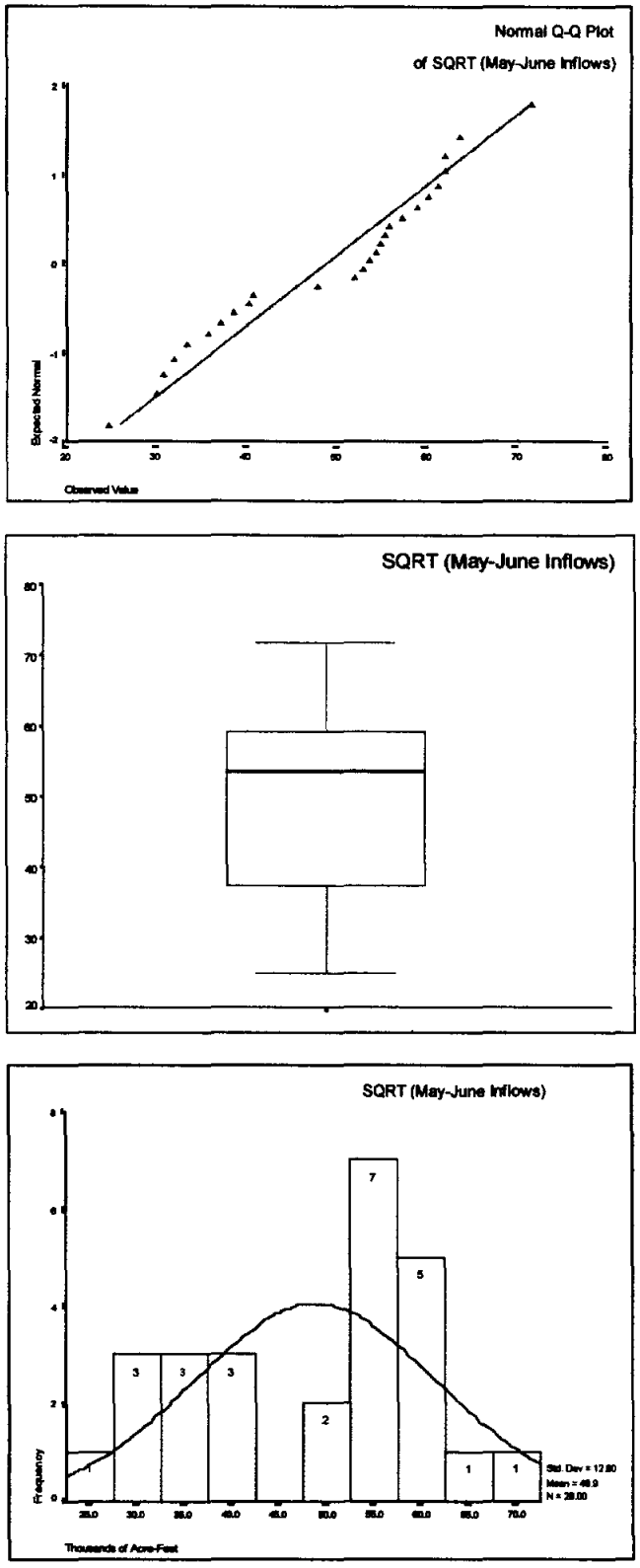


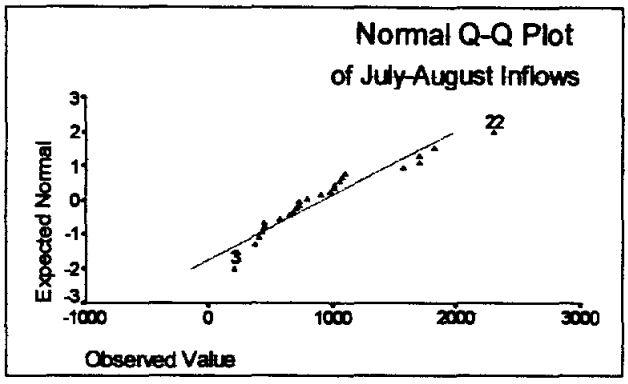
Fig. 1.4c. Exploratory Plots of Transformed May-June Inflows.

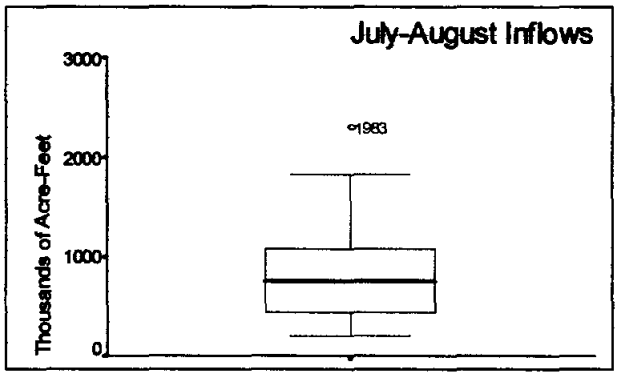
Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		911.6129	104.5030
	95% Confidence Interval for Mean	Lower Bound	696.3850	
		Upper Bound	1126.84	
	5% Trimmed Mean		879.3051	
	Median		768.3225	
	Variance		283943	
	Std. Deviation		532.8626	
	Minimum		208.60	
	Maximum		2302.66	
	Range		2094.06	
	Interquartile Range		641.7063	
	Skewness		.968	.456
	Kurtosis		.512	.887

Extreme Values

			Case Number	YEAR	Value
July-August Inflows	Highest	1	22	1983	2302.66
		2	23	1984	1820.12
		3	18	1979	1705.39
		4	19	1980	1701.37
		5	21	1982	1572.64
	Lowest	1	3	1964	208.60
		2	4	1965	229.70
		3	2	1963	367.34
		4	17	1978	401.86
		5	10	1971	425.88





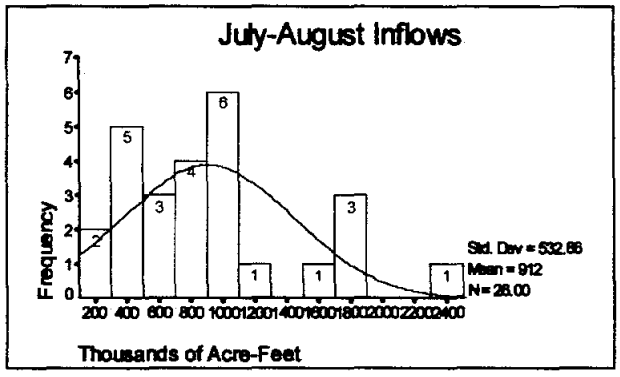


Fig. 1.5a. Exploratory Plots of July-August Inflows.

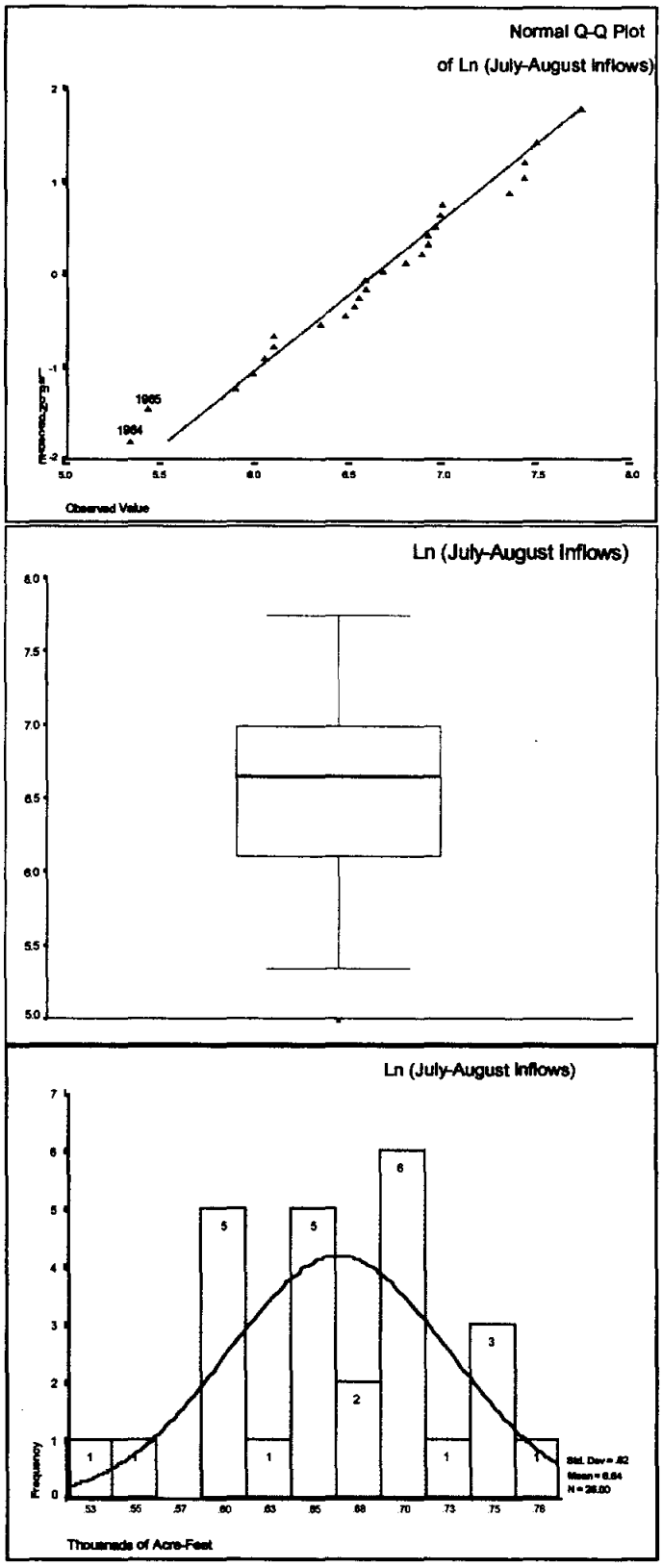


Fig. 1.5b. Exploratory Plots of Transformed July-August Inflows.

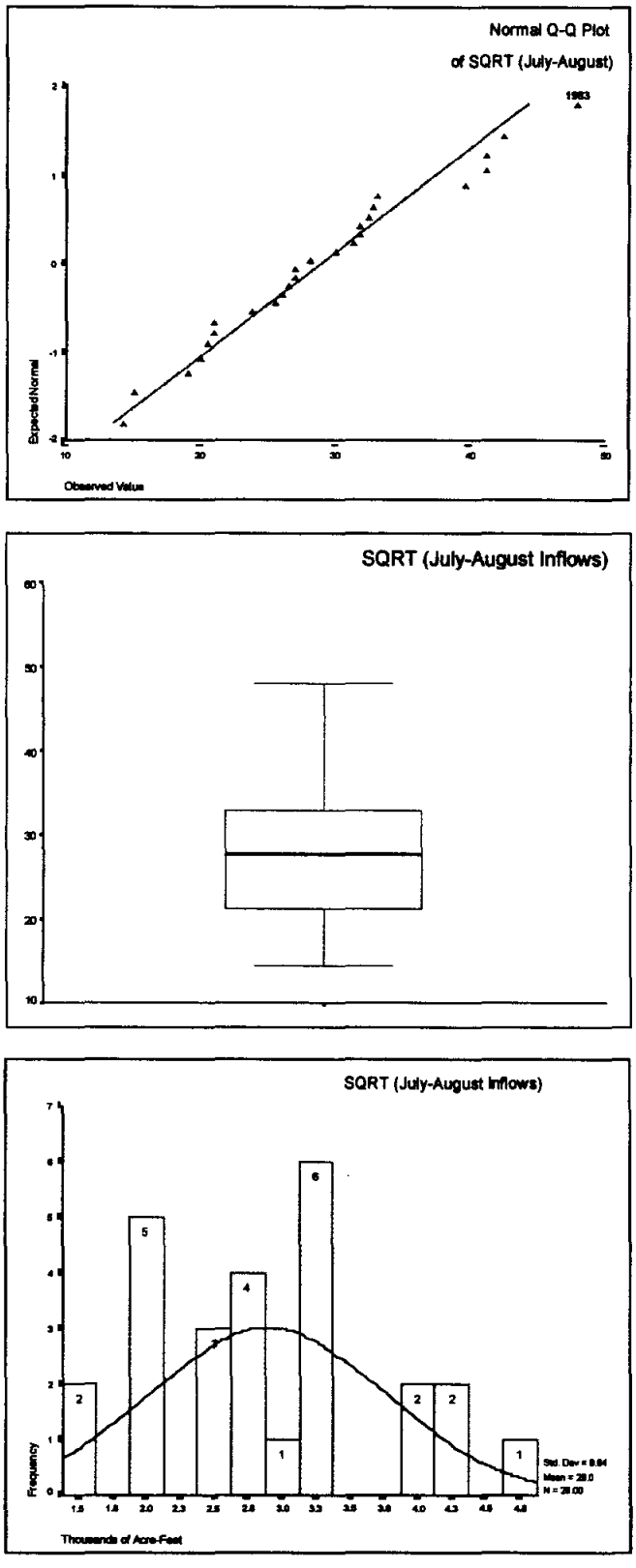


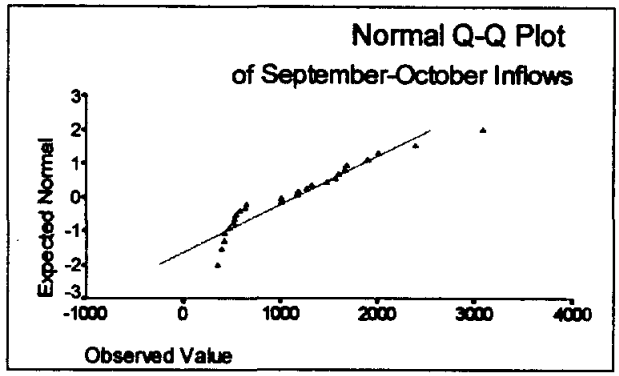
Fig. 1.5c. Exploratory Plots of Transformed July-August Inflows.

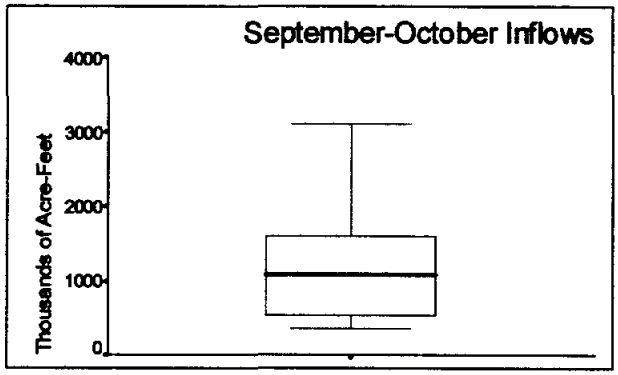
Descriptives

			Statistic	Std. Error
September-October Inflows	Mean		1154.69	138.1562
	95% Confidence Interval for Mean	Lower Bound	870.1527	
		Upper Bound	1439.23	
	5% Trimmed Mean		1099.59	
	Median		1097.12	
	Variance		496265	
	Std. Deviation		704.4609	
	Minimum		357.73	
	Maximum		3097.29	
	Range		2739.56	
	Interquartile Range		1090.23	
	Skewness		.947	.456
	Kurtosis		.704	.887

Extreme Values

			Case Number	YEAR	Value
September-October Inflows	Highest	1	13	1974	3097.29
		2	12	1973	2393.69
		3	23	1984	2018.63
		4	19	1980	1901.76
		5	24	1985	1690.87
	Lowest	1	3	1964	357.73
		2	5	1966	395.08
		3	4	1965	424.64
		4	17	1978	445.47
		5	8	1969	476.12





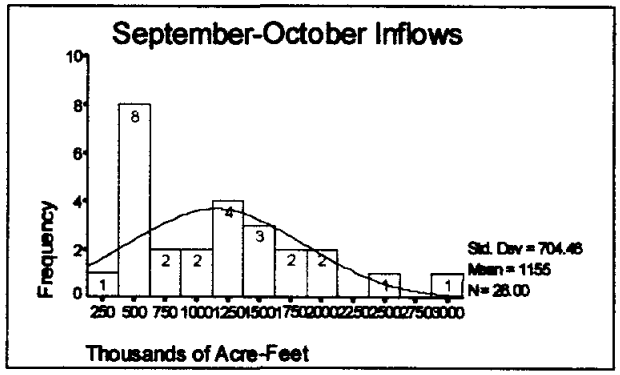


Fig. 1.6a. Exploratory Plots of September-October Inflows.

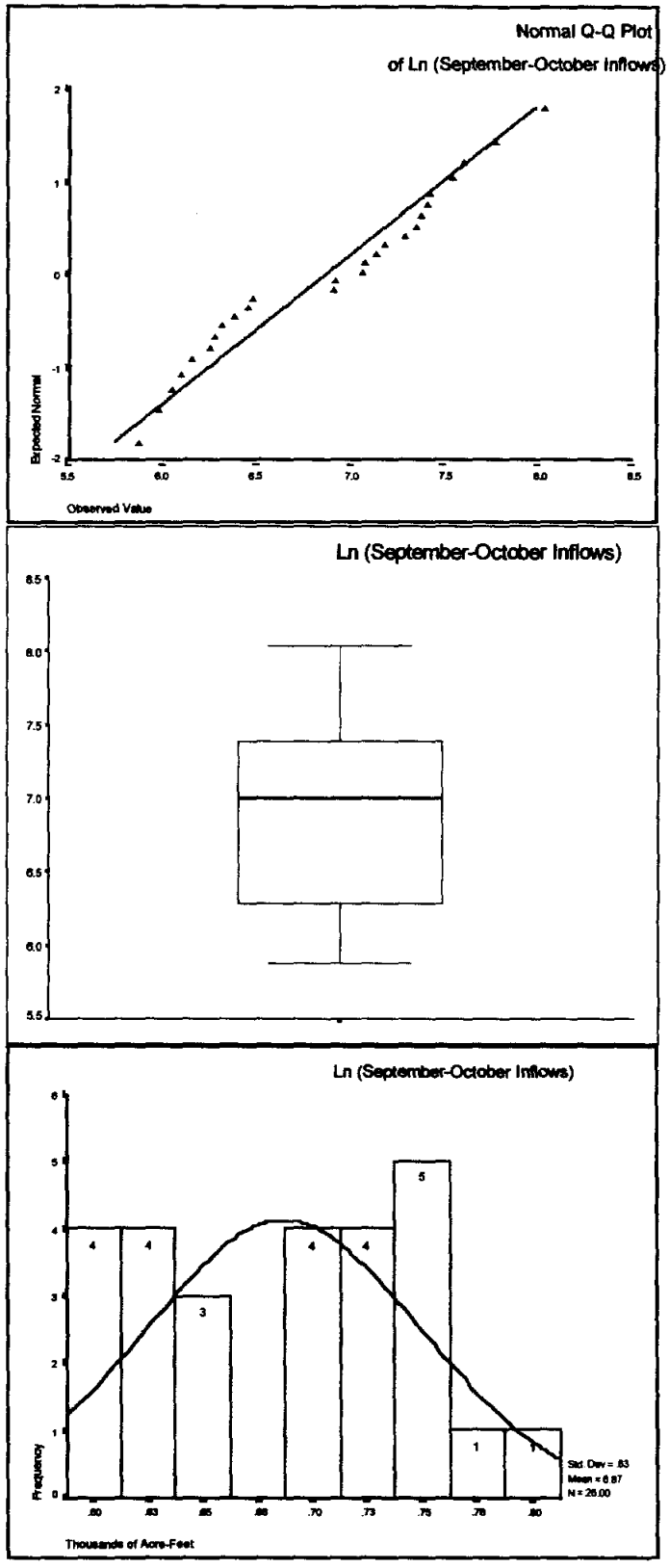


Fig. 1.6b. Exploratory Plots of Transformed September-October Inflows.

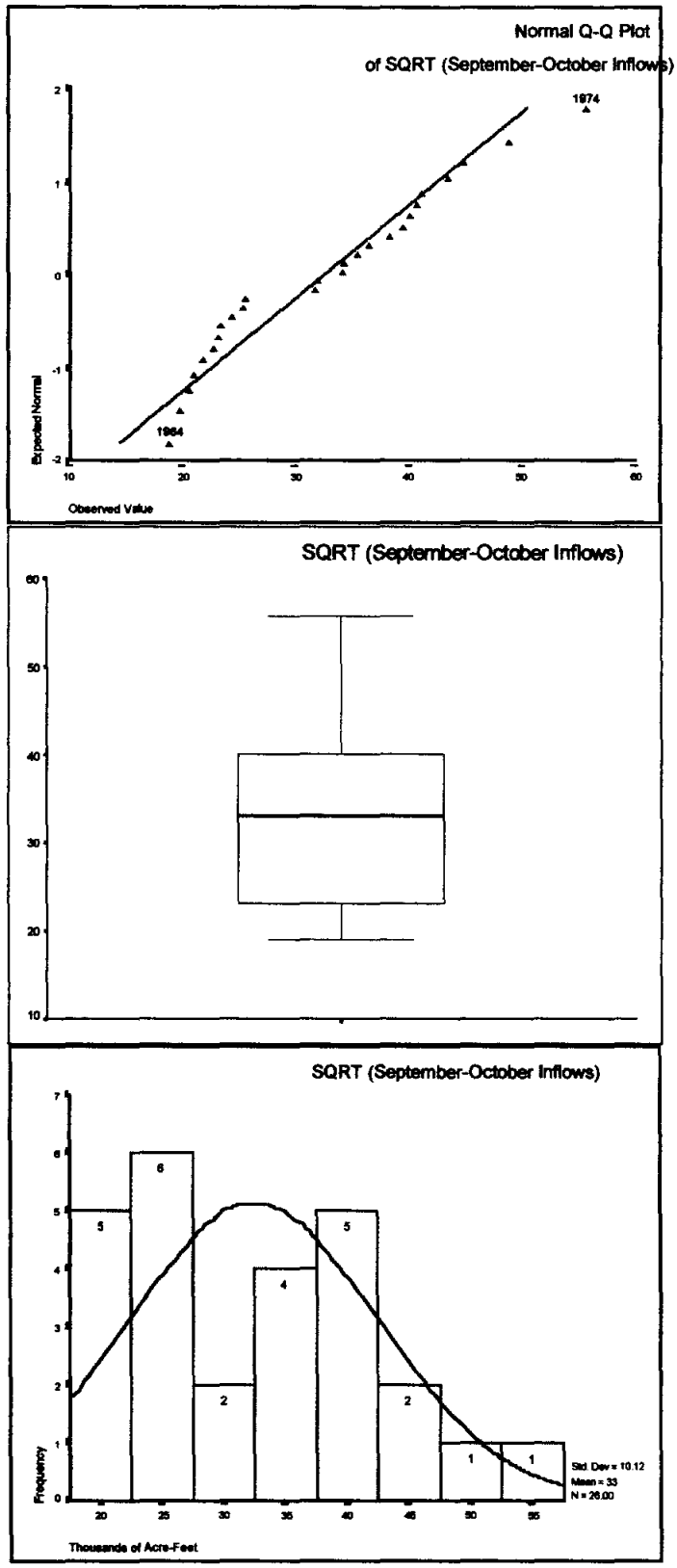


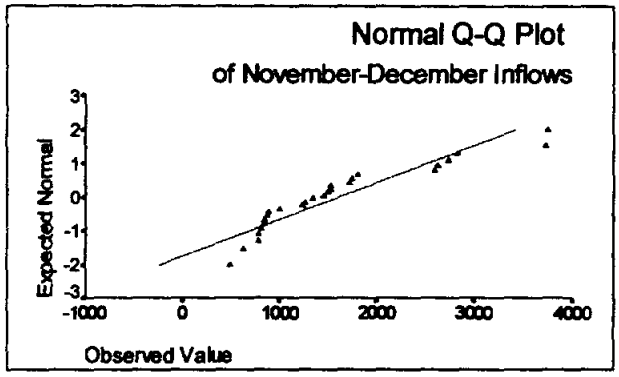
Fig. 1.6c. Exploratory Plots of Transformed September-October Inflows.

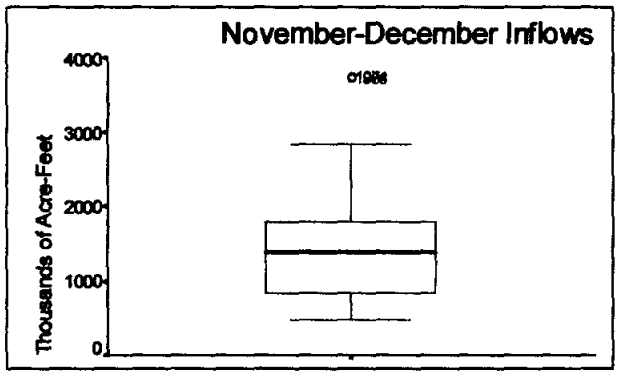
Descriptives

			Statistic	Std. Error
November-December Inflows	Mean		1588.86	180.5879
	95% Confidence Interval for Mean	Lower Bound	1216.93	
		Upper Bound	1960.79	
	5% Trimmed Mean		1527.61	
	Median		1394.51	
	Variance		847912	
	Std. Deviation		920.8213	
	Minimum		491.33	
	Maximum		3763.55	
	Range		3272.23	
	Interquartile Range		1156.72	
	Skewness		1.123	.456
	Kurtosis		.476	.887

Extreme Values

			Case Number	YEAR	Value
November-December Inflows	Highest	1	13	1974	3763.55
		2	25	1986	3736.27
		3	14	1975	2834.55
		4	24	1985	2729.59
		5	21	1982	2629.44
	Lowest	1	9	1970	491.33
		2	6	1967	628.35
		3	19	1980	781.13
		4	8	1969	782.52
		5	5	1966	812.45





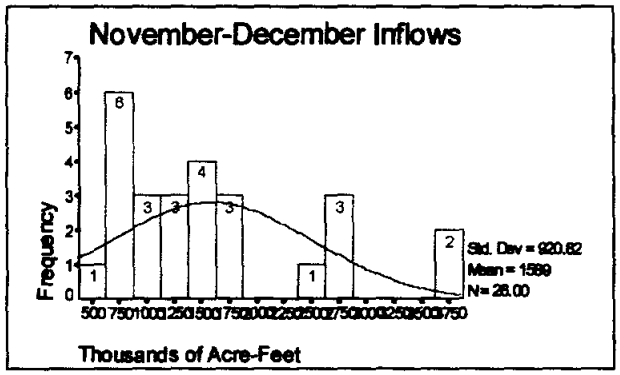


Fig. 1.7a. Exploratory Plots of November-December Inflows.

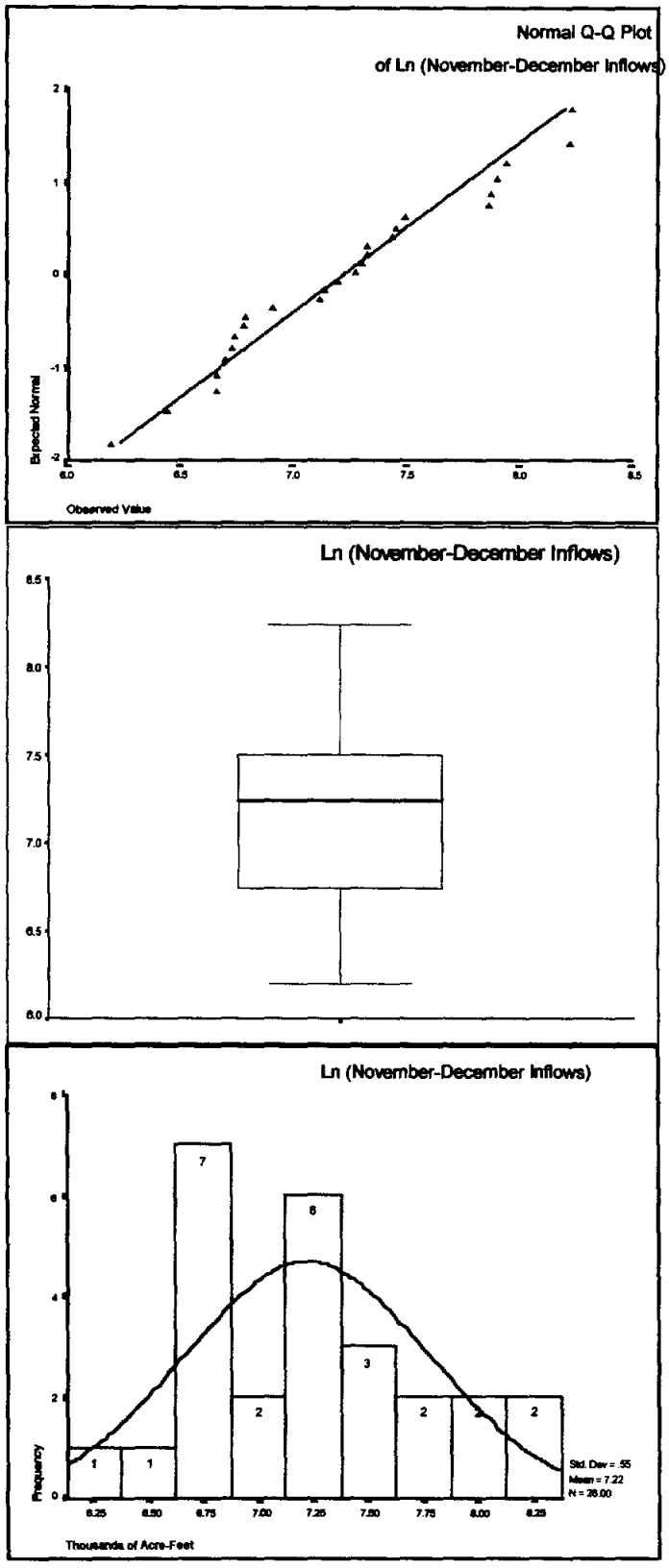


Fig. 1.7b. Exploratory Plots of Transformed November-December Inflows.

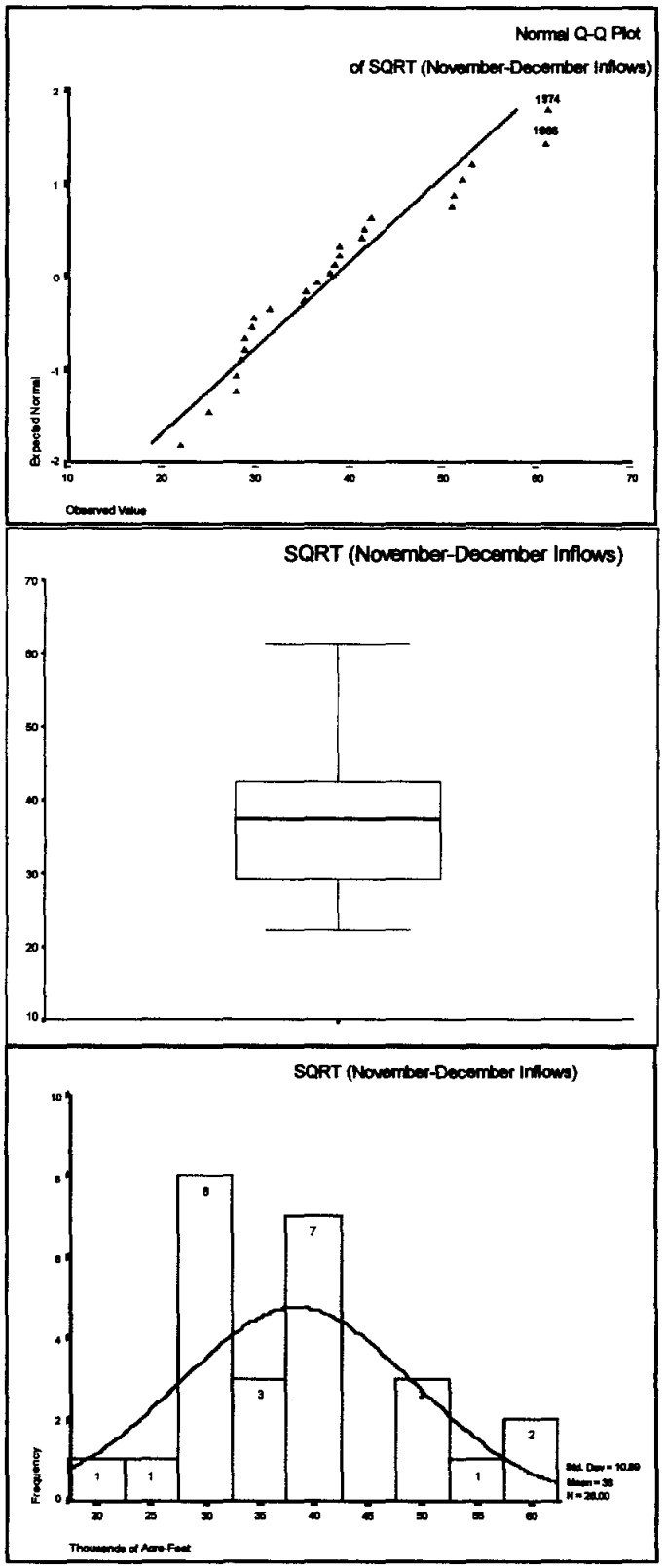


Fig. 1.7c. Exploratory Plots of Transformed November-December Inflows.

Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	CRAB	415.9150	867.3100	1322.38	1783.50	1998.93	2671.47	2937.50
	QJF_LAG	587.8903	897.5995	1159.24	1787.49	2080.80	2822.65	3140.29
	QMA_LAG	506.0215	649.7070	1054.26	1590.05	2163.14	3278.56	3570.99
	QMJ_LAG	724.3750	939.1790	1365.59	2862.90	3536.06	3928.22	4765.10
	QJA_LAG	215.9818	326.0480	445.9275	768.3225	1087.63	1739.81	2133.77
	QSO_LAG	370.7975	415.7670	532.5713	1097.12	1622.81	2131.15	2851.03
	QND_LAG	539.2820	735.2945	844.6875	1394.51	2001.40	3105.07	3754.00
	LN_QJF	6.3247	6.7993	7.0555	7.4886	7.6405	7.9450	8.0511
	LN_QMA	6.2266	6.4657	6.9606	7.3715	7.6708	8.0949	8.1799
	LN_QMJ	6.5675	6.8449	7.2188	7.9595	8.1706	8.2757	8.4630
	LN_QJA	5.3741	5.7654	6.1002	6.6432	6.9917	7.4611	7.6595
	LN_QSO	5.9145	6.0296	6.2777	6.9979	7.3918	7.6613	7.9481
	LN_QND	6.2832	6.5954	6.7390	7.2396	7.5882	8.0325	8.2306
	SQR_QJF	23.9281	29.9565	34.0476	42.2786	45.6153	53.1225	56.0248
	SQR_QMA	22.4948	25.4224	32.4693	39.8754	46.4081	57.2553	59.7471
	SQR_QMJ	26.7928	30.6451	36.9493	53.5048	59.4629	62.6714	68.9262
	SQR_QJA	14.6924	17.9630	21.1170	27.7118	32.9789	41.7063	46.1229
	SQR_QSO	19.2506	20.3876	23.0771	33.1016	40.2829	46.1280	53.2985
	SQR_QND	23.1812	27.0841	29.0634	37.3369	44.5827	55.6059	61.2698
Tukey's Hinges	CRAB			1357.80	1783.50	1982.90		
	QJF_LAG			1159.28	1787.49	2068.95		
	QMA_LAG			1056.13	1590.05	1992.32		
	QMJ_LAG			1390.30	2862.90	3503.55		
	QJA_LAG			446.0000	768.3225	1081.86		
	QSO_LAG			535.9950	1097.12	1608.58		
	QND_LAG			847.0500	1394.51	1801.08		
	LN_QJF			7.0556	7.4886	7.6348		
	LN_QMA			6.9624	7.3715	7.5971		
	LN_QMJ			7.2373	7.9595	8.1615		
	LN_QJA			6.1003	6.6432	6.9864		
	LN_QSO			6.2841	6.9979	7.3831		
	LN_QND			6.7418	7.2396	7.4961		
	SQR_QJF			34.0481	42.2786	45.4857		
	SQR_QMA			32.4982	39.8754	44.6354		
	SQR_QMJ			37.2867	53.5048	59.1908		
	SQR_QJA			21.1187	27.7118	32.8916		
	SQR_QSO			23.1516	33.1016	40.1070		
	SQR_QND			29.1041	37.3369	42.4391		

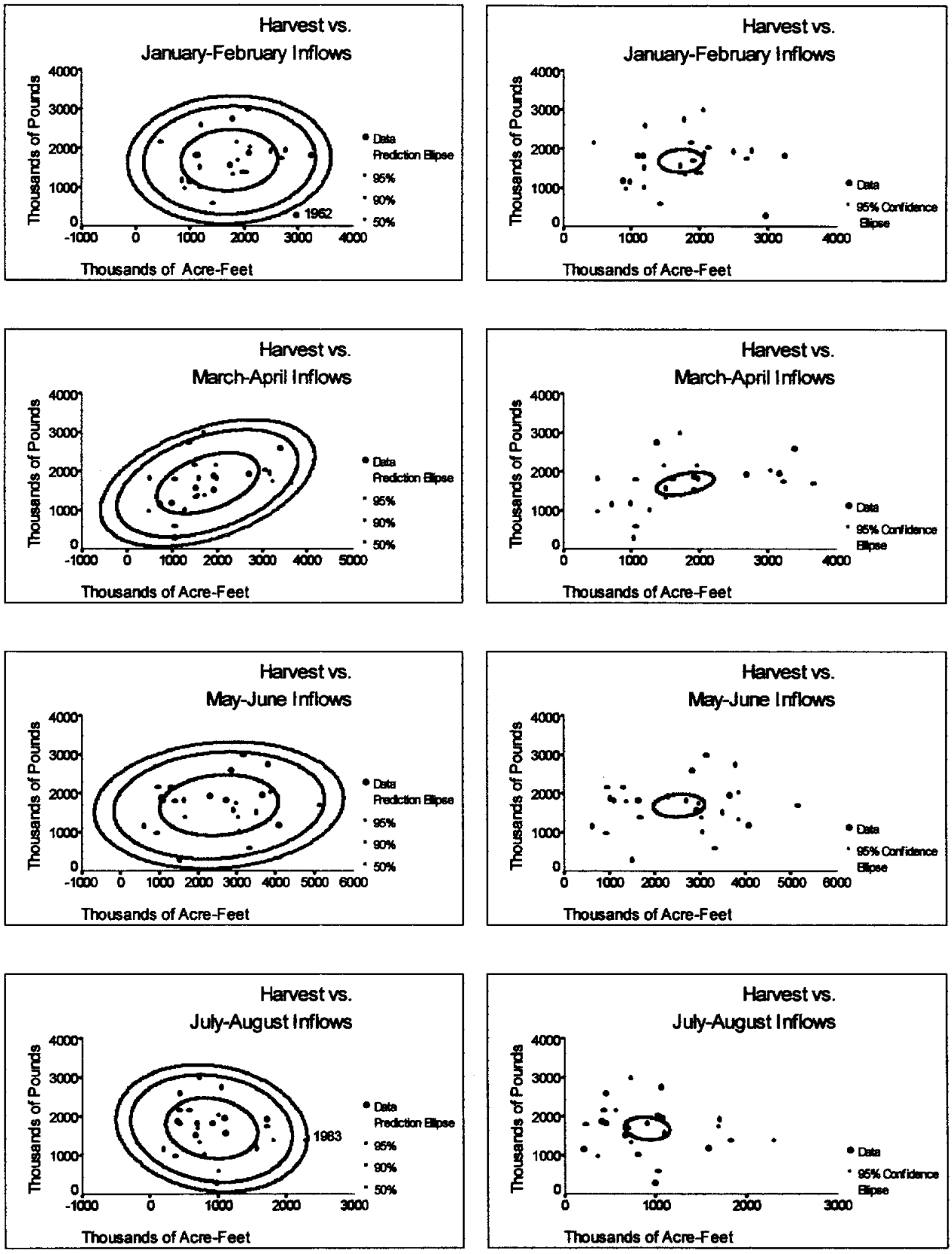


Fig. 2.1. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

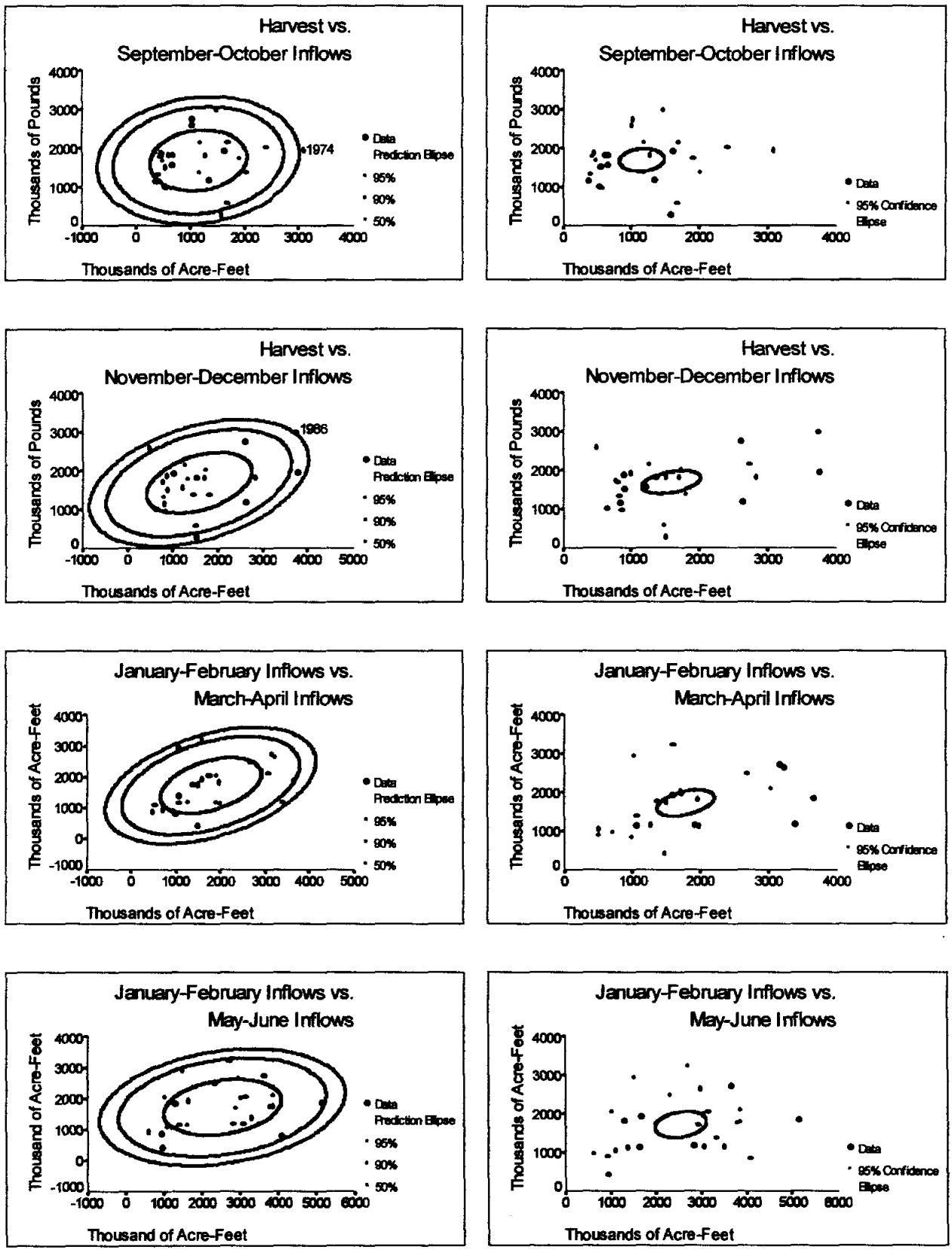


Fig. 2.2. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

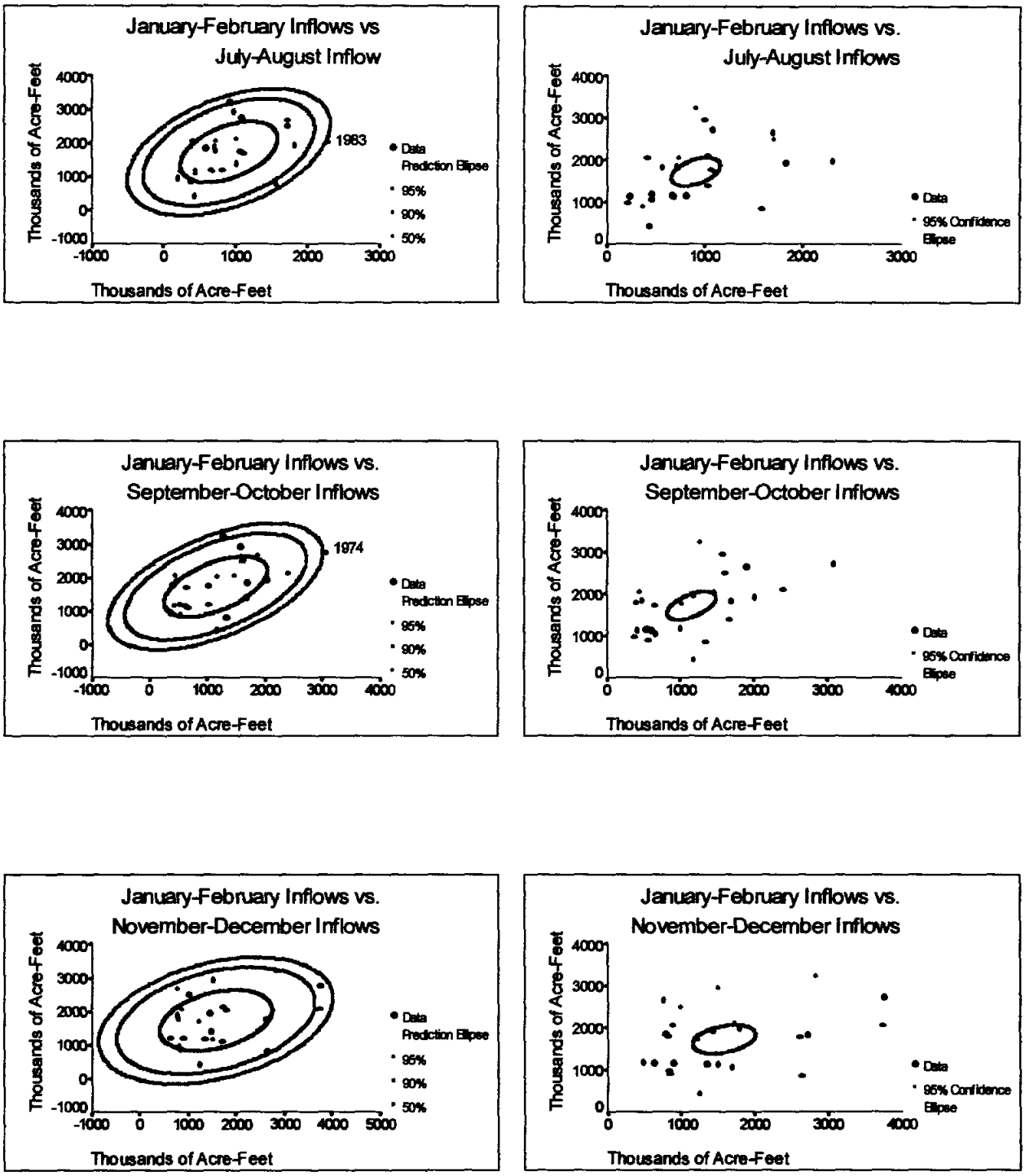


Fig. 2.3. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

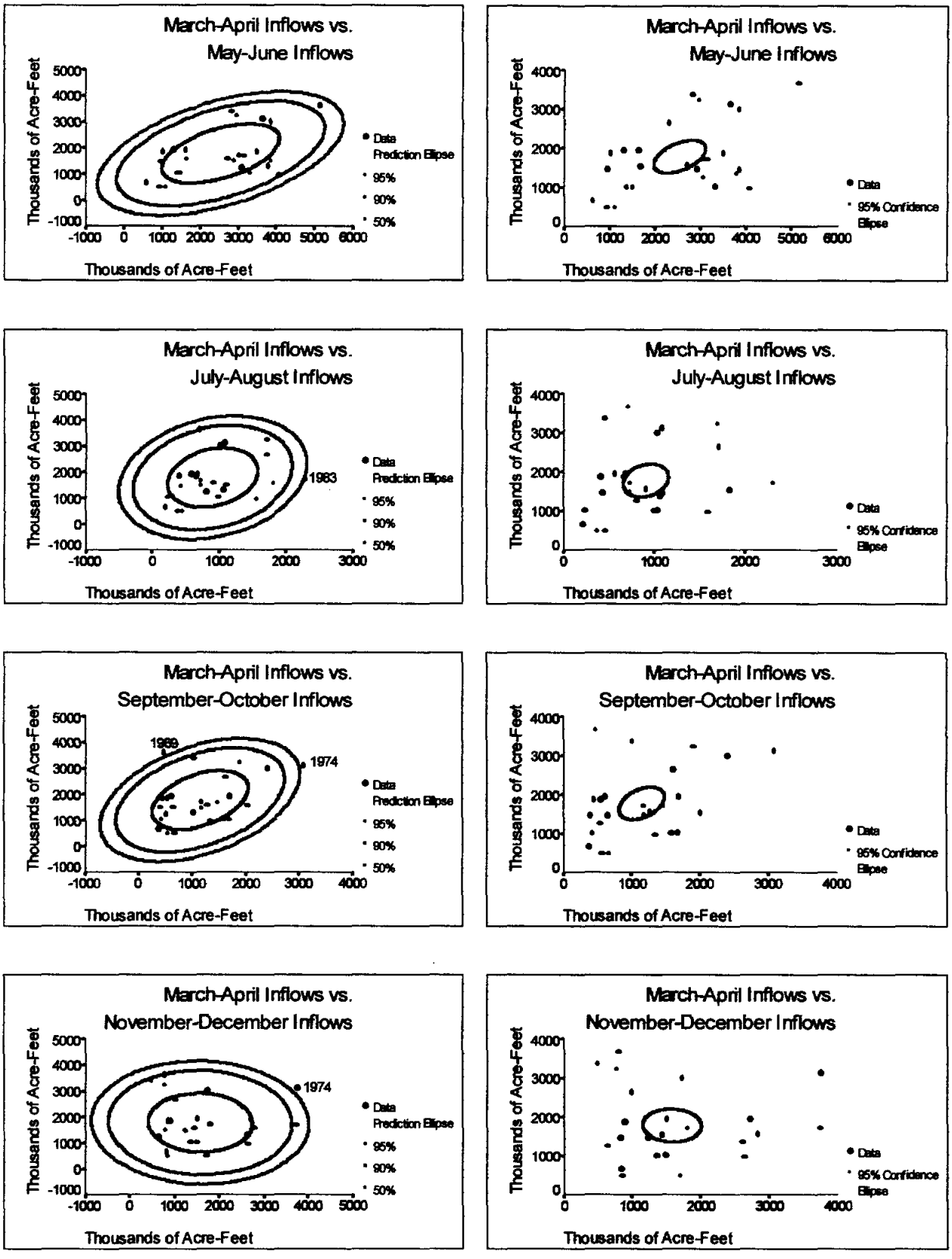


Fig. 2.4. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

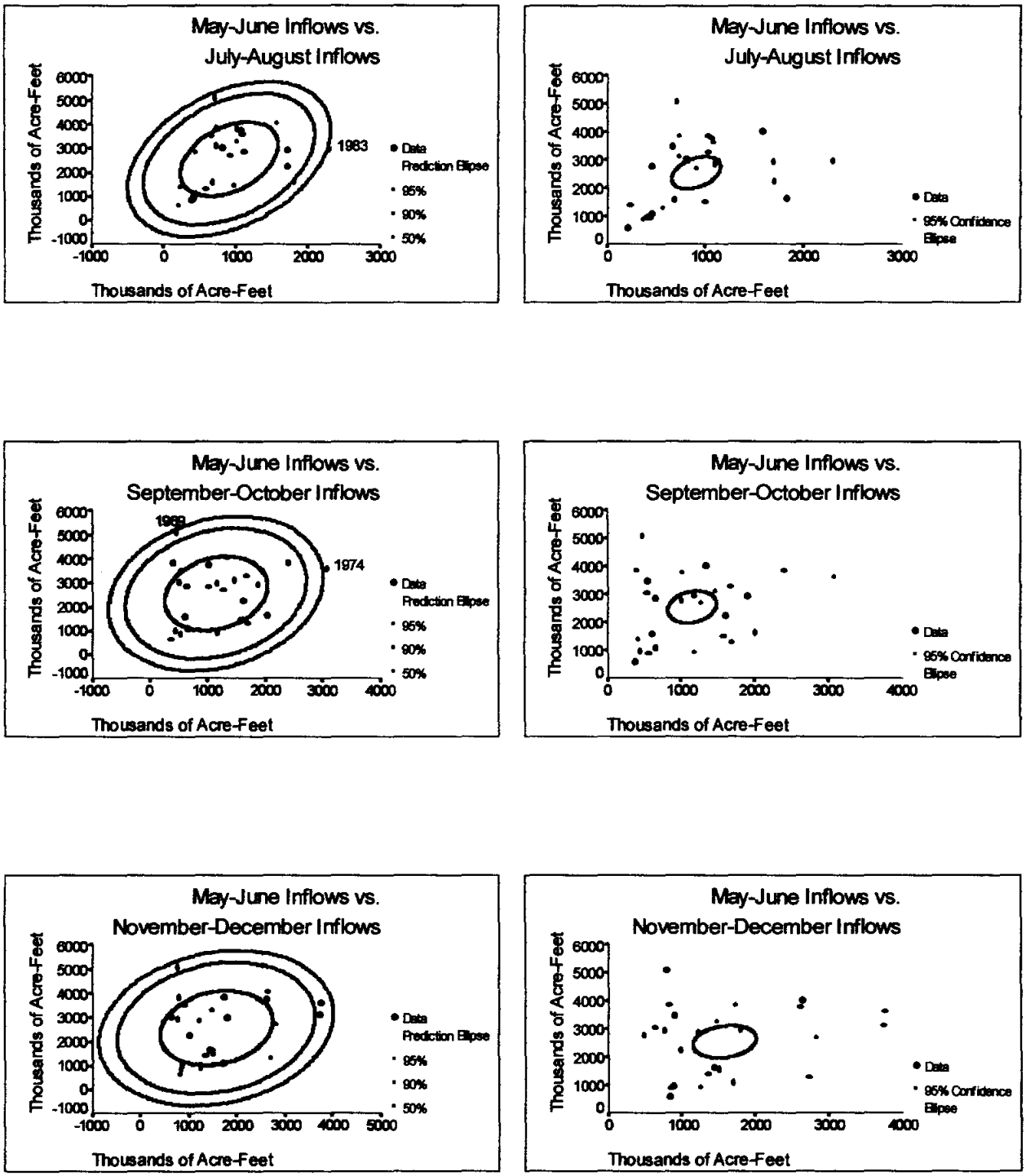
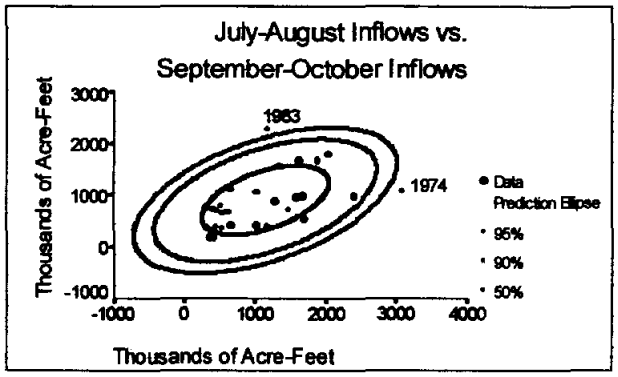
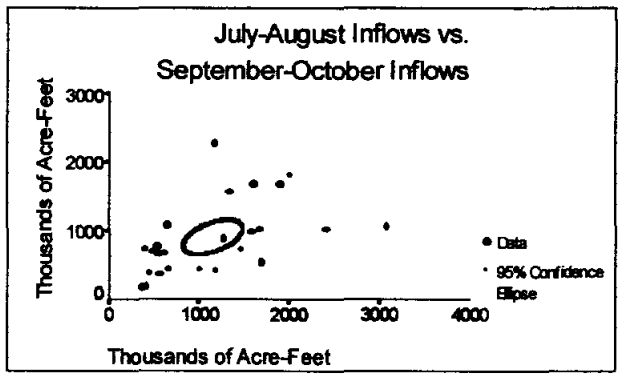
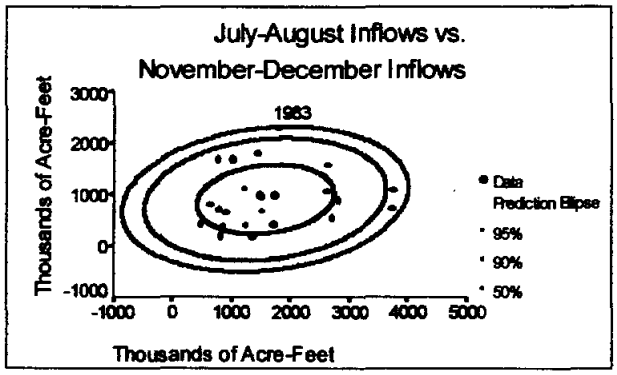


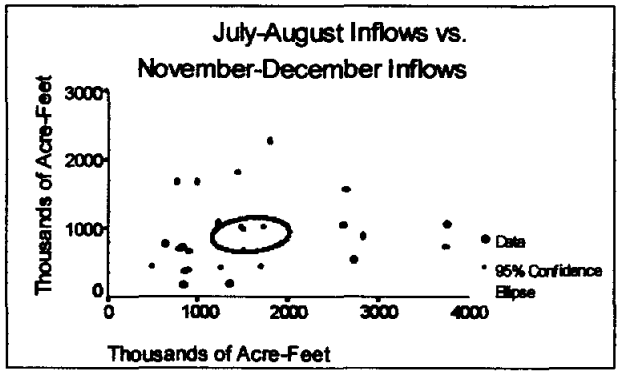
Fig. 2.5. Prediction and Confidence Ellipses.

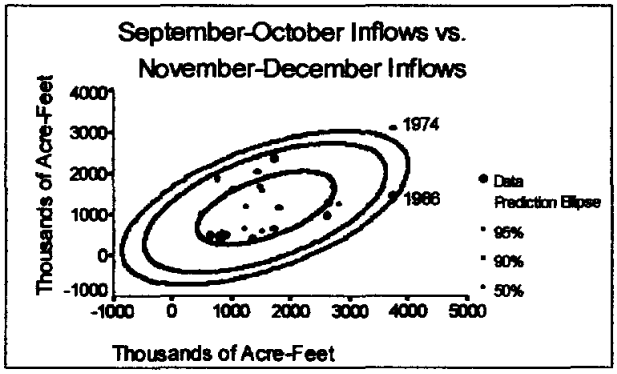
The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.











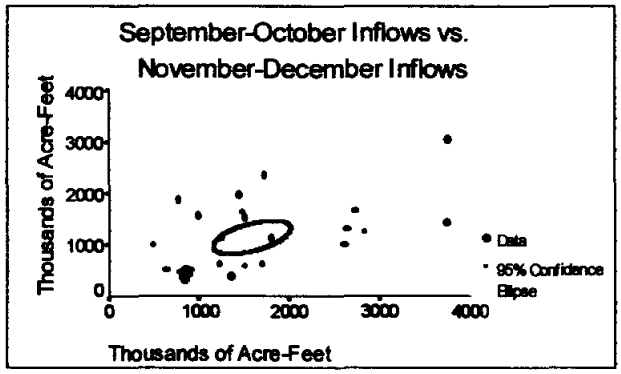


Fig. 2.6. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

Box-Cox Analysis

Numerical Results

Crab	QJF_Lag	QMA_Lag	QMJ_Lag	QJA_Lag	QSO_Lag	QND_Lag	LAMBDA
1.426623057	.367313724	.396937052	.954703085	.156784601	.097485750	.139773131	-.000200000
1.139668141	.314432682	.346935332	.830470433	.134041271	.089299500	.127389959	-.000190000
.914418790	.270436073	.304355779	.725860019	.115107263	.082073957	.116601492	-.000180000
.737132744	.233765319	.268052825	.637559595	.099316763	.075693538	.107200286	-.000170000
.597207602	.203145249	.237066226	.562845899	.086125228	.070058195	.099009140	-.000160000
.486449614	.177531418	.210590405	.499476592	.075086817	.065081327	.091876706	-.000150000
.398515351	.156067401	.187948987	.445602523	.065836107	.060687999	.085673779	-.000140000
.328484882	.138050151	.168573644	.399696435	.058073280	.056813413	.080290160	-.000130000
.272535081	.122901874	.151986502	.360494969	.051552110	.053401611	.075632013	-.000120000
.227689246	.110147175	.137785500	.326951443	.046070216	.050404363	.071619624	-.000110000
.191624957	.099394468	.125632208	.298197359	.041461142	.047780226	.068185528	-.000100000
.162526426	.090320854	.115241678	.273510995	.037587927	.045493745	.065272933	-.000090000
.138970867	.082659794	.106373987	.252291754	.034337873	.043514785	.062834399	-.000080000
.119840924	.076191070	.098827191	.234039188	.031618297	.041817968	.060830745	-.000070000
.104257077	.070732579	.092431446	.218335833	.029353072	.040382217	.059230155	-.000060000
.091525389	.066133648	.087044115	.204833144	.027479819	.039190381	.058007446	-.000050000
.081097034	.062269559	.082545685	.193239969	.025947630	.038228953	.057143493	-.000040000
.072536919	.059037077	.078836369	.183313085	.024715219	.037487852	.056624788	-.000030000
.065499290	.056350790	.075833281	.174849439	.023749437	.036960286	**.056443122**	**-.000020000**
.059708752	.054140111	.073468092	.167679768	.023024076	.036642685	.056595382	-.000010000
.054945467	.052346824	.071685091	.161663370	.022518924	**.036534701**	.057083461	**.000000000**
.051033589	.050923076	.070439588	.156683814	.022219021	.036639285	.057914265	.000010000
.047832211	.049829730	.069696610	.152645430	**.022114094**	.036962843	.059099841	**.000020000**
.045228273	.049035017	**.069429847**	.149470438	.022198143	.037515467	.060657599	**.000030000**
.043130982	.048513443	.069620811	.147096631	.022469156	.038311270	.062610658	.000040000
.041467426	.048244888	.070258181	.145475493	.022928955	.039368817	.064988308	.000050000
.040179118	**.048213886**	.071337315	.144570712	.023583139	.040711680	.067826612	**.000060000**
.039219265	.048409032	.072859905	**.144357010**	.024441146	.042369131	.071169146	**.000070000**
.038550610	.048822520	.074833770	.144819263	.025516415	.044376993	.075067919	.000080000
.038143729	.049449774	.077272767	.145951860	.026826661	.046778690	.079584469	.000090000
.037975682	.050289162	.080196816	.147758283	.028394256	.049626518	.084791182	**.000100000**
.038028946	.051341783	.083632044	.150250891	.030246747	.052983191	.090772866	.000110000
.038290576	.052611320	.087611030	.153450881	.032417499	.056923707	.097628606	.000120000
.038751549	.054103943	.092173168	.157388432	.034946510	.061537607	.105473961	.000130000
.039406244	.055828266	.097365137	.162103021	.037881386	.066931700	.114443564	.000140000
.040252053	.057795344	.103241498	.167643905	.041278544	.073233353	.124694170	.000150000
.041289075	.060018715	.109865409	.174070788	.045204646	.080594460	.136408262	.000160000
.042519901	.062514483	.117309490	.181454669	.049738324	.089196238	.149798285	.000170000
.043949461	.065301435	.125656829	.189878887	.054972241	.099255017	.165111641	.000180000
.045584923	.068401202	.135002157	.199440387	.061015560	.111029237	.182636566	.000190000
.047435649	.071838454	.145453214	.210251216	.067996885	.124827907	.202709048	.000200000

Model Choice Diagnostics

Untransformed Data

N = 26 Regression Models for Dependent Variable: CRAB

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1850	0.1510	20.84	331.7	322399	334.2	QMA_LAG
1	0.1473	0.1117	22.82	332.9	337330	335.4	QND_LAG
1	0.0210	-.0198	29.46	336.5	387271	339.0	QJA_LAG
1	0.0145	-.0266	29.80	336.6	389857	339.1	QSO_LAG
2	0.3414	0.2841	14.62	328.2	271852	331.9	QMA_LAG QND_LAG
2	0.2463	0.1808	19.62	331.7	311100	335.4	QMA_LAG QJA_LAG
2	0.2074	0.1384	21.66	333.0	327188	336.7	QJF_LAG QMA_LAG
2	0.1982	0.1285	22.14	333.3	330961	337.0	QMA_LAG QMJ_LAG
3	0.4995	0.4313	8.308	323.0	215984	328.0	QMA_LAG QSO_LAG QND_LAG
3	0.4528	0.3782	10.76	325.3	236123	330.4	QJF_LAG QMA_LAG QND_LAG
3	0.4472	0.3718	11.06	325.6	238549	330.6	QMA_LAG QJA_LAG QND_LAG
3	0.3859	0.3022	14.28	328.3	265011	333.4	QMA_LAG QMJ_LAG QND_LAG
4	0.5823	0.5028	5.954	320.3	188826	326.6	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.5545	0.4697	7.416	322.0	201398	328.3	QJF_LAG QMA_LAG QSO_LAG QND_LAG
4	0.5257	0.4353	8.931	323.6	214431	329.9	QMA_LAG QJA_LAG QSO_LAG QND_LAG
4	0.5050	0.4107	10.02	324.7	223807	331.0	QJF_LAG QMA_LAG QMJ_LAG QND_LAG
5	0.6376	0.5470	5.049	318.6	172028	326.2	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.5842	0.4802	7.858	322.2	197398	329.7	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.5648	0.4559	8.878	323.4	206609	330.9	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.5283	0.4103	10.80	325.5	223937	333.0	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
6	0.6385	0.5244	7.000	320.6	180619	329.4	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG
1	MODEL1	PARMS	CRAB	567.802	1168.89	.	0.29598
2	MODEL1	PARMS	CRAB	580.801	1291.55	.	.
3	MODEL1	PARMS	CRAB	622.311	1852.38	.	.
4	MODEL1	PARMS	CRAB	624.386	1578.09	.	.
5	MODEL1	PARMS	CRAB	521.395	735.02	.	0.30333
6	MODEL1	PARMS	CRAB	557.763	1366.51	.	0.33518
7	MODEL1	PARMS	CRAB	572.003	1331.25	-0.14327	0.34378
8	MODEL1	PARMS	CRAB	575.292	1258.79	.	0.34137
9	MODEL1	PARMS	CRAB	464.741	665.43	.	0.46853
10	MODEL1	PARMS	CRAB	485.925	971.66	-0.34845	0.42227
11	MODEL1	PARMS	CRAB	488.415	932.80	.	0.35681
12	MODEL1	PARMS	CRAB	514.792	850.15	.	0.38979
13	MODEL1	PARMS	CRAB	434.541	815.87	.	0.61055
14	MODEL1	PARMS	CRAB	448.774	849.81	-0.25442	0.52785
15	MODEL1	PARMS	CRAB	463.067	790.48	.	0.46400

OBS	QMJ_LAG	QJA_LAG	QSO_LAG	QND_LAG	CRAB	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	24
2	.	.	.	0.25681	-1	1	2	24
3	.	-0.16761	.	.	-1	1	2	24
4	.	.	0.10521	.	-1	1	2	24
5	.	.	.	0.26477	-1	2	3	23
6	.	-0.29388	.	.	-1	2	3	23
7	.	.	.	.	-1	2	3	23
8	-0.06719	.	.	.	-1	2	3	23
9	.	.	-0.48930	0.47773	-1	3	4	22
10	.	.	.	0.36135	-1	3	4	22
11	.	-0.39259	.	0.30519	-1	3	4	22
12	-0.12663	.	.	0.29792	-1	3	4	22
13	-0.17569	.	-0.55460	0.55214	-1	4	5	21
14	.	.	-0.40777	0.51276	-1	4	5	21
15	.	-0.21943	-0.38731	0.45593	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	322398.73	0.18500	0.15104	20.8393	331.691	334.207
2	337329.91	0.14725	0.11172	22.8233	332.868	335.384
3	387270.85	0.02101	-0.01979	29.4593	336.458	338.974
4	389857.46	0.01447	-0.02660	29.8030	336.631	339.147
5	271852.37	0.34141	0.28414	14.6177	328.151	331.925
6	311099.60	0.24633	0.18079	19.6155	331.657	335.431
7	327188.00	0.20735	0.13843	21.6642	332.968	336.742
8	330960.66	0.19821	0.12849	22.1446	333.266	337.040
9	215984.29	0.49951	0.43126	8.3077	323.014	328.046
10	236123.36	0.45284	0.37822	10.7607	325.331	330.364
11	238549.24	0.44722	0.37184	11.0562	325.597	330.630
12	265010.81	0.38590	0.30216	14.2793	328.332	333.365
13	188825.86	0.58233	0.50277	5.9542	320.310	326.601
14	201397.95	0.55452	0.46967	7.4160	321.986	328.277
15	214431.09	0.52569	0.43535	8.9313	323.616	329.907

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG
16	MODEL1	PARMS	CRAB	473.083	1104.71	-0.36065	0.52014
17	MODEL1	PARMS	CRAB	414.763	1000.92	-0.25502	0.67023
18	MODEL1	PARMS	CRAB	444.295	841.87	.	0.59922
19	MODEL1	PARMS	CRAB	454.542	908.36	-0.22300	0.51758
20	MODEL1	PARMS	CRAB	473.220	1134.54	-0.29264	0.50333
21	MODEL1	PARMS	CRAB	424.993	989.17	-0.26562	0.68118

OBS	QMJ_LAG	QJA_LAG	QSO_LAG	QND_LAG	CRAB	_IN_	_P_	_EDF_
16	-0.13724	.	.	0.40066	-1	4	5	21
17	-0.17597	.	-0.47297	0.58737	-1	5	6	20
18	-0.16333	-0.06420	-0.52016	0.54052	-1	5	6	20
19	.	-0.14271	-0.35151	0.49426	-1	5	6	20
20	-0.10484	-0.20939	.	0.39488	-1	5	6	20
21	-0.18523	0.04800	-0.49533	0.59752	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
16	223807.07	0.50495	0.41066	10.0214	324.729	331.020
17	172028.33	0.63760	0.54700	5.0488	318.619	326.168
18	197397.83	0.58416	0.48020	7.8580	322.196	329.744
19	206608.83	0.56476	0.45594	8.8779	323.382	330.930
20	223937.04	0.52825	0.41031	10.7967	325.476	333.024
21	180618.64	0.63853	0.52438	7.0000	320.553	329.359

Logged Inflows

N = 26 Regression Models for Dependent Variable: CRAB

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.2045	0.1714	9.527	331.1	314668	333.6	LN_QMA
1	0.0802	0.0419	14.46	334.8	363863	337.4	LN_QND
1	0.0237	-.0170	16.70	336.4	386212	338.9	LN_QSO
1	0.0186	-.0222	16.89	336.5	388203	339.0	LN_QMJ
2	0.2996	0.2387	7.758	329.7	289090	333.5	LN_QMA LN_QND
2	0.2945	0.2331	7.962	329.9	291218	333.7	LN_QMA LN_QJA
2	0.2374	0.1711	10.23	332.0	314790	335.7	LN_QJF LN_QMA
2	0.2223	0.1547	10.82	332.5	320999	336.2	LN_QMA LN_QMJ
3	0.4861	0.4160	2.367	323.7	221765	328.7	LN_QMA LN_QJA LN_QND
3	0.3919	0.3089	6.103	328.1	262440	333.1	LN_QJF LN_QMA LN_QND
3	0.3753	0.2902	6.757	328.8	269564	333.8	LN_QMA LN_QSO LN_QND
3	0.3414	0.2516	8.104	330.2	284221	335.2	LN_QMA LN_QMJ LN_QND
4	0.5133	0.4206	3.289	324.3	220028	330.6	LN_QJF LN_QMA LN_QJA LN_QND
4	0.4914	0.3945	4.158	325.4	229934	331.7	LN_QMA LN_QJA LN_QSO LN_QND
4	0.4865	0.3887	4.351	325.7	232132	332.0	LN_QMA LN_QMJ LN_QJA LN_QND
4	0.4491	0.3442	5.833	327.5	249043	333.8	LN_QJF LN_QMA LN_QSO LN_QND
5	0.5200	0.4000	5.023	325.9	227843	333.5	LN_QJF LN_QMA LN_QJA LN_QSO LN_QND
5	0.5134	0.3918	5.285	326.3	230982	333.8	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND
5	0.4915	0.3643	6.155	327.4	241398	335.0	LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND
5	0.4819	0.3524	6.534	327.9	245932	335.5	LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND
6	0.5206	0.3692	7.000	327.9	239541	336.7	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA
1	MODEL1	PARMS	CRAB	560.953	-2122.84	.	519.12
2	MODEL1	PARMS	CRAB	603.211	-584.38	.	.
3	MODEL1	PARMS	CRAB	621.459	663.55	.	.
4	MODEL1	PARMS	CRAB	623.060	566.70	.	.
5	MODEL1	PARMS	CRAB	537.671	-4757.12	.	538.54
6	MODEL1	PARMS	CRAB	539.646	-1028.02	.	663.35
7	MODEL1	PARMS	CRAB	561.062	-904.70	-276.837	630.61
8	MODEL1	PARMS	CRAB	566.568	-1538.82	.	619.62
9	MODEL1	PARMS	CRAB	470.919	-4425.22	.	769.51
10	MODEL1	PARMS	CRAB	512.289	-3521.77	-492.966	743.95
11	MODEL1	PARMS	CRAB	519.196	-5313.80	.	720.10
12	MODEL1	PARMS	CRAB	533.124	-4224.66	.	698.89
13	MODEL1	PARMS	CRAB	469.071	-3757.00	-285.225	855.97
14	MODEL1	PARMS	CRAB	479.514	-4625.52	.	802.69
15	MODEL1	PARMS	CRAB	481.801	-4478.44	.	757.24

OBS	LN_QMJ	LN_QJA	LN_QSO	LN_QND	CRAB	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	24
2	.	.	.	316.248	-1	1	2	24
3	.	.	150.840	.	-1	1	2	24
4	147.015	.	.	.	-1	1	2	24
5	.	.	.	344.954	-1	2	3	23
6	.	-324.597	.	.	-1	2	3	23
7	.	.	.	.	-1	2	3	23
8	-171.825	.	.	.	-1	2	3	23
9	.	-497.480	.	521.213	-1	3	4	22
10	.	.	.	467.233	-1	3	4	22
11	.	.	-375.089	593.639	-1	3	4	22
12	-269.316	.	.	395.097	-1	3	4	22
13	.	-427.715	.	567.245	-1	4	5	21
14	.	-450.335	-113.767	579.938	-1	4	5	21
15	31.727	-511.734	.	520.357	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	314667.94	0.20454	0.17140	9.5271	331.060	333.576
2	363863.02	0.08018	0.04185	14.4561	334.837	337.353
3	386211.75	0.02368	-0.01700	16.6952	336.387	338.903
4	388203.45	0.01865	-0.02224	16.8948	336.520	339.036
5	289090.47	0.29965	0.23875	7.7576	329.749	333.523
6	291217.68	0.29450	0.23315	7.9619	329.940	333.714
7	314790.45	0.23739	0.17107	10.2253	331.964	335.738
8	320999.35	0.22235	0.15472	10.8214	332.471	336.246
9	221764.53	0.48611	0.41604	2.3674	323.700	328.733
10	262440.45	0.39185	0.30892	6.1032	328.079	333.111
11	269563.98	0.37535	0.29017	6.7574	328.775	333.808
12	284221.28	0.34138	0.25157	8.1036	330.152	335.184
13	220027.80	0.51331	0.42061	3.2893	324.286	330.577
14	229933.50	0.49140	0.39452	4.1578	325.431	331.722
15	232132.11	0.48654	0.38873	4.3505	325.679	331.969

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA
16	MODEL1	PARMS	CRAB	499.042	-4131.44	-444.410	882.89
17	MODEL1	PARMS	CRAB	477.329	-3964.68	-293.032	895.77
18	MODEL1	PARMS	CRAB	480.606	-3785.36	-284.104	849.70
19	MODEL1	PARMS	CRAB	491.322	-4611.96	.	809.64
20	MODEL1	PARMS	CRAB	495.915	-3773.32	-405.316	1016.68
21	MODEL1	PARMS	CRAB	489.429	-3915.89	-296.991	917.45

OBS	LN_QMJ	LN_QJA	LN_QSO	LN_QND	CRAB	_IN_	_P_	_EDF_
16	.	.	-328.810	673.191	-1	4	5	21
17	.	-372.617	-128.351	634.757	-1	5	6	20
18	15.343	-434.882	.	566.650	-1	5	6	20
19	-13.825	-441.857	-119.238	583.135	-1	5	6	20
20	-240.958	.	-342.487	717.424	-1	5	6	20
21	-40.655	-346.635	-144.636	644.900	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
16	249043.34	0.44913	0.34420	5.8331	327.507	333.797
17	227843.10	0.52002	0.40003	5.0233	325.925	333.474
18	230982.09	0.51341	0.39176	5.2854	326.281	333.830
19	241397.58	0.49147	0.36434	6.1550	327.428	334.976
20	245931.79	0.48192	0.35240	6.5336	327.912	335.460
21	239540.70	0.52061	0.36923	7.0000	327.893	336.700

Squared Root Inflows

N = 26 Regression Models for Dependent Variable: CRAB

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.2015	0.1683	15.17	331.2	315858	333.7	SQR_QMA
1	0.1156	0.0788	19.16	333.8	349844	336.3	SQR_QND
1	0.0184	-.0224	23.69	336.5	388282	339.0	SQR_QSO
1	0.0168	-.0242	23.77	336.6	388945	339.1	SQR_QJA
2	0.3315	0.2734	11.11	328.5	275931	332.3	SQR_QMA SQR_QND
2	0.2794	0.2167	13.54	330.5	297451	334.3	SQR_QMA SQR_QJA
2	0.2309	0.1640	15.80	332.2	317474	336.0	SQR_QJF SQR_QMA
2	0.2170	0.1490	16.44	332.6	323186	336.4	SQR_QMA SQR_QMJ
3	0.4846	0.4143	5.989	323.8	222413	328.8	SQR_QMA SQR_QJA SQR_QND
3	0.4588	0.3850	7.189	325.0	233534	330.1	SQR_QMA SQR_QSO SQR_QND
3	0.4434	0.3675	7.908	325.8	240197	330.8	SQR_QJF SQR_QMA SQR_QND
3	0.3764	0.2914	11.02	328.7	269099	333.8	SQR_QMA SQR_QMJ SQR_QND
4	0.5293	0.4397	5.907	323.4	212780	329.7	SQR_QJF SQR_QMA SQR_QSO SQR_QND
4	0.5272	0.4372	6.005	323.5	213731	329.8	SQR_QJF SQR_QMA SQR_QJA SQR_QND
4	0.5258	0.4354	6.074	323.6	214399	329.9	SQR_QMA SQR_QMJ SQR_QSO SQR_QND
4	0.5213	0.4301	6.284	323.9	216438	330.1	SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.5889	0.4862	5.133	321.9	195128	329.4	SQR_QJF SQR_QMA SQR_QMJ SQR_QSO SQR_QND
5	0.5607	0.4509	6.447	323.6	208529	331.2	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.5433	0.4292	7.256	324.6	216777	332.2	SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.5352	0.4190	7.634	325.1	220636	332.6	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QND
6	0.5918	0.4629	7.000	323.7	203968	332.5	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA
1	MODEL1	PARMS	CRAB	562.012	623.25	.	26.2136
2	MODEL1	PARMS	CRAB	591.476	960.84	.	.
3	MODEL1	PARMS	CRAB	623.123	1430.72	.	.
4	MODEL1	PARMS	CRAB	623.655	1967.41	.	.
5	MODEL1	PARMS	CRAB	525.292	-199.73	.	27.1599
6	MODEL1	PARMS	CRAB	545.391	1015.67	.	31.4077
7	MODEL1	PARMS	CRAB	563.448	964.42	-13.6228	31.4149
8	MODEL1	PARMS	CRAB	568.494	785.47	.	30.6142
9	MODEL1	PARMS	CRAB	471.606	120.71	.	35.0142
10	MODEL1	PARMS	CRAB	483.254	-353.01	.	39.6528
11	MODEL1	PARMS	CRAB	490.099	205.33	-28.7775	38.5103
12	MODEL1	PARMS	CRAB	518.748	-29.05	.	34.9753
13	MODEL1	PARMS	CRAB	461.281	0.35	-23.3658	46.8741
14	MODEL1	PARMS	CRAB	462.310	323.16	-19.0666	40.9189
15	MODEL1	PARMS	CRAB	463.033	-157.02	.	50.4162

OBS	SQR_QMJ	SQR_QJA	SQR_QSO	SQR_QND	CRAB	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	24
2	.	.	.	19.2366	-1	1	2	24
3	.	.	8.2728	.	-1	1	2	24
4	.	-9.2416	.	.	-1	1	2	24
5	.	.	.	20.4182	-1	2	3	23
6	.	-20.8995	.	.	-1	2	3	23
7	.	.	.	.	-1	2	3	23
8	-7.0117	.	.	.	-1	2	3	23
9	.	-30.4414	.	26.6494	-1	3	4	22
10	.	.	-30.6530	36.9937	-1	3	4	22
11	.	.	.	28.2496	-1	3	4	22
12	-12.2462	.	.	23.2134	-1	3	4	22
13	.	.	-25.7588	40.7058	-1	4	5	21
14	.	-24.1797	.	30.5564	-1	4	5	21
15	-15.0706	.	-33.4635	41.9533	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	315857.65	0.20153	0.16826	15.1655	331.158	333.674
2	349843.94	0.11562	0.07877	19.1645	333.815	336.331
3	388281.77	0.01845	-0.02245	23.6873	336.526	339.042
4	388945.49	0.01677	-0.02420	23.7654	336.570	339.086
5	275931.29	0.33153	0.27340	11.1147	328.538	332.312
6	297451.21	0.27939	0.21673	13.5414	330.490	334.265
7	317473.60	0.23089	0.16401	15.7991	332.184	335.959
8	323185.63	0.21705	0.14897	16.4432	332.648	336.422
9	222412.62	0.48461	0.41433	5.9894	323.776	328.809
10	233534.33	0.45884	0.38504	7.1890	325.045	330.077
11	240197.32	0.44340	0.36750	7.9076	325.776	330.809
12	269099.01	0.37642	0.29139	11.0250	328.730	333.763
13	212780.22	0.52934	0.43969	5.9072	323.415	329.706
14	213730.60	0.52724	0.43719	6.0051	323.531	329.822
15	214399.24	0.52576	0.43543	6.0739	323.613	329.903

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA
16	MODEL1	PARMS	CRAB	465.229	-59.90	.	40.5483
17	MODEL1	PARMS	CRAB	441.733	167.26	-22.1538	56.6729
18	MODEL1	PARMS	CRAB	456.649	142.89	-18.3597	45.9937
19	MODEL1	PARMS	CRAB	465.593	-36.44	.	47.5143
20	MODEL1	PARMS	CRAB	469.719	382.23	-20.2104	44.1093
21	MODEL1	PARMS	CRAB	451.629	194.92	-20.5268	54.9748

OBS	SQR_QMJ	SQR_QJA	SQR_QSO	SQR_QND	CRAB	_IN_	_P_	_EDF_
16	.	-22.2094	-18.7899	35.1250	-1	4	5	21
17	-14.2445	.	-28.6691	45.2010	-1	5	6	20
18	.	-16.5373	-17.9741	38.5190	-1	5	6	20
19	-10.2218	-13.9150	-25.1266	39.1868	-1	5	6	20
20	-5.6850	-20.7351	.	31.4601	-1	5	6	20
21	-12.2356	-5.9393	-25.4628	43.7817	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
16	216437.83	0.52125	0.43006	6.2838	323.859	330.149
17	195127.98	0.58894	0.48618	5.1332	321.895	329.444
18	208528.53	0.56071	0.45089	6.4471	323.622	331.171
19	216777.28	0.54333	0.42917	7.2560	324.631	332.179
20	220635.69	0.53521	0.41901	7.6343	325.090	332.638
21	203968.41	0.59180	0.46290	7.0000	323.714	332.520

Logged and Squared Root Inflows

N = 26 Regression Models for Dependent Variable: CRAB

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.2015	0.1683	10.89	331.2	315858	333.7	SQR_QMA
1	0.0802	0.0419	15.89	334.8	363863	337.4	LN_QND
1	0.0237	-.0170	18.22	336.4	386212	338.9	LN_QSO
1	0.0158	-.0252	18.54	336.6	389319	339.1	SQR_QMJ
2	0.3102	0.2502	8.413	329.4	284735	333.1	SQR_QMA LN_QND
2	0.2761	0.2132	9.817	330.6	298799	334.4	SQR_QMA LN_QJA
2	0.2309	0.1640	11.68	332.2	317474	336.0	SQR_QJF SQR_QMA
2	0.2170	0.1490	12.25	332.6	323186	336.4	SQR_QMA SQR_QMJ
3	0.4831	0.4126	3.291	323.9	223059	328.9	SQR_QMA LN_QJA LN_QND
3	0.4172	0.3377	6.006	327.0	251508	332.0	SQR_QJF SQR_QMA LN_QND
3	0.3987	0.3167	6.770	327.8	259505	332.8	SQR_QMA LN_QSO LN_QND
3	0.3496	0.2609	8.792	329.8	280693	334.9	SQR_QMA SQR_QMJ LN_QND
4	0.5196	0.4280	3.790	324.0	217206	330.2	SQR_QJF SQR_QMA LN_QJA LN_QND
4	0.4939	0.3975	4.845	325.3	228786	331.6	SQR_QMA LN_QJA LN_QSO LN_QND
4	0.4831	0.3847	5.291	325.9	233679	332.1	SQR_QMA SQR_QMJ LN_QJA LN_QND
4	0.4771	0.3775	5.540	326.2	236412	332.4	SQR_QJF SQR_QMA LN_QSO LN_QND
5	0.5307	0.4133	5.332	325.3	222786	332.9	SQR_QJF SQR_QMA LN_QJA LN_QSO LN_QND
5	0.5229	0.4036	5.652	325.8	226471	333.3	SQR_QJF SQR_QMA SQR_QMJ LN_QSO LN_QND
5	0.5207	0.4009	5.743	325.9	227520	333.4	SQR_QJF SQR_QMA SQR_QMJ LN_QJA LN_QND
5	0.4967	0.3708	6.733	327.2	238936	334.7	SQR_QMA SQR_QMJ LN_QJA LN_QSO LN_QND
6	0.5387	0.3931	7.000	326.9	230486	335.7	SQR_QJF SQR_QMA SQR_QMJ LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA
1	MODEL1	PARMS	CRAB	562.012	623.25	.	26.2136
2	MODEL1	PARMS	CRAB	603.211	-584.38	.	.
3	MODEL1	PARMS	CRAB	621.459	663.55	.	.
4	MODEL1	PARMS	CRAB	623.955	1403.27	.	.
5	MODEL1	PARMS	CRAB	533.605	-2128.42	.	28.1460
6	MODEL1	PARMS	CRAB	546.625	2312.61	.	32.0618
7	MODEL1	PARMS	CRAB	563.448	964.42	-13.6228	31.4149
8	MODEL1	PARMS	CRAB	568.494	785.47	.	30.6142
9	MODEL1	PARMS	CRAB	472.291	-686.21	.	38.5761
10	MODEL1	PARMS	CRAB	501.505	-2586.24	-28.2799	39.7623
11	MODEL1	PARMS	CRAB	509.417	-1777.30	.	38.7406
12	MODEL1	PARMS	CRAB	529.804	-2220.64	.	35.5654
13	MODEL1	PARMS	CRAB	466.054	-1226.16	-17.6755	44.0010
14	MODEL1	PARMS	CRAB	478.316	-751.93	.	41.3512
15	MODEL1	PARMS	CRAB	483.404	-690.39	.	38.6267

OBS	SQR_QMJ	LN_QJA	LN_QSO	LN_QND	CRAB	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	24
2	.	.	.	316.248	-1	1	2	24
3	.	.	150.840	.	-1	1	2	24
4	6.0587	.	.	.	-1	1	2	24
5	.	.	.	370.023	-1	2	3	23
6	.	-290.383	.	.	-1	2	3	23
7	.	.	.	.	-1	2	3	23
8	-7.0117	.	.	.	-1	2	3	23
9	.	-472.355	.	545.618	-1	3	4	22
10	.	.	.	526.825	-1	3	4	22
11	.	.	-411.353	652.378	-1	3	4	22
12	-11.4228	.	.	417.962	-1	3	4	22
13	.	-389.228	.	612.721	-1	4	5	21
14	.	-404.427	-165.983	634.298	-1	4	5	21
15	-0.1142	-471.288	.	545.701	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	315857.65	0.20153	0.16826	10.8895	331.158	333.674
2	363863.02	0.08018	0.04185	15.8882	334.837	337.353
3	386211.75	0.02368	-0.01700	18.2153	336.387	338.903
4	389319.39	0.01583	-0.02518	18.5389	336.595	339.111
5	284734.60	0.31020	0.25022	8.4134	329.354	333.129
6	298798.88	0.27613	0.21318	9.8168	330.608	334.382
7	317473.60	0.23089	0.16401	11.6804	332.184	335.959
8	323185.63	0.21705	0.14897	12.2504	332.648	336.422
9	223058.51	0.48311	0.41263	3.2910	323.852	328.884
10	251507.56	0.41719	0.33771	6.0065	326.973	332.005
11	259505.31	0.39866	0.31665	6.7699	327.786	332.819
12	280692.73	0.34956	0.26086	8.7922	329.827	334.859
13	217206.24	0.51955	0.42804	3.7900	323.951	330.241
14	228786.00	0.49394	0.39755	4.8451	325.301	331.592
15	233678.96	0.48312	0.38466	5.2909	325.851	332.142

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA
16	MODEL1	PARMS	CRAB	486.222	-2233.03	-24.5786	47.0915
17	MODEL1	PARMS	CRAB	472.002	-1295.01	-17.7484	46.8366
18	MODEL1	PARMS	CRAB	475.889	-2291.23	-23.6319	55.5595
19	MODEL1	PARMS	CRAB	476.991	-1324.62	-18.2048	45.1605
20	MODEL1	PARMS	CRAB	488.811	-906.15	.	43.6976
21	MODEL1	PARMS	CRAB	480.090	-1614.14	-19.3393	51.4429

OBS	SQR_QMJ	LN_QJA	LN_QSO	LN_QND	CRAB	_IN_	_P_	_EDF_
16	.	.	-343.598	742.150	-1	4	5	21
17	.	-320.023	-168.265	702.897	-1	5	6	20
18	-12.4008	.	-374.746	810.326	-1	5	6	20
19	-2.2490	-365.735	.	616.360	-1	5	6	20
20	-3.7813	-352.709	-206.063	658.453	-1	5	6	20
21	-6.6310	-221.765	-238.754	751.404	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
16	236411.82	0.47707	0.37747	5.5399	326.154	332.444
17	222785.52	0.53068	0.41335	5.3318	325.342	332.890
18	226470.72	0.52291	0.40364	5.6515	325.768	333.317
19	227520.12	0.52070	0.40088	5.7426	325.888	333.437
20	238936.42	0.49665	0.37082	6.7332	327.161	334.710
21	230486.45	0.53873	0.39307	7.0000	326.892	335.698

Logged Harvest and Inflows

N = 26 Regression Models for Dependent Variable: LN_CRAB

In	Rsq	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.1983	0.1649	8.863	-41.42	0.1888	-38.91	LN_QMA
1	0.0345	-.0058	15.17	-36.59	0.2274	-34.07	LN_QND
1	0.0162	-.0247	15.87	-36.10	0.2317	-33.59	LN_QMJ
1	0.0108	-.0305	16.08	-35.96	0.2330	-33.44	LN_QJA
2	0.2877	0.2258	7.421	-42.50	0.1751	-38.72	LN_QMA LN_QJA
2	0.2726	0.2093	8.004	-41.95	0.1788	-38.18	LN_QJF LN_QMA
2	0.2425	0.1767	9.160	-40.90	0.1862	-37.12	LN_QMA LN_QND
2	0.2197	0.1518	10.04	-40.12	0.1918	-36.35	LN_QMA LN_QSO
3	0.3986	0.3166	5.152	-44.90	0.1545	-39.86	LN_QMA LN_QJA LN_QND
3	0.3760	0.2909	6.022	-43.94	0.1603	-38.91	LN_QJF LN_QMA LN_QND
3	0.3706	0.2848	6.231	-43.71	0.1617	-38.68	LN_QMA LN_QSO LN_QND
3	0.3139	0.2203	8.415	-41.47	0.1763	-36.44	LN_QJF LN_QMA LN_QJA
4	0.4752	0.3752	4.203	-46.44	0.1413	-40.15	LN_QJF LN_QMA LN_QSO LN_QND
4	0.4582	0.3550	4.858	-45.61	0.1458	-39.32	LN_QJF LN_QMA LN_QJA LN_QND
4	0.4341	0.3263	5.787	-44.48	0.1523	-38.19	LN_QMA LN_QJA LN_QSO LN_QND
4	0.4119	0.2998	6.642	-43.48	0.1583	-37.19	LN_QMA LN_QMJ LN_QSO LN_QND
5	0.5015	0.3769	5.190	-45.78	0.1409	-38.23	LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND
5	0.4990	0.3738	5.286	-45.65	0.1416	-38.10	LN_QJF LN_QMA LN_QJA LN_QSO LN_QND
5	0.4582	0.3228	6.858	-43.61	0.1531	-36.06	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND
5	0.4379	0.2974	7.639	-42.65	0.1589	-35.11	LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND
6	0.5065	0.3506	7.000	-44.04	0.1468	-35.23	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA
1	MODEL1	PARMS	LN_CRAB	0.43453	4.44753	.	0.39441
2	MODEL1	PARMS	LN_CRAB	0.47688	6.19650	.	.
3	MODEL1	PARMS	LN_CRAB	0.48135	6.53582	.	.
4	MODEL1	PARMS	LN_CRAB	0.48269	7.88247	.	.
5	MODEL1	PARMS	LN_CRAB	0.41839	5.28973	.	0.50537
6	MODEL1	PARMS	LN_CRAB	0.42282	5.86073	-0.32117	0.52376
7	MODEL1	PARMS	LN_CRAB	0.43146	3.06130	.	0.40463
8	MODEL1	PARMS	LN_CRAB	0.43793	4.87542	.	0.44782
9	MODEL1	PARMS	LN_CRAB	0.39309	3.29560	.	0.56768
10	MODEL1	PARMS	LN_CRAB	0.40040	4.20814	-0.45764	0.59533
11	MODEL1	PARMS	LN_CRAB	0.40214	2.50266	.	0.58684
12	MODEL1	PARMS	LN_CRAB	0.41987	6.00285	-0.21007	0.56214
13	MODEL1	PARMS	LN_CRAB	0.37584	3.58905	-0.40834	0.73641
14	MODEL1	PARMS	LN_CRAB	0.38188	4.05882	-0.32578	0.66644
15	MODEL1	PARMS	LN_CRAB	0.39030	2.89546	.	0.63397

OBS	LN_QMJ	LN_QJA	LN_QSO	LN_QND	LN_CRAB	_IN_	_P_	_EDF_
1	.	.	.	.	-1	1	2	24
2	.	.	.	0.15996	-1	1	2	24
3	0.10588	.	.	.	-1	1	2	24
4	.	-0.07988	.	.	-1	1	2	24
5	.	-0.24970	.	.	-1	2	3	23
6	.	.	.	.	-1	2	3	23
7	.	.	.	0.18152	-1	2	3	23
8	.	.	-0.11956	.	-1	2	3	23
9	.	-0.35118	.	0.30595	-1	3	4	22
10	.	.	.	0.29504	-1	3	4	22
11	.	.	-0.37641	0.43108	-1	3	4	22
12	.	-0.18707	.	.	-1	3	4	22
13	.	.	-0.33389	0.50418	-1	4	5	21
14	.	-0.27150	.	0.35853	-1	4	5	21
15	.	-0.25700	-0.22728	0.42327	-1	4	5	21

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.18882	0.19831	0.16491	8.8630	-41.4225	-38.9063
2	0.22741	0.03445	-0.00578	15.1712	-36.5871	-34.0709
3	0.23170	0.01625	-0.02474	15.8721	-36.1014	-33.5852
4	0.23299	0.01075	-0.03046	16.0835	-35.9567	-33.4405
5	0.17505	0.28772	0.22578	7.4210	-42.4969	-38.7226
6	0.17878	0.27256	0.20931	8.0045	-41.9495	-38.1752
7	0.18616	0.24255	0.17668	9.1601	-40.8982	-37.1239
8	0.19178	0.21966	0.15181	10.0410	-40.1243	-36.3500
9	0.15452	0.39861	0.31660	5.1520	-44.8969	-39.8645
10	0.16032	0.37602	0.29093	6.0219	-43.9379	-38.9055
11	0.16172	0.37058	0.28475	6.2310	-43.7126	-38.6802
12	0.17629	0.31386	0.22030	8.4146	-41.4691	-36.4368
13	0.14126	0.47521	0.37525	4.2032	-46.4391	-40.1487
14	0.14583	0.45821	0.35501	4.8576	-45.6103	-39.3199
15	0.15233	0.43407	0.32627	5.7871	-44.4767	-38.1863

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA
16	MODEL1	PARMS	LN_CRAB	0.39788	2.89938	.	0.71399
17	MODEL1	PARMS	LN_CRAB	0.37534	3.83669	-0.38131	0.82892
18	MODEL1	PARMS	LN_CRAB	0.37628	3.66364	-0.34063	0.74217
19	MODEL1	PARMS	LN_CRAB	0.39131	4.05815	-0.32575	0.66629
20	MODEL1	PARMS	LN_CRAB	0.39858	2.97364	.	0.67401
21	MODEL1	PARMS	LN_CRAB	0.38318	3.79745	-0.35149	0.80161

OBS	LN_QMJ	LN_QJA	LN_QSO	LN_QND	LN_CRAB	_IN_	_P_	_EDF_
16	-0.20685	.	-0.38465	0.47506	-1	4	5	21
17	-0.16662	.	-0.34334	0.53477	-1	5	6	20
18	.	-0.16666	-0.24423	0.48699	-1	5	6	20
19	0.00036	-0.27167	.	0.35851	-1	5	6	20
20	-0.07973	-0.20810	-0.25883	0.44171	-1	5	6	20
21	-0.11149	-0.09541	-0.28889	0.51480	-1	6	7	19

OBS	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
16	0.15831	0.41187	0.29984	6.6416	-43.4765	-37.1860
17	0.14088	0.50154	0.37692	5.1895	-45.7775	-38.2289
18	0.14159	0.49903	0.37378	5.2862	-45.6468	-38.0982
19	0.15313	0.45821	0.32276	6.8576	-43.6103	-36.0618
20	0.15887	0.43790	0.29738	7.6394	-42.6536	-35.1050
21	0.14683	0.50646	0.35061	7.0000	-44.0356	-35.2289

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Logged the others Inflows

N = 26 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.204540	0.171396	10.7453	331.1	314668	333.6	LN_QMA
1	0.080178	0.041853	15.8647	334.8	363863	337.4	LN_QND
1	0.023682	-.016998	18.1903	336.4	386212	338.9	LN_QSO
1	0.013075	-.028047	18.6270	336.7	390408	339.2	QMJ_LAG
2	0.299649	0.238748	8.8301	329.7	289090	333.5	LN_QMA LN_QND
2	0.294495	0.233147	9.0423	329.9	291218	333.7	LN_QMA LN_QJA
2	0.239274	0.173123	11.3155	331.9	314012	335.7	QJF_LAG LN_QMA
2	0.222859	0.155282	11.9912	332.5	320788	336.2	LN_QMA QMJ_LAG
3	0.486111	0.416035	3.1544	323.7	221765	328.7	LN_QMA LN_QJA LN_QND
3	0.410694	0.330334	6.2589	327.3	254310	332.3	QJF_LAG LN_QMA LN_QND
3	0.375347	0.290167	7.7140	328.8	269564	333.8	LN_QMA LN_QSO LN_QND
3	0.334170	0.243375	9.4090	330.4	287333	335.5	LN_QMA QMJ_LAG LN_QND
4	0.527093	0.437016	3.4673	323.5	213797	329.8	QJF_LAG LN_QMA LN_QJA LN_QND
4	0.491400	0.394524	4.9366	325.4	229934	331.7	LN_QMA LN_QJA LN_QSO LN_QND
4	0.486347	0.388509	5.1446	325.7	232218	332.0	LN_QMA QMJ_LAG LN_QJA LN_QND
4	0.452657	0.348401	6.5315	327.3	247449	333.6	QJF_LAG LN_QMA QMJ_LAG LN_QND
5	0.530752	0.413440	5.3167	325.3	222750	332.9	QJF_LAG LN_QMA QMJ_LAG LN_QJA LN_QND
5	0.530279	0.412848	5.3362	325.4	222975	332.9	QJF_LAG LN_QMA LN_QJA LN_QSO LN_QND
5	0.505764	0.382205	6.3453	326.7	234612	334.2	QJF_LAG LN_QMA QMJ_LAG LN_QSO LN_QND
5	0.493798	0.367247	6.8379	327.3	240292	334.9	LN_QMA QMJ_LAG LN_QJA LN_QSO LN_QND
6	0.538446	0.392692	7.0000	326.9	230630	335.7	QJF_LAG LN_QMA QMJ_LAG LN_QJA LN_QSO LN_QND

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	5111959.1091	851993.18485	3.694	0.0133
Error	19	4381961.3113	230629.5427		
C Total	25	9493920.4204			

Root MSE	480.23905	R-square	0.5384
Dep Mean	1699.58077	Adj R-sq	0.3927
C.V.	28.25632		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-6833.967452	2628.1430767	-2.600	0.0176	0.00000000
QJF_LAG	1	-0.244419	0.18028923	-1.356	0.1911	1.77189933
LN_QMA	1	982.877125	264.40381067	3.717	0.0015	2.18429793
QMJ_LAG	1	-0.065603	0.11314383	-0.580	0.5689	2.05040016
LN_QJA	1	-298.093077	257.00103263	-1.160	0.2605	2.72877848
LN_QSO	1	-150.030964	266.59024040	-0.563	0.5802	3.04516031
LN_QND	1	678.199232	239.08254108	2.837	0.0105	1.88637277

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop LN_QMA	Var Prop QMJ_LAG	Var Prop LN_QJA	Var Prop LN_QSO	Var Prop LN_QND
1	2.93974	1.00000	0.0368	0.0223	0.0205	0.0296	0.0245	0.0151
2	1.26660	1.52348	0.0014	0.0897	0.0837	0.0003	0.0289	0.1754
3	0.72028	2.02024	0.2351	0.0775	0.2778	0.0275	0.0068	0.0726
4	0.47740	2.48149	0.0086	0.1462	0.0582	0.3594	0.0246	0.3101
5	0.44956	2.55717	0.5801	0.1837	0.0382	0.0074	0.2275	0.0022
6	0.14642	4.48084	0.1380	0.4806	0.5216	0.5758	0.6876	0.4246

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	LN_QMA	QMJ_LAG	LN_QJA	LN_QSO
1	MODEL1	PARMS	CRAB	560.953	-2122.84	.	519.12	.	.	.
2	MODEL1	PARMS	CRAB	603.211	-584.38	.	.	.	.	.
3	MODEL1	PARMS	CRAB	621.459	663.55	.	.	.	.	150.840
4	MODEL1	PARMS	CRAB	624.826	1551.80	.	.	0.05797	.	.
5	MODEL1	PARMS	CRAB	537.671	-4757.12	.	538.54	.	.	.
6	MODEL1	PARMS	CRAB	539.646	-1028.02	.	663.35	.	-324.597	.
7	MODEL1	PARMS	CRAB	560.368	-2634.65	-0.18300	631.66	.	.	.
8	MODEL1	PARMS	CRAB	566.381	-2598.07	.	611.28	-0.07978	.	.
9	MODEL1	PARMS	CRAB	470.919	-4425.22	.	769.51	.	-497.480	.
10	MODEL1	PARMS	CRAB	504.292	-6958.39	-0.35542	766.02	.	.	.
11	MODEL1	PARMS	CRAB	519.196	-5313.80	.	720.10	.	.	-375.089
12	MODEL1	PARMS	CRAB	536.035	-5668.60	.	668.48	-0.11088	.	.
13	MODEL1	PARMS	CRAB	462.382	-5895.53	-0.22865	878.13	.	-416.227	.
14	MODEL1	PARMS	CRAB	479.514	-4625.52	.	802.69	.	-450.335	-113.767
15	MODEL1	PARMS	CRAB	481.890	-4512.50	.	777.66	-0.01000	-489.807	.
16	MODEL1	PARMS	CRAB	497.442	-8041.08	-0.36772	917.38	-0.12244	.	.
17	MODEL1	PARMS	CRAB	471.964	-6344.47	-0.24375	918.16	-0.04029	-379.934	.
18	MODEL1	PARMS	CRAB	472.202	-6018.03	-0.22344	901.49	.	-381.367	-88.586
19	MODEL1	PARMS	CRAB	484.368	-8309.77	-0.31133	1057.94	-0.13894	.	-324.999
20	MODEL1	PARMS	CRAB	490.196	-4989.22	.	840.97	-0.03482	-409.571	-147.637
21	MODEL1	PARMS	CRAB	480.239	-6833.97	-0.24442	982.88	-0.06560	-298.093	-150.031

OBS	LN_QND	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	314667.94	0.20454	0.17140	10.7453	331.060	333.576
2	316.248	-1	1	2	24	363863.02	0.08018	0.04185	15.8647	334.837	337.353
3	.	-1	1	2	24	386211.75	0.02368	-0.01700	18.1903	336.387	338.903
4	.	-1	1	2	24	390407.94	0.01307	-0.02805	18.6270	336.668	339.184
5	344.954	-1	2	3	23	289090.47	0.29965	0.23875	8.8301	329.749	333.523
6	.	-1	2	3	23	291217.68	0.29450	0.23315	9.0423	329.940	333.714
7	.	-1	2	3	23	314012.02	0.23927	0.17312	11.3155	331.899	335.673
8	.	-1	2	3	23	320787.60	0.22286	0.15528	11.9912	332.454	336.229
9	521.213	-1	3	4	22	221764.53	0.48611	0.41604	3.1544	323.700	328.733
10	503.039	-1	3	4	22	254310.32	0.41069	0.33033	6.2589	327.261	332.293
11	593.639	-1	3	4	22	269563.98	0.37535	0.29017	7.7140	328.775	333.808
12	377.820	-1	3	4	22	287333.43	0.33417	0.24338	9.4090	330.435	335.467
13	594.123	-1	4	5	21	213797.17	0.52709	0.43702	3.4673	323.539	329.830
14	579.938	-1	4	5	21	229933.50	0.49140	0.39452	4.9366	325.431	331.722
15	521.458	-1	4	5	21	232217.98	0.48635	0.38851	5.1446	325.688	331.979
16	544.802	-1	4	5	21	247449.00	0.45266	0.34840	6.5315	327.340	333.631
17	599.923	-1	5	6	20	222750.30	0.53075	0.41344	5.3167	325.338	332.886
18	638.190	-1	5	6	20	222974.79	0.53028	0.41285	5.3362	325.364	332.912
19	740.085	-1	5	6	20	234611.89	0.50576	0.38220	6.3453	326.686	334.235
20	598.272	-1	5	6	20	240292.12	0.49380	0.36725	6.8379	327.308	334.857
21	678.199	-1	6	7	19	230629.54	0.53845	0.39269	7.0000	326.908	335.714

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Squared Root others Inflows

N = 26 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.201533	0.168263	16.6470	331.2	315858	333.7	SQR_QMA
1	0.115618	0.078768	20.8054	333.8	349844	336.3	SQR_QND
1	0.018449	-.022448	25.5085	336.5	388282	339.0	SQR_QSO
1	0.016772	-.024196	25.5897	336.6	388945	339.1	SQR_QJA
2	0.331528	0.273400	12.3551	328.5	275931	332.3	SQR_QMA SQR_QND
2	0.279394	0.216732	14.8784	330.5	297451	334.3	SQR_QMA SQR_QJA
2	0.231761	0.164957	17.1840	332.2	317113	335.9	QJF_LAG SQR_QMA
2	0.218511	0.150555	17.8253	332.6	322583	336.4	SQR_QMA QMJ_LAG
3	0.484609	0.414329	6.9457	323.8	222413	328.8	SQR_QMA SQR_QJA SQR_QND
3	0.458837	0.385042	8.1931	325.0	233534	330.1	SQR_QMA SQR_QSO SQR_QND
3	0.451456	0.376654	8.5504	325.4	236720	330.4	QJF_LAG SQR_QMA SQR_QND
3	0.374148	0.288804	12.2922	328.8	270081	333.9	SQR_QMA QMJ_LAG SQR_QND
4	0.534509	0.445844	6.5305	323.1	210444	329.4	QJF_LAG SQR_QMA SQR_QJA SQR_QND
4	0.531705	0.442506	6.6662	323.3	211712	329.6	SQR_QMA QMJ_LAG SQR_QSO SQR_QND
4	0.529027	0.439317	6.7958	323.4	212923	329.7	QJF_LAG SQR_QMA SQR_QSO SQR_QND
4	0.521252	0.430062	7.1721	323.9	216438	330.1	SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.604848	0.506060	5.1259	320.9	187577	328.4	QJF_LAG SQR_QMA QMJ_LAG SQR_QSO SQR_QND
5	0.563339	0.454173	7.1351	323.5	207281	331.0	QJF_LAG SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.550445	0.438056	7.7591	324.2	213402	331.8	QJF_LAG SQR_QMA QMJ_LAG SQR_QJA SQR_QND
5	0.549941	0.437426	7.7835	324.3	213641	331.8	SQR_QMA QMJ_LAG SQR_QJA SQR_QSO SQR_QND
6	0.607450	0.483487	7.0000	322.7	196149	331.5	QJF_LAG SQR_QMA QMJ_LAG SQR_QJA SQR_QSO SQR_QND

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	5767085.0405	961180.84008	4.900	0.0035
Error	19	3726835.3799	196149.23052		
C Total	25	9493920.4204			

Root MSE	442.88738	R-square	0.6075
Dep Mean	1699.58077	Adj R-sq	0.4835
C.V.	26.05862		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-483.921868	559.30987441	-0.865	0.3977	0.00000000
QJF_LAG	1	-0.277329	0.16622519	-1.668	0.1116	1.77101179
SQR_QMA	1	56.461946	12.79028711	4.414	0.0003	2.32226711
QMJ_LAG	1	-0.148894	0.10189949	-1.461	0.1603	1.95546146
SQR_QJA	1	-5.489123	15.46741800	-0.355	0.7266	2.27392551
SQR_QSO	1	-25.624601	15.42660911	-1.661	0.1131	3.10514756
SQR_QND	1	44.706014	11.65770793	3.835	0.0011	2.05519575

Collinearity Diagnostics(intercept adjusted)

Number	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop SQR_QMA	Var Prop QMJ_LAG	Var Prop SQR_QJA	Var Prop SQR_QSO	Var Prop SQR_QND
1	2.86420	1.00000	0.0398	0.0210	0.0219	0.0322	0.0262	0.0159
2	1.22708	1.52779	0.0019	0.0974	0.0907	0.0003	0.0255	0.1597
3	0.72526	1.98726	0.1929	0.0735	0.3099	0.0287	0.0122	0.0764
4	0.59137	2.20075	0.0017	0.1255	0.0346	0.4249	0.0000	0.1765
5	0.44975	2.52356	0.6462	0.0858	0.0479	0.0064	0.2398	0.0130
6	0.14233	4.48586	0.1174	0.5968	0.4949	0.5075	0.6963	0.5585

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	SQR_QMA	QMJ_LAG	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	CRAB	562.012	623.25	.	26.2136	.	.	.
2	MODEL1	PARMS	CRAB	591.476	960.84	.	.	.	.	.
3	MODEL1	PARMS	CRAB	623.123	1430.72	.	.	.	.	8.2728
4	MODEL1	PARMS	CRAB	623.655	1967.41	.	.	.	-9.2416	.
5	MODEL1	PARMS	CRAB	525.292	-199.73	.	27.1599	.	.	.
6	MODEL1	PARMS	CRAB	545.391	1015.67	.	31.4077	.	-20.8995	.
7	MODEL1	PARMS	CRAB	563.128	707.02	-0.16898	31.2996	.	.	.
8	MODEL1	PARMS	CRAB	567.964	635.50	.	30.6674	-0.07654	.	.
9	MODEL1	PARMS	CRAB	471.606	120.71	.	35.0142	.	-30.4414	.
10	MODEL1	PARMS	CRAB	483.254	-353.01	.	39.6528	.	.	-30.6530
11	MODEL1	PARMS	CRAB	486.539	-361.39	-0.36702	38.6014	.	.	.
12	MODEL1	PARMS	CRAB	519.694	-275.94	.	34.4720	-0.12377	.	.
13	MODEL1	PARMS	CRAB	458.742	-59.07	-0.25276	41.2165	.	-23.9399	.
14	MODEL1	PARMS	CRAB	460.122	-473.76	.	50.9543	-0.16415	.	-34.5880
15	MODEL1	PARMS	CRAB	461.436	-451.16	-0.29014	46.2819	.	.	-24.7254
16	MODEL1	PARMS	CRAB	465.229	-59.90	.	40.5483	.	-22.2094	-18.7899
17	MODEL1	PARMS	CRAB	433.102	-576.43	-0.29625	57.9520	-0.16747	.	-28.6155
18	MODEL1	PARMS	CRAB	455.282	-206.26	-0.23332	45.6731	.	-17.1009	-16.7519
19	MODEL1	PARMS	CRAB	461.954	-169.41	-0.28277	45.8734	-0.08227	-19.5255	.
20	MODEL1	PARMS	CRAB	462.213	-258.23	.	48.3383	-0.11809	-13.7642	-26.1318
21	MODEL1	PARMS	CRAB	442.887	-483.92	-0.27733	56.4619	-0.14889	-5.4891	-25.6246

OBS	SQR_QND	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	315857.65	0.20153	0.16826	16.6470	331.158	333.674
2	19.2366	-1	1	2	24	349843.94	0.11562	0.07877	20.8054	333.815	336.331
3	.	-1	1	2	24	388281.77	0.01845	-0.02245	25.5085	336.526	339.042
4	.	-1	1	2	24	388945.49	0.01677	-0.02420	25.5897	336.570	339.086
5	20.4182	-1	2	3	23	275931.29	0.33153	0.27340	12.3551	328.538	332.312
6	.	-1	2	3	23	297451.21	0.27939	0.21673	14.8784	330.490	334.265
7	.	-1	2	3	23	317113.24	0.23176	0.16496	17.1840	332.155	335.929
8	.	-1	2	3	23	322582.55	0.21851	0.15055	17.8253	332.599	336.374
9	26.6494	-1	3	4	22	222412.62	0.48461	0.41433	6.9457	323.776	328.809
10	36.9937	-1	3	4	22	233534.33	0.45884	0.38504	8.1931	325.045	330.077
11	28.9433	-1	3	4	22	236719.90	0.45146	0.37665	8.5504	325.397	330.429
12	22.8005	-1	3	4	22	270081.49	0.37415	0.28880	12.2922	328.825	333.857
13	31.1898	-1	4	5	21	210444.49	0.53451	0.44584	6.5305	323.128	329.419
14	42.2811	-1	4	5	21	211712.16	0.53171	0.44251	6.6662	323.285	329.575
15	40.5278	-1	4	5	21	212923.05	0.52903	0.43932	6.7958	323.433	329.723
16	35.1250	-1	4	5	21	216437.83	0.52125	0.43006	7.1721	323.859	330.149
17	45.9968	-1	5	6	20	187576.94	0.60485	0.50606	5.1259	320.869	328.418
18	38.3968	-1	5	6	20	207281.36	0.56334	0.45417	7.1351	323.466	331.015
19	32.5668	-1	5	6	20	213401.90	0.55045	0.43806	7.7591	324.223	331.771
20	39.6394	-1	5	6	20	213641.12	0.54994	0.43743	7.7835	324.252	331.800
21	44.7060	-1	6	7	19	196149.23	0.60745	0.48349	7.0000	322.697	331.504

Untransformed Harvest, Jan-Feb and May-Jun Inflows, Squared Root March-April Inflows, and Logged others Inflows

N = 26 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.201533	0.168263	11.8486	331.2	315858	333.7	SQR_QMA
1	0.080178	0.041853	16.9930	334.8	363863	337.4	LN_QND
1	0.023682	-.016998	19.3880	336.4	386212	338.9	LN_QSO
1	0.013075	-.028047	19.8377	336.7	390408	339.2	QMJ_LAG
2	0.310201	0.250219	9.2419	329.4	284735	333.1	SQR_QMA LN_QND
2	0.276129	0.213184	10.6863	330.6	298799	334.4	SQR_QMA LN_QJA
2	0.231761	0.164957	12.5672	332.2	317113	335.9	QJF_LAG SQR_QMA
2	0.218511	0.150555	13.1289	332.6	322583	336.4	SQR_QMA QMJ_LAG
3	0.483113	0.412628	3.9119	323.9	223059	328.9	SQR_QMA LN_QJA LN_QND
3	0.424799	0.346363	6.3839	326.6	248223	331.7	QJF_LAG SQR_QMA LN_QND
3	0.398656	0.316654	7.4922	327.8	259505	332.8	SQR_QMA LN_QSO LN_QND
3	0.347716	0.258768	9.6516	329.9	281488	334.9	SQR_QMA QMJ_LAG LN_QND
4	0.526536	0.436352	4.0711	323.6	214049	329.9	QJF_LAG SQR_QMA LN_QJA LN_QND
4	0.493939	0.397546	5.4529	325.3	228786	331.6	SQR_QMA LN_QJA LN_QSO LN_QND
4	0.483741	0.385406	5.8852	325.8	233396	332.1	SQR_QMA QMJ_LAG LN_QJA LN_QND
4	0.477307	0.377747	6.1580	326.1	236305	332.4	QJF_LAG SQR_QMA LN_QSO LN_QND
5	0.538299	0.422874	5.5724	324.9	219167	332.5	QJF_LAG SQR_QMA QMJ_LAG LN_QSO LN_QND
5	0.535042	0.418802	5.7105	325.1	220714	332.6	QJF_LAG SQR_QMA LN_QJA LN_QSO LN_QND
5	0.532174	0.415218	5.8321	325.3	222075	332.8	QJF_LAG SQR_QMA QMJ_LAG LN_QJA LN_QND
5	0.500275	0.375344	7.1843	327.0	237218	334.5	SQR_QMA QMJ_LAG LN_QJA LN_QSO LN_QND
6	0.551802	0.410266	7.0000	326.1	223956	335.0	QJF_LAG SQR_QMA QMJ_LAG LN_QJA LN_QSO LN_QND

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	5238763.0261	873127.17101	3.899	0.0105
Error	19	4255157.3943	223955.65233		
C Total	25	9493920.4204			

Root MSE	473.23953	R-square	0.5518
Dep Mean	1699.58077	Adj R-sq	0.4103
C.V.	27.84449		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-2350.421967	1787.1149339	-1.315	0.2041	0.00000000
QJF_LAG	1	-0.264959	0.17927483	-1.478	0.1558	1.80422628
SQR_QMA	1	53.399210	13.88207582	3.847	0.0011	2.39598993
QMJ_LAG	1	-0.097286	0.11541695	-0.843	0.4098	2.19719721
LN_QJA	1	-197.104072	260.52305743	-0.757	0.4586	2.88764491
LN_QSO	1	-249.807570	273.86124363	-0.912	0.3731	3.30929688
LN_QND	1	773.974627	246.97086210	3.134	0.0055	2.07288943

Collinearity Diagnostics(intercept adjusted)

Number	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop SQR_QMA	Var Prop QMJ_LAG	Var Prop LN_QJA	Var Prop LN_QSO	Var Prop LN_QND
1	2.90443	1.00000	0.0371	0.0190	0.0197	0.0285	0.0234	0.0139
2	1.29726	1.49629	0.0010	0.0899	0.0703	0.0001	0.0231	0.1557
3	0.73174	1.99229	0.2097	0.0742	0.2647	0.0314	0.0101	0.0506
4	0.48209	2.45451	0.0174	0.1840	0.0399	0.3344	0.0000	0.2646
5	0.45837	2.51723	0.5738	0.0686	0.0527	0.0088	0.2345	0.0312
6	0.12611	4.79904	0.1610	0.5643	0.5527	0.5969	0.7089	0.4839

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	SQR_QMA	QMJ_LAG	LN_QJA	LN_QSO
1	MODEL1	PARMS	CRAB	562.012	623.25	.	26.2136	.	.	.
2	MODEL1	PARMS	CRAB	603.211	-584.38	.	.	.	.	.
3	MODEL1	PARMS	CRAB	621.459	663.55	.	.	.	.	150.840
4	MODEL1	PARMS	CRAB	624.826	1551.80	.	.	0.05797	.	.
5	MODEL1	PARMS	CRAB	533.605	-2128.42	.	28.1460	.	.	.
6	MODEL1	PARMS	CRAB	546.625	2312.61	.	32.0618	.	-290.383	.
7	MODEL1	PARMS	CRAB	563.128	707.02	-0.16898	31.2996	.	.	.
8	MODEL1	PARMS	CRAB	567.964	635.50	.	30.6674	-0.07654	.	.
9	MODEL1	PARMS	CRAB	472.291	-686.21	.	38.5761	.	-472.355	.
10	MODEL1	PARMS	CRAB	498.220	-3217.90	-0.36065	39.8913	.	.	.
11	MODEL1	PARMS	CRAB	509.417	-1777.30	.	38.7406	.	.	-411.353
12	MODEL1	PARMS	CRAB	530.554	-2409.89	.	35.0903	-0.11572	.	.
13	MODEL1	PARMS	CRAB	462.654	-1664.59	-0.23638	44.3629	.	-385.790	.
14	MODEL1	PARMS	CRAB	478.316	-751.93	.	41.3512	.	-404.427	-165.983
15	MODEL1	PARMS	CRAB	483.111	-765.37	.	39.2788	-0.01643	-459.520	.
16	MODEL1	PARMS	CRAB	486.112	-2776.03	-0.30613	46.4798	.	.	-324.738
17	MODEL1	PARMS	CRAB	468.153	-3117.78	-0.31289	56.9082	-0.14921	.	-373.447
18	MODEL1	PARMS	CRAB	469.802	-1698.02	-0.23036	46.6793	.	-327.686	-147.367
19	MODEL1	PARMS	CRAB	471.248	-1991.62	-0.25654	47.0188	-0.05057	-338.911	.
20	MODEL1	PARMS	CRAB	487.050	-1057.35	.	44.8942	-0.05823	-333.170	-228.969
21	MODEL1	PARMS	CRAB	473.240	-2350.42	-0.26496	53.3992	-0.09729	-197.104	-249.808

OBS	LN_QND	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	315857.65	0.20153	0.16826	11.8486	331.158	333.674
2	316.248	-1	1	2	24	363863.02	0.08018	0.04185	16.9930	334.837	337.353
3	.	-1	1	2	24	386211.75	0.02368	-0.01700	19.3880	336.387	338.903
4	.	-1	1	2	24	390407.94	0.01307	-0.02805	19.8377	336.668	339.184
5	370.023	-1	2	3	23	284734.60	0.31020	0.25022	9.2419	329.354	333.129
6	.	-1	2	3	23	298798.88	0.27613	0.21318	10.6863	330.608	334.382
7	.	-1	2	3	23	317113.24	0.23176	0.16496	12.5672	332.155	335.929
8	.	-1	2	3	23	322582.55	0.21851	0.15055	13.1289	332.599	336.374
9	545.618	-1	3	4	22	223058.51	0.48311	0.41263	3.9119	323.852	328.884
10	540.569	-1	3	4	22	248223.09	0.42480	0.34636	6.3839	326.631	331.663
11	652.378	-1	3	4	22	259505.31	0.39866	0.31665	7.4922	327.786	332.819
12	410.363	-1	3	4	22	281487.75	0.34772	0.25877	9.6516	329.901	334.933
13	625.219	-1	4	5	21	214049.03	0.52654	0.43635	4.0711	323.570	329.861
14	634.298	-1	4	5	21	228786.00	0.49394	0.39755	5.4529	325.301	331.592
15	546.575	-1	4	5	21	233396.10	0.48374	0.38541	5.8852	325.820	332.110
16	737.693	-1	4	5	21	236304.94	0.47731	0.37775	6.1580	326.142	332.432
17	826.336	-1	5	6	20	219167.47	0.53830	0.42287	5.5724	324.916	332.464
18	701.926	-1	5	6	20	220713.90	0.53504	0.41880	5.7105	325.099	332.647
19	634.953	-1	5	6	20	222075.00	0.53217	0.41522	5.8321	325.259	332.807
20	671.341	-1	5	6	20	237217.55	0.50027	0.37534	7.1843	326.974	334.522
21	773.975	-1	6	7	19	223955.65	0.55180	0.41027	7.0000	326.144	334.951

Regression –Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, January-February Inflows, September-October Inflows[c,d]	.	.799	.639	.524	424.9925	1.413

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, January-February Inflows, September-October Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6062166.35	6	1010361	5.594	.002[b]
	Residual	3431754.07	19	180619		
	Total	9493920.42	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, January-February Inflows, September-October Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	989.172	281.43		3.515	.002	400.1	1578		
	Jan-Feb Inflows	-.266	.157	-.306	-1.691	.107	-.594	.063	.582	1.72
	March-April Inflows	.681	.144	.990	4.744	.000	.381	.982	.437	2.29
	May-June Inflows	-.185	.094	-.365	-1.969	.064	-.382	.012	.553	1.81
	July-Aug Inflows	4.8E-02	.217	.042	.221	.828	-.407	.503	.539	1.86
	Sept-Oct Inflows	-.495	.206	-.566	-2.408	.026	-.926	-.065	.344	2.91
	Nov-Dec Inflows	.598	.133	.893	4.479	.000	.318	.877	.479	2.09

a. Dependent Variable: CRAB

Collinearity Diagnostics

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	989.172	281.4255	3.515	0.0023	0.0000
Jan-Feb Inflows	1	-0.2656	0.1571	-1.691	0.1073	1.7184
March-April Inflows	1	0.6812	0.1436	4.744	0.0001	2.2883
May-June Inflows	1	-0.1852	0.0941	-1.969	0.0637	1.8095
July-August Inflows	1	0.0480	0.2173	0.221	0.8275	1.8561
Sept-Oct Inflows	1	-0.4953	0.2057	-2.408	0.0264	2.9074
Nov-Dec Inflows	1	0.5975	0.1334	4.479	0.0003	2.0884

#	Eigenvalue	Condition Index	Jan-Feb Inflows	March-April Inflows	May-June Inflows	July-Aug Inflows	Sept-Oct Inflows	Nov-Dec Inflows
1	2.75491	1.00000	0.0449	0.0224	0.0252	0.0338	0.0305	0.0179
2	1.18438	1.52514	0.0037	0.1088	0.1020	0.0006	0.0249	0.1584
3	0.72926	1.94362	0.0959	0.0012	0.2657	0.1593	0.0048	0.1979
4	0.72003	1.95605	0.0693	0.1641	0.1101	0.3511	0.0149	0.0000
5	0.45798	2.45263	0.7005	0.0636	0.0429	0.0196	0.2438	0.0055
6	0.15344	4.23727	0.0857	0.6399	0.4542	0.4355	0.6811	0.6204

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	814.0202	2570.804	1699.58	492.4293	26
Std. Predicted Value	-1.798	1.769	.000	1.000	26
Standard Error of Predicted Value	129.9764	291.3629	216.0501	45.0383	26
Adjusted Predicted Value	940.6474	2943.434	1736.24	538.0580	26
Residual	-592.9131	942.7524	-6.E-13	370.4999	26
Std. Residual	-1.395	2.218	.000	.872	26
Stud. Residual	-1.880	2.442	-.035	1.050	26
Deleted Residual	-1076.12	1142.900	-36.6583	544.2051	26
Stud. Deleted Residual	-2.028	2.870	-.032	1.114	26
Mahal. Distance	1.377	10.789	5.769	2.701	26
Cook's Distance	.001	.411	.075	.107	26
Centered Leverage Value	.055	.432	.231	.108	26

a. Dependent Variable: CRAB

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE	SDR
1962	814.02017	-502.72017	-817.07773	1128.37773	-1.79835	-1.18289	-1.50804	-1.56443
1963	1169.22280	-191.72280	-234.48003	1211.98003	-1.07702	-.45112	-.49889	-.48880
1964	1431.02827	-235.42827	-287.89365	1483.49365	-.54536	-.55396	-.61258	-.60222
1965	1741.52353	76.37647	87.40872	1730.49128	.08518	.17971	.19225	.18731
1966	1146.72013	211.07987	279.57389	1078.22611	-1.12272	.49667	.57160	.56120
1967	1130.59352	-82.69352	-97.25097	1145.15097	-1.15547	-.19458	-.21101	-.20562
1968	1623.24869	-80.64869	-92.77538	1635.37538	-.15501	-.18976	-.20353	-.19832
1969	2298.61310	-592.91310	-1076.12281	2781.82281	1.21648	-1.39511	-1.87951	-2.02755
1970	2267.21055	354.78945	514.34724	2107.65276	1.15271	.83481	1.00515	1.00544
1971	1899.05182	261.74818	369.76962	1791.03038	.40508	.61589	.73203	.72277
1972	1557.46686	312.63314	365.80593	1504.29407	-.28860	.73562	.79572	.78774
1973	1690.50266	356.49734	511.38744	1535.61256	-.01844	.83883	1.00467	1.00493
1974	2503.72380	-520.82380	-960.53420	2943.43420	1.63301	-1.22549	-1.66426	-1.75265
1975	1820.23756	43.26244	68.67847	1794.82153	.24502	.10180	.12826	.12489
1976	1495.37697	104.12303	114.86692	1484.63308	-.41469	.24500	.25733	.25090
1977	2381.07316	-521.67316	-666.59047	2525.99047	1.38394	-1.22749	-1.38755	-1.42465
1978	1873.23308	47.66692	62.95570	1857.94430	.35264	.11216	.12890	.12551
1979	1605.00782	348.69218	456.71663	1496.98337	-.19205	.82047	.93899	.93592
1980	1533.02410	216.07590	301.49720	1447.60280	-.33823	.50842	.60057	.59018
1981	834.99953	-224.79953	-330.44738	940.64738	-1.75575	-.52895	-.64131	-.63107
1982	1669.28923	-453.18923	-771.43436	1987.53436	-.06151	-1.06635	-1.39126	-1.42889
1983	1676.91120	-269.31120	-508.14281	1915.74281	-.04604	-.63368	-.87044	-.86464
1984	1189.29004	207.30996	288.93763	1107.66237	-1.03627	.48780	.57588	.56548
1985	2422.77937	-254.87937	-328.33077	2496.23077	1.46863	-.59973	-.68068	-.67075
1986	2570.80449	447.79551	653.11806	2365.48194	1.76924	1.05366	1.27249	1.29496
1987	1844.14756	942.75244	1142.90000	1644.00000	.29358	2.21828	2.44243	**2.87019**

PRE Predicted value of harvest
RES Ordinary residual; observed harvest minus predicted harvest
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$

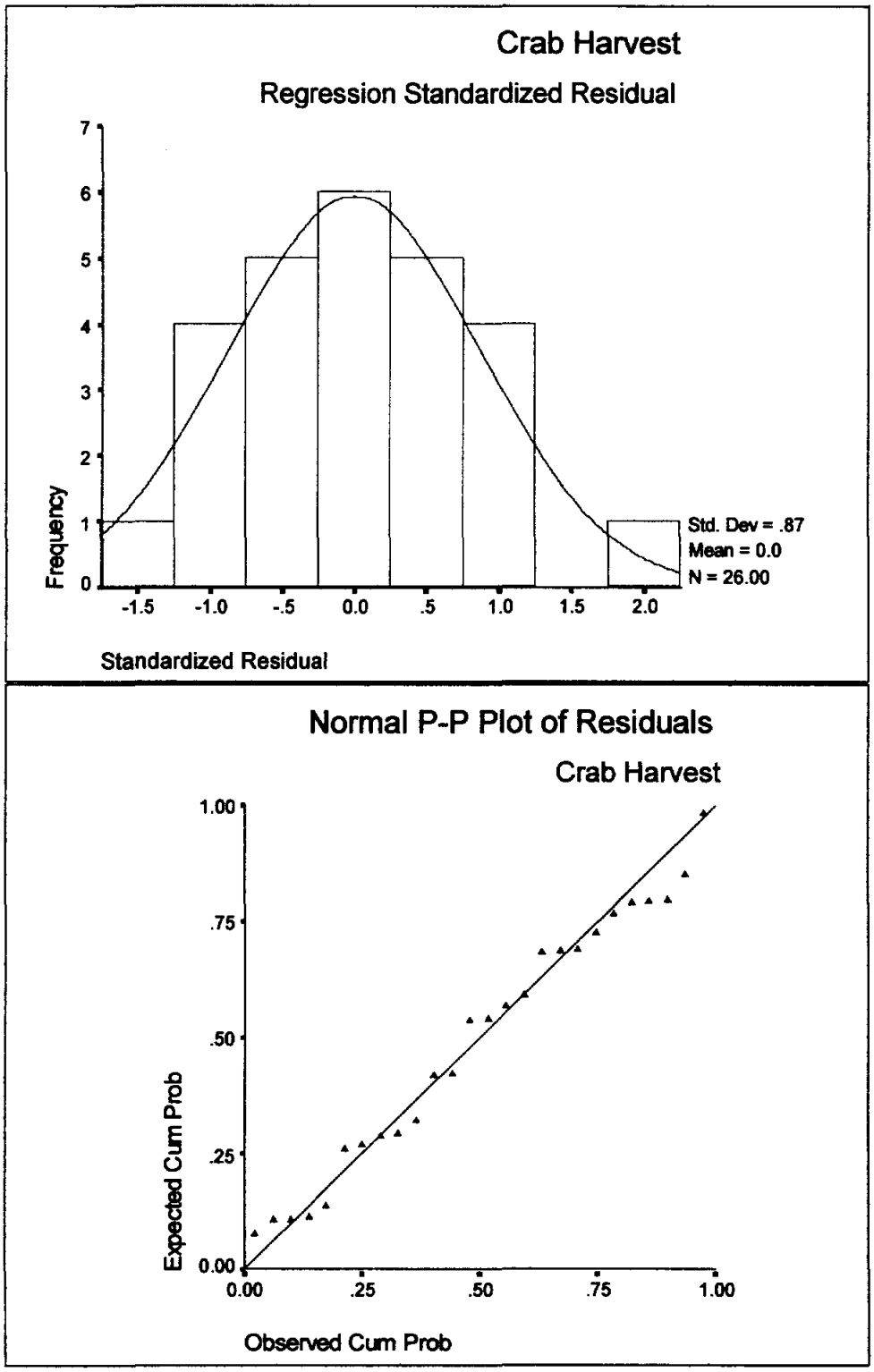


Fig. 3.1. Exploratory Plots of Crab Harvest Standardized Residual.

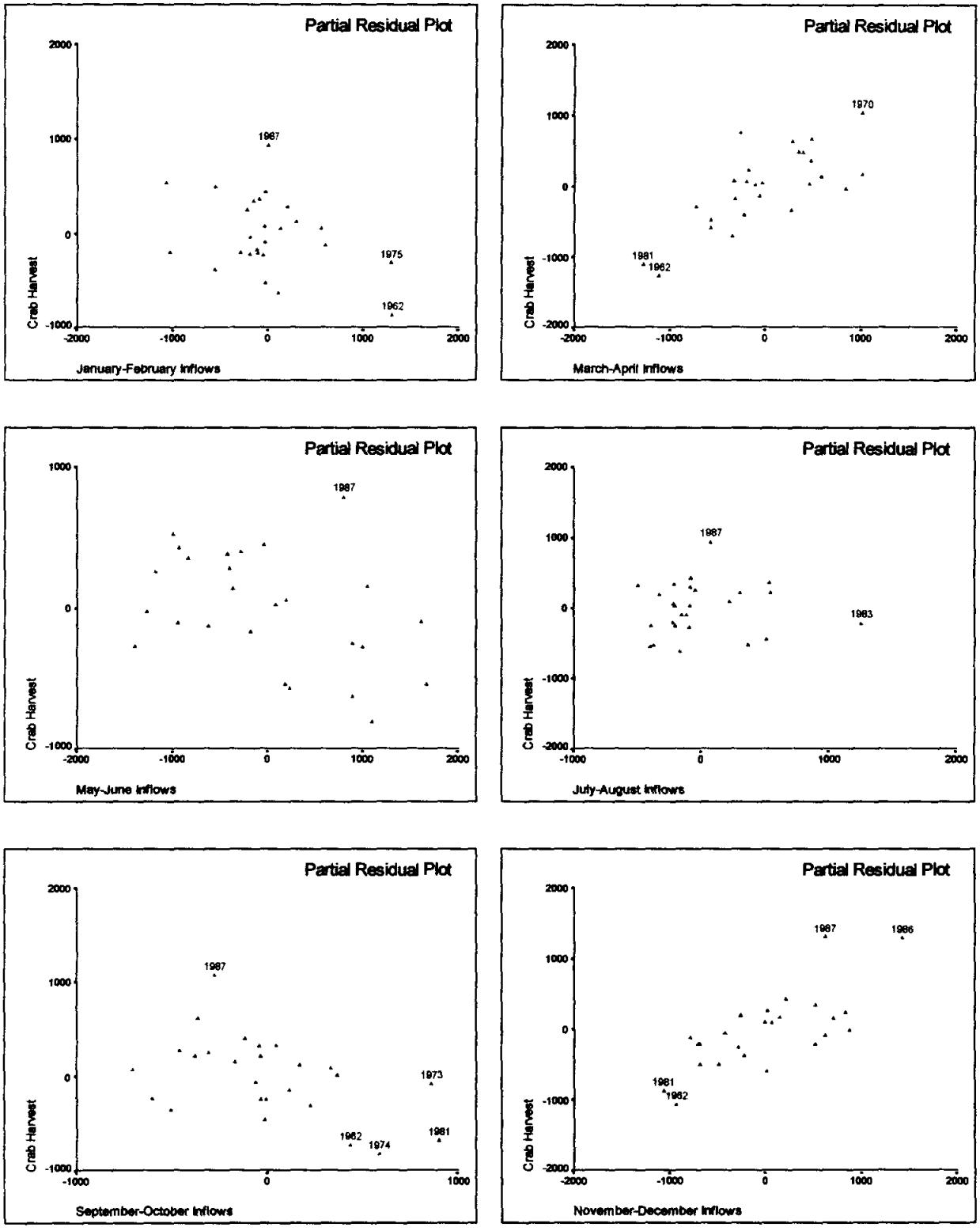


Fig. 3.2. Partial Residual Plots of Crab Harvest vs. Inflows.

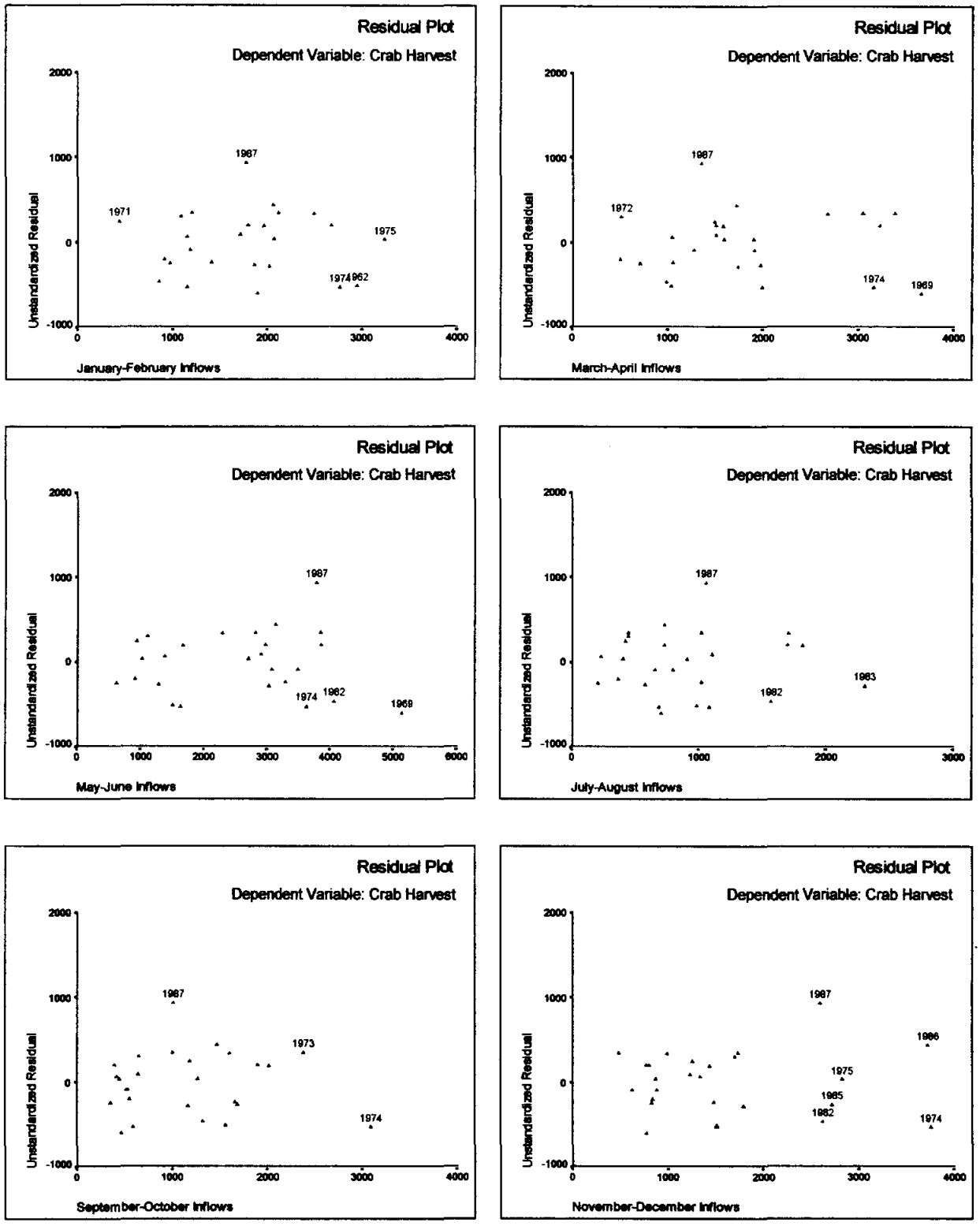


Fig. 3.3. Residual Plots of Crab Harvest vs. Inflows.

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-232.71947	1860.75981
1963	977.50	201.99589	2136.44970
1964	1195.60	463.84651	2398.21002
1965	1817.90	797.53639	2685.51068
1966	1357.80	154.20032	2139.23994
1967	1047.90	176.81885	2084.36818
1968	1542.60	677.37933	2569.11804
1969	1705.70	1227.84864	3369.37756
1970	2622.00	1249.02568	3285.39541
1971	2160.80	887.91740	2910.18624
1972	1870.10	605.49062	2509.44309
1973	2047.00	675.17071	2705.83462
1974	1982.90	1429.73183	3577.71577
1975	1863.50	779.05397	2861.42115
1976	1599.50	565.18732	2425.56662
1977	1859.40	1399.61387	3362.53246
1978	1920.90	881.56846	2864.89770
1979	1953.70	615.87007	2594.14557
1980	1749.10	525.34186	2540.70634
1981	610.20	-186.86896	1856.86802
1982	1216.10	612.09351	2726.48495
1983	1407.60	598.42282	2755.39958
1984	1396.60	181.92745	2196.65263
1985	2167.90	1438.77951	3406.77922
1986	3018.60	1551.00503	3590.60395
1987	2786.90	879.88107	2808.41406

CRAB Crab harvest
LICI Lower limit for 99% prediction interval for crab harvest
UICI Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	8.65681	.20315	.34627	.278	.019
1963	3.59719	.00793	.14389	.825	.000
1964	3.59443	.01195	.14378	.825	.000
1965	2.19383	.00076	.08775	.948	.000
1966	5.16332	.01515	.20653	.640	.000
1967	2.78070	.00112	.11123	.905	.000
1968	2.30622	.00089	.09225	.941	.000
1969	10.26417	.41128	.41057	.174	.117
1970	6.79382	.06491	.27175	.451	.001
1971	6.34175	.03159	.25367	.500	.000
1972	2.67241	.01538	.10690	.914	.000
1973	6.61051	.06265	.26442	.471	.001
1974	10.48288	.33406	.41932	.163	.072
1975	8.29028	.00138	.33161	.308	.000
1976	1.37679	.00098	.05507	.986	.000
1977	4.47348	.07640	.17894	.724	.001
1978	5.10971	.00076	.20439	.647	.000
1979	4.95156	.03902	.19806	.666	.000
1980	6.12155	.02037	.24486	.526	.000
1981	7.03125	.02761	.28125	.426	.000
1982	9.35188	.19418	.37408	.228	.017
1983	10.78868	.09599	.43155	.148	.002
1984	6.10120	.01865	.24405	.528	.000
1985	4.63125	.01907	.18525	.705	.000
1986	6.89778	.10606	.27591	.440	.003
1987	3.41653	.18092	.13666	.844	.014

MAH Mahalonobis distance
COO Cook's distance
LEV Leverage value
MAHA_PV P-value associated with the Mahalanobis distance
COOK_PV P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.23710**	-.13920	-.96763	.74562	-.08208	.38186	-.42420	.57883
1963	-.23083	-.21897	.02152	.10333	.02095	.06073	-.05935	.08199
1964	-.28429	-.25526	.01144	.04828	.09151	.06789	.00225	.04474
1965	.07119	.05055	-.00217	-.00200	-.01602	-.02189	-.01600	.01006
1966	.31968	.03988	.13739	-.15641	.23080	-.10692	-.01109	-.13827
1967	-.08627	-.04593	.00221	.04252	-.04993	.01335	-.01253	.04736
1968	-.07690	-.02461	.01419	.00413	-.04226	.01662	.00605	.01852
1969	**-1.83039**	.52176	-.12249	-.77568	-.66687	.23062	.66857	-.01450
1970	.67427	.12595	-.24516	.41710	-.07356	-.12658	.02819	-.09586
1971	.46431	.32108	-.33519	.10052	-.17554	-.01997	.14018	.00824
1972	.32487	.24271	-.04658	-.09260	-.07891	-.03636	-.01699	.05802
1973	.66240	-.06153	-.03922	-.06845	.28168	-.30073	.50265	-.29295
1974	**-1.61039**	.68866	.01702	-.22484	-.12193	.48607	-.68148	-.39927
1975	.09573	-.03579	.07601	-.01629	.00293	-.01633	-.02873	.02602
1976	.08060	.01158	.01433	-.00934	.01174	.03058	-.03931	.00009
1977	-.75088	-.16886	.32519	-.55373	.49302	-.30279	.46958	-.44591
1978	.07108	.01617	.03254	.02355	-.03755	-.00621	-.03218	.00362
1979	.52093	-.07799	.08728	.17749	-.23342	.29448	-.06031	-.08504
1980	.37108	-.08025	.07939	.09386	-.06199	.10927	.05718	-.15169
1981	-.43263	-.15128	.02987	.32908	-.28371	.15417	-.33385	.25487
1982	**-1.19740**	-.05033	.70405	.21485	-.37279	-.49132	.00779	-.36941
1983	-.81424	.16806	.12535	-.18654	.24472	-.76223	.40573	-.26823
1984	.35483	.06576	-.05200	-.04316	-.12205	.18664	.11955	-.08702
1985	-.36008	-.01963	.05099	-.15148	.21292	.03472	.01229	-.20122
1986	.87687	-.28370	-.00967	.15149	-.01337	-.05947	-.27538	.70509
1987	**1.32247**	-.27361	.01782	-.27203	.56823	.12289	-.41803	.62536

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the January-February inflows
SDFB_2 Standardized dfbeta for the March-April inflows
SDFB_3 Standardized dfbeta for the May-June inflows
SDFB_4 Standardized dfbeta for the July-August inflows
SDFB_5 Standardized dfbeta for the September-October inflows
SDFB_6 Standardized dfbeta for the November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

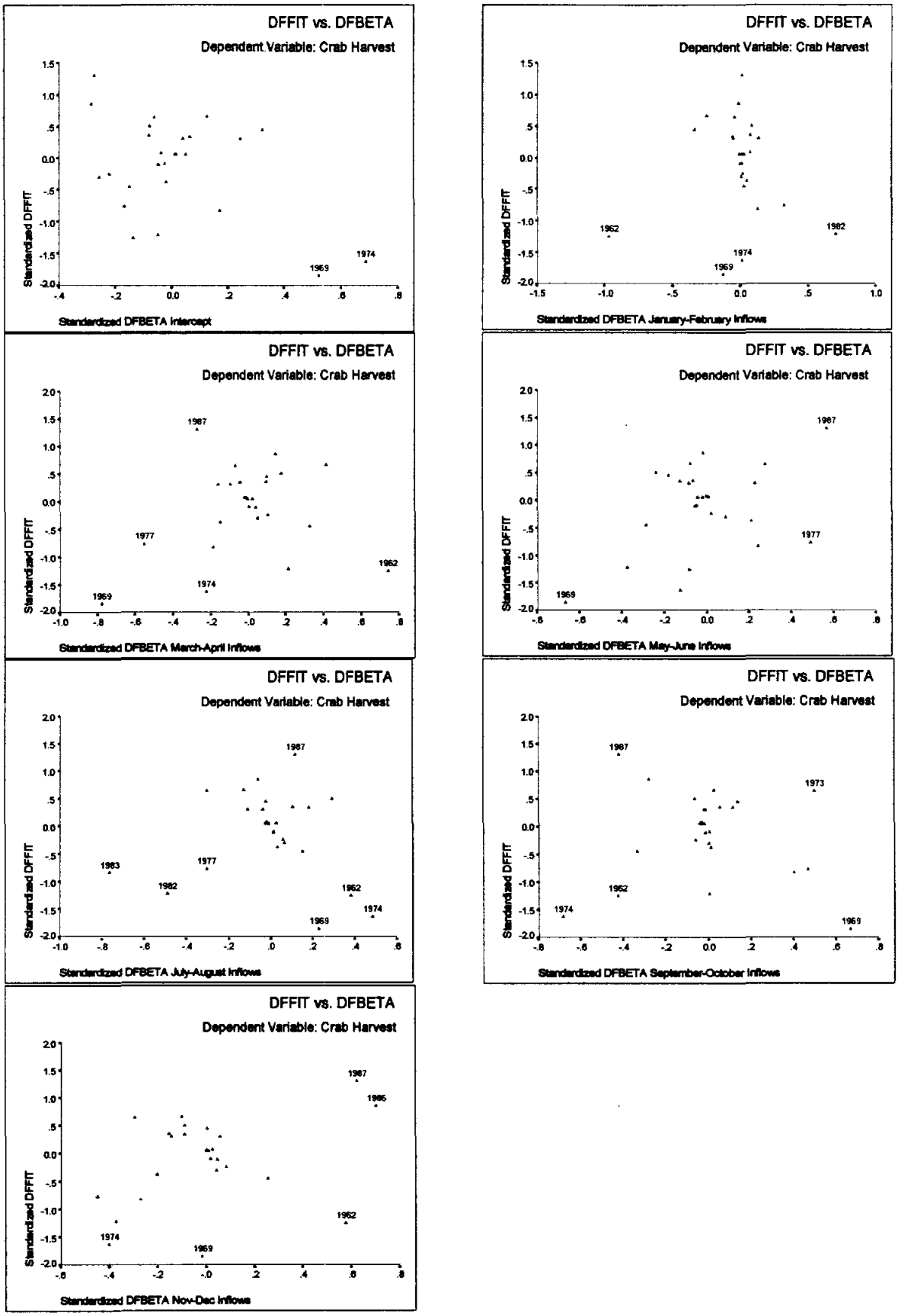


Fig. 3.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Harvest and Logged Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (November-December Inflows), Ln (March-April Inflows), Ln(July-August Inflows), Ln(January -February Inflows), Ln(May -June Inflows), Ln(September-October Inflows)[c,d]	.	.722	.521	.369	489.4289	1.454

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows) , Ln (March-April Inflows), Ln (July-August Inflows), Ln (January -February Inflows), Ln (May -June Inflows), Ln (September-October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4942647	6	823775	3.439	.018[b]
	Residual	4551273	19	239541		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (January-February Inflows), L (May-June Inflows), Ln (September-October Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-3916	2085		-1.878	.076		
	Ln (January-February Inflows)	-297	276.3	-.221	-1.075	.296	.599	1.670
	Ln (March-April Inflows)	917.4	271.3	.799	3.382	.003	.452	2.214
	Ln (May-June Inflows)	-40.7	266.2	-.038	-.153	.880	.413	2.422
	Ln (July-August Inflows)	-347	279.9	-.347	-1.238	.231	.321	3.116
	Ln (September-October Inflows)	-145	270.7	-.148	-.534	.599	.331	3.024
	Ln (November-December Inflows)	644.9	243.5	.577	2.649	.016	.531	1.884

a. Dependent Variable: CRAB

Collinearity Diagnostics

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-3915.89	2084.65	-1.878	0.0758	0.0000
Ln(Jan-Feb Inflows)	1	-296.99	276.34	-1.075	0.296	1.6698
Ln(Mar-Apr Inflows)	1	917.45	271.27	3.382	0.003	2.2137
Ln(May-Jun Inflows)	1	-40.66	266.16	-0.153	0.880	2.4224
Ln(Jul-Aug Inflows)	1	-346.64	279.91	-1.238	0.231	3.1165
Ln(Sept-Oct Inflows)	1	-144.64	270.73	-0.534	0.599	3.0236
Ln(Nov-Dec Inflows)	1	644.90	243.48	2.649	0.016	1.8835

#	Eigen value	Cond Index	Ln(Jan-Feb Inflows)	Ln(Mar-Apr Inflows)	Ln(May-Jun Inflows)	Ln(Jul-Aug Inflows)	Ln(Sept_Oct Inflows)	Ln(Nov-Dec Inflows)
1	3.041	1.0000	0.0351	0.0212	0.0236	0.0249	0.0214	0.0126
2	1.233	1.5704	0.0021	0.0888	0.0391	0.0000	0.0360	0.2162
3	0.622	2.2106	0.3653	0.0822	0.2349	0.0694	0.0080	0.0028
4	0.519	2.4196	0.4658	0.2052	0.0316	0.0061	0.1912	0.0102
5	0.449	2.6017	0.0080	0.1240	0.1268	0.2466	0.0535	0.3718
6	0.135	4.7543	0.1237	0.4786	0.5440	0.6530	0.6897	0.3865

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	876.4794	2516.776	1699.58	444.6413	26
Std. Predicted Value	-1.851	1.838	.000	1.000	26
Standard Error of Predicted Value	174.7694	370.7955	250.6312	41.7464	26
Adjusted Predicted Value	835.3041	2750.170	1709.41	472.1406	26
Residual	-750.6632	982.6425	1.0E-12	426.6743	26
Std. Residual	-1.534	2.008	.000	.872	26
Stud. Residual	-1.826	2.186	-.009	1.018	26
Deleted Residual	-1063.54	1164.410	-9.8329	586.2800	26
Stud. Deleted Residual	-1.957	2.459	.005	1.072	26
Mahal. Distance	2.226	13.388	5.769	2.344	26
Cook's Distance	.000	.329	.055	.078	26
Centered Leverage Value	.089	.536	.231	.094	26

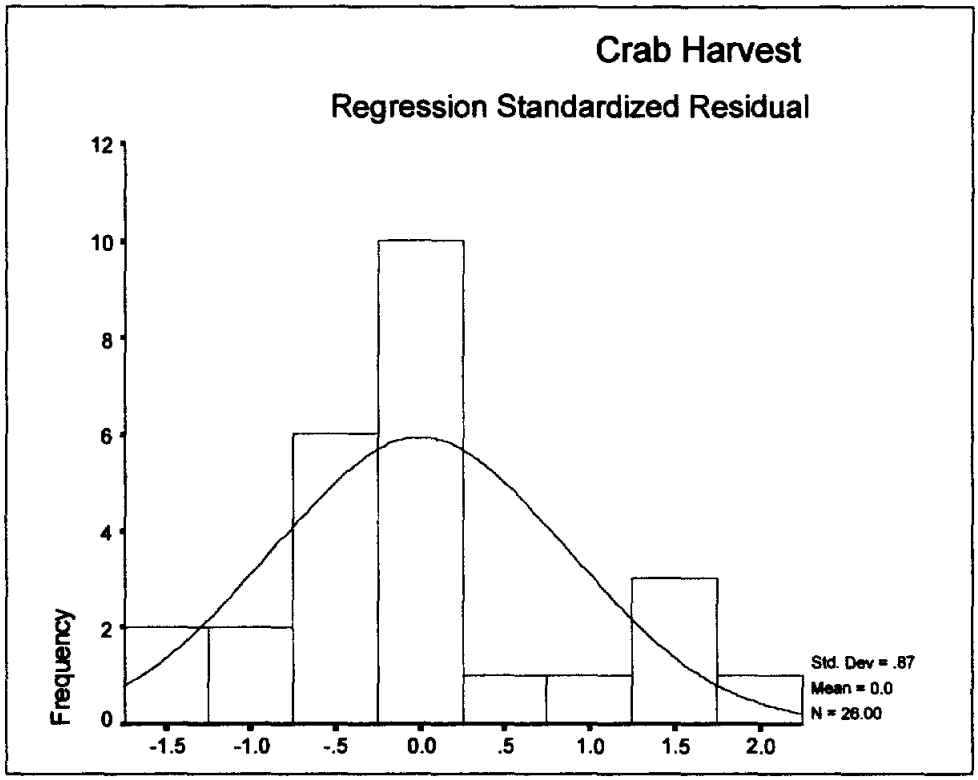
a. Dependent Variable: CRAB

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	1061.9632	-750.6632	-1063.54144	1374.84144	-1.43400	-1.53375	-1.82562	-1.95682
1963	876.4794	101.0206	142.19590	835.30410	-1.85116	.20640	.24488	.23873
1964	1439.2082	-243.6028	-341.86437	1537.46437	-.58559	-.49773	-.58963	-.57923
1965	1960.9971	-143.0971	-184.80432	2002.70432	.58793	-.29238	-.33226	-.32434
1966	1405.9791	-48.1791	-62.36044	1420.16044	-.66031	-.09844	-.11199	-.10904
1967	1150.3819	-102.4819	-127.22263	1175.12263	-1.23515	-.20939	-.23330	-.22740
1968	1802.8458	-260.2458	-304.82364	1847.42364	.23224	-.53173	-.57548	-.56507
1969	2154.9025	-449.2025	-654.18625	2359.88625	1.02402	-.91781	-1.10760	-1.11464
1970	1991.7228	630.2772	1122.41931	1499.58069	.65703	1.28778	1.71852	1.82011
1971	2183.1281	-22.3281	-52.40976	2213.20976	1.08750	-.04562	-.06989	-.06804
1972	1190.8458	679.2542	873.05288	997.04712	-1.14415	1.38785	1.57343	1.64218
1973	2118.9317	-71.9317	-90.70496	2137.70496	.94312	-.14697	-.16504	-.16075
1974	2516.7758	-533.8758	-767.27036	2750.17036	1.83787	-1.09081	-1.30769	-1.33427
1975	1859.1956	4.3044	5.47647	1858.02353	.35897	.00879	.00992	.00966
1976	1488.9774	110.5226	126.67518	1472.82482	-.47365	.22582	.24176	.23567
1977	2194.5869	-335.1869	-475.33774	2334.73774	1.11327	-.68485	-.81556	-.80808
1978	1876.3332	44.5668	65.26146	1855.63854	.39752	.09106	.11019	.10729
1979	1494.7782	458.9218	588.64884	1365.05116	-.46060	.93767	1.06196	1.06575
1980	1453.1715	295.9285	408.98449	1340.11551	-.55418	.60464	.71082	.70124
1981	1226.0034	-615.8034	-841.96317	1452.16317	-1.06508	-1.25821	-1.47122	-1.52125
1982	1555.5598	-339.4598	-571.99744	1788.09744	-.32390	-.69358	-.90033	-.89563
1983	1469.4600	-61.8600	-85.47853	1493.07853	-.51754	-.12639	-.14857	-.14470
1984	1280.4631	116.1369	155.74791	1240.85209	-.94260	.23729	.27479	.26800
1985	2343.6851	-175.7851	-230.11617	2398.01617	1.44859	-.35916	-.41094	-.40177
1986	2288.4722	730.1278	945.55305	2073.04695	1.32442	1.49180	1.69767	1.79405
1987	1804.2575	982.6425	1164.41023	1622.48977	.23542	2.00773	2.18555	2.45865

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$



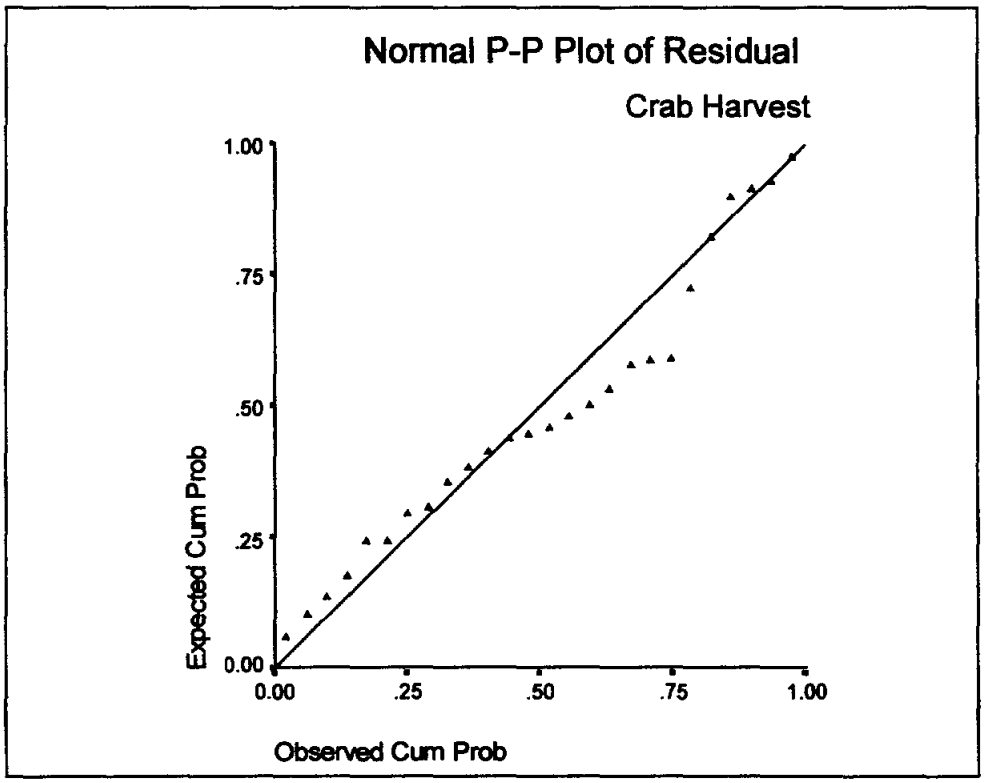


Fig. 4.1. Exploratory Plots of Crab Harvest Standardized Residual.

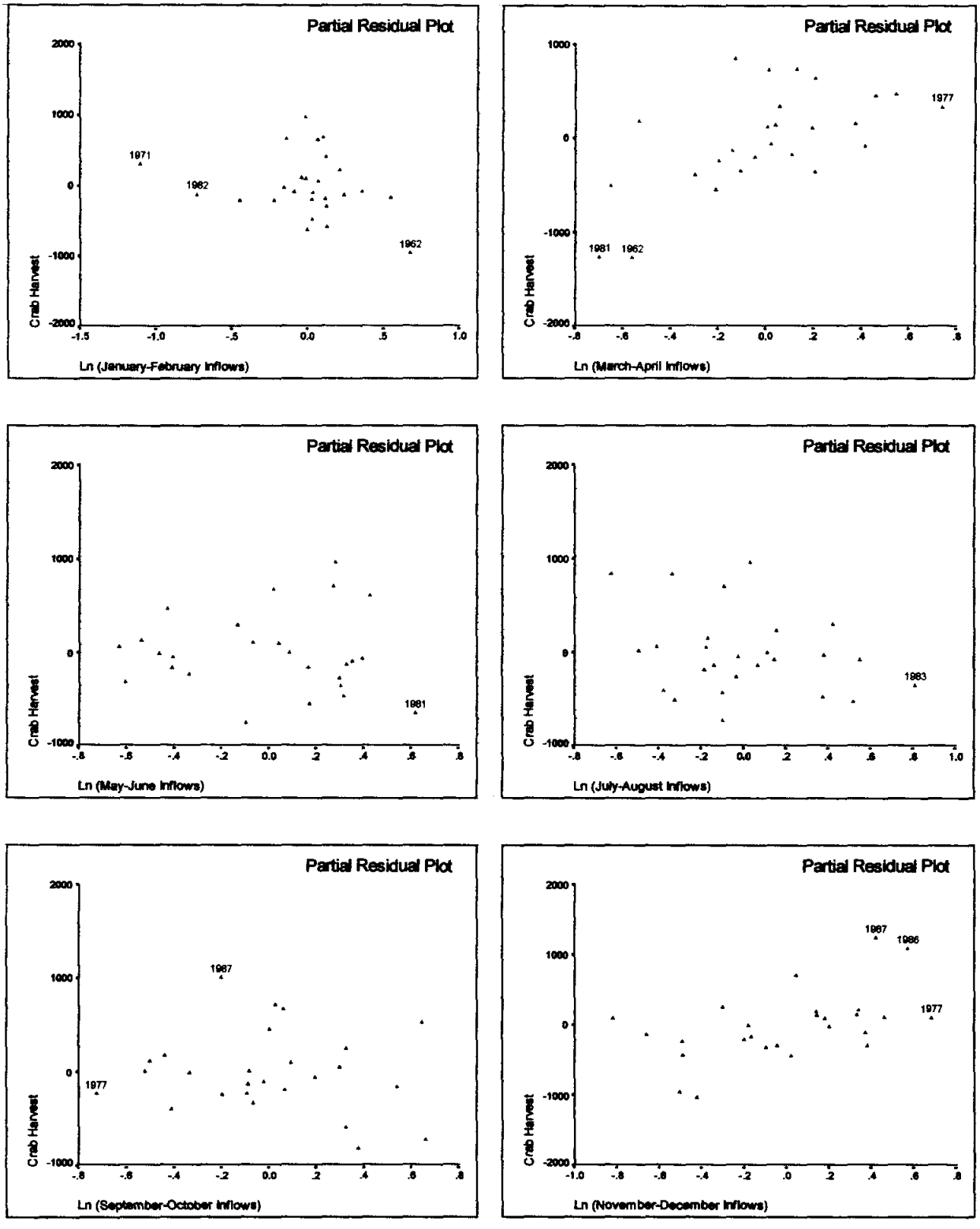


Fig 4.2. Partial Residual Plots of Crab Harvest vs. Logged Inflows

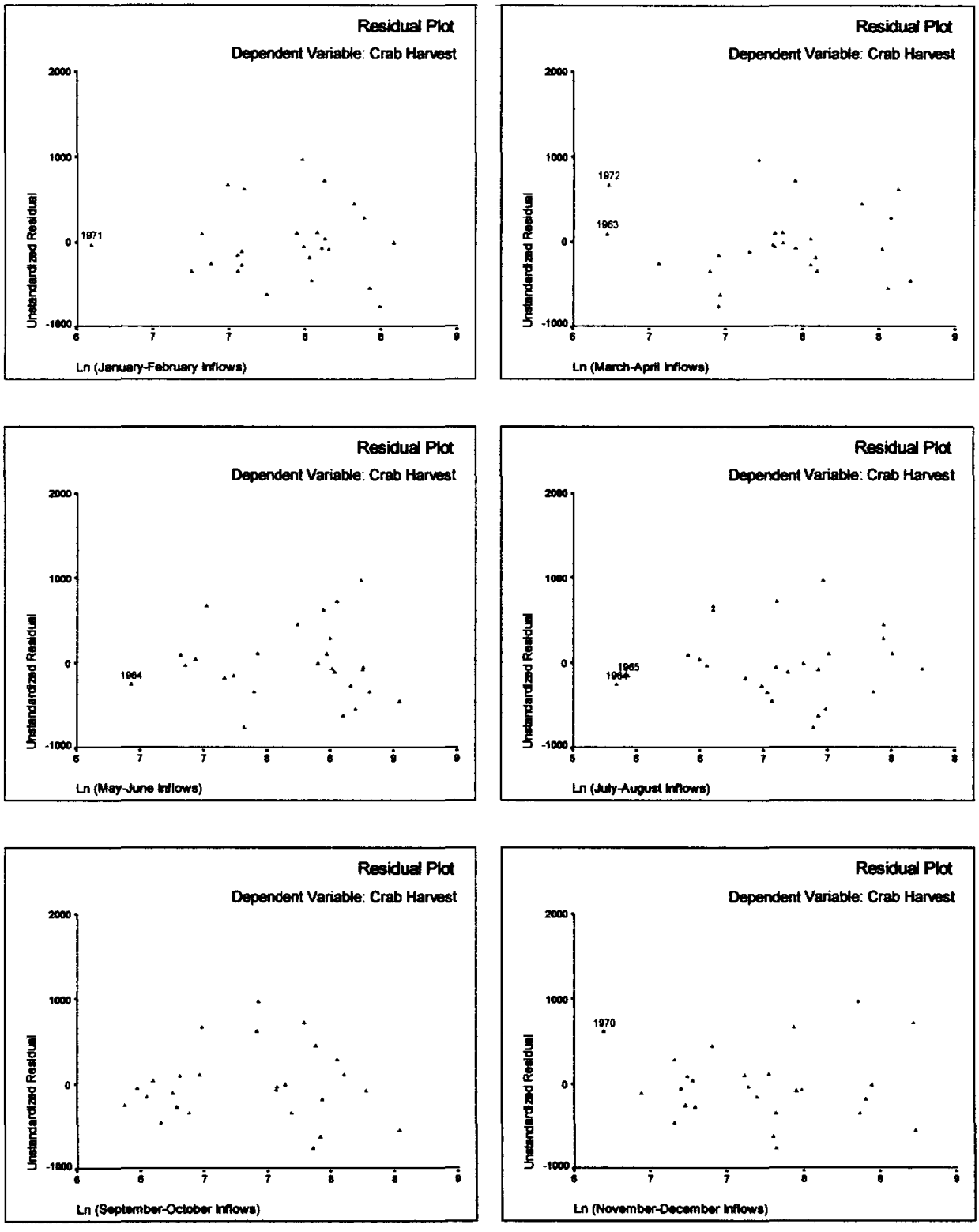


Fig 4.3. Residual Plots of Crab Harvest vs. Logged Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-530.96353	2654.88999
1963	977.50	-713.60304	2466.56191
1964	1195.60	-149.56027	3027.96590
1965	1817.90	410.80067	3511.19346
1966	1357.80	-145.30813	2957.26637
1967	1047.90	-379.94718	2680.71099
1968	1542.60	303.72842	3301.96316
1969	1705.70	550.22990	3759.57507
1970	2622.00	312.34927	3671.09635
1971	2160.80	426.43498	3939.82121
1972	1870.10	-357.00574	2738.69744
1973	2047.00	580.61452	3657.24891
1974	1982.90	917.70488	4115.84666
1975	1863.50	316.39838	3401.99273
1976	1599.50	2.15813	2975.79676
1977	1859.40	601.25426	3787.91948
1978	1920.90	269.36364	3483.30281
1979	1953.70	-52.06150	3041.61793
1980	1749.10	-128.79126	3035.13432
1981	610.20	-351.10541	2803.11221
1982	1216.10	-105.07083	3216.19039
1983	1407.60	-112.42719	3051.34725
1984	1396.60	-287.74276	2848.66891
1985	2167.90	786.91355	3900.45663
1986	3018.60	736.91895	3840.02546
1987	2786.90	298.70530	3309.80969

CRAB Crab harvest
LICI Lower limit for 99% prediction interval for crab harvest
UICI Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.39309	.19845	.25572	.495	.018
1963	6.27765	.00349	.25111	.508	.000
1964	6.22417	.02003	.24897	.514	.000
1965	4.68054	.00460	.18722	.699	.000
1966	4.72368	.00053	.18895	.694	.000
1967	3.90016	.00188	.15601	.791	.000
1968	2.69450	.00810	.10778	.912	.000
1969	6.87200	.07997	.27488	.442	.001
1970	10.00010	.32943	.40000	.189	.069
1971	13.38773	.00094	**.53551**	**.063**	.000
1972	4.58792	.10091	.18352	.710	.002
1973	4.21272	.00102	.16851	.755	.000
1974	6.64317	.10680	.26573	.467	.003
1975	4.38873	.00000	.17555	.734	.000
1976	2.22626	.00122	.08905	.946	.000
1977	6.40958	.03973	.25638	.493	.000
1978	6.96607	.00081	.27864	.432	.000
1979	4.54799	.04554	.18192	.715	.000
1980	5.94924	.02758	.23797	.546	.000
1981	5.75371	.11356	.23015	.569	.003
1982	9.20187	.07932	.36807	.238	.001
1983	5.94619	.00120	.23785	.546	.000
1984	5.39665	.00368	.21587	.612	.000
1985	4.94103	.00746	.19764	.667	.000
1986	4.73421	.12148	.18937	.692	.004
1987	2.94103	.12623	.11764	.890	.005

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.26333**	-.04643	-.89488	.72084	.12104	.13224	-.49178	.48612
1963	.15241	.12241	.01238	-.10165	.00619	-.02712	.04703	-.06923
1964	-.36787	-.23960	-.05026	.03945	.12509	.07249	.03375	.03180
1965	-.17510	-.03235	-.02437	.00930	-.03370	.10426	.01791	-.03785
1966	-.05916	-.00124	-.01700	.01339	-.02675	.00168	.02263	.01010
1967	-.11173	-.05326	.01162	.04127	-.04567	-.00996	.00232	.06144
1968	-.23387	-.02628	.07586	-.03743	-.09973	.01208	.06574	.01334
1969	-.75296	.21592	-.02529	-.31064	-.23126	.07421	.30163	-.01597
1970	**1.60834**	.30242	-.18244	.17297	.56807	-.86601	.87072	-.98521
1971	-.07897	-.03400	.06497	-.03164	.02621	-.00863	-.01144	-.00941
1972	.87716	.44211	.07377	-.54865	.02050	-.09746	.06327	.04590
1973	-.08212	.03459	-.00410	-.00251	-.03482	.04231	-.05412	.01774
1974	-.88220	.64057	-.11871	-.18669	-.15066	.34240	-.29063	-.30616
1975	.00504	-.00306	.00339	-.00084	.00051	-.00109	-.00049	.00185
1976	.09010	-.00278	-.00069	.00596	-.00941	.05455	-.06101	.01783
1977	-.52252	.01069	.24368	-.39446	.31679	-.28711	.38436	-.32923
1978	.07311	.00319	.02673	.03328	-.04443	.00844	-.03574	.00956
1979	.56663	-.04410	.08311	.14075	-.27906	.29314	.00360	-.17926
1980	.43343	-.02923	.09946	.02684	-.05863	.07449	.14872	-.26981
1981	-.92191	-.16432	-.00489	.68760	-.59897	.32792	-.65324	.44295
1982	-.74128	-.04772	.47695	.13445	-.19214	-.24910	.04212	-.21763
1983	-.08941	.01584	.01453	-.01861	.03737	-.07876	.04882	-.02821
1984	.15651	.01757	-.00617	.00151	-.09005	.09730	.01600	-.02689
1985	-.22336	.06748	-.00813	-.09599	.10196	.03698	-.01697	-.10658
1986	.97450	-.58736	.12299	.01482	.30498	-.39342	.03216	.58539
1987	**1.05744**	-.44245	-.01821	-.18978	.41161	.05101	-.29420	.56693

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the January-February inflows
SDFB_2 Standardized dfbeta for the March-April inflows
SDFB_3 Standardized dfbeta for the May-June inflows
SDFB_4 Standardized dfbeta for the July-August inflows
SDFB_5 Standardized dfbeta for the September-October inflows
SDFB_6 Standardized dfbeta for the November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

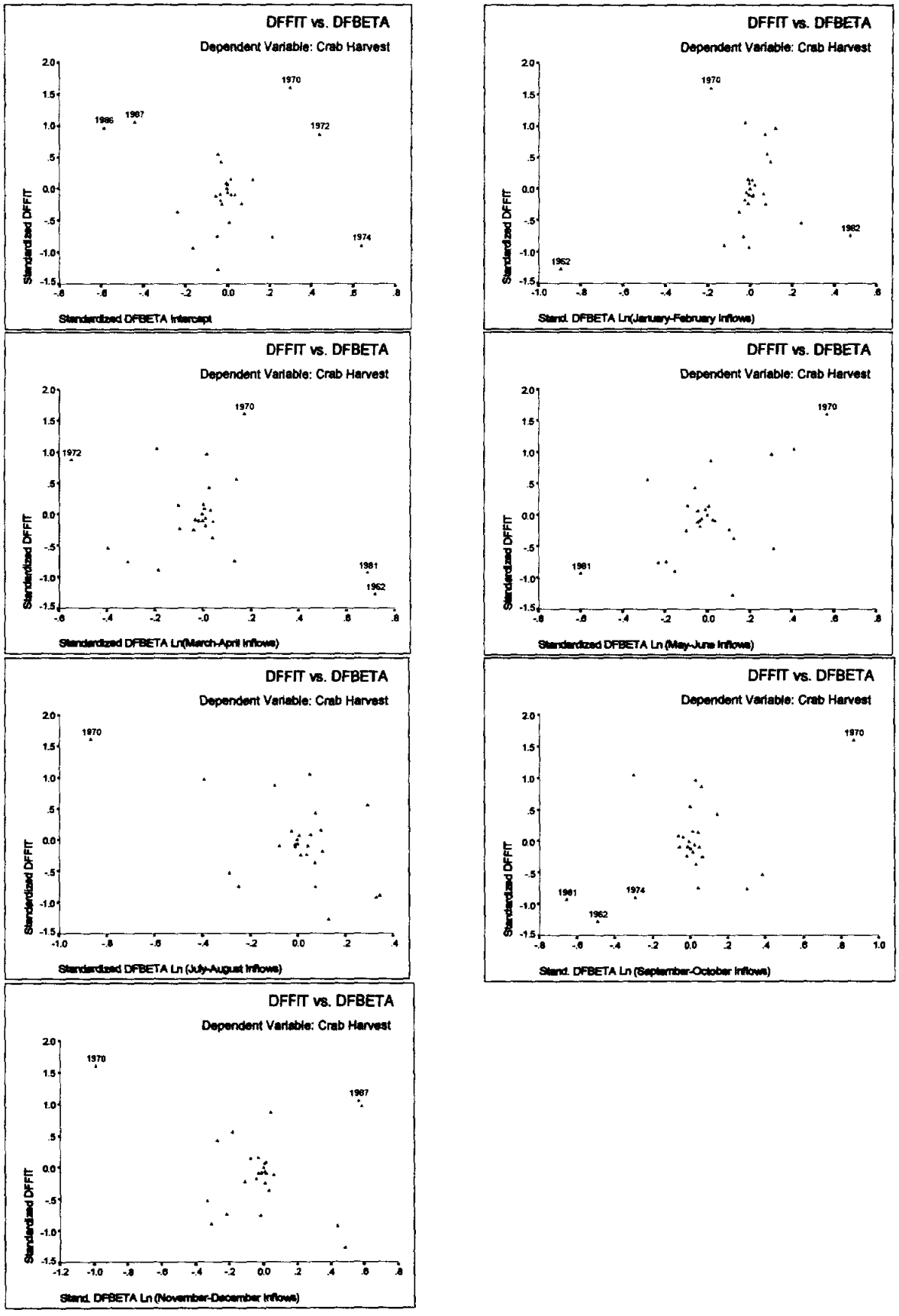


Fig. 4.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Harvest and Squared Root Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (Sept-Oct Inflows), SQRT (May-June Inflows), SQRT (Jan-Feb Inflows), SQRT (Nov-Dec Inflows), SQRT (March-April Inflows), SQRT (Jul-Aug Inflows)[c,d]	.	.769	.592	.463	451.629	1.442

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5618521	6	936420	4.591	.005[b]
	Residual	3875400	19	203968		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	194.9	548.70		.355	.726	-953.5	1343.4		
	SQRT (Jul-Aug Inflows)	-5.939	16.276	-.083	-.365	.719	-40.006	28.127	.413	2.421
	SQRT (Jan-Feb Inflows)	-20.53	13.666	-.291	-1.5	.150	-49.131	8.077	.572	1.747
	SQRT (March-April Inflows)	54.975	13.111	.941	4.19	.000	27.533	82.416	.426	2.347
	SQRT (May-June Inflows)	-12.24	10.171	-.254	-1.2	.244	-33.524	9.053	.482	2.076
	SQRT (Nov-Dec Inflows)	43.782	11.911	.774	3.68	.002	18.851	68.712	.485	2.063
	SQRT (Sept-Oct Inflows)	-25.46	15.688	-.418	-1.6	.121	-58.299	7.373	.324	3.088

a. Dependent Variable: CRAB

Collinearity Diagnostics

Variable	DF	Estimate	Error	Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	194.9154	548.7037	0.355	0.7263	0.0000000
SQRT (Jan - Feb Inflows)	1	-20.5269	13.6665	-1.502	0.1495	1.7467889
SQRT (March-April Inflows)	1	54.9748	13.1110	4.193	0.0005	2.3466283
SQRT (May-June Inflows)	1	-12.2356	10.1712	-1.203	0.2438	2.0760729
SQRT (July-August Inflows)	1	-5.9393	16.2763	-0.365	0.7192	2.4214418
SQRT (Sept-October Inflows)	1	-25.4628	15.6882	-1.623	0.1211	3.0882503
SQRT (Nov - Dec Inflows)	1	43.7817	11.9113	3.676	0.0016	2.0633136

#	Eigen value	Cond Index	SQRT (Jan-Feb Inflows)	SQRT (Mar-Apr Inflows)	SQRT (May-Jun Inflows)	SQRT (Jul-Aug Inflows)	SQRT (Sept-Oct Inflows)	SQRT (Nov-Dec Inflows)
1	2.922	1.0000	0.0388	0.0203	0.0243	0.0296	0.0243	0.0144
2	1.205	1.5571	0.0000	0.0973	0.0635	0.0001	0.0291	0.1840
3	0.685	2.0651	0.1883	0.1006	0.2880	0.0753	0.0214	0.0233
4	0.577	2.2499	0.0371	0.1097	0.0883	0.3329	0.0006	0.2031
5	0.473	2.4844	0.6179	0.0741	0.0363	0.0156	0.2246	0.0254
6	0.138	4.6073	0.1179	0.5980	0.4997	0.5464	0.7000	0.5497

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	892.1780	2543.935	1699.58	474.0684	26
Std. Predicted Value	-1.703	1.781	.000	1.000	26
Standard Error of Predicted Value	151.5117	294.4166	231.2297	38.7982	26
Adjusted Predicted Value	1005.069	2880.392	1726.76	504.8395	26
Residual	-580.8781	953.6703	-6.E-13	393.7207	26
Std. Residual	-1.286	2.112	.000	.872	26
Stud. Residual	-1.601	2.318	-.025	1.031	26
Deleted Residual	-902.2435	1148.765	-27.1781	554.6936	26
Stud. Deleted Residual	-1.676	2.663	-.016	1.086	26
Mahal. Distance	1.852	9.663	5.769	2.172	26
Cook's Distance	.000	.217	.062	.076	26
Centered Leverage Value	.074	.387	.231	.087	26

a. Dependent Variable: CRAB

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	892.1781	-580.8780	-900.2616	1211.5616	-1.70314	-1.28619	-1.60120	-1.67564
1963	998.7458	-21.2458	-27.5692	1005.0692	-1.47834	-.04704	-.05359	-.05216
1964	1412.1501	-216.5501	-279.5305	1475.1305	-.60631	-.47949	-.54477	-.53443
1965	1810.1047	7.7952	9.2273	1808.6726	.23314	.01726	.01878	.01828
1966	1278.9278	78.8721	103.2593	1254.5406	-.88733	.17464	.19982	.19470
1967	1122.4685	-74.5685	-90.0148	1137.9148	-1.21736	-.16511	-.18141	-.17672
1968	1729.9540	-187.3540	-217.5858	1760.1858	.06407	-.41484	-.44706	-.43744
1969	2264.9049	-559.2049	-902.2435	2607.9435	1.19250	-1.23820	-1.57277	-1.64140
1970	2066.5496	555.4504	838.4407	1783.5592	.77408	1.22988	1.51104	1.56797
1971	2065.4411	95.3588	163.0614	1997.7385	.77175	.21114	.27611	.26928
1972	1382.4851	487.6148	589.8788	1280.2211	-.66888	1.07968	1.18751	1.20128
1973	1915.5622	131.4377	177.2699	1869.7300	.45559	.29103	.33798	.32996
1974	2543.9350	-561.0350	-897.4922	2880.3922	1.78108	-1.24225	-1.57119	-1.63950
1975	1828.7678	34.7321	48.8142	1814.6857	.27251	.07690	.09117	.08876
1976	1515.7185	83.7814	94.4065	1505.0934	-.38784	.18551	.19692	.19187
1977	2384.6877	-525.2877	-724.5286	2583.9286	1.44516	-1.16310	-1.36598	-1.40007
1978	1912.3206	8.5793	12.0127	1908.8873	.44875	.01900	.02248	.02188
1979	1544.3445	409.3554	535.3197	1418.3802	-.32746	.90640	1.03651	1.03866
1980	1457.8233	291.2766	405.5922	1343.5077	-.50996	.64495	.76106	.75231
1981	967.5510	-357.3510	-524.4970	1134.6970	-1.54414	-.79125	-.95860	-.95645
1982	1623.8032	-407.7032	-709.0162	1925.1162	-.15985	-.90274	-1.19047	-1.20451
1983	1588.5390	-180.9390	-295.9102	1703.5102	-.23423	-.40064	-.51235	-.50216
1984	1241.3087	155.2912	213.2867	1183.3132	-.96668	.34385	.40297	.39391
1985	2411.3875	-243.4875	-318.6192	2486.5192	1.50149	-.53913	-.61673	-.60638
1986	2396.2105	622.3894	841.3031	2177.2968	1.46947	1.37810	1.60223	1.67689
1987	1833.2296	953.6703	1148.7650	1638.1350	.28192	2.11163	2.31757	**2.66342**

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$

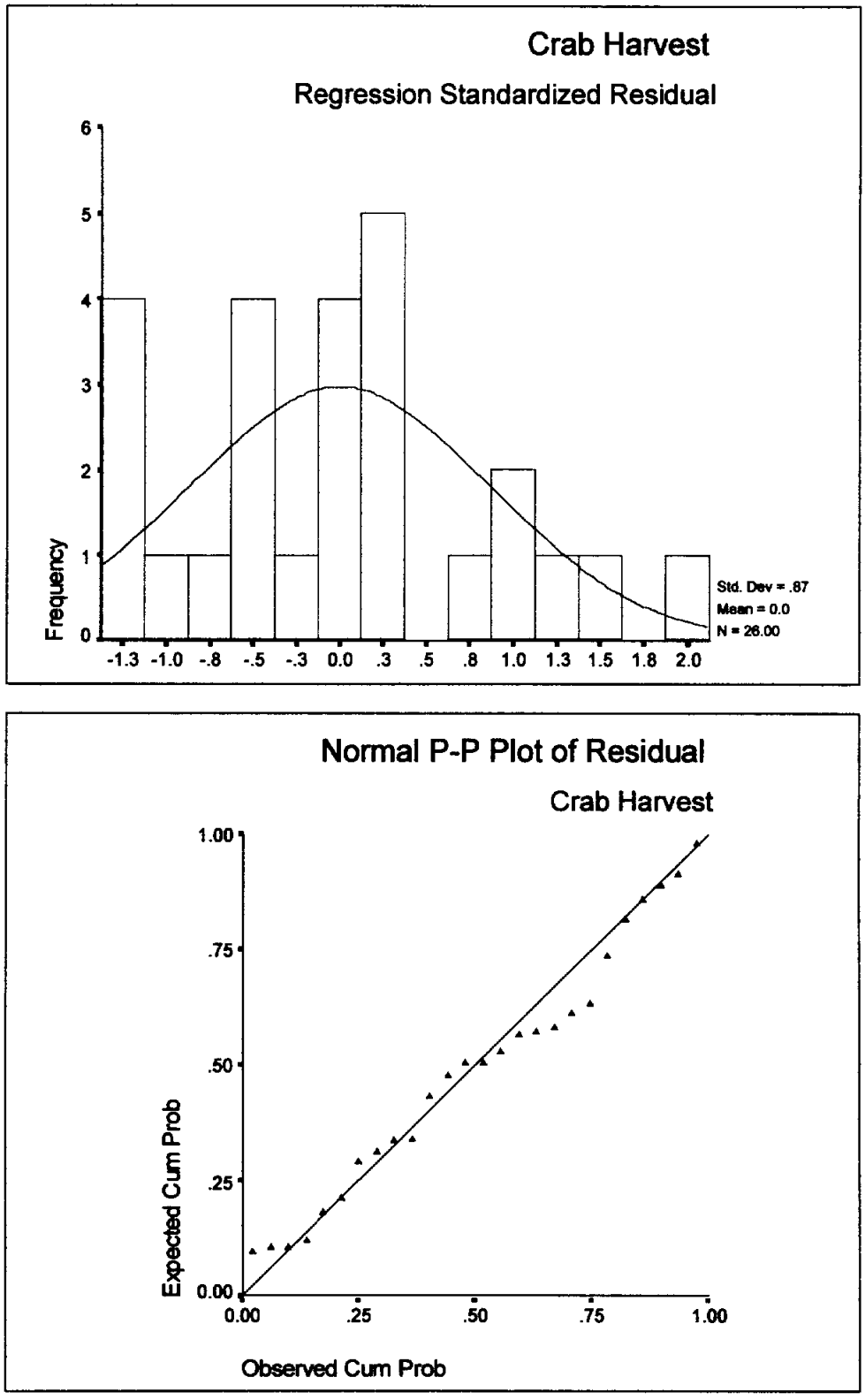


Fig. 5.1. Exploratory Plots of Crab Harvest Standardized Residual.

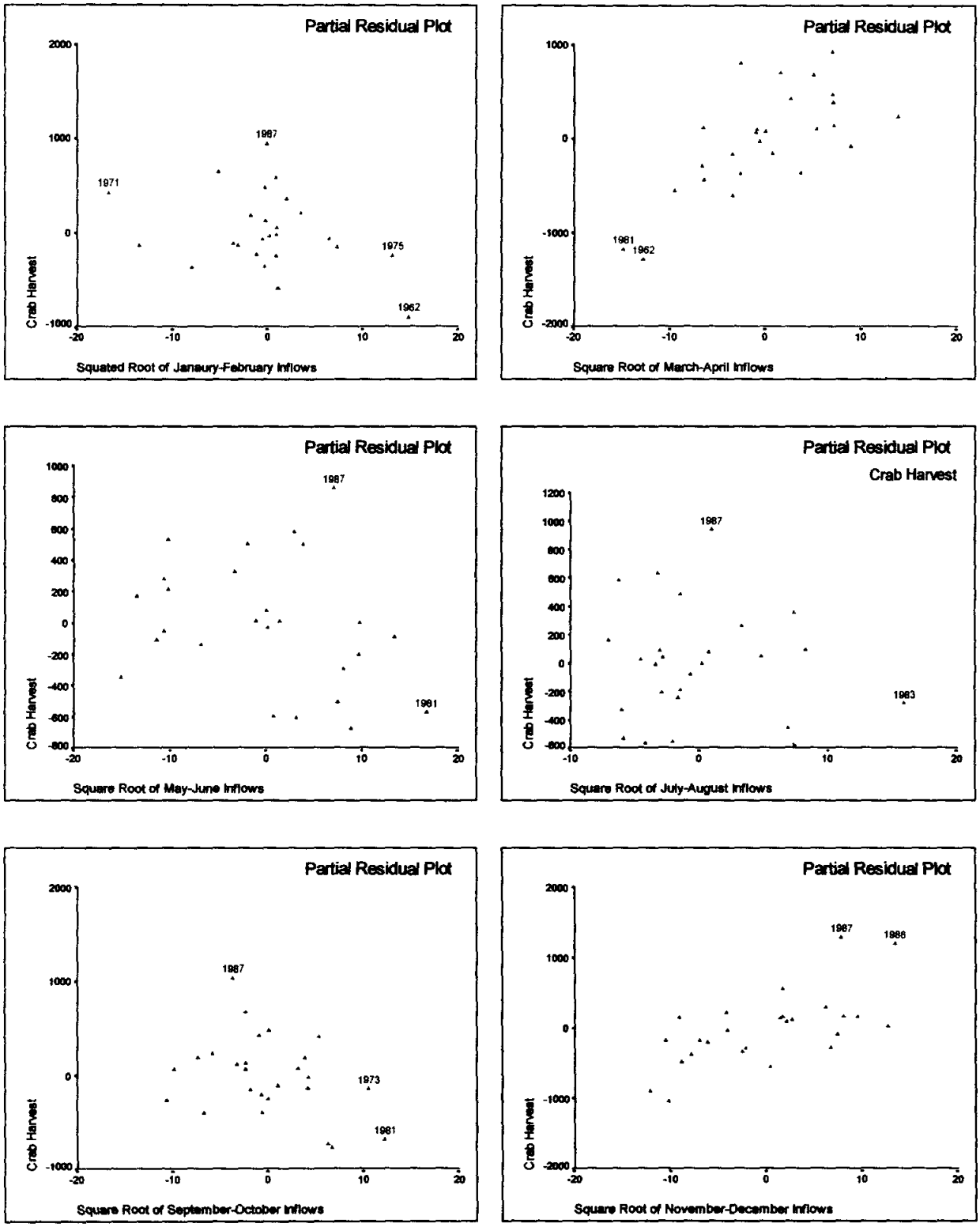


Fig 5.2. Partial Residual Plots of Crab Harvest vs. Squared Root Inflows

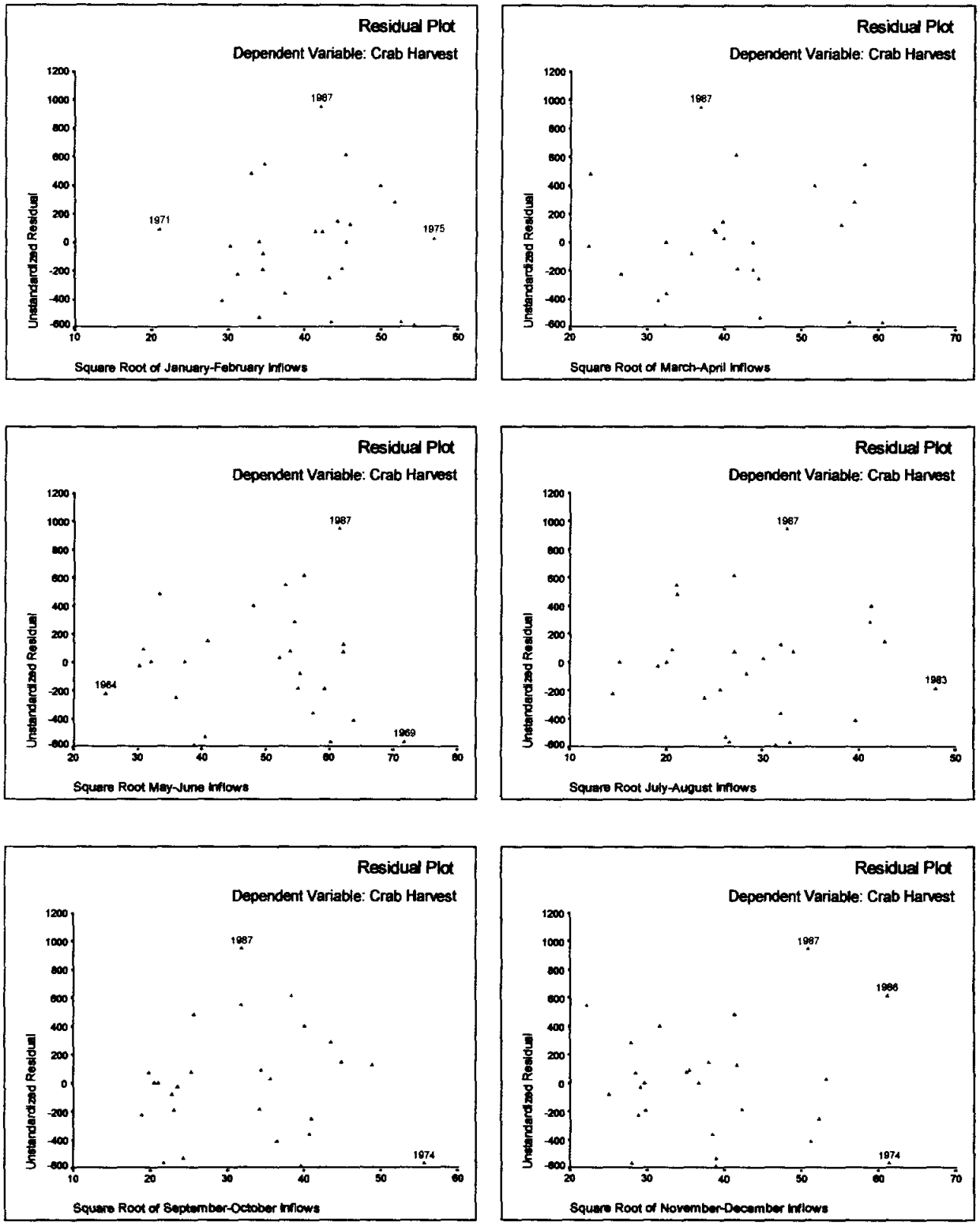


Fig 5.3. Residual Plots of Crab Harvest vs. Squared Root Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-611.73170	2396.08782
1963	977.50	-433.87112	2431.36275
1964	1195.60	-18.09996	2842.40028
1965	1817.90	421.37719	3198.83227
1966	1357.80	-157.65016	2715.50578
1967	1047.90	-276.08310	2521.02027
1968	1542.60	351.03037	3108.87764
1969	1705.70	746.94131	3782.86859
1970	2622.00	572.24374	3560.85547
1971	2160.80	528.35624	3602.52614
1972	1870.10	-17.12100	2782.09128
1973	2047.00	466.04384	3365.08070
1974	1982.90	1028.89994	4058.97025
1975	1863.50	362.11022	3295.42546
1976	1599.50	152.86764	2878.56947
1977	1859.40	925.72770	3843.64787
1978	1920.90	447.18365	3377.45773
1979	1953.70	108.27066	2980.41843
1980	1749.10	-5.05339	2920.70006
1981	610.20	-516.19264	2451.29469
1982	1216.10	81.41841	3166.18813
1983	1407.60	66.00274	3111.07532
1984	1396.60	-215.88771	2698.50517
1985	2167.90	975.02463	3847.75048
1986	3018.60	945.73479	3846.68630
1987	2786.90	435.73311	3230.72626

CRAB Crab harvest

LICI Lower limit for 99% prediction interval for crab harvest

UICI Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	7.90765	.20138	.31631	.341	.019
1963	4.77262	.00012	.19090	.688	.000
1964	4.67116	.01233	.18685	.700	.000
1965	2.91834	.00001	.11673	.892	.000
1966	4.94281	.00176	.19771	.667	.000
1967	3.32839	.00097	.13314	.853	.000
1968	2.51201	.00461	.10048	.926	.000
1969	8.54362	.21677	.34174	.287	.023
1970	7.47646	.16618	.29906	.381	.011
1971	9.41839	.00773	.37674	.224	.000
1972	3.37257	.04225	.13490	.849	.000
1973	5.50208	.00569	.22008	.599	.000
1974	8.41061	.21149	.33642	.298	.022
1975	6.25054	.00048	.25002	.511	.000
1976	1.85211	.00070	.07408	.968	.000
1977	5.91330	.10111	.23653	.550	.002
1978	6.18378	.00003	.24735	.518	.000
1979	4.92113	.04723	.19685	.670	.000
1980	6.08467	.03247	.24339	.530	.000
1981	7.00543	.06140	.28022	.428	.000
1982	9.66279	.14963	.38651	.209	.008
1983	8.75181	.02383	.35007	.271	.000
1984	5.83629	.00866	.23345	.559	.000
1985	4.93356	.01677	.19734	.668	.000
1986	5.54366	.12899	.22175	.594	.005
1987	3.28421	.15697	.13137	.858	.009

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.2425**	-.11165	.31016	-.93852	.76860	-.03631	.55771	-.48991
1963	-.0284	-.02536	.00715	-.00040	.01627	-.00024	.01213	-.00874
1964	-.2882	-.22962	.06312	-.01785	.04618	.09197	.03839	.01459
1965	.0078	.00391	-.00326	.00055	-.00032	-.00044	.00145	-.00165
1966	.1082	.01035	-.02459	.04407	-.04222	.06736	-.03576	-.01796
1967	-.0804	-.04073	.00463	.00326	.03575	-.04252	.04477	-.00706
1968	-.1757	-.04042	.02349	.04372	-.01074	-.08609	.02615	.02986
1969	**-1.2855**	.35979	.14878	-.06559	-.54175	-.42037	-.03027	.48499
1970	**1.1191**	.24106	-.43467	-.29775	.39214	.17177	-.45857	.36312
1971	.2269	.12088	.00922	-.17733	.07266	-.08038	.01747	.05296
1972	.5501	.34667	-.06647	-.00997	-.24869	-.05691	.06490	.00419
1973	.1948	-.04159	-.09668	-.00207	-.01079	.08499	-.06955	.14039
1974	**-1.2696**	.72934	.43792	-.07469	-.22741	-.15112	-.37123	-.45857
1975	.0565	-.02661	-.01068	.04203	-.01040	.00333	.01752	-.01176
1976	.0683	.00043	.03542	.00616	.00011	.00026	.00870	-.04118
1977	-.8622	-.02671	-.44004	.39682	-.66515	.55707	-.55386	.60240
1978	.0138	.00146	.00025	.00580	.00535	-.00781	.00150	-.00662
1979	.5761	-.09381	.31731	.07650	.17351	-.27249	-.12716	-.03891
1980	.4713	-.07848	.10661	.09685	.06816	-.06503	-.24381	.12057
1981	-.6541	-.19959	.24959	.01025	.49770	-.43771	.36956	-.49679
1982	**-1.0355**	-.04178	-.39811	.64776	.15526	-.27008	-.31667	.03581
1983	-.4002	.09588	-.36843	.07015	-.10003	.15344	-.13834	.21924
1984	.2407	.02531	.13738	-.02483	-.01150	-.10976	-.04815	.05091
1985	-.3368	.04858	.04118	.02260	-.14431	.17794	-.17657	-.00150
1986	.9945	-.45216	-.22446	.05599	.09199	.13572	.69792	-.15609
1987	**1.20466**	-.37520	.10630	-.00127	-.21208	.46860	.61209	-.37598

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

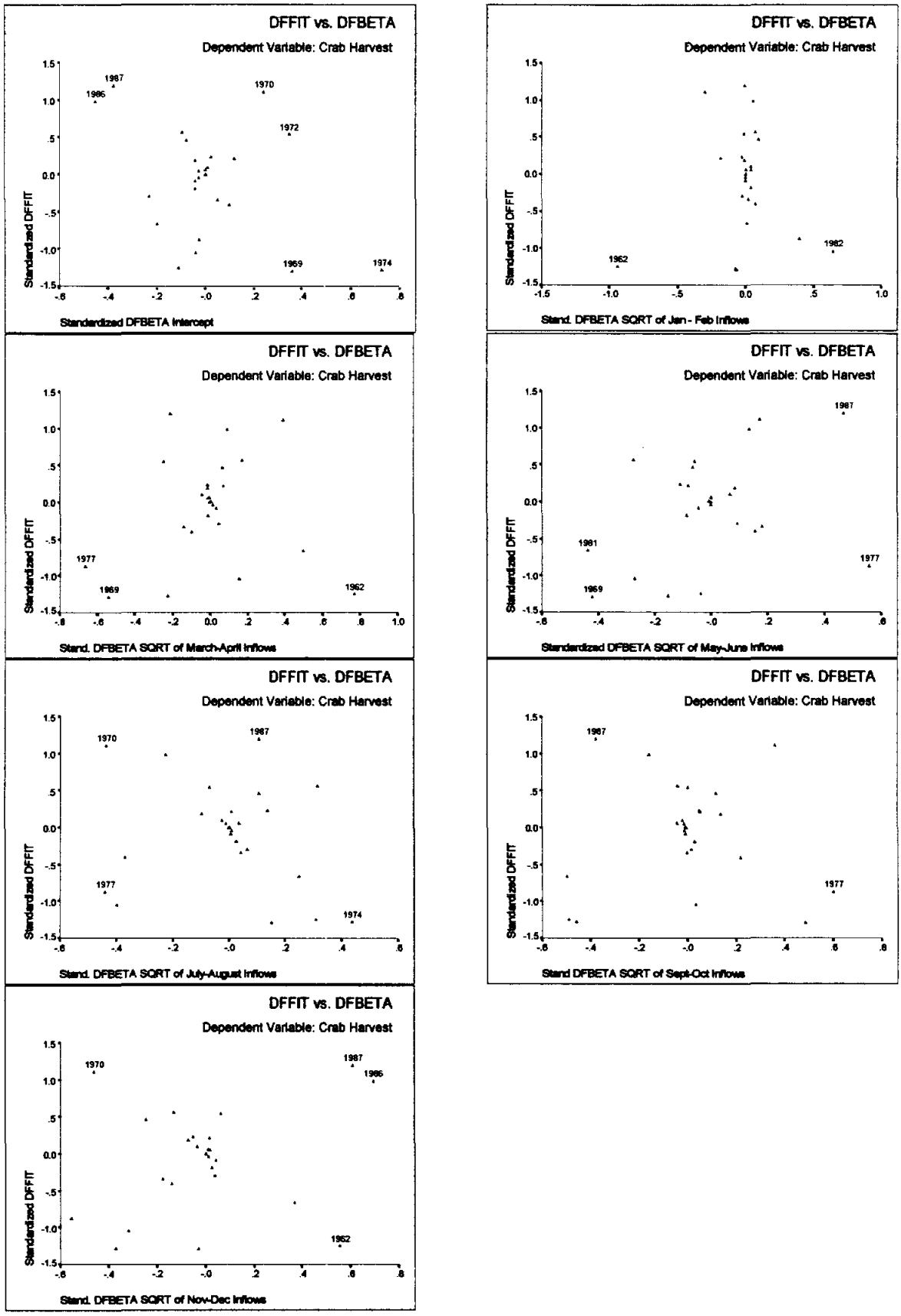


Fig. 5.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Harvest and Logged and Squared Root Inflows (Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (Nov - Dec Inflows), SQRT (March-April Inflows), Ln(Jul - Aug Inflows), SQRT(Jan - Feb Inflows), SQRT (March-Jun Inflows), Ln (Sept - Oct Inflows)[c,d]	.	.734	.539	.393	480.090	1.399

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), Ln (November - December Inflows), SQRT (March-April Inflows), Ln(July - August Inflows), SQRT(January - February Inflows), SQRT (March-June Inflows), Ln (September - October Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5114678	6	852446	3.698	.013[b]
	Residual	4379242	19	230486		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), Ln (November-December Inflows), SQRT (March-April Inflows), Ln (July-August Inflows), SQRT (January-February Inflows), SQRT (May-June Inflows, Ln (September-October

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-1614.14	1625.9		-.993	.333	-5017.20	1788.923		
	SQRT (Jan-Feb Inflows)	-19.339	14.690	-.274	-1.317	.204	-50.085	11.407	.560	1.786
	SQRT (March-April Inflows)	51.443	14.142	.881	3.638	.002	21.844	81.042	.414	2.416
	SQRT (May-June Inflows)	-6.631	11.512	-.138	-.576	.571	-30.726	17.464	.425	2.354
	Ln (Jul-Aug Inflows)	-221.765	274.740	-.222	-.807	.430	-796.803	353.272	.320	3.120
	Ln (Sept-Oct Inflows)	-238.754	277.059	-.244	-.862	.400	-818.644	341.137	.304	3.291
	Ln (Nov-Dec Inflows)	751.404	250.508	.673	3.000	.007	227.084	1275.724	.483	2.072

a. Dependent Variable: CRAB

Collinearity Diagnostics

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter =0	Prob > |T|	Variance Inflation
INTERCEP	1	-1614.1376	1625.9062	-0.993	0.3333	0.0000000
SQRT (Jan-Feb Inflows)	1	-19.339280	14.6897	-1.317	0.2037	1.7859554
SQRT (March-April Inflows)	1	51.442922	14.14187	3.638	0.0018	2.4160531
SQRT (May-June Inflows)	1	-6.630983	11.51226	-0.576	0.5714	2.3536440
LN (Jul-Aug Inflows)	1	-221.76529	274.73994	-0.807	0.4296	3.1204102
Ln (Sept-Oct Inflows)	1	-238.75372	277.05870	-0.862	0.3996	3.2910524
Ln (Nov-Dec Inflows)	1	751.403882	250.50846	3.000	0.0074	2.0722691

#	Eigen value	Cond Index	SQRT (Jan-Feb Inflows)	SQRT (Mar-Apr Inflows)	SQRT (May-Jun Inflows)	Ln (Jul-Aug Inflows)	Ln (Sept-Oct Inflows	Ln (Nov -Dec Inflows)
1	2.965	1.0000	0.0359	0.0184	0.0216	0.0257	0.0217	0.0125
2	1.275	1.5248	0.0000	0.0905	0.0490	0.0000	0.0260	0.1760
3	0.687	2.0772	0.2252	0.0835	0.2617	0.0465	0.0158	0.0184
4	0.488	2.4651	0.5338	0.1925	0.0020	0.0343	0.1520	0.0094
5	0.464	2.5289	0.0393	0.0529	0.1079	0.2547	0.0766	0.3176
6	0.121	4.9476	0.1657	0.5622	0.5578	0.6387	0.7079	0.4661

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	959.3063	2580.904	1699.58	452.3131	26
Std. Predicted Value	-1.637	1.948	.000	1.000	26
Standard Error of Predicted Value	172.4314	315.0494	246.1914	38.7503	26
Adjusted Predicted Value	1010.363	2866.474	1721.37	485.9429	26
Residual	-648.0062	1014.378	1.3E-12	418.5328	26
Std. Residual	-1.350	2.113	.000	.872	26
Stud. Residual	-1.672	2.308	-.020	1.029	26
Deleted Residual	-994.1964	1210.875	-21.7927	588.5165	26
Stud. Deleted Residual	-1.762	2.649	-.006	1.090	26
Mahal. Distance	2.263	9.804	5.769	2.081	26
Cook's Distance	.000	.301	.061	.083	26
Centered Leverage Value	.091	.392	.231	.083	26

a. Dependent Variable: CRAB

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	959.3063	-648.0063	-994.19642	1305.49642	-1.63664	-1.34976	-1.67187	-1.76204
1963	1002.5573	-25.0573	-32.86336	1010.36336	-1.54102	-.05219	-.05977	-.05818
1964	1455.3214	-259.7214	-351.22103	1546.82103	-.54002	-.54098	-.62910	-.61880
1965	1907.9915	-90.0915	-115.11355	1933.01355	.46077	-.18766	-.21212	-.20671
1966	1294.7154	63.0846	83.53756	1274.26244	-.89510	.13140	.15121	.14727
1967	1055.6596	-7.7596	-9.69899	1057.59899	-1.42362	-.01616	-.01807	-.01759
1968	1739.0131	-196.4131	-227.39974	1769.99974	.08718	-.40912	-.44021	-.43067
1969	2262.9732	-557.2732	-899.80989	2605.50989	1.24558	-1.16077	-1.47498	-1.52564
1970	2007.5122	614.4878	1068.36147	1553.63853	.68079	1.27994	1.68769	1.78164
1971	2094.8634	65.9366	115.80787	2044.99213	.87391	.13734	.18202	.17732
1972	1380.0368	490.0632	592.06252	1278.03748	-.70647	1.02077	1.12199	1.13014
1973	2136.5306	-89.5306	-114.42784	2161.42784	.96603	-.18649	-.21083	-.20545
1974	2580.9042	-598.0042	-883.57436	2866.47436	1.94848	-1.24561	-1.51409	-1.57156
1975	1750.1119	113.3881	155.96656	1707.53344	.11172	.23618	.27700	.27016
1976	1476.3292	123.1708	141.41296	1458.08704	-.49358	.25656	.27490	.26810
1977	2286.5802	-427.1802	-654.18942	2513.58942	1.29777	-.88979	-1.10112	-1.10768
1978	1848.8232	72.0768	102.07025	1818.82975	.32995	.15013	.17866	.17404
1979	1540.6168	413.0832	535.51768	1418.18232	-.35145	.86043	.97968	.97858
1980	1499.7479	249.3521	347.58927	1401.51073	-.44180	.51939	.61322	.60286
1981	1132.4256	-522.2256	-743.92298	1354.12298	-1.25390	-1.08777	-1.29829	-1.32374
1982	1582.7008	-366.6008	-614.77465	1830.87465	-.25840	-.76361	-.98885	-.98825
1983	1522.3783	-114.7783	-158.99588	1566.59588	-.39177	-.23908	-.28138	-.27445
1984	1291.9069	104.6931	141.12780	1255.47220	-.90131	.21807	.25319	.24685
1985	2361.0944	-193.1944	-251.30748	2419.20748	1.46251	-.40241	-.45896	-.44922
1986	2246.4784	772.1216	990.55548	2028.04452	1.20911	1.60829	1.82163	1.95164
1987	1772.5217	1014.3783	1210.87517	1576.02483	.16126	2.11289	2.30848	**2.64889**

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$

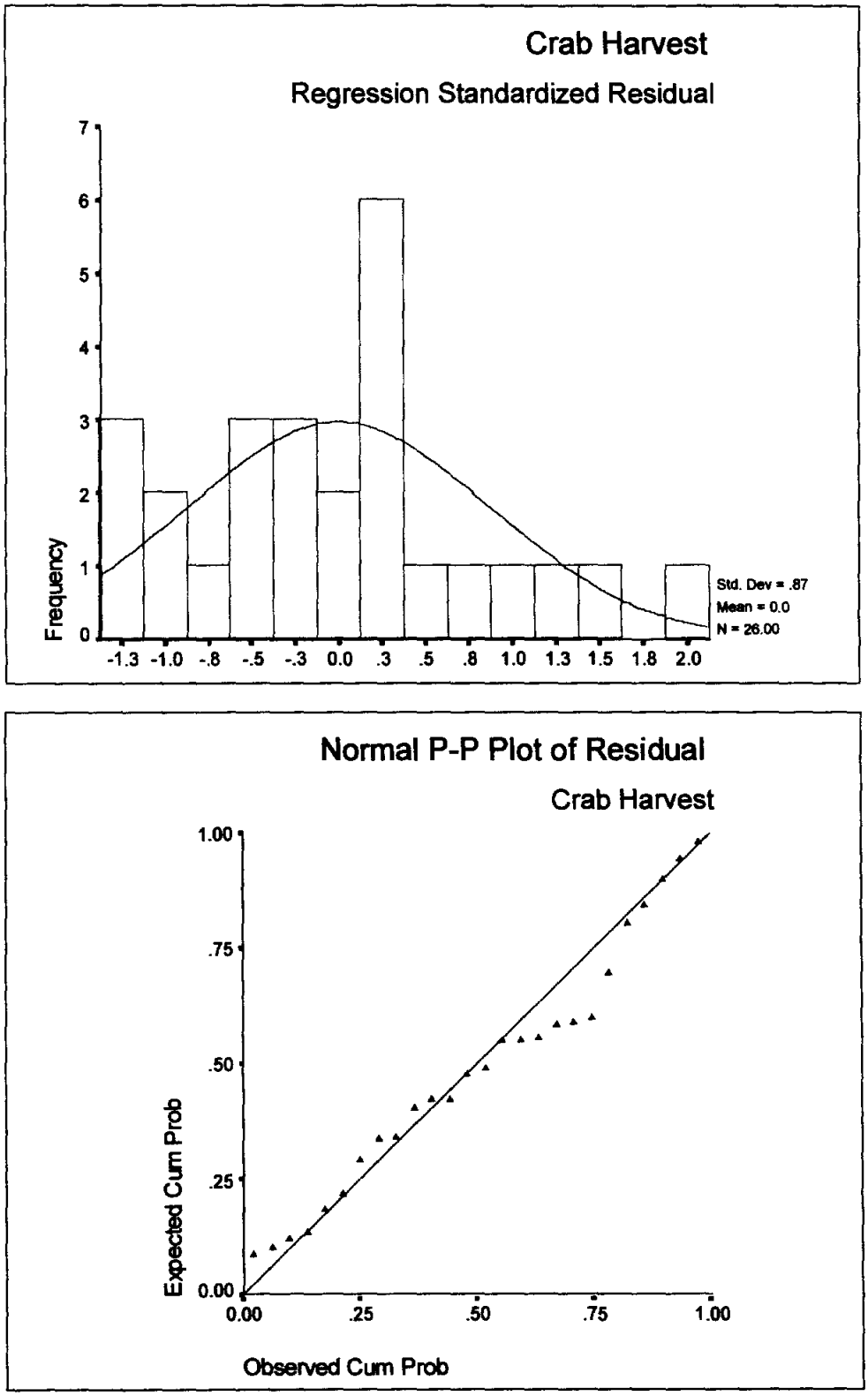


Fig. 6.1. Exploratory Plots of Crab Harvest Standardized Residual.

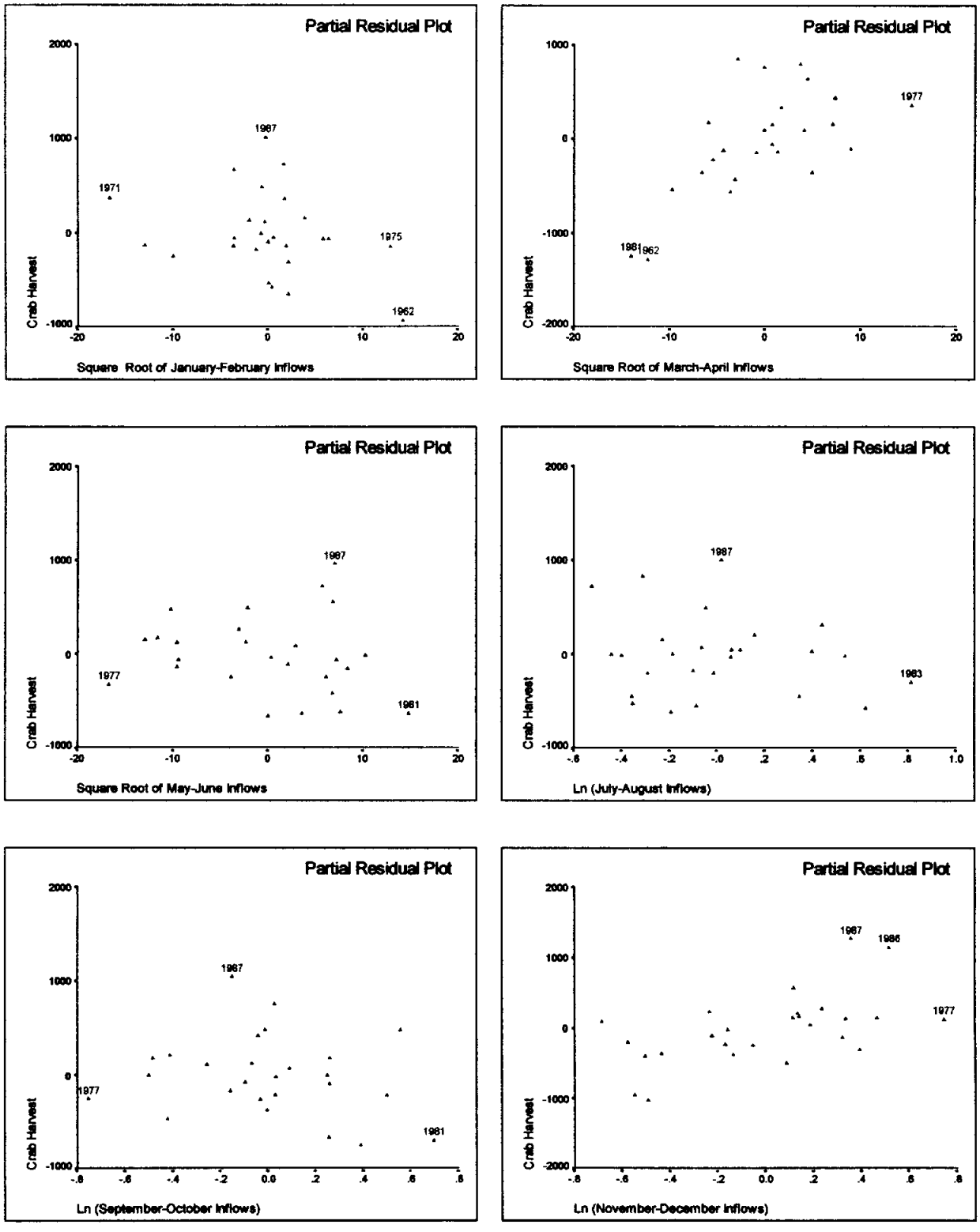


Fig 6.2. Partial Residual Plots of Crab Harvest vs. Squared Root and Logged Inflows

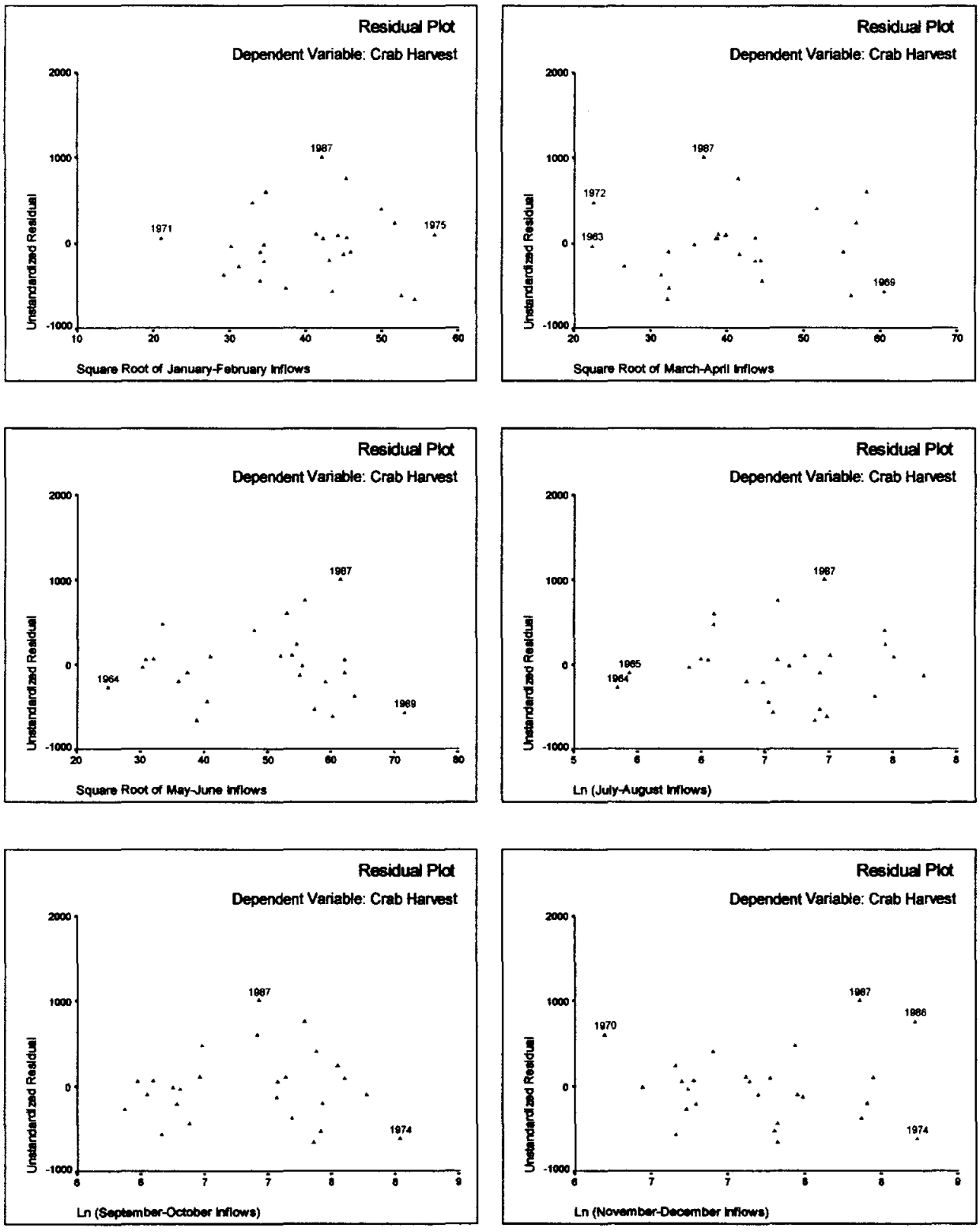


Fig 6.3. Residual Plots of Crab Harvest vs. Squared Root and Logged Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-635.50601	2554.11851
1963	977.50	-525.39116	2530.50573
1964	1195.60	-86.75285	2997.39560
1965	1817.90	392.54107	3423.44183
1966	1357.80	-237.73545	2827.16618
1967	1047.90	-448.91310	2560.23234
1968	1542.60	274.91409	3203.11212
1969	1705.70	649.07324	3876.87324
1970	2622.00	368.00854	3647.01584
1971	2160.80	452.02267	3737.70405
1972	1870.10	-107.08289	2867.15644
1973	2047.00	620.94864	3652.11256
1974	1982.90	1000.95477	4160.85357
1975	1863.50	200.42359	3299.80016
1976	1599.50	16.91872	2935.73972
1977	1859.40	692.47934	3880.68099
1978	1920.90	286.49330	3411.15307
1979	1953.70	18.17437	3063.05921
1980	1749.10	-55.78913	3055.28491
1981	610.20	-432.41401	2697.26527
1982	1216.10	-44.58963	3209.99131
1983	1407.60	-30.41619	3075.17271
1984	1396.60	-248.72877	2832.54253
1985	2167.90	837.03290	3885.15592
1986	3018.60	729.07006	3763.88669
1987	2786.90	291.75922	3253.28416

CRAB Crab harvest
LICI Lower limit for 99% prediction interval for crab harvest
UICI Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	7.74374	.21333	.30975	.356	.022
1963	4.97674	.00016	.19907	.663	.000
1964	5.55143	.01992	.22206	.593	.000
1965	4.47268	.00179	.17891	.724	.000
1966	5.15934	.00106	.20637	.641	.000
1967	4.03735	.00001	.16149	.775	.000
1968	2.44509	.00437	.09780	.931	.000
1969	8.55538	.19104	.34222	.286	.016
1970	9.65925	.30055	.38637	.209	.055
1971	9.80440	.00358	.39218	.200	.000
1972	3.34541	.03743	.13382	.851	.000
1973	4.47797	.00177	.17912	.723	.000
1974	7.11843	.15639	.28474	.417	.009
1975	5.86339	.00412	.23454	.556	.000
1976	2.26344	.00160	.09054	.944	.000
1977	7.71367	.09205	.30855	.359	.002
1978	6.38473	.00190	.25539	.496	.000
1979	4.75417	.04064	.19017	.690	.000
1980	6.10407	.02116	.24416	.528	.000
1981	6.48874	.10222	.25955	.484	.002
1982	9.13053	.09456	.36522	.243	.002
1983	5.99110	.00436	.23964	.541	.000
1984	5.49266	.00319	.21971	.600	.000
1985	4.81953	.00905	.19278	.682	.000
1986	4.55137	.13411	.18205	.715	.006
1987	3.09538	.14747	.12382	.876	.008

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.28791**	-.26016	-.95442	.78557	-.00166	.23576	-.49385	.55703
1963	-.03248	-.01976	-.00126	.01893	-.00058	.00705	-.01006	.01507
1964	-.36729	-.23913	-.05071	.06566	.06594	.11908	.01232	.04961
1965	-.10894	-.05093	-.01415	.00574	-.01209	.05902	.01277	-.02301
1966	.08385	.04346	.03036	-.02682	.04198	-.00595	-.02484	-.01968
1967	-.00879	-.00502	.00042	.00377	-.00344	-.00069	-.00039	.00514
1968	-.17106	-.06032	.05074	-.01803	-.06920	.00325	.04191	.01266
1969	**-1.19611**	-.25606	-.02448	-.51658	-.35930	.09279	.46930	-.09121
1970	**1.53120**	.73093	-.25265	.26024	.39404	-.70460	.75490	-.83857
1971	.15421	-.01855	-.11947	.05092	-.05375	.00873	.03406	.01433
1972	.51559	.07903	-.02405	-.21540	-.06158	-.03113	-.00856	.07831
1973	-.10834	.01266	-.00031	-.00553	-.04688	.05274	-.06732	.02031
1974	**-1.08601**	.52629	-.13255	-.27959	-.16676	.38331	-.28353	-.39556
1975	.16555	-.01873	.12566	-.04062	.02282	-.04116	-.01262	.03927
1976	.10318	-.00946	-.00241	.00687	-.01534	.06543	-.06809	.02040
1977	-.80748	.31234	.41463	-.62100	.54903	-.48873	.59404	-.53501
1978	.11227	.03049	.04088	.04490	-.06384	.01189	-.05776	.01541
1979	.53276	-.10290	.06190	.14796	-.27066	.28081	-.02689	-.13494
1980	.37840	.01943	.08748	.03696	-.05164	.06440	.10776	-.21324
1981	-.86249	-.16411	-.00548	.64799	-.56163	.31930	-.63843	.44931
1982	-.81310	.34852	.50337	.13573	-.21102	-.25317	.00232	-.21757
1983	-.17035	.09664	.03435	-.03968	.07233	-.15056	.09281	-.05698
1984	.14562	-.05399	-.01704	-.00033	-.07963	.08822	.01552	-.02338
1985	-.24638	.10334	.01921	-.10730	.11676	.02906	-.00973	-.12544
1986	**1.03805**	-.39610	.11830	-.00061	.30816	-.39019	.03641	.59914
1987	**1.16585**	-.39337	-.01577	-.24491	.49151	.03320	-.24990	.54327

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the squared root January-February inflows
SDFB_2 Standardized dfbeta for the squared root March-April inflows
SDFB_3 Standardized dfbeta for the squared root May-June inflows
SDFB_4 Standardized dfbeta for the squared root July-August inflows
SDFB_5 Standardized dfbeta for the squared root September-October inflows
SDFB_6 Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

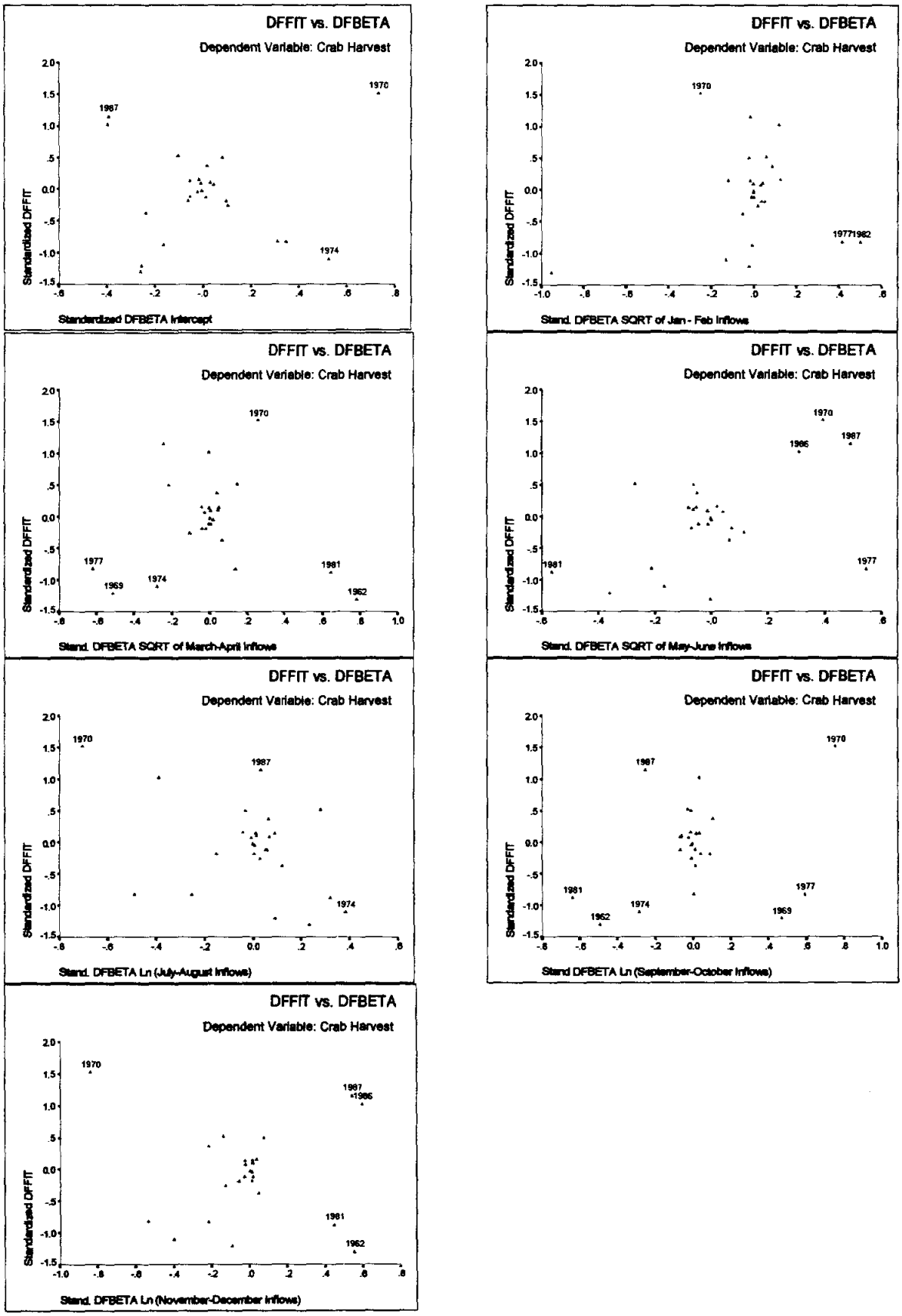


Fig. 6.4. Standardized DFFIT vs. Standardized DFBETA.

Regression – Logged Harvest and and Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (Nov-Dec Inflows), Ln(Mar-Apr Inflows), Ln(Jul-Aug Inflows), Ln(Jan-Feb Inflows), Ln(May-Jun Inflows), Ln(Sept-Oct Inflows)[c,d]	.	.712	.506	.351	.3832	1.687

a. Dependent Variable: Ln (Crab Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln (Nov-Dec Inflows), Ln(Mar-Apr Inflows), Ln(Jul-Aug Inflows), Ln(Jan-Feb Inflows), Ln(May-Jun Inflows), Ln(Sept-Oct Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.863	6	.477	3.250	.023[b]
	Residual	2.790	19	.147		
	Total	5.653	25			

a. Dependent Variable: Ln (Crab Harvest)

b. Independent Variables: (Constant), Ln (Nov-Dec Inflows), Ln(Mar-Apr Inflows), Ln(Jul-Aug Inflows), Ln(Jan-Feb Inflows), Ln(May-Jun Inflows), Ln(Sept-Oct Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	3.797	1.632		2.327	.031	.381	7.214		
	Ln (Jan-Feb Inflows)	-.351	.216	-.338	-1.625	.121	-.804	.101	.599	1.670
	Ln (Mar-Apr Inflows)	.802	.212	.905	3.774	.001	.357	1.246	.452	2.214
	Ln (May-Jun Inflows)	-.111	.208	-.134	-.535	.599	-.548	.325	.413	2.422
	Ln (Jul-Aug Inflows)	-9.5E-02	.219	-.124	-.435	.668	-.554	.363	.321	3.116
	Ln (Sept-Oct Inflows)	-.289	.212	-.382	-1.363	.189	-.733	.155	.331	3.024
	Ln (Nov-Dec Inflows)	.515	.191	.597	2.701	.014	.116	.914	.531	1.884

a. Dependent Variable: Ln (Crab Harvest)

Collinearity Diagnostics

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	3.797449	1.63211449	2.327	0.0312	0.00000000
Ln (Jan-Feb Inflows)	1	-0.351491	0.21635321	-1.625	0.1207	1.66979200
Ln (Mar-Apr Inflows)	1	0.801611	0.21238374	3.774	0.0013	2.21370179
Ln (May-Jun Inflows)	1	-0.111487	0.20838358	-0.535	0.5989	2.42244187
Ln (Jul-Aug Inflows)	1	-0.095407	0.21914565	-0.435	0.6682	3.11648023
Ln Sept-Oct Inflows)	1	-0.288886	0.21196036	-1.363	0.1888	3.02364711
Ln (Nov-Dec Inflows)	1	0.514804	0.19062145	2.701	0.0142	1.88354265

#	Eigen value	Condition Index	Ln (Jan-Feb Inflows	Ln (Mar-Apr Inflows	Ln (May-Jun Inflows)	Ln (Jul-Aug Inflows	Ln (Sept-Oct Inflows	Ln (Nov-Dec Inflows)
1	3.04119	1.00000	0.0351	0.0212	0.0236	0.0249	0.0214	0.0126
2	1.23316	1.57041	0.0021	0.0888	0.0391	0.0000	0.0360	0.2162
3	0.62231	2.21064	0.3653	0.0822	0.2349	0.0694	0.0080	0.0028
4	0.51948	2.41956	0.4658	0.2052	0.0316	0.0061	0.1912	0.0102
5	0.44931	2.60166	0.0080	0.1240	0.1268	0.2466	0.0535	0.3718
6	0.13455	4.75427	0.1237	0.4786	0.5440	0.6530	0.6897	0.3865

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	6.7102	7.8853	7.3517	.3384	26
Std. Predicted Value	-1.896	1.577	.000	1.000	26
Standard Error of Predicted Value	.1368	.2903	.1962	3.27E-02	26
Adjusted Predicted Value	6.6390	8.0346	7.3653	.3658	26
Residual	-.9924	.6021	-1.E-16	.3341	26
Std. Residual	-2.590	1.571	.000	.872	26
Stud. Residual	-3.083	1.781	-.015	1.024	26
Deleted Residual	-1.4061	.7739	-1.E-02	.4632	26
Stud. Deleted Residual	-4.244	1.900	-.054	1.189	26
Mahal. Distance	2.226	13.388	5.769	2.344	26
Cook's Distance	.000	.566	.057	.112	26
Centered Leverage Value	.089	.536	.231	.094	26

a. Dependent Variable: Ln (Crab Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	6.73319	-.99244	-1.40609	7.14684	-1.82782	-2.58997	**-3.08283**	**-4.24436**
1963	6.71024	.17476	.24600	6.63900	-1.89566	.45608	.54110	.53078
1964	7.17931	-.09290	-.13038	7.21678	-.50951	-.24245	-.28721	-.28016
1965	7.52738	-.02195	-.02834	7.53378	.51910	-.05728	-.06509	-.06336
1966	7.20116	.01246	.01613	7.19749	-.44493	.03252	.03700	.03601
1967	7.01906	-.06452	-.08010	7.03464	-.98304	-.16838	-.18761	-.18277
1968	7.51632	-.17510	-.20509	7.54632	.48641	-.45696	-.49455	-.48449
1969	7.79380	-.35207	-.51273	7.95446	1.30639	-.91880	-1.10880	-1.11593
1970	7.54222	.32948	.58674	7.28495	.56293	.85984	1.14744	1.15766
1971	7.80273	-.12450	-.29223	7.97046	1.33278	-.32490	-.49777	-.48769
1972	6.93167	.60208	.77385	6.75989	-1.24129	1.57124	1.78134	1.89971
1973	7.54813	.07600	.09584	7.52829	.58040	.19834	.22273	.21707
1974	7.80844	-.21613	-.31061	7.90293	1.34966	-.56403	-.67617	-.66620
1975	7.36407	.16614	.21138	7.31883	.03649	.43358	.48906	.47904
1976	7.28547	.09197	.10541	7.27203	-.19577	.24002	.25696	.25054
1977	7.88525	-.35724	-.50662	8.03463	1.57664	-.93230	-1.11023	-1.11748
1978	7.55197	.00858	.01256	7.54799	.59175	.02239	.02709	.02637
1979	7.22484	.35264	.45233	7.12515	-.37496	.92030	1.04228	1.04479
1980	7.14682	.32003	.44230	7.02456	-.60549	.83519	.98185	.98087
1981	6.88364	-.46985	-.64241	7.05620	-1.38323	-1.22618	-1.43377	-1.47776
1982	7.29997	-.19657	-.33122	7.43462	-.15293	-.51298	-.66589	-.65583
1983	7.28580	-.03616	-.04996	7.29961	-.19481	-.09436	-.11093	-.10800
1984	7.04286	.19894	.26679	6.97501	-.91272	.51917	.60122	.59083
1985	7.75517	-.07366	-.09642	7.77794	1.19224	-.19223	-.21994	-.21434
1986	7.68789	.32466	.42045	7.59210	.99341	.84727	.96420	.96232
1987	7.41735	.51533	.61066	7.32202	.19394	1.34487	1.46399	1.51282

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$

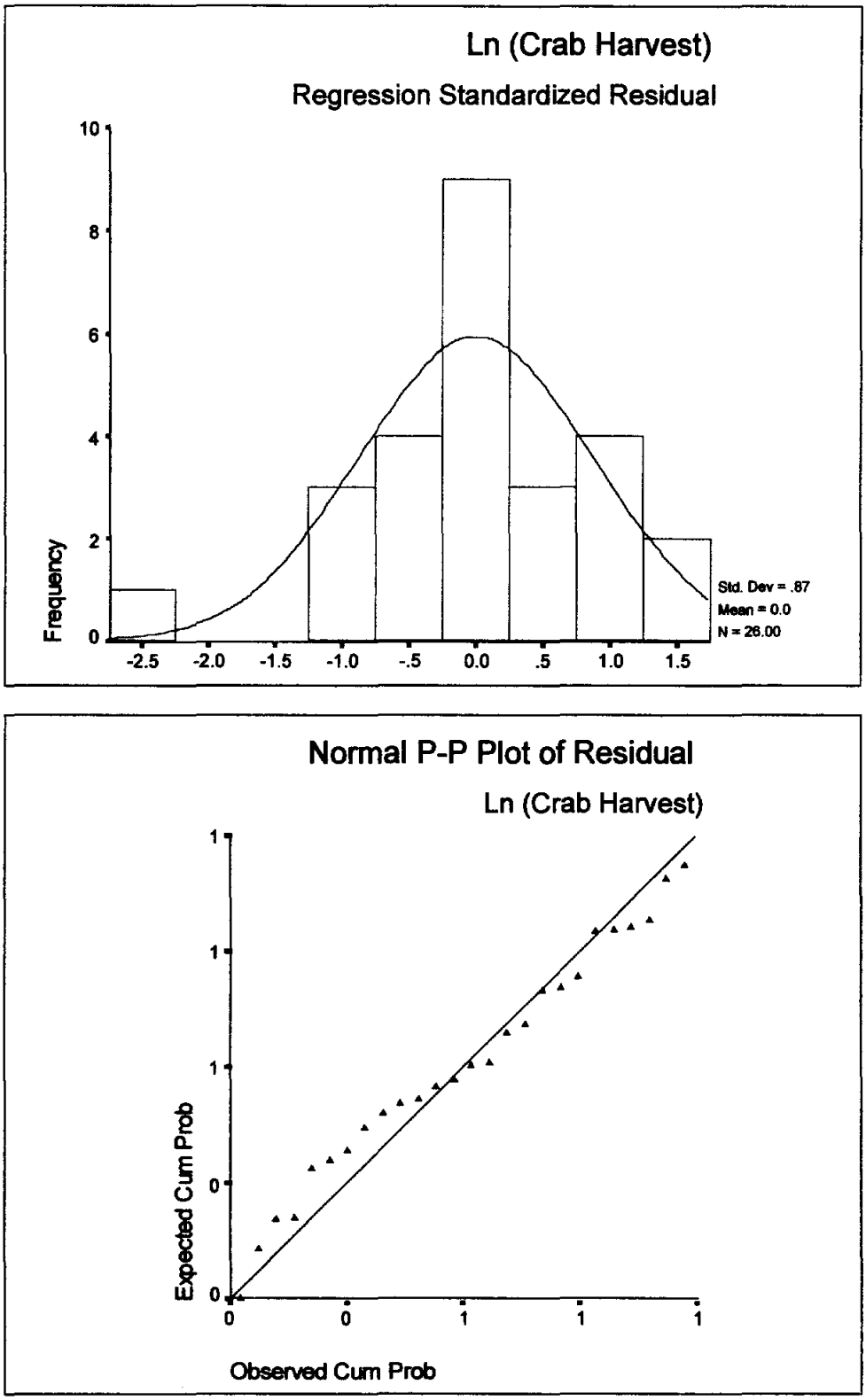


Fig. 7.1. Exploratory Plots of Ln (Crab Harvest) Standardized Residual.

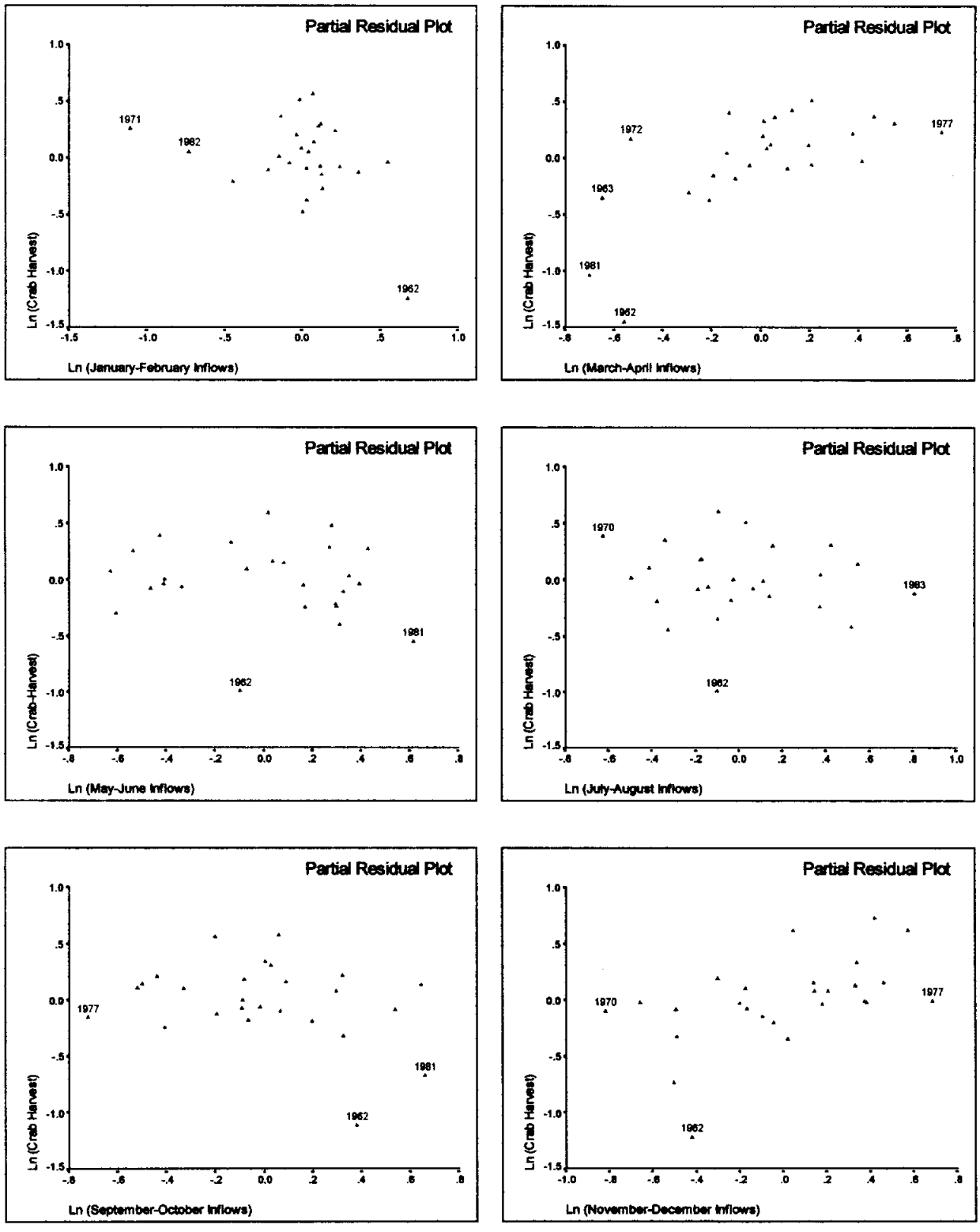


Fig 7.2. Partial Residual Plots of Ln (Crab Harvest) vs. Ln (Inflows).

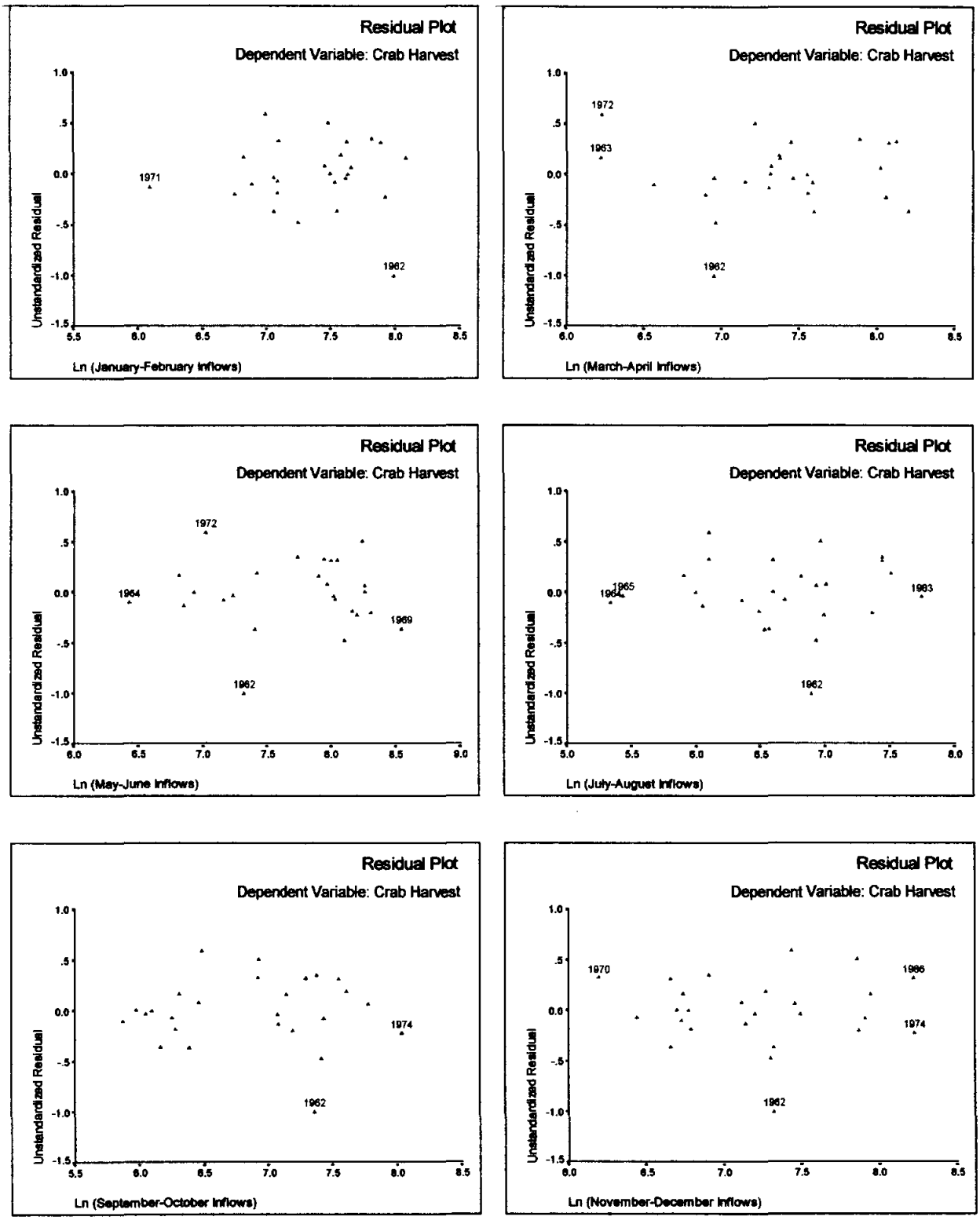


Fig 7.3. Residual Plots of Ln (Crab Harvest) vs. Ln (Inflows).

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	5.74	5.48606	7.98033
1963	6.88	5.46533	7.95514
1964	7.09	5.93543	8.42318
1965	7.51	6.31370	8.74107
1966	7.21	5.98663	8.41569
1967	6.95	5.82094	8.21719
1968	7.34	6.34263	8.69001
1969	7.44	6.53747	9.05013
1970	7.87	6.22740	8.85703
1971	7.68	6.42738	9.17808
1972	7.53	5.71983	8.14352
1973	7.62	6.34375	8.75251
1974	7.59	6.55650	9.06039
1975	7.53	6.15618	8.57196
1976	7.38	6.12141	8.44954
1977	7.53	6.63780	9.13271
1978	7.56	6.29384	8.81010
1979	7.58	6.01379	8.43589
1980	7.47	5.90827	8.38538
1981	6.41	5.64889	8.11839
1982	7.10	5.99983	8.60011
1983	7.25	6.04731	8.52429
1984	7.24	5.81508	8.27064
1985	7.68	6.53634	8.97400
1986	8.01	6.47314	8.90263
1987	7.93	6.23862	8.59608

CRAB Crab harvest
LICI Lower limit for 99% prediction interval for crab harvest
UICI Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.39309	.56589	.25572	.505	.2257
1963	6.27765	.01705	.25111	.492	.0000
1964	6.22417	.00475	.24897	.486	.0000
1965	4.68054	.00018	.18722	.301	.0000
1966	4.72368	.00006	.18895	.306	.0000
1967	3.90016	.00121	.15601	.209	.0000
1968	2.69450	.00598	.10778	.088	.0000
1969	6.87200	.08015	.27488	.558	.0011
1970	10.00010	.14687	.40000	.811	.0075
1971	13.38773	.04769	**.53551**	.937	.0002
1972	4.58792	.12933	.18352	.290	.0051
1973	4.21272	.00185	.16851	.245	.0000
1974	6.64317	.02855	.26573	.533	.0000
1975	4.38873	.00930	.17555	.266	.0000
1976	2.22626	.00138	.08905	**.054**	.0000
1977	6.40958	.07363	.25638	.507	.0009
1978	6.96607	.00005	.27864	.568	.0000
1979	4.54799	.04387	.18192	.285	.0002
1980	5.94924	.05261	.23797	.454	.0003
1981	5.75371	.10785	.23015	.431	.0029
1982	9.20187	.04339	.36807	.762	.0002
1983	5.94619	.00067	.23785	.454	.0000
1984	5.39665	.01761	.21587	.388	.0000
1985	4.94103	.00214	.19764	.333	.0000
1986	4.73421	.03919	.18937	.308	.0001
1987	2.94103	.05664	.11764	.110	.0004

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-2.74017**	-.10071	**-1.94101**	**1.56351**	.26253	.28684	**-1.06667**	**1.05441**
1963	.33886	.27216	.02753	-.22599	.01377	-.06029	.10456	-.15393
1964	-.17793	-.11589	-.02431	.01908	.06050	.03506	.01633	.01538
1965	-.03421	-.00632	-.00476	.00182	-.00658	.02037	.00350	-.00739
1966	.01954	.00041	.00561	-.00442	.00883	-.00055	-.00747	-.00334
1967	-.08980	-.04281	.00934	.03317	-.03670	-.00800	.00187	.04938
1968	-.20052	-.02253	.06504	-.03209	-.08550	.01036	.05636	.01144
1969	-.75384	.21617	-.02532	-.31100	-.23152	.07430	.30198	-.01598
1970	**1.02297**	.19235	-.11604	.11001	.36132	-.55082	.55381	-.62664
1971	-.56607	-.24373	.46568	-.22676	.18788	-.06189	-.08200	-.06747
1972	**1.01472**	.51144	.08534	-.63469	.02372	-.11275	.07320	.05310
1973	.11089	-.04671	.00554	.00338	.04702	-.05713	.07307	-.02396
1974	-.44048	.31983	-.05927	-.09321	-.07522	.17096	-.14511	-.15286
1975	.24997	-.15159	.16797	-.04169	.02550	-.05429	-.02426	.09175
1976	.09578	-.00296	-.00073	.00634	-.01001	.05799	-.06486	.01895
1977	-.72259	.01478	.33699	-.54550	.43808	-.39703	.53152	-.45529
1978	.01797	.00078	.00657	.00818	-.01092	.00207	-.00878	.00235
1979	.55549	-.04323	.08148	.13798	-.27357	.28738	.00353	-.17573
1980	.60627	-.04088	.13912	.03754	-.08201	.10419	.20802	-.37740
1981	-.89555	-.15963	-.00475	.66794	-.58185	.31854	-.63457	.43028
1982	-.54280	-.03495	.34925	.09845	-.14070	-.18240	.03084	-.15936
1983	-.06673	.01183	.01085	-.01389	.02790	-.05879	.03644	-.02105
1984	.34506	.03873	-.01359	.00334	-.19852	.21451	.03528	-.05929
1985	-.11916	.03600	-.00434	-.05121	.05440	.01973	-.00905	-.05686
1986	.52272	-.31506	.06597	.00795	.16359	-.21103	.01725	.31400
1987	.65065	-.27224	-.01121	-.11677	.25326	.03139	-.18102	.34883

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the squared root January-February inflows
SDFB_2 Standardized dfbeta for the squared root March-April inflows
SDFB_3 Standardized dfbeta for the squared root May-June inflows
SDFB_4 Standardized dfbeta for the squared root July-August inflows
SDFB_5 Standardized dfbeta for the squared root September-October inflows
SDFB_6 Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

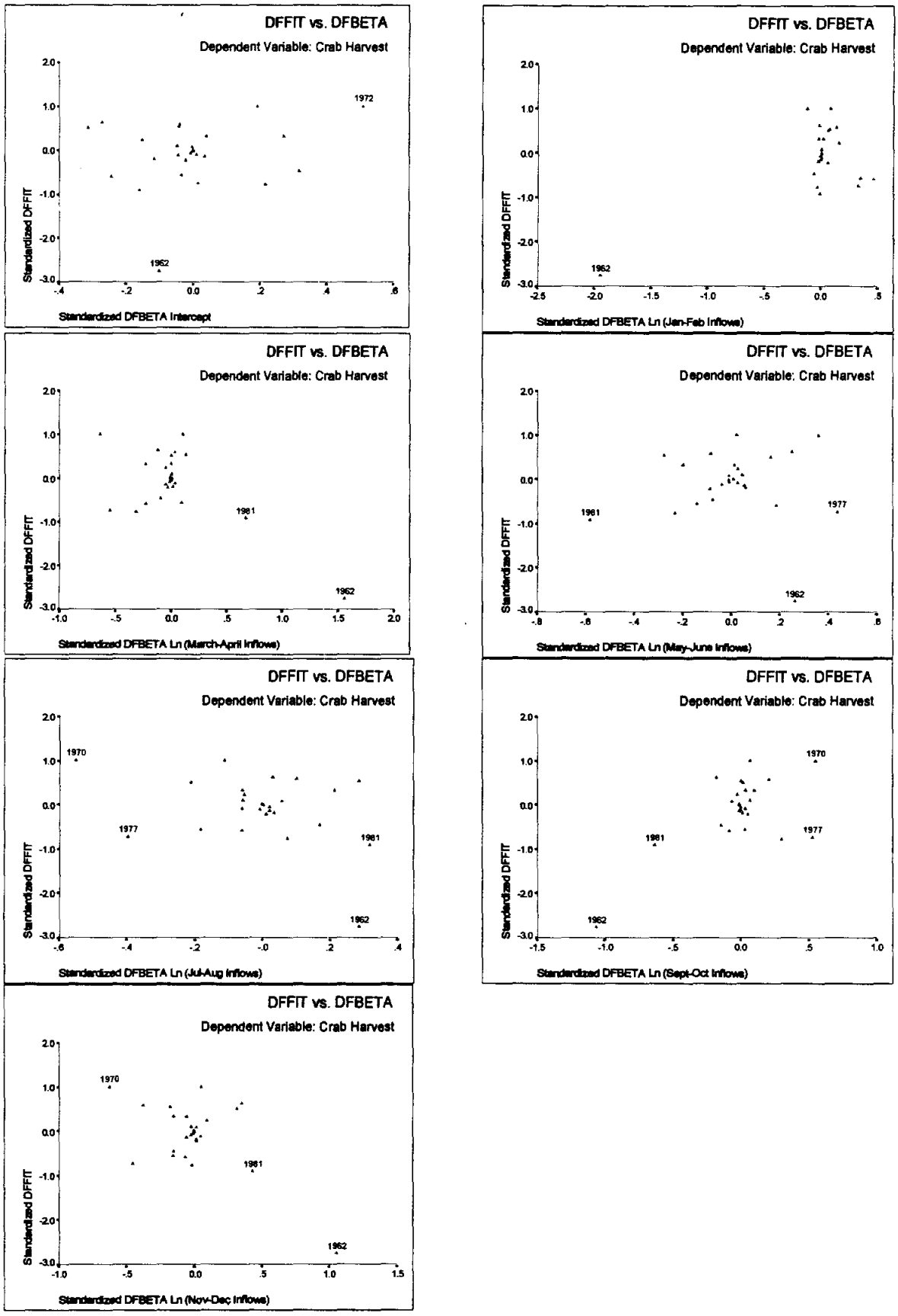


Fig. 7.4. Standardized DFFIT vs. Standardized DFBETA.

Regression - Untransformed Harvest, January-February and May-June Inflows, and Squared Root others Inflows

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows, Jan-Feb Inflows, SQRT (Sept-Oct Inflows)[c,d]	.	.779	.607	.483	442.8874	1.426

a. Dependent Variable: CRAB

b. Method: Enter

c. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows, Jan-Feb Inflows, SQRT (Sept-Oct Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5767085	6	961181	4.900	.003[b]
	Residual	3726835	19	196149		
	Total	9493920	25			

a. Dependent Variable: CRAB

b. Independent Variables: (Constant), SQRT (Nov-Dec Inflows), SQRT (Mar-Apr Inflows), SQRT (Jul-Aug Inflows), May-Jun Inflows, Jan-Feb Inflows, SQRT (Sept-Oct Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	-483.92	559.310		-.865	.398	-1654.57	686.727		
	Jan-Feb Inflows	-.277	.166	-.319	-1.668	.112	-.625	.071	.565	1.771
	SQRT (Mar-Apr Inflows)	56.462	12.790	.967	4.414	.000	29.692	83.232	.431	2.322
	May-Jun Inflows	-.149	.102	-.294	-1.461	.160	-.362	.064	.511	1.955
	SQRT (Jul-Aug Inflows)	-5.489	15.467	-.077	-.355	.727	-37.863	26.885	.440	2.274
	SQRT (Sept-Oct Inflows)	-25.625	15.427	-.421	-1.661	.113	-57.913	6.664	.322	3.105
	SQRT (Nov-Dec Inflows)	44.706	11.658	.790	3.835	.001	20.306	69.106	.487	2.055

a. Dependent Variable: CRAB

Collinearity Diagnostics

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-483.921868	559.30987441	-0.865	0.3977	0.00000000
QJF_LAG	1	-0.277329	0.16622519	-1.668	0.1116	1.77101179
SQR_QMA	1	56.461946	12.79028711	4.414	0.0003	2.32226711
QMJ_LAG	1	-0.148894	0.10189949	-1.461	0.1603	1.95546146
SQR_QJA	1	-5.489123	15.46741800	-0.355	0.7266	2.27392551
SQR_QSO	1	-25.624601	15.42660911	-1.661	0.1131	3.10514756
SQR_QND	1	44.706014	11.65770793	3.835	0.0011	2.05519575

#	Eigenval	Condition Index	Var Prop QJF_LAG	Var Prop SQR_QMA	Var Prop QMJ_LAG	Var Prop SQR_QJA	Var Prop SQR_QSO	Var Prop SQR_QND
1	2.86420	1.00000	0.0398	0.0210	0.0219	0.0322	0.0262	0.0159
2	1.22708	1.52779	0.0019	0.0974	0.0907	0.0003	0.0255	0.1597
3	0.72526	1.98726	0.1929	0.0735	0.3099	0.0287	0.0122	0.0764
4	0.59137	2.20075	0.0017	0.1255	0.0346	0.4249	0.0000	0.1765
5	0.44975	2.52356	0.6462	0.0858	0.0479	0.0064	0.2398	0.0130
6	0.14233	4.48586	0.1174	0.5968	0.4949	0.5075	0.6963	0.5585

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	852.1708	2520.254	1699.58	480.2951	26
Std. Predicted Value	-1.764	1.709	.000	1.000	26
Standard Error of Predicted Value	148.6406	286.2543	226.6421	38.7362	26
Adjusted Predicted Value	988.7080	2846.969	1728.25	511.3326	26
Residual	-585.4000	959.7250	-1.E-12	386.1003	26
Std. Residual	-1.322	2.167	.000	.872	26
Stud. Residual	-1.579	2.382	-.027	1.033	26
Deleted Residual	-871.2051	1159.295	-28.6647	545.6781	26
Stud. Deleted Residual	-1.649	2.768	-.017	1.090	26
Mahal. Distance	1.854	9.482	5.769	2.194	26
Cook's Distance	.000	.211	.063	.075	26
Centered Leverage Value	.074	.379	.231	.088	26

a. Dependent Variable: CRAB

Cases Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	852.1708	-540.8707	-871.20516	1182.50516	-1.76435	-1.22124	-1.54994	-1.61408
1963	986.1316	-8.6316	-11.20800	988.70800	-1.48544	-.01949	-.02221	-.02162
1964	1386.2113	-190.6112	-241.25900	1436.85900	-.65245	-.43038	-.48420	-.47422
1965	1843.4149	-25.5149	-30.28688	1848.18688	.29947	-.05761	-.06277	-.06110
1966	1249.9665	107.8335	140.71339	1217.08661	-.93612	.24348	.27813	.27127
1967	1127.8208	-79.9207	-94.82509	1142.72509	-1.19043	-.18045	-.19656	-.19151
1968	1732.2312	-189.6312	-217.85455	1760.45455	.06798	-.42817	-.45893	-.44918
1969	2190.3037	-484.6037	-832.29633	2537.99633	1.02171	-1.09419	-1.43397	-1.47799
1970	2107.2803	514.7196	774.88042	1847.11958	.84885	1.16219	1.42597	1.46875
1971	2025.4824	135.3175	200.04979	1960.75021	.67854	.30553	.37149	.36291
1972	1398.8908	471.2091	570.44506	1299.65494	-.62605	1.06395	1.17063	1.18287
1973	1906.6849	140.3150	191.25132	1855.74868	.43120	.31682	.36988	.36132
1974	2520.2541	-537.3541	-864.06886	2846.96886	1.70869	-1.21330	-1.53855	-1.60053
1975	1769.5137	93.9862	144.68434	1718.81566	.14560	.21221	.26330	.25675
1976	1539.3588	60.1411	67.77523	1531.72477	-.33359	.13579	.14415	.14039
1977	2444.7999	-585.3999	-835.47805	2694.87805	1.55159	-1.32178	-1.57907	-1.64895
1978	1930.5975	-9.6975	-13.27415	1934.17415	.48099	-.02190	-.02562	-.02493
1979	1561.3132	392.3867	515.66905	1438.03095	-.28788	.88597	1.01566	1.01655
1980	1444.5696	304.5303	426.55244	1322.54756	-.53095	.68760	.81378	.80625
1981	971.4919	-361.2919	-522.35739	1132.55739	-1.51592	-.81576	-.98089	-.97986
1982	1589.0371	-372.9371	-634.14214	1850.24214	-.23016	-.84206	-1.09804	-1.10437
1983	1611.2874	-203.6874	-331.84336	1739.44336	-.18383	-.45991	-.58702	-.57662
1984	1285.1896	111.4103	153.42001	1243.17999	-.86278	.25155	.29520	.28798
1985	2467.8280	-299.9280	-395.33925	2563.23925	1.59953	-.67721	-.77750	-.76910
1986	2420.0940	598.5059	805.42126	2213.17874	1.50015	1.35137	1.56766	1.63527
1987	1827.1749	959.7250	1159.29497	1627.60503	.26566	2.16697	2.38165	**2.76780**

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$

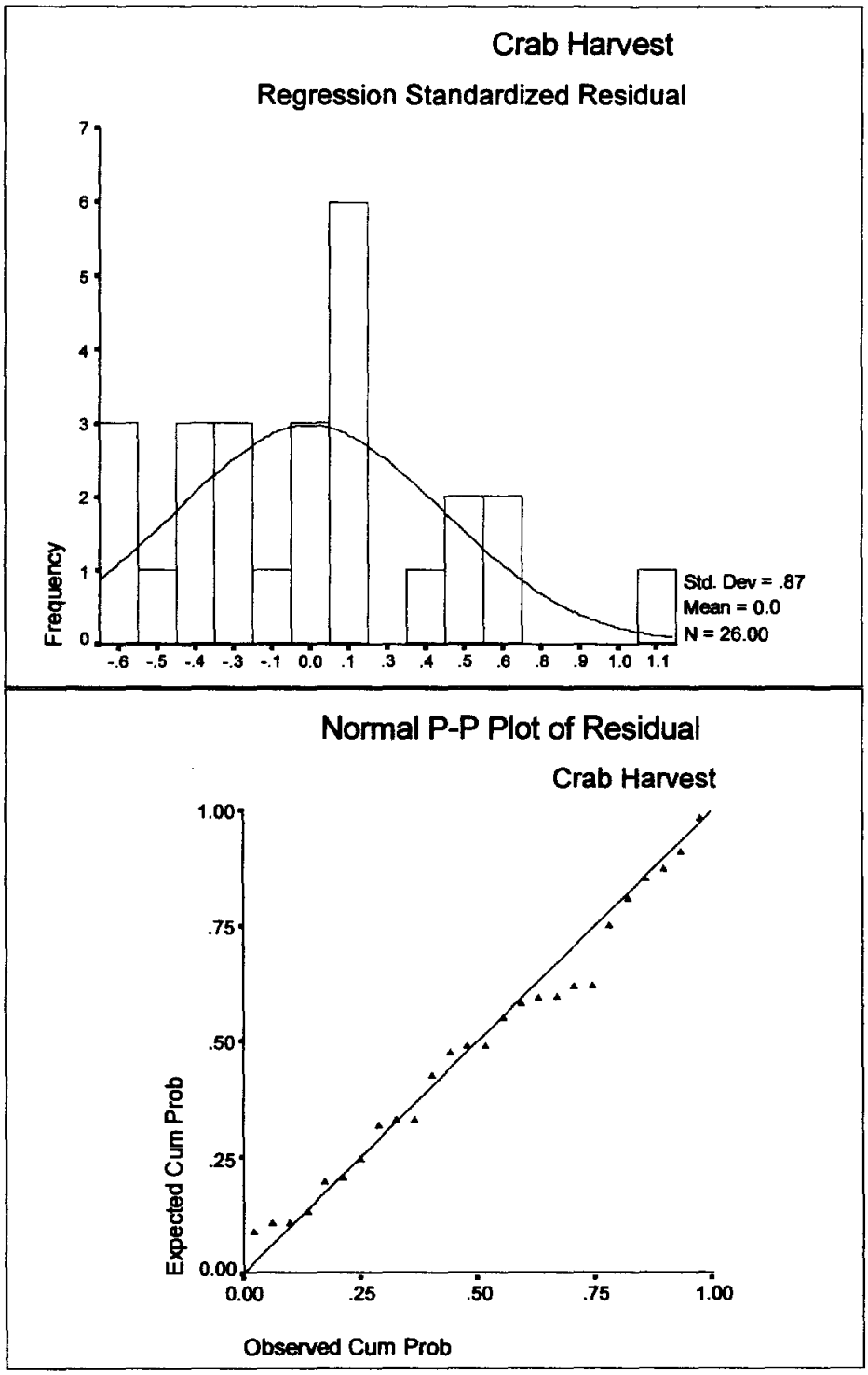


Fig. 8.1. Exploratory Plots of Crab Harvest Standarized Residual.

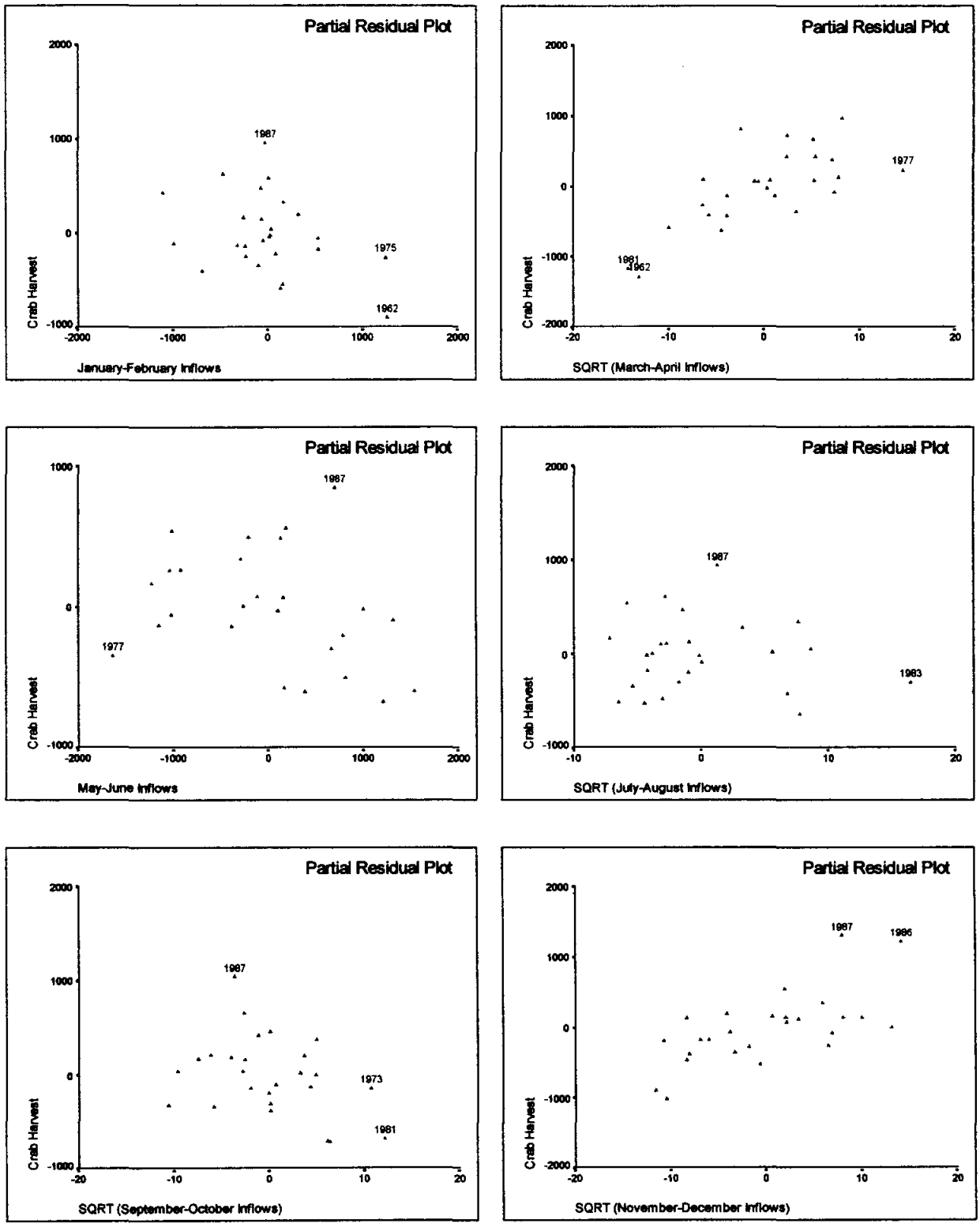


Fig 8.2. Partial Residual Plots of Crab Harvest vs. Untransformed and Squared Root Inflows

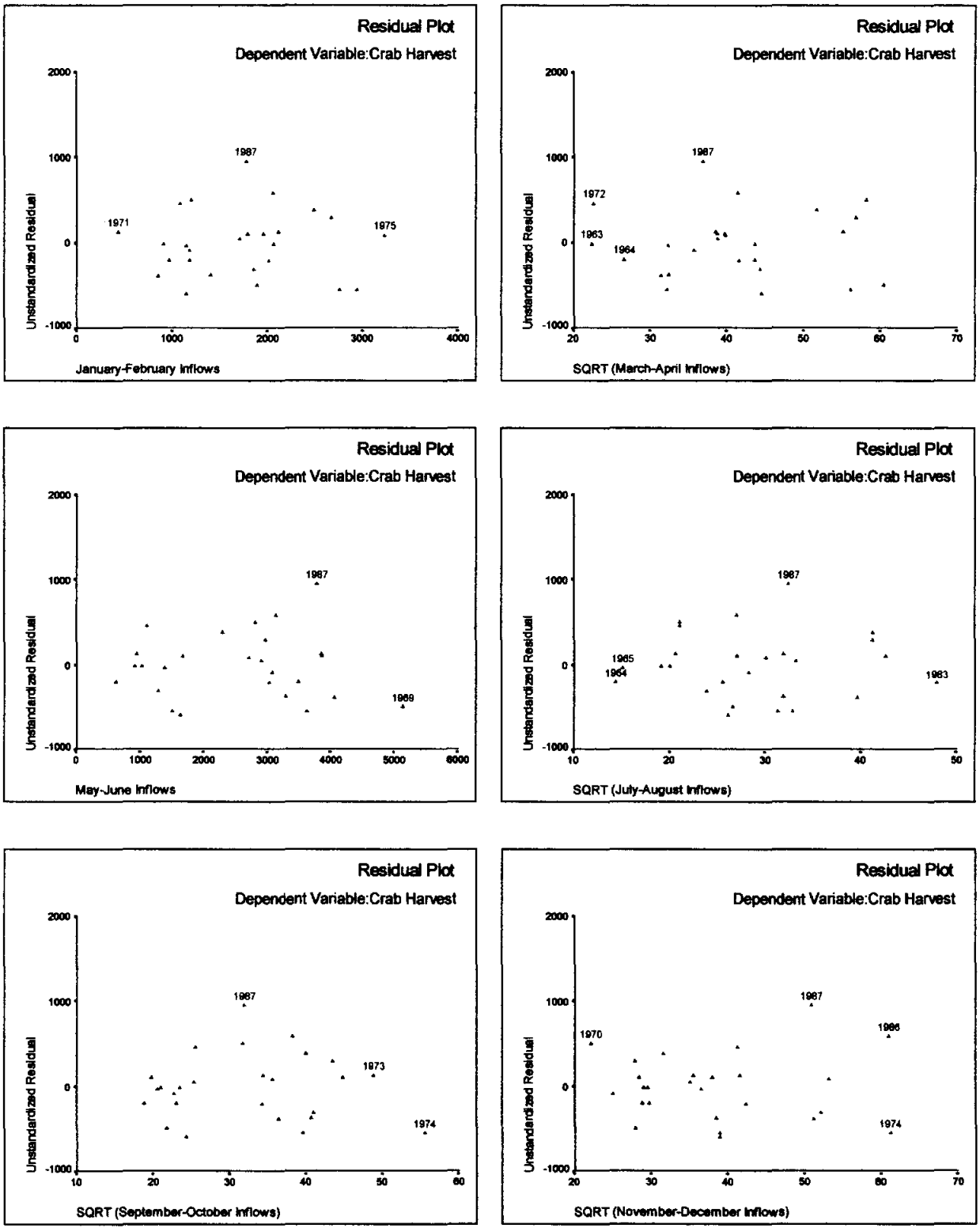


Fig 8.3. Residual Plots of Crab Harvest vs. Untransformed and Squared Root Inflows

Prediction Intervals for Crab Harvest

YEAR	CRAB	LICI	UICI
1962	311.30	-635.85360	2340.19517
1963	977.50	-419.04369	2391.30697
1964	1195.60	-7.52800	2779.95052
1965	1817.90	480.17426	3206.65565
1966	1357.80	-157.37650	2657.30946
1967	1047.90	-235.19575	2490.83729
1968	1542.60	385.58278	3078.87961
1969	1705.70	681.60957	3698.99790
1970	2622.00	642.87027	3571.69040
1971	2160.80	567.75467	3483.21018
1972	1870.10	26.02437	2771.75735
1973	2047.00	480.83129	3332.53860
1974	1982.90	1032.80039	4007.70792
1975	1863.50	297.08857	3241.93896
1976	1599.50	202.83003	2875.88775
1977	1859.40	1000.49188	3889.10810
1978	1920.90	502.99417	3358.20092
1979	1953.70	150.88954	2971.73702
1980	1749.10	7.64882	2881.49055
1981	610.20	-477.82081	2420.80468
1982	1216.10	83.45783	3094.61651
1983	1407.60	119.47830	3103.09653
1984	1396.60	-144.87446	2715.25382
1985	2167.90	1056.11449	3879.54170
1986	3018.60	999.55834	3840.62974
1987	2786.90	455.36991	3198.98004

CRAB Crab harvest
LICI Lower limit for 99% prediction interval for crab harvest
UICI Upper limit for 99% prediction interval for crab harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	8.51770	.20960	.34071	.289	.0210
1963	4.78517	.00002	.19141	.686	.0000
1964	4.28674	.00890	.17147	.746	.0000
1965	2.97740	.00011	.11910	.887	.0000
1966	4.88010	.00337	.19520	.675	.0000
1967	2.96788	.00103	.11872	.888	.0000
1968	2.27725	.00448	.09109	.943	.0000
1969	9.48224	.21076	.37929	.220	.0214
1970	7.43204	.14682	.29728	.385	.0075
1971	7.12798	.00943	.28512	.416	.0000
1972	3.38752	.04123	.13550	.847	.0001
1973	5.69675	.00709	.22787	.576	.0000
1974	8.49126	.20560	.33965	.291	.0199
1975	7.79858	.00534	.31194	.351	.0000
1976	1.85443	.00038	.07418	.967	.0000
1977	6.52154	.15217	.26086	.480	.0083
1978	5.77450	.00003	.23098	.566	.0000
1979	5.01528	.04630	.20061	.658	.0002
1980	6.19011	.03791	.24760	.518	.0001
1981	6.74705	.06128	.26988	.456	.0005
1982	9.33603	.12064	.37344	.229	.0041
1983	8.69331	.03097	.34773	.275	.0000
1984	5.88400	.00469	.23536	.553	.0000
1985	5.07196	.02747	.20288	.651	.0000
1986	5.46104	.12138	.21844	.604	.0042
1987	3.34215	.16850	.13369	.852	.0113

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

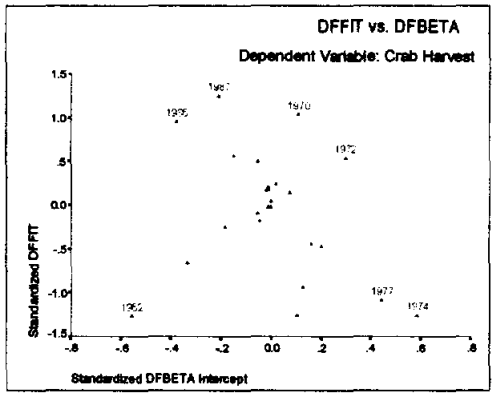
[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

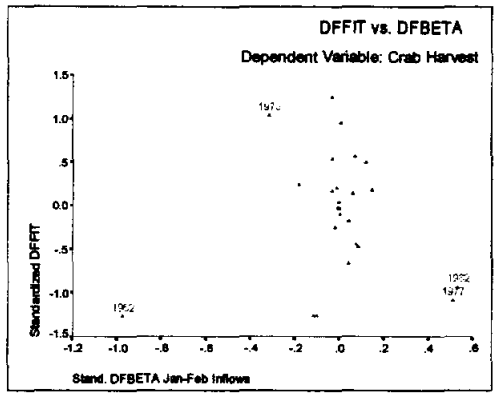
[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

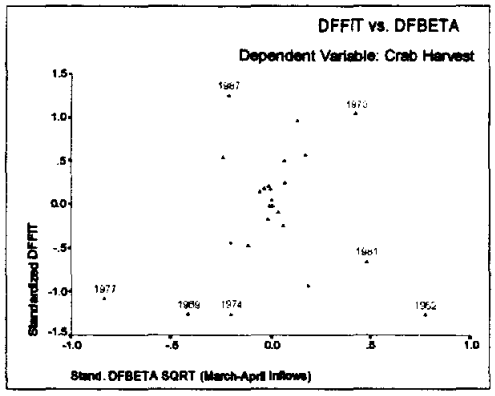
YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	**-1.26141**	-.55629	-.97428	.77234	-.07777	.31482	-.44131	.56156
1963	-.01181	-.01038	-.00025	.00704	-.00056	.00328	-.00379	.00521
1964	-.24445	-.18383	-.01711	.05918	.04673	.07732	.00059	.04574
1965	-.02642	-.01190	-.00048	-.00064	.00392	.00980	.00649	-.00597
1966	.14979	.07433	.06261	-.05744	.09396	-.02886	-.02741	-.04888
1967	-.08270	-.05398	.00359	.03433	-.03793	-.00081	-.00503	.04537
1968	-.17329	-.04625	.04271	-.01705	-.07424	.01563	.03287	.02262
1969	**-1.25192**	.10199	-.11701	-.41448	-.54138	.20458	.39220	.03040
1970	**1.04420**	.10881	-.31324	.42712	.05686	-.36317	.31644	-.39075
1971	.25100	.02048	-.18168	.06965	-.09294	-.01373	.07691	.00786
1972	.54283	.29897	-.03300	-.23788	-.06049	-.06326	.00447	.06972
1973	.21770	-.01274	-.00989	-.01151	.09781	-.10523	.15764	-.07610
1974	**-1.24801**	.58671	-.10037	-.20034	-.18280	.45508	-.45677	-.34873
1975	.18857	-.01203	.14925	-.03546	.01162	-.03462	-.04390	.04988
1976	.05002	.00074	.00212	.00297	-.00380	.02934	-.03171	.00824
1977	**-1.07776**	.44360	.51051	-.83266	.73885	-.53576	.72597	-.68588
1978	-.01514	-.00154	-.00590	-.00605	.00821	.00009	.00759	-.00165
1979	.56980	-.14897	.07308	.17402	-.27116	.31202	-.04625	-.12395
1980	.51036	-.05293	.12057	.06697	-.06192	.11035	.12450	-.26763
1981	-.65424	-.33059	.04206	.48281	-.41745	.21858	-.50037	.35850
1982	-.92424	.12574	.53331	.18359	-.27011	-.34161	-.00793	-.26247
1983	-.45738	.20323	.08727	-.11235	.17247	-.42398	.24582	-.15707
1984	.17684	-.02077	-.03217	-.00555	-.08006	.10216	.03882	-.03331
1985	-.43378	.16184	.07520	-.19951	.23346	.05263	-.00278	-.23514
1986	.96150	-.37650	.00818	.13110	.08304	-.18275	-.16896	.70751
1987	**1.26214**	-.20988	-.03323	-.21528	.49787	.14222	-.37812	.64402

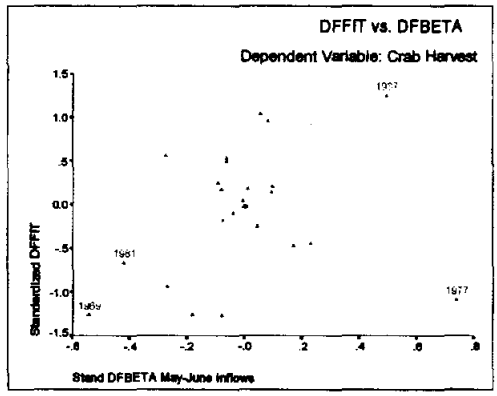
SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the squared root January-February inflows
SDFB_2	Standardized dfbeta for the squared root March-April inflows
SDFB_3	Standardized dfbeta for the squared root May-June inflows
SDFB_4	Standardized dfbeta for the squared root July-August inflows
SDFB_5	Standardized dfbeta for the squared root September-October inflows
SDFB_6	Standardized dfbeta for the squared root November-December inflows

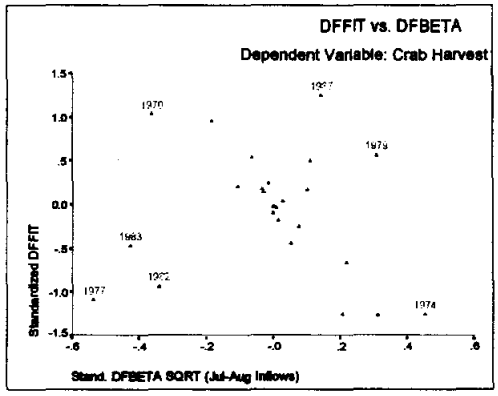
Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

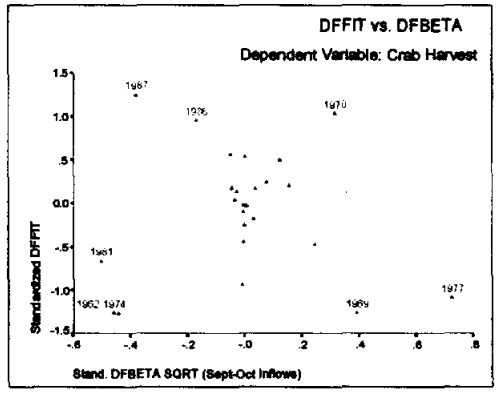












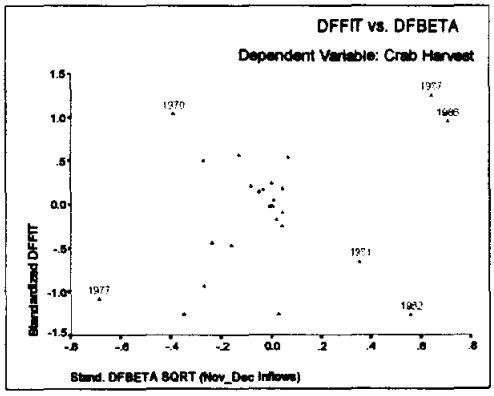


Fig. 8.4. Standardized DFFIT vs. Standardized DFBETA.

Examining Subsets of the Data

Untransformed Data: 1962 Omitted

N = 25 Regression Models for Dependent Variable: CRAB

	R-square In	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.179885	0.144228	15.5974	314.3	267055	316.7	QND_LAG
1	0.161605	0.125153	16.4132	314.8	273007	317.3	QMA_LAG
1	0.062107	0.021329	20.8533	317.7	305407	320.1	QJF_LAG
1	0.039705	-.002047	21.8530	318.2	312702	320.7	QSO_LAG
2	0.352059	0.293155	9.9142	310.4	220580	314.1	QMA_LAG QND_LAG
2	0.230525	0.160573	15.3376	314.7	261954	318.4	QJA_LAG QND_LAG
2	0.223553	0.152967	15.6487	314.9	264327	318.6	QMA_LAG QJA_LAG
2	0.192911	0.119539	17.0162	315.9	274759	319.6	QMA_LAG QMJ_LAG
3	0.465673	0.389340	6.8442	307.6	190564	312.5	QMA_LAG QSO_LAG QND_LAG
3	0.464346	0.387824	6.9034	307.6	191037	312.5	QMA_LAG QJA_LAG QND_LAG
3	0.432577	0.351517	8.3211	309.1	202367	314.0	QMA_LAG QMJ_LAG QND_LAG
3	0.382641	0.294447	10.5495	311.2	220177	316.1	QJF_LAG QMA_LAG QND_LAG
4	0.582430	0.498916	3.6340	303.4	156370	309.5	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.507315	0.408778	6.9860	307.6	184498	313.7	QMA_LAG QJA_LAG QSO_LAG QND_LAG
4	0.501019	0.401223	7.2669	307.9	186856	314.0	QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4	0.481699	0.378039	8.1291	308.8	194091	314.9	QJF_LAG QMA_LAG QSO_LAG QND_LAG
5	0.596143	0.489865	5.0220	304.6	159194	311.9	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.586619	0.477835	5.4470	305.2	162948	312.5	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.510717	0.381958	8.8341	309.4	192868	316.7	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.506893	0.377128	9.0048	309.6	194375	316.9	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
6	0.596636	0.462182	7.0000	306.6	167833	315.1	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	4468511.3785	744751.89642	4.437	0.0063
Error	18	3020992.6079	167832.92266		
C Total	24	7489503.9864			

Root MSE	409.67417	R-square	0.5966
Dep Mean	1755.11200	Adj R-sq	0.4622
C.V.	23.34177		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	1026.934735	272.35363657	3.771	0.0014	0.00000000
QJF_LAG	1	-0.119068	0.17808962	-0.669	0.5122	2.08204460
QMA_LAG	1	0.577980	0.15331968	3.770	0.0014	2.72661496
QMJ_LAG	1	-0.177787	0.09079607	-1.958	0.0659	1.75897657
QJA_LAG	1	-0.031992	0.21563836	-0.148	0.8837	1.96516308
QSO_LAG	1	-0.411204	0.20547929	-2.001	0.0607	3.07574403
QND_LAG	1	0.523090	0.13710803	3.815	0.0013	2.37375747

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.85839	1.00000	0.0382	0.0194	0.0263	0.0291	0.0262	0.0141
2	1.15906	1.57039	0.0000	0.0866	0.0788	0.0004	0.0257	0.1719
3	0.73170	1.97649	0.0327	0.1294	0.0646	0.3987	0.0097	0.0078
4	0.67724	2.05442	0.0425	0.0032	0.4507	0.1069	0.0241	0.1273
5	0.44323	2.53948	0.6485	0.0477	0.0000	0.0015	0.2484	0.0038
6	0.13037	4.68238	0.2381	0.7137	0.3796	0.4633	0.6658	0.6751

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	516.773	1353.81	.	.	.	.	.
2	MODEL1	PARMS	CRAB	522.501	1300.57	.	0.24935	.	.	.
3	MODEL1	PARMS	CRAB	552.636	1409.37	0.20547	.	.	.	.
4	MODEL1	PARMS	CRAB	559.197	1577.63	.	.	.	.	0.15596
5	MODEL1	PARMS	CRAB	469.659	872.61	.	0.25749	.	.	.
6	MODEL1	PARMS	CRAB	511.814	1529.88	.	.	.	-0.23475	.
7	MODEL1	PARMS	CRAB	514.128	1472.24	.	0.28625	.	-0.26296	.
8	MODEL1	PARMS	CRAB	524.175	1429.75	.	0.30976	-0.09237	.	.
9	MODEL1	PARMS	CRAB	436.536	785.48	.	0.39822	.	.	-0.38485
10	MODEL1	PARMS	CRAB	437.078	1046.14	.	0.30920	.	-0.36021	.
11	MODEL1	PARMS	CRAB	449.853	1020.32	.	0.35823	-0.15213	.	.
12	MODEL1	PARMS	CRAB	469.230	967.65	-0.19051	0.33396	.	.	.
13	MODEL1	PARMS	CRAB	395.436	951.40	.	0.54407	-0.18555	.	-0.44768
14	MODEL1	PARMS	CRAB	429.533	931.11	.	0.39005	.	-0.24634	-0.26579
15	MODEL1	PARMS	CRAB	432.268	1119.29	.	0.37116	-0.10770	-0.29499	.
16	MODEL1	PARMS	CRAB	440.558	859.91	-0.13943	0.44632	.	.	-0.36332
17	MODEL1	PARMS	CRAB	398.991	1018.70	-0.12903	0.58719	-0.18378	.	-0.42716
18	MODEL1	PARMS	CRAB	403.668	987.66	.	0.52821	-0.16901	-0.08636	-0.40034
19	MODEL1	PARMS	CRAB	439.167	952.06	-0.06866	0.41462	.	-0.21978	-0.26802
20	MODEL1	PARMS	CRAB	440.880	1151.99	-0.09089	0.40590	-0.11313	-0.25782	.
21	MODEL1	PARMS	CRAB	409.674	1026.93	-0.11907	0.57798	-0.17779	-0.03199	-0.41120

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	0.25213	-1	1	2	23	267054.54	0.17989	0.14423	15.5974	314.296	316.733
2	.	-1	1	2	23	273007.01	0.16161	0.12515	16.4132	314.847	317.285
3	.	-1	1	2	23	305406.70	0.06211	0.02133	20.8533	317.650	320.088
4	.	-1	1	2	23	312701.60	0.03970	-0.00205	21.8530	318.241	320.678
5	0.25955	-1	2	3	22	220579.78	0.35206	0.29316	9.9142	310.405	314.061
6	0.27552	-1	2	3	22	261953.91	0.23052	0.16057	15.3376	314.702	318.359
7	.	-1	2	3	22	264327.30	0.22355	0.15297	15.6487	314.928	318.584
8	.	-1	2	3	22	274759.06	0.19291	0.11954	17.0162	315.895	319.552
9	0.42828	-1	3	4	21	190564.09	0.46567	0.38934	6.8442	307.585	312.460
10	0.29693	-1	3	4	21	191037.19	0.46435	0.38782	6.9034	307.647	312.522
11	0.29902	-1	3	4	21	202367.34	0.43258	0.35152	8.3211	309.087	313.963
12	0.31366	-1	3	4	21	220176.90	0.38264	0.29445	10.5495	311.196	316.071
13	0.50396	-1	4	5	20	156369.59	0.58243	0.49892	3.6340	303.421	309.515
14	0.40164	-1	4	5	20	184498.32	0.50731	0.40878	6.9860	307.556	313.651
15	0.31810	-1	4	5	20	186856.02	0.50102	0.40122	7.2669	307.874	313.968
16	0.45844	-1	4	5	20	194090.93	0.48170	0.37804	8.1291	308.823	314.918
17	0.53115	-1	5	6	19	159194.03	0.59614	0.48987	5.0220	304.586	311.899
18	0.48788	-1	5	6	19	162948.16	0.58662	0.47784	5.4470	305.169	312.482
19	0.41937	-1	5	6	19	192867.73	0.51072	0.38196	8.8341	309.383	316.696
20	0.34147	-1	5	6	19	194375.03	0.50689	0.37713	9.0048	309.578	316.891
21	0.52309	-1	6	7	18	167832.92	0.59664	0.46218	7.0000	306.556	315.088

Untransformed Data: 1987 Omitted

N = 25 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.251133	0.218573	26.3182	314.5	269083	316.9	QMA_LAG
1	0.111025	0.072374	35.1711	318.8	319427	321.2	QND_LAG
1	0.031426	-.010686	40.2007	320.9	348028	323.4	QJA_LAG
1	0.020795	-.021779	40.8724	321.2	351848	323.6	QSO_LAG
2	0.363902	0.306075	21.1927	312.4	238952	316.1	QMA_LAG QND_LAG
2	0.341889	0.282061	22.5837	313.3	247221	316.9	QMA_LAG QJA_LAG
2	0.320997	0.259270	23.9037	314.0	255069	317.7	QMA_LAG QMJ_LAG
2	0.286041	0.221136	26.1125	315.3	268201	318.9	QJF_LAG QMA_LAG
3	0.500310	0.428926	14.5736	308.4	196649	313.2	QMA_LAG QSO_LAG QND_LAG
3	0.495936	0.423927	14.8500	308.6	198370	313.5	QMA_LAG QJA_LAG QND_LAG
3	0.484410	0.410754	15.5783	309.2	202906	314.0	QJF_LAG QMA_LAG QND_LAG
3	0.471358	0.395837	16.4030	309.8	208043	314.7	QMA_LAG QMJ_LAG QND_LAG
4	0.647616	0.577139	7.2659	301.6	145612	307.7	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.602483	0.522979	10.1177	304.7	164261	310.7	QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4	0.566210	0.479453	12.4096	306.8	179250	312.9	QJF_LAG QMA_LAG QSO_LAG QND_LAG
4	0.549761	0.459713	13.4490	307.8	186047	313.9	QMA_LAG QMJ_LAG QJA_LAG QND_LAG
5	0.714833	0.639790	5.0186	298.3	124038	305.7	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.651544	0.559845	9.0177	303.4	151567	310.7	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.625023	0.526345	10.6934	305.2	163102	312.5	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
5	0.588604	0.480342	12.9946	307.5	178943	314.8	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
6	0.715129	0.620171	7.0000	300.3	130793	308.9	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	5910084.4782	985014.07969	7.531	0.0004
Error	18	2354282.3082	130793.46157		
C Total	24	8264366.7864			

Root MSE	361.65379	R-square	0.7151
Dep Mean	1656.08800	Adj R-sq	0.6202
C.V.	21.83784		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	1054.696948	240.56896563	4.384	0.0004	0.00000000
QJF_LAG	1	-0.268006	0.13370847	-2.004	0.0603	1.71817419
QMA_LAG	1	0.714414	0.12272809	5.821	0.0001	2.28677760
QMJ_LAG	1	-0.230713	0.08159675	-2.827	0.0112	1.79849548
QJA_LAG	1	0.025276	0.18510213	0.137	0.8929	1.85368665
QSO_LAG	1	-0.422145	0.17691914	-2.386	0.0282	2.96445121
QND_LAG	1	0.526532	0.11617910	4.532	0.0003	2.07731555

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.77706	1.00000	0.0441	0.0232	0.0252	0.0329	0.0298	0.0177
2	1.21822	1.50984	0.0046	0.0950	0.1139	0.0009	0.0256	0.1508
3	0.73291	1.94655	0.0047	0.0891	0.0264	0.4730	0.0008	0.1086
4	0.67104	2.03431	0.2370	0.0818	0.3351	0.0358	0.0065	0.1000
5	0.44489	2.49842	0.6257	0.0908	0.0867	0.0173	0.2504	0.0167
6	0.15587	4.22095	0.0838	0.6201	0.4126	0.4401	0.6869	0.6062

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	518.732	1070.86	.	0.32329	.	.	.
2	MODEL1	PARMS	CRAB	565.178	1325.52	.	.	.	.	.
3	MODEL1	PARMS	CRAB	589.939	1829.61	.	.	.	-0.19158	.
4	MODEL1	PARMS	CRAB	593.168	1519.44	.	.	.	.	0.11779
5	MODEL1	PARMS	CRAB	488.827	735.67	.	0.32442	.	.	.
6	MODEL1	PARMS	CRAB	497.214	1290.37	.	0.36946	.	-0.33463	.
7	MODEL1	PARMS	CRAB	505.044	1254.22	.	0.43052	-0.15101	.	.
8	MODEL1	PARMS	CRAB	517.881	1257.94	-0.16734	0.37984	.	.	.
9	MODEL1	PARMS	CRAB	443.451	674.21	.	0.46587	.	.	-0.43121
10	MODEL1	PARMS	CRAB	445.387	942.00	.	0.38113	.	-0.40953	.
11	MODEL1	PARMS	CRAB	450.451	965.36	-0.33826	0.43923	.	.	.
12	MODEL1	PARMS	CRAB	456.117	908.73	.	0.45965	-0.19019	.	.
13	MODEL1	PARMS	CRAB	381.591	869.78	.	0.64678	-0.22493	.	-0.49512
14	MODEL1	PARMS	CRAB	405.292	1157.09	-0.35319	0.58620	-0.19956	.	.
15	MODEL1	PARMS	CRAB	423.379	862.68	-0.25985	0.52641	.	.	-0.34688
16	MODEL1	PARMS	CRAB	431.332	1029.91	.	0.47015	-0.14071	-0.32989	.
17	MODEL1	PARMS	CRAB	352.190	1061.00	-0.26244	0.70873	-0.22594	.	-0.41025
18	MODEL1	PARMS	CRAB	389.316	905.79	.	0.63158	-0.20842	-0.08783	-0.44752
19	MODEL1	PARMS	CRAB	403.859	1183.87	-0.29083	0.56997	-0.16907	-0.19225	.
20	MODEL1	PARMS	CRAB	423.017	945.30	-0.21647	0.51197	.	-0.19895	-0.26377
21	MODEL1	PARMS	CRAB	361.654	1054.70	-0.26801	0.71441	-0.23071	0.02528	-0.42215

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	23	269083.23	0.25113	0.21857	26.3182	314.485	316.923
2	0.21350	-1	1	2	23	319426.64	0.11103	0.07237	35.1711	318.773	321.210
3	.	-1	1	2	23	348028.43	0.03143	-0.01069	40.2007	320.916	323.354
4	.	-1	1	2	23	351848.29	0.02079	-0.02178	40.8724	321.189	323.627
5	0.21517	-1	2	3	22	238952.09	0.36390	0.30608	21.1927	312.405	316.061
6	.	-1	2	3	22	247221.38	0.34189	0.28206	22.5837	313.255	316.912
7	.	-1	2	3	22	255069.45	0.32100	0.25927	23.9037	314.036	317.693
8	.	-1	2	3	22	268200.87	0.28604	0.22114	26.1125	315.291	318.948
9	0.41258	-1	3	4	21	196648.56	0.50031	0.42893	14.5736	308.371	313.246
10	0.25517	-1	3	4	21	198369.91	0.49594	0.42393	14.8500	308.588	313.464
11	0.31048	-1	3	4	21	202906.02	0.48441	0.41075	15.5783	309.154	314.029
12	0.25232	-1	3	4	21	208042.61	0.47136	0.39584	16.4030	309.779	314.654
13	0.48577	-1	4	5	20	145611.69	0.64762	0.57714	7.2659	301.639	307.733
14	0.35366	-1	4	5	20	164261.40	0.60248	0.52298	10.1177	304.652	310.746
15	0.44719	-1	4	5	20	179249.80	0.56621	0.47945	12.4096	306.835	312.929
16	0.27488	-1	4	5	20	186047.20	0.54976	0.45971	13.4490	307.765	313.860
17	0.52105	-1	5	6	19	124037.96	0.71483	0.63979	5.0186	298.348	305.661
18	0.46933	-1	5	6	19	151566.60	0.65154	0.55985	9.0177	303.359	310.672
19	0.34891	-1	5	6	19	163102.38	0.62502	0.52635	10.6934	305.192	312.506
20	0.41635	-1	5	6	19	178943.42	0.58860	0.48034	12.9946	307.510	314.823
21	0.52653	-1	6	7	18	130793.46	0.71513	0.62017	7.0000	300.322	308.854

Untransformed Data: 1962 and 1987 Omitted

N = 24 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.232874	0.198005	23.1599	297.4	222486	299.8	QMA_LAG
1	0.141108	0.102067	28.3229	300.1	249101	302.5	QND_LAG
1	0.066478	0.024045	32.5217	302.1	270745	304.5	QJF_LAG
1	0.053146	0.010108	33.2717	302.5	274612	304.8	QSO_LAG
2	0.376336	0.316939	17.0885	294.4	189492	298.0	QMA_LAG QND_LAG
2	0.351189	0.289397	18.5033	295.4	197132	298.9	QMA_LAG QMJ_LAG
2	0.329156	0.265266	19.7429	296.2	203827	299.7	QMA_LAG QJA_LAG
2	0.233221	0.160194	25.1404	299.4	232975	302.9	QMA_LAG QSO_LAG
3	0.549646	0.482093	9.3377	288.6	143675	293.3	QMA_LAG QMJ_LAG QND_LAG
3	0.521024	0.449178	10.9481	290.1	152807	294.8	QMA_LAG QJA_LAG QND_LAG
3	0.469797	0.390266	13.8302	292.5	169150	297.3	QMA_LAG QSO_LAG QND_LAG
3	0.411831	0.323606	17.0915	295.0	187642	299.8	QJF_LAG QMA_LAG QND_LAG
4	0.678108	0.610341	4.1103	282.6	108098	288.5	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.621260	0.541525	7.3086	286.5	127188	292.4	QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4	0.584406	0.496912	9.3821	288.7	139564	294.6	QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4	0.541649	0.445154	11.7877	291.1	153923	296.9	QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.696046	0.611614	5.1010	283.2	107744	290.3	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.686155	0.598976	5.6575	284.0	111250	291.0	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.628970	0.525906	8.8748	288.0	131521	295.1	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
5	0.544475	0.417940	13.6287	292.9	161473	300.0	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
6	0.697841	0.591197	7.0000	285.1	113408	293.3	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	4452618.9629	742103.16048	6.544	0.0010
Error	17	1927940.7767	113408.28098		
C Total	23	6380559.7396			

Root MSE	336.76146	R-square	0.6978
Dep Mean	1712.12083	Adj R-sq	0.5912
C.V.	19.66926		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	1093.647873	224.90979192	4.863	0.0001	0.00000000
QJF_LAG	1	-0.118704	0.14639376	-0.811	0.4287	2.08023899
QMA_LAG	1	0.609512	0.12644086	4.821	0.0002	2.71333340
QMJ_LAG	1	-0.223460	0.07607253	-2.937	0.0092	1.75049777
QJA_LAG	1	-0.056393	0.17743379	-0.318	0.7545	1.96255285
QSO_LAG	1	-0.335901	0.17064135	-1.968	0.0655	3.13536716
QND_LAG	1	0.450181	0.11512663	3.910	0.0011	2.35245032

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.88133	1.00000	0.0375	0.0201	0.0263	0.0283	0.0256	0.0140
2	1.18808	1.55730	0.0002	0.0739	0.0953	0.0008	0.0275	0.1641
3	0.72973	1.98708	0.0138	0.1132	0.0018	0.4868	0.0011	0.0308
4	0.63344	2.13276	0.1082	0.0309	0.5238	0.0145	0.0148	0.1182
5	0.43511	2.57335	0.6031	0.0654	0.0086	0.0018	0.2616	0.0117
6	0.13230	4.66670	0.2371	0.6965	0.3443	0.4678	0.6694	0.6613

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	471.684	1200.30	.	0.27785	.	.	.
2	MODEL1	PARMS	CRAB	499.100	1384.41	.	.	.	.	.
3	MODEL1	PARMS	CRAB	520.332	1382.60	0.19630	.	.	.	.
4	MODEL1	PARMS	CRAB	524.034	1521.65	.	.	.	.	0.16664
5	MODEL1	PARMS	CRAB	435.307	867.27	.	0.27925	.	.	.
6	MODEL1	PARMS	CRAB	443.996	1420.05	.	0.39775	-0.17342	.	.
7	MODEL1	PARMS	CRAB	451.472	1392.88	.	0.32208	.	-0.30368	.
8	MODEL1	PARMS	CRAB	482.675	1192.91	.	0.27255	.	.	0.01500
9	MODEL1	PARMS	CRAB	379.045	1072.61	.	0.42690	-0.21314	.	.
10	MODEL1	PARMS	CRAB	390.905	1049.02	.	0.33452	.	-0.37780	.
11	MODEL1	PARMS	CRAB	411.278	793.98	.	0.39571	.	.	-0.32712
12	MODEL1	PARMS	CRAB	433.177	961.78	-0.18944	0.35526	.	.	.
13	MODEL1	PARMS	CRAB	328.782	1007.49	.	0.57985	-0.23539	.	-0.38632
14	MODEL1	PARMS	CRAB	356.634	1165.07	.	0.43775	-0.16996	-0.27868	.
15	MODEL1	PARMS	CRAB	373.583	1165.71	-0.18747	0.50181	-0.21269	.	.
16	MODEL1	PARMS	CRAB	392.330	973.41	.	0.38540	.	-0.30173	-0.17416
17	MODEL1	PARMS	CRAB	328.244	1078.85	-0.13623	0.62557	-0.23379	.	-0.36431
18	MODEL1	PARMS	CRAB	333.542	1054.51	.	0.55990	-0.21472	-0.11060	-0.32506
19	MODEL1	PARMS	CRAB	362.658	1199.75	-0.09612	0.47463	-0.17582	-0.23933	.
20	MODEL1	PARMS	CRAB	401.837	990.85	-0.05778	0.40609	.	-0.27913	-0.17645
21	MODEL1	PARMS	CRAB	336.761	1093.65	-0.11870	0.60951	-0.22346	-0.05639	-0.33590

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	22	222485.92	0.23287	0.19801	23.1599	297.415	299.771
2	0.21149	-1	1	2	22	249100.62	0.14111	0.10207	28.3229	300.126	302.483
3	.	-1	1	2	22	270745.26	0.06648	0.02404	32.5217	302.126	304.482
4	.	-1	1	2	22	274611.64	0.05315	0.01011	33.2717	302.466	304.823
5	0.21325	-1	2	3	21	189491.81	0.37634	0.31694	17.0885	294.446	297.980
6	.	-1	2	3	21	197132.39	0.35119	0.28940	18.5033	295.394	298.929
7	.	-1	2	3	21	203826.67	0.32916	0.26527	19.7429	296.196	299.730
8	.	-1	2	3	21	232975.35	0.23322	0.16019	25.1404	299.404	302.938
9	0.25472	-1	3	4	20	143675.47	0.54965	0.48209	9.3377	288.632	293.344
10	0.25028	-1	3	4	20	152806.62	0.52102	0.44918	10.9481	290.111	294.823
11	0.36340	-1	3	4	20	169149.74	0.46980	0.39027	13.8302	292.549	297.261
12	0.26713	-1	3	4	20	187642.40	0.41183	0.32361	17.0915	295.039	299.752
13	0.43636	-1	4	5	19	108097.53	0.67811	0.61034	4.1103	282.572	288.462
14	0.27363	-1	4	5	19	127188.12	0.62126	0.54153	7.3086	286.475	292.366
15	0.30794	-1	4	5	19	139564.47	0.58441	0.49691	9.3821	288.704	294.594
16	0.32276	-1	4	5	19	153923.01	0.54165	0.44515	11.7877	291.054	296.945
17	0.46469	-1	5	6	18	107744.24	0.69605	0.61161	5.1010	283.196	290.264
18	0.41506	-1	5	6	18	111250.29	0.68616	0.59898	5.6575	283.965	291.033
19	0.29825	-1	5	6	18	131521.05	0.62897	0.52591	8.8748	287.982	295.050
20	0.33803	-1	5	6	18	161472.58	0.54447	0.41794	13.6287	292.906	299.974
21	0.45018	-1	6	7	17	113408.28	0.69784	0.59120	7.0000	285.054	293.300

Untransformed Data: 1969 and 1974 Omitted

N = 24 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.225845	0.190656	34.5987	307.0	331131	309.3	QMA_LAG
1	0.156594	0.118258	39.4828	309.0	360752	311.4	QND_LAG
1	0.023113	-.021291	48.8968	312.5	417847	314.9	QJA_LAG
1	0.011740	-.033181	49.6989	312.8	422711	315.2	QMJ_LAG
2	0.447875	0.395292	20.9397	300.8	247408	304.4	QMA_LAG QND_LAG
2	0.314980	0.249740	30.3123	306.0	306958	309.6	QMA_LAG QJA_LAG
2	0.255971	0.185111	34.4740	308.0	333400	311.5	QJF_LAG QMA_LAG
2	0.248923	0.177391	34.9711	308.2	336559	311.8	QMA_LAG QSO_LAG
3	0.649260	0.596649	8.7366	292.0	165025	296.7	QMA_LAG QSO_LAG QND_LAG
3	0.609454	0.550872	11.5440	294.5	183754	299.2	QMA_LAG QJA_LAG QND_LAG
3	0.576525	0.513003	13.8664	296.5	199248	301.2	QJF_LAG QMA_LAG QND_LAG
3	0.487154	0.410227	20.1694	301.1	241297	305.8	QMA_LAG QMJ_LAG QND_LAG
4	0.710035	0.648989	6.4503	289.4	143611	295.3	QJF_LAG QMA_LAG QSO_LAG QND_LAG
4	0.693912	0.629473	7.5874	290.7	151596	296.6	QMA_LAG QJA_LAG QSO_LAG QND_LAG
4	0.692702	0.628008	7.6727	290.8	152195	296.7	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.663691	0.592889	9.7188	292.9	166564	298.8	QJF_LAG QMA_LAG QJA_LAG QND_LAG
5	0.755067	0.687030	5.2743	287.3	128047	294.4	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.733308	0.659227	6.8089	289.4	139422	296.5	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.710532	0.630124	8.4153	291.3	151330	298.4	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.672558	0.581602	11.0935	294.3	171182	301.4	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
6	0.758957	0.673883	7.0000	289.0	133426	297.2	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	7141879.4052	1190313.2342	8.921	0.0002
Error	17	2268243.1744	133426.06908		
C Total	23	9410122.5796			

Root MSE	365.27533	R-square	0.7590
Dep Mean	1687.52083	Adj R-sq	0.6739
C.V.	21.64568		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	661.710440	267.72742894	2.472	0.0243	0.00000000
QJF_LAG	1	-0.250034	0.13529577	-1.848	0.0821	1.56599670
QMA_LAG	1	0.817883	0.13319831	6.140	0.0001	1.88907560
QMJ_LAG	1	-0.114768	0.08533122	-1.345	0.1963	1.55450657
QJA_LAG	1	-0.102199	0.19512236	-0.524	0.6072	2.00558178
QSO_LAG	1	-0.488880	0.19804796	-2.468	0.0245	2.38288269
QND_LAG	1	0.651195	0.11759829	5.537	0.0001	1.63145473

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.67474	1.00000	0.0465	0.0271	0.0322	0.0419	0.0397	0.0130
2	1.14522	1.52825	0.0007	0.1641	0.0009	0.0003	0.0026	0.3396
3	0.86100	1.76254	0.1586	0.0080	0.4903	0.0209	0.0394	0.0001
4	0.60819	2.09711	0.0156	0.2474	0.0391	0.4207	0.0033	0.1470
5	0.51176	2.28617	0.6793	0.0047	0.0739	0.0305	0.2958	0.0002
6	0.19910	3.66530	0.0993	0.5487	0.3636	0.4857	0.6193	0.5000

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	575.440	1046.37	.	0.38677	.	.	.
2	MODEL1	PARMS	CRAB	600.627	1218.82	.	.	.	.	.
3	MODEL1	PARMS	CRAB	646.411	1848.12	.	.	.	-0.17591	.
4	MODEL1	PARMS	CRAB	650.163	1538.30	.	.	0.06228	.	.
5	MODEL1	PARMS	CRAB	497.401	386.98	.	0.44413	.	.	.
6	MODEL1	PARMS	CRAB	554.038	1256.46	.	0.45839	.	-0.36014	.
7	MODEL1	PARMS	CRAB	577.408	1237.20	-0.17014	0.44425	.	.	.
8	MODEL1	PARMS	CRAB	580.137	1142.88	.	0.45129	.	.	-0.18462
9	MODEL1	PARMS	CRAB	406.233	352.47	.	0.69609	.	.	-0.63041
10	MODEL1	PARMS	CRAB	428.666	559.83	.	0.55266	.	-0.49509	.
11	MODEL1	PARMS	CRAB	446.372	622.25	-0.37471	0.58681	.	.	.
12	MODEL1	PARMS	CRAB	491.220	506.69	.	0.51095	-0.12624	.	.
13	MODEL1	PARMS	CRAB	378.960	525.75	-0.26751	0.75908	.	.	-0.53315
14	MODEL1	PARMS	CRAB	389.353	465.25	.	0.69573	.	-0.29734	-0.46641
15	MODEL1	PARMS	CRAB	390.122	478.03	.	0.76904	-0.13279	.	-0.63705
16	MODEL1	PARMS	CRAB	408.122	685.51	-0.25967	0.62808	.	-0.38810	.
17	MODEL1	PARMS	CRAB	357.837	655.87	-0.27102	0.83418	-0.13522	.	-0.53864
18	MODEL1	PARMS	CRAB	373.393	581.25	-0.22302	0.74833	.	-0.22228	-0.42673
19	MODEL1	PARMS	CRAB	389.011	518.12	.	0.74602	-0.09136	-0.20899	-0.51971
20	MODEL1	PARMS	CRAB	413.741	740.20	-0.27817	0.65784	-0.06562	-0.33325	.
21	MODEL1	PARMS	CRAB	365.275	661.71	-0.25003	0.81788	-0.11477	-0.10220	-0.48888

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	22	331131.45	0.22585	0.19066	34.5987	306.958	309.314
2	0.30597	-1	1	2	22	360752.34	0.15659	0.11826	39.4828	309.014	311.371
3	.	-1	1	2	22	417846.73	0.02311	-0.02129	48.8968	312.541	314.897
4	.	-1	1	2	22	422711.32	0.01174	-0.03318	49.6989	312.818	315.175
5	0.36838	-1	2	3	21	247407.85	0.44787	0.39529	20.9397	300.846	304.380
6	.	-1	2	3	21	306958.12	0.31498	0.24974	30.3123	306.022	309.557
7	.	-1	2	3	21	333400.05	0.25597	0.18511	34.4740	308.006	311.540
8	.	-1	2	3	21	336558.58	0.24892	0.17739	34.9711	308.232	311.766
9	0.57177	-1	3	4	20	165025.43	0.64926	0.59665	8.7366	291.957	296.669
10	0.43317	-1	3	4	20	183754.49	0.60945	0.55087	11.5440	294.537	299.249
11	0.47175	-1	3	4	20	199247.73	0.57652	0.51300	13.8664	296.480	301.192
12	0.41539	-1	3	4	20	241297.06	0.48715	0.41023	20.1694	301.075	305.787
13	0.61419	-1	4	5	19	143610.98	0.71003	0.64899	6.4503	289.390	295.280
14	0.55777	-1	4	5	19	151595.92	0.69391	0.62947	7.5874	290.689	296.579
15	0.62337	-1	4	5	19	152195.19	0.69270	0.62801	7.6727	290.783	296.674
16	0.49080	-1	4	5	19	166563.75	0.66369	0.59289	9.7188	292.948	298.839
17	0.66728	-1	5	6	18	128047.02	0.75507	0.68703	5.2743	287.339	294.408
18	0.59667	-1	5	6	18	139422.44	0.73331	0.65923	6.8089	289.382	296.450
19	0.59743	-1	5	6	18	151329.65	0.71053	0.63012	8.4153	291.349	298.417
20	0.51316	-1	5	6	18	171181.63	0.67256	0.58160	11.0935	294.307	301.375
21	0.65119	-1	6	7	17	133426.07	0.75896	0.67388	7.0000	288.955	297.201

Untransformed Data: 1986 and 1987 Omitted

N = 24 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.341036	0.311083	21.4822	293.6	189619	295.9	QMA_LAG
1	0.027742	-.016451	41.2042	302.9	279771	305.3	QJA_LAG
1	0.014830	-.029950	42.0170	303.2	283486	305.6	QND_LAG
1	0.013218	-.031636	42.1185	303.3	283950	305.6	QSO_LAG
2	0.490308	0.441766	14.0854	289.4	153650	292.9	QMA_LAG QMJ_LAG
2	0.436759	0.383117	17.4563	291.8	169792	295.3	QMA_LAG QJA_LAG
2	0.419434	0.364142	18.5470	292.5	175015	296.1	QJF_LAG QMA_LAG
2	0.360833	0.299960	22.2359	294.8	192681	298.4	QMA_LAG QSO_LAG
3	0.566117	0.501035	11.3132	287.5	137336	292.3	QJF_LAG QMA_LAG QMJ_LAG
3	0.528073	0.457284	13.7081	289.6	149379	294.3	QMA_LAG QMJ_LAG QJA_LAG
3	0.517898	0.445582	14.3486	290.1	152599	294.8	QMA_LAG QMJ_LAG QND_LAG
3	0.511317	0.438014	14.7629	290.4	154682	295.1	QMA_LAG QMJ_LAG QSO_LAG
4	0.654924	0.582277	7.7227	284.1	114975	289.9	QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4	0.644660	0.569851	8.3689	284.8	118395	290.6	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.573462	0.483664	12.8508	289.1	142118	295.0	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG
4	0.572359	0.482329	12.9202	289.2	142485	295.1	QMA_LAG QMJ_LAG QJA_LAG QND_LAG
5	0.728960	0.653672	5.0621	280.3	95324	287.3	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.664866	0.571774	9.0969	285.4	117866	292.4	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
5	0.648078	0.550322	10.1537	286.5	123770	293.6	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.573510	0.455041	14.8478	291.1	149996	298.2	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG
6	0.729947	0.634634	7.0000	282.2	100564	290.4	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	4620984.1645	770164.02742	7.658	0.0004
Error	17	1709592.0488	100564.23817		
C Total	23	6330576.2133			

Root MSE	317.11865	R-square	0.7299
Dep Mean	1599.31667	Adj R-sq	0.6346
C.V.	19.82838		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	1186.494602	217.27225224	5.461	0.0001	0.00000000
QJF_LAG	1	-0.266167	0.11724546	-2.270	0.0365	1.70272267
QMA_LAG	1	0.687913	0.10812275	6.362	0.0001	2.30744632
QMJ_LAG	1	-0.237199	0.07159452	-3.313	0.0041	1.77912962
QJA_LAG	1	0.040475	0.16241905	0.249	0.8062	1.84819394
QSO_LAG	1	-0.323710	0.15993008	-2.024	0.0590	3.12456355
QND_LAG	1	0.372410	0.11867307	3.138	0.0060	2.12065322

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.80823	1.00000	0.0430	0.0221	0.0234	0.0340	0.0281	0.0187
2	1.25364	1.49668	0.0027	0.0910	0.1283	0.0001	0.0229	0.1336
3	0.70603	1.99437	0.0229	0.1611	0.0266	0.4813	0.0089	0.0194
4	0.64801	2.08174	0.3080	0.0050	0.3007	0.0334	0.0001	0.1933
5	0.42873	2.55931	0.5505	0.1037	0.1500	0.0513	0.2194	0.0513
6	0.15535	4.25163	0.0729	0.6171	0.3711	0.4000	0.7206	0.5838

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	435.453	1001.08	.	0.32980	.	.	.
2	MODEL1	PARMS	CRAB	528.933	1743.45	.	.	.	-0.15788	.
3	MODEL1	PARMS	CRAB	532.434	1484.58	.	.	.	.	.
4	MODEL1	PARMS	CRAB	532.870	1504.65	.	.	.	.	0.08253
5	MODEL1	PARMS	CRAB	391.982	1231.20	.	0.46903	-0.19518	.	.
6	MODEL1	PARMS	CRAB	412.059	1201.19	.	0.37116	.	-0.30138	.
7	MODEL1	PARMS	CRAB	418.348	1244.09	-0.22094	0.40484	.	.	.
8	MODEL1	PARMS	CRAB	438.954	1062.56	.	0.36615	.	.	-0.11107
9	MODEL1	PARMS	CRAB	370.589	1468.19	-0.21728	0.54162	-0.19349	.	.
10	MODEL1	PARMS	CRAB	386.495	1324.31	.	0.47242	-0.16143	-0.20017	.
11	MODEL1	PARMS	CRAB	390.640	1086.53	.	0.47574	-0.20534	.	.
12	MODEL1	PARMS	CRAB	393.297	1295.47	.	0.50704	-0.19598	.	-0.11442
13	MODEL1	PARMS	CRAB	339.080	1295.41	-0.31758	0.58821	-0.21254	.	.
14	MODEL1	PARMS	CRAB	344.086	1010.97	.	0.61771	-0.22861	.	-0.38646
15	MODEL1	PARMS	CRAB	376.985	1479.01	-0.18563	0.53270	-0.17731	-0.09747	.
16	MODEL1	PARMS	CRAB	377.472	1158.17	.	0.48187	-0.16692	-0.24561	.
17	MODEL1	PARMS	CRAB	308.746	1196.10	-0.25727	0.67892	-0.22954	.	-0.30504
18	MODEL1	PARMS	CRAB	343.316	1305.30	-0.28228	0.57855	-0.19398	-0.11352	.
19	MODEL1	PARMS	CRAB	351.810	1039.35	.	0.60551	-0.21509	-0.07177	-0.34836
20	MODEL1	PARMS	CRAB	387.293	1478.82	-0.18742	0.53115	-0.17667	-0.10087	0.00663
21	MODEL1	PARMS	CRAB	317.119	1186.49	-0.26617	0.68791	-0.23720	0.04047	-0.32371

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	22	189619.20	0.34104	0.31108	21.4822	293.578	295.934
2	.	-1	1	2	22	279770.56	0.02774	-0.01645	41.2042	302.913	305.269
3	0.07874	-1	1	2	22	283486.00	0.01483	-0.02995	42.0170	303.230	305.586
4	.	-1	1	2	22	283950.05	0.01322	-0.03164	42.1185	303.269	305.625
5	.	-1	2	3	21	153649.70	0.49031	0.44177	14.0854	289.414	292.948
6	.	-1	2	3	21	169792.34	0.43676	0.38312	17.4563	291.811	295.345
7	.	-1	2	3	21	175015.24	0.41943	0.36414	18.5470	292.538	296.072
8	.	-1	2	3	21	192680.65	0.36083	0.29996	22.2359	294.846	298.380
9	.	-1	3	4	20	137336.47	0.56612	0.50103	11.3132	287.549	292.261
10	.	-1	3	4	20	149378.61	0.52807	0.45728	13.7081	289.566	294.278
11	0.10818	-1	3	4	20	152599.31	0.51790	0.44558	14.3486	290.078	294.790
12	.	-1	3	4	20	154682.28	0.51132	0.43801	14.7629	290.403	295.116
13	0.21101	-1	4	5	19	114975.17	0.65492	0.58228	7.7227	284.053	289.943
14	0.32701	-1	4	5	19	118395.19	0.64466	0.56985	8.3689	284.756	290.646
15	.	-1	4	5	19	142117.50	0.57346	0.48366	12.8508	289.139	295.029
16	0.14004	-1	4	5	19	142484.93	0.57236	0.48233	12.9202	289.201	295.091
17	0.36421	-1	5	6	18	95324.28	0.72896	0.65367	5.0621	280.257	287.325
18	0.21431	-1	5	6	18	117866.11	0.66487	0.57177	9.0969	285.351	292.419
19	0.31475	-1	5	6	18	123770.34	0.64808	0.55032	10.1537	286.524	293.592
20	.	-1	5	6	18	149995.96	0.57351	0.45504	14.8478	291.136	298.205
21	0.37241	-1	6	7	17	100564.24	0.72995	0.63463	7.0000	282.169	290.415

Untransformed Data: 1962, 1969 and 1974 Omitted

N = 23 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.207380	0.169636	28.7314	290.4	280580	292.7	QMA_LAG
1	0.196753	0.158504	29.3713	290.7	284341	293.0	QND_LAG
1	0.056302	0.011364	37.8292	294.4	334060	296.7	QJF_LAG
1	0.034326	-.011658	39.1526	295.0	341839	297.2	QSO_LAG
2	0.475736	0.423309	14.5711	282.9	194864	286.3	QMA_LAG QND_LAG
2	0.298945	0.228839	25.2174	289.6	260575	293.0	QMA_LAG QJA_LAG
2	0.247711	0.172482	28.3027	291.2	279618	294.6	QJA_LAG QND_LAG
2	0.220334	0.142368	29.9513	292.1	289794	295.5	QMA_LAG QMJ_LAG
3	0.650116	0.594871	6.0699	275.6	136893	280.2	QMA_LAG QJA_LAG QND_LAG
3	0.624393	0.565087	7.6190	277.3	146957	281.8	QMA_LAG QSO_LAG QND_LAG
3	0.551558	0.480752	12.0051	281.3	175454	285.9	QMA_LAG QMJ_LAG QND_LAG
3	0.521443	0.445881	13.8186	282.8	187237	287.4	QJF_LAG QMA_LAG QND_LAG
4	0.696120	0.628591	5.2996	274.4	125499	280.1	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.693956	0.625946	5.4299	274.5	126393	280.2	QMA_LAG QJA_LAG QSO_LAG QND_LAG
4	0.665342	0.590973	7.1530	276.6	138210	282.3	QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4	0.654760	0.578040	7.7903	277.3	142580	283.0	QJF_LAG QMA_LAG QJA_LAG QND_LAG
5	0.723099	0.641658	5.6749	274.2	121084	281.1	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.721299	0.639328	5.7833	274.4	121871	281.2	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.701094	0.613180	7.0001	276.0	130706	282.8	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.671922	0.575429	8.7568	278.1	143462	285.0	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
6	0.734306	0.634671	7.0000	275.3	123444	283.2	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	5458681.2827	909780.21378	7.370	0.0007
Error	16	1975110.3939	123444.39962		
C Total	22	7433791.6765			

Root MSE	351.34655	R-square	0.7343
Dep Mean	1747.35652	Adj R-sq	0.6347
C.V.	20.10732		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	703.277369	258.92726553	2.716	0.0153	0.00000000
QJF_LAG	1	-0.125772	0.15309502	-0.822	0.4234	1.84641253
QMA_LAG	1	0.715345	0.14436853	4.955	0.0001	2.33251154
QMJ_LAG	1	-0.116083	0.08208178	-1.414	0.1765	1.50965844
QJA_LAG	1	-0.170701	0.19287465	-0.885	0.3892	2.11644568
QSO_LAG	1	-0.389722	0.20107046	-1.938	0.0704	2.57954027
QND_LAG	1	0.589417	0.12000825	4.911	0.0002	1.83636922

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.78197	1.00000	0.0405	0.0228	0.0334	0.0361	0.0333	0.0103
2	1.14541	1.55846	0.0005	0.1280	0.0019	0.0000	0.0016	0.3086
3	0.80085	1.86381	0.0811	0.0240	0.5032	0.0558	0.0451	0.0266
4	0.58398	2.18261	0.0258	0.1095	0.2082	0.4021	0.0429	0.0727
5	0.52439	2.30329	0.5789	0.0518	0.0039	0.0275	0.2460	0.0101
6	0.16339	4.12636	0.2730	0.6639	0.2495	0.4785	0.6312	0.5718

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	529.698	1184.71	.	0.33405	.	.	.
2	MODEL1	PARMS	CRAB	533.237	1280.23	.	.	.	.	.
3	MODEL1	PARMS	CRAB	577.979	1409.97	0.20746	.	.	.	.
4	MODEL1	PARMS	CRAB	584.670	1552.67	.	.	.	.	0.18000
5	MODEL1	PARMS	CRAB	441.434	535.41	.	0.39192	.	.	.
6	MODEL1	PARMS	CRAB	510.465	1366.87	.	0.40169	.	-0.32545	.
7	MODEL1	PARMS	CRAB	528.789	1457.91	.	.	.	-0.23490	.
8	MODEL1	PARMS	CRAB	538.325	1289.57	.	0.36161	-0.06214	.	.
9	MODEL1	PARMS	CRAB	369.991	682.70	.	0.49705	.	-0.45886	.
10	MODEL1	PARMS	CRAB	383.350	457.74	.	0.61404	.	.	-0.51205
11	MODEL1	PARMS	CRAB	418.872	696.19	.	0.47086	-0.15703	.	.
12	MODEL1	PARMS	CRAB	432.708	634.89	-0.23457	0.49804	.	.	.
13	MODEL1	PARMS	CRAB	354.258	615.21	.	0.68780	-0.15276	.	-0.50505
14	MODEL1	PARMS	CRAB	355.517	593.54	.	0.60575	.	-0.33135	-0.31792
15	MODEL1	PARMS	CRAB	371.766	742.57	.	0.52238	-0.07631	-0.40197	.
16	MODEL1	PARMS	CRAB	377.598	707.42	-0.08013	0.52669	.	-0.43000	.
17	MODEL1	PARMS	CRAB	347.971	662.76	.	0.66043	-0.10794	-0.22875	-0.37308
18	MODEL1	PARMS	CRAB	349.100	688.55	-0.17541	0.75470	-0.14825	.	-0.48155
19	MODEL1	PARMS	CRAB	361.533	621.51	-0.09964	0.64598	.	-0.29149	-0.32781
20	MODEL1	PARMS	CRAB	378.764	776.17	-0.09589	0.55955	-0.08144	-0.36360	.
21	MODEL1	PARMS	CRAB	351.347	703.28	-0.12577	0.71534	-0.11608	-0.17070	-0.38972

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	21	280579.53	0.20738	0.16964	28.7314	290.434	292.705
2	0.30483	-1	1	2	21	284341.31	0.19675	0.15850	29.3713	290.740	293.011
3	.	-1	1	2	21	334059.57	0.05630	0.01136	37.8292	294.446	296.717
4	.	-1	1	2	21	341838.86	0.03433	-0.01166	39.1526	294.976	297.247
5	0.36011	-1	2	3	20	194863.62	0.47574	0.42331	14.5711	282.927	286.333
6	.	-1	2	3	20	260575.00	0.29894	0.22884	25.2174	289.610	293.017
7	0.32835	-1	2	3	20	279618.17	0.24771	0.17248	28.3027	291.233	294.639
8	.	-1	2	3	20	289793.61	0.22033	0.14237	29.9513	292.055	295.461
9	0.42087	-1	3	4	19	136892.98	0.65012	0.59487	6.0699	275.626	280.168
10	0.52808	-1	3	4	19	146957.03	0.62439	0.56509	7.6190	277.257	281.799
11	0.41792	-1	3	4	19	175453.86	0.55156	0.48075	12.0051	281.334	285.876
12	0.42748	-1	3	4	19	187236.53	0.52144	0.44588	13.8186	282.829	287.371
13	0.58203	-1	4	5	18	125498.90	0.69612	0.62859	5.2996	274.383	280.061
14	0.50828	-1	4	5	18	126392.68	0.69396	0.62595	5.4299	274.547	280.224
15	0.44143	-1	4	5	18	138209.97	0.66534	0.59097	7.1530	276.602	282.280
16	0.44006	-1	4	5	18	142580.09	0.65476	0.57804	7.7903	277.318	282.996
17	0.55253	-1	5	6	17	121083.78	0.72310	0.64166	5.6749	274.245	281.058
18	0.62304	-1	5	6	17	121870.78	0.72130	0.63933	5.7833	274.394	281.207
19	0.53486	-1	5	6	17	130706.27	0.70109	0.61318	7.0001	276.004	282.817
20	0.46578	-1	5	6	17	143462.37	0.67192	0.57543	8.7568	278.146	284.959
21	0.58942	-1	6	7	16	123444.40	0.73431	0.63467	7.0000	275.295	283.243

Untransformed Data: 1969, 1974 and 1987 Omitted

N = 23 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.295690	0.262151	43.3503	289.8	273304	292.1	QMA_LAG
1	0.108617	0.066170	59.9112	295.2	345896	297.5	QND_LAG
1	0.034481	-.011496	66.4742	297.1	374664	299.4	QJA_LAG
1	0.010676	-.036434	68.5816	297.6	383902	299.9	QSO_LAG
2	0.459356	0.405292	30.8614	285.7	220284	289.2	QMA_LAG QND_LAG
2	0.423714	0.366086	34.0167	287.2	234806	290.6	QMA_LAG QJA_LAG
2	0.341892	0.276081	41.2602	290.3	268144	293.7	QJF_LAG QMA_LAG
2	0.336963	0.270659	41.6965	290.4	270152	293.8	QMA_LAG QMJ_LAG
3	0.654209	0.599611	15.6117	277.5	148307	282.0	QMA_LAG QJA_LAG QND_LAG
3	0.653084	0.598308	15.7113	277.5	148789	282.1	QMA_LAG QSO_LAG QND_LAG
3	0.600636	0.537578	20.3544	280.8	171284	285.3	QJF_LAG QMA_LAG QND_LAG
3	0.550746	0.479811	24.7710	283.5	192681	288.0	QMA_LAG QMJ_LAG QND_LAG
4	0.740119	0.682368	10.0064	272.9	117653	278.6	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.724574	0.663369	11.3825	274.2	124690	279.9	QJF_LAG QMA_LAG QSO_LAG QND_LAG
4	0.719452	0.657108	11.8360	274.7	127010	280.3	QMA_LAG QJA_LAG QSO_LAG QND_LAG
4	0.709929	0.645468	12.6791	275.4	131321	281.1	QJF_LAG QMA_LAG QJA_LAG QND_LAG
5	0.814570	0.760032	5.4155	267.1	88886	273.9	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.762505	0.692653	10.0247	272.8	113843	279.6	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.761499	0.691352	10.1137	272.9	114325	279.7	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.745618	0.670800	11.5196	274.4	121938	281.2	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
6	0.819264	0.751487	7.0000	268.5	92051	276.5	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	6676129.1225	1112688.1871	12.088	0.0001
Error	16	1472809.5766	92050.598537		
C Total	22	8148938.6991			

Root MSE	303.39842	R-square	0.8193
Dep Mean	1639.72174	Adj R-sq	0.7515
C.V.	18.50304		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	757.293276	224.73956599	3.370	0.0039	0.00000000
QJF_LAG	1	-0.254144	0.11238563	-2.261	0.0380	1.56489541
QMA_LAG	1	0.829779	0.11070876	7.495	0.0001	1.87958343
QMJ_LAG	1	-0.163093	0.07275777	-2.242	0.0395	1.52101736
QJA_LAG	1	-0.104469	0.16207086	-0.645	0.5283	1.99933819
QSO_LAG	1	-0.423809	0.16598174	-2.553	0.0213	2.42386764
QND_LAG	1	0.583573	0.10034964	5.815	0.0001	1.59111739

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.69282	1.00000	0.0456	0.0283	0.0330	0.0412	0.0390	0.0124
2	1.15340	1.52797	0.0060	0.1359	0.0260	0.0011	0.0092	0.3383
3	0.83413	1.79675	0.1737	0.0428	0.4667	0.0265	0.0234	0.0171
4	0.61384	2.09449	0.0346	0.2441	0.0455	0.3976	0.0051	0.1505
5	0.50274	2.31436	0.6440	0.0066	0.1147	0.0446	0.2898	0.0019
6	0.20307	3.64151	0.0962	0.5422	0.3141	0.4890	0.6336	0.4799

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	522.785	949.57	.	0.41315	.	.	.
2	MODEL1	PARMS	CRAB	588.130	1273.31	.	.	.	.	.
3	MODEL1	PARMS	CRAB	612.098	1821.28	.	.	.	-0.20026	.
4	MODEL1	PARMS	CRAB	619.598	1525.13	.	.	.	.	0.10365
5	MODEL1	PARMS	CRAB	469.344	427.77	.	0.45391	.	.	.
6	MODEL1	PARMS	CRAB	484.568	1178.10	.	0.49507	.	-0.40301	.
7	MODEL1	PARMS	CRAB	517.826	1166.86	-0.19648	0.48036	.	.	.
8	MODEL1	PARMS	CRAB	519.762	1130.60	.	0.47438	-0.12132	.	.
9	MODEL1	PARMS	CRAB	385.106	606.20	.	0.56528	.	-0.50616	.
10	MODEL1	PARMS	CRAB	385.732	387.07	.	0.68444	.	.	-0.58210
11	MODEL1	PARMS	CRAB	413.865	655.77	-0.36560	0.59274	.	.	.
12	MODEL1	PARMS	CRAB	438.955	613.93	.	0.55449	-0.18531	.	.
13	MODEL1	PARMS	CRAB	343.006	569.21	.	0.78004	-0.18086	.	-0.57560
14	MODEL1	PARMS	CRAB	353.115	562.36	-0.27001	0.74789	.	.	-0.48339
15	MODEL1	PARMS	CRAB	356.384	520.37	.	0.68253	.	-0.33975	-0.38852
16	MODEL1	PARMS	CRAB	362.382	723.37	-0.24517	0.63608	.	-0.40479	.
17	MODEL1	PARMS	CRAB	298.137	751.23	-0.27559	0.84643	-0.18395	.	-0.47474
18	MODEL1	PARMS	CRAB	337.407	632.32	-0.21701	0.73394	.	-0.26601	-0.35120
19	MODEL1	PARMS	CRAB	338.120	610.45	.	0.75663	-0.13884	-0.21297	-0.45577
20	MODEL1	PARMS	CRAB	349.196	835.20	-0.27858	0.69488	-0.12684	-0.30147	.
21	MODEL1	PARMS	CRAB	303.398	757.29	-0.25414	0.82978	-0.16309	-0.10447	-0.42381

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	21	273303.75	0.29569	0.26215	43.3503	289.829	292.100
2	0.24669	-1	1	2	21	345896.34	0.10862	0.06617	59.9112	295.247	297.518
3	.	-1	1	2	21	374664.39	0.03448	-0.01150	66.4742	297.085	299.356
4	.	-1	1	2	21	383901.83	0.01068	-0.03643	68.5816	297.645	299.916
5	0.30547	-1	2	3	20	220283.61	0.45936	0.40529	30.8614	285.747	289.153
6	.	-1	2	3	20	234805.76	0.42371	0.36609	34.0167	287.215	290.622
7	.	-1	2	3	20	268144.19	0.34189	0.27608	41.2602	290.269	293.675
8	.	-1	2	3	20	270152.42	0.33696	0.27066	41.6965	290.441	293.847
9	0.36904	-1	3	4	19	148306.68	0.65421	0.59961	15.6117	277.468	282.010
10	0.50691	-1	3	4	19	148789.20	0.65308	0.59831	15.7113	277.542	282.084
11	0.40870	-1	3	4	19	171283.96	0.60064	0.53758	20.3544	280.781	285.323
12	0.35837	-1	3	4	19	192681.43	0.55075	0.47981	24.7710	283.488	288.030
13	0.55629	-1	4	5	18	117653.05	0.74012	0.68237	10.0064	272.899	278.576
14	0.54899	-1	4	5	18	124690.32	0.72457	0.66337	11.3825	274.235	279.912
15	0.48259	-1	4	5	18	127009.52	0.71945	0.65711	11.8360	274.659	280.336
16	0.42554	-1	4	5	18	131320.75	0.70993	0.64547	12.6791	275.426	281.104
17	0.60009	-1	5	6	17	88885.66	0.81457	0.76003	5.4155	267.135	273.948
18	0.52169	-1	5	6	17	113843.31	0.76250	0.69265	10.0247	272.827	279.640
19	0.52958	-1	5	6	17	114325.34	0.76150	0.69135	10.1137	272.924	279.737
20	0.45820	-1	5	6	17	121937.64	0.74562	0.67080	11.5196	274.407	281.220
21	0.58357	-1	6	7	16	92050.60	0.81926	0.75149	7.0000	268.545	276.494

Untransformed Data: 1962, 1969, 1974, 1986 and 1987 Omitted

N = 21 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.396018	0.364229	28.3562	251.1	142502	253.2	QMA_LAG
1	0.036825	-.013869	55.3299	260.9	227249	263.0	QMJ_LAG
1	0.036329	-.014391	55.3671	260.9	227366	263.0	QJF_LAG
1	0.036004	-.014733	55.3915	260.9	227443	263.0	QJA_LAG
2	0.592486	0.547207	15.6024	244.8	101489	248.0	QMA_LAG QMJ_LAG
2	0.553006	0.503340	18.5671	246.8	111322	249.9	QMA_LAG QJA_LAG
2	0.432619	0.369577	27.6076	251.8	141303	254.9	QMA_LAG QND_LAG
2	0.430183	0.366870	27.7906	251.9	141910	255.0	QMA_LAG QSO_LAG
3	0.663524	0.604145	12.2678	242.8	88727	247.0	QMA_LAG QMJ_LAG QND_LAG
3	0.656669	0.596081	12.7825	243.2	90535	247.4	QMA_LAG QJA_LAG QND_LAG
3	0.643512	0.580603	13.7705	244.0	94004	248.2	QMA_LAG QMJ_LAG QJA_LAG
3	0.607043	0.537697	16.5092	246.1	103621	250.3	QMA_LAG QMJ_LAG QSO_LAG
4	0.769689	0.712111	6.2953	236.9	64528	242.1	QMA_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.755127	0.693908	7.3888	238.1	68607	243.4	QMA_LAG QMJ_LAG QJA_LAG QND_LAG
4	0.705009	0.631261	11.1524	242.1	82649	247.3	QJF_LAG QMA_LAG QMJ_LAG QND_LAG
4	0.681348	0.601685	12.9293	243.7	89279	248.9	QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.801138	0.734850	5.9336	235.8	59431	242.0	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.797763	0.730350	6.1870	236.1	60439	242.4	QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.765855	0.687806	8.5832	239.2	69975	245.5	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
5	0.688861	0.585148	14.3651	245.2	92985	251.4	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
6	0.813570	0.733672	7.0000	236.4	59695	243.7	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

Dependent Variable: CRAB

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	3647078.5323	607846.42205	10.183	0.0002
Error	14	835729.36008	59694.95429		
C Total	20	4482807.8924			

Root MSE	244.32551	R-square	0.8136
Dep Mean	1637.31905	Adj R-sq	0.7337
C.V.	14.92229		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	982.445948	198.16974417	4.958	0.0002	0.00000000
QJF_LAG	1	-0.116051	0.10651615	-1.090	0.2943	1.80506263
QMA_LAG	1	0.677866	0.10226540	6.628	0.0001	2.40136907
QMJ_LAG	1	-0.180452	0.05896644	-3.060	0.0085	1.46301825
QJA_LAG	1	-0.131009	0.13558717	-0.966	0.3503	2.14657507
QSO_LAG	1	-0.270115	0.14269597	-1.893	0.0792	2.63102930
QND_LAG	1	0.376595	0.10539190	3.573	0.0031	1.71701851

Collinearity Diagnostics(intercept adjusted)

#	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.80079	1.00000	0.0399	0.0230	0.0328	0.0376	0.0325	0.0092
2	1.19140	1.53324	0.0001	0.1013	0.0192	0.0026	0.0082	0.3148
3	0.81244	1.85671	0.0984	0.0586	0.4958	0.0544	0.0258	0.0014
4	0.53296	2.29240	0.5774	0.0550	0.0001	0.0177	0.2500	0.0035
5	0.49066	2.38919	0.0179	0.0739	0.2769	0.4747	0.0238	0.1990
6	0.17175	4.03825	0.2663	0.6883	0.1752	0.4129	0.6597	0.4722

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	CRAB	377.494	1026.29	.	0.35988	.	.	.
2	MODEL1	PARMS	CRAB	476.706	1826.74	.	.	-0.08107	.	.
3	MODEL1	PARMS	CRAB	476.829	1428.01	0.13095	.	.	.	.
4	MODEL1	PARMS	CRAB	476.909	1775.96	.	.	.	-0.15217	.
5	MODEL1	PARMS	CRAB	318.574	1331.27	.	0.45578	-0.20021	.	.
6	MODEL1	PARMS	CRAB	333.649	1209.04	.	0.43095	.	-0.33301	.
7	MODEL1	PARMS	CRAB	375.903	807.95	.	0.37877	.	.	.
8	MODEL1	PARMS	CRAB	376.710	1094.65	.	0.42240	.	.	-0.16371
9	MODEL1	PARMS	CRAB	297.871	1053.10	.	0.49190	-0.21994	.	.
10	MODEL1	PARMS	CRAB	300.890	870.28	.	0.48196	.	-0.41621	.
11	MODEL1	PARMS	CRAB	306.600	1371.89	.	0.47716	-0.15091	-0.21085	.
12	MODEL1	PARMS	CRAB	321.902	1363.98	.	0.49314	-0.19206	.	-0.10805
13	MODEL1	PARMS	CRAB	254.023	929.83	.	0.64355	-0.20970	.	-0.35222
14	MODEL1	PARMS	CRAB	261.930	1027.24	.	0.53216	-0.15753	-0.29189	.
15	MODEL1	PARMS	CRAB	287.488	1106.60	-0.17497	0.56970	-0.21448	.	.
16	MODEL1	PARMS	CRAB	298.795	798.84	.	0.54922	.	-0.34427	-0.19102
17	MODEL1	PARMS	CRAB	243.784	982.14	-0.15286	0.70466	-0.20539	.	-0.33631
18	MODEL1	PARMS	CRAB	245.844	947.94	.	0.62659	-0.17325	-0.18385	-0.25395
19	MODEL1	PARMS	CRAB	264.528	1059.65	-0.09509	0.56925	-0.16261	-0.25424	.
20	MODEL1	PARMS	CRAB	304.935	818.24	-0.07950	0.58214	.	-0.31264	-0.20030
21	MODEL1	PARMS	CRAB	244.326	982.45	-0.11605	0.67787	-0.18045	-0.13101	-0.27011

OBS	QND_LAG	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	19	142501.90	0.39602	0.36423	28.3562	251.108	253.197
2	.	-1	1	2	19	227248.90	0.03682	-0.01387	55.3299	260.908	262.997
3	.	-1	1	2	19	227365.95	0.03633	-0.01439	55.3671	260.919	263.008
4	.	-1	1	2	19	227442.58	0.03600	-0.01473	55.3915	260.926	263.015
5	.	-1	2	3	18	101489.27	0.59249	0.54721	15.6024	244.845	247.978
6	.	-1	2	3	18	111321.60	0.55301	0.50334	18.5671	246.787	249.920
7	0.13532	-1	2	3	18	141303.34	0.43262	0.36958	27.6076	251.795	254.928
8	.	-1	2	3	18	141910.10	0.43018	0.36687	27.7906	251.885	255.018
9	0.19103	-1	3	4	17	88727.02	0.66352	0.60415	12.2678	242.822	247.000
10	0.23825	-1	3	4	17	90534.58	0.65667	0.59608	12.7825	243.246	247.424
11	.	-1	3	4	17	94003.82	0.64351	0.58060	13.7705	244.035	248.214
12	.	-1	3	4	17	103620.74	0.60704	0.53770	16.5092	246.081	250.259
13	0.34892	-1	4	5	16	64527.61	0.76969	0.71211	6.2953	236.861	242.084
14	0.24741	-1	4	5	16	68607.49	0.75513	0.69391	7.3888	238.149	243.371
15	0.25010	-1	4	5	16	82649.33	0.70501	0.63126	11.1524	242.059	247.282
16	0.30749	-1	4	5	16	89278.58	0.68135	0.60168	12.9293	243.679	248.902
17	0.39339	-1	5	6	15	59430.73	0.80114	0.73485	5.9336	235.778	242.045
18	0.34038	-1	5	6	15	60439.35	0.79776	0.73035	6.1870	236.131	242.399
19	0.27224	-1	5	6	15	69975.29	0.76585	0.68781	8.5832	239.208	245.475
20	0.33137	-1	5	6	15	92985.14	0.68886	0.58515	14.3651	245.178	251.445
21	0.37659	-1	6	7	14	59694.95	0.81357	0.73367	7.0000	236.422	243.734

Untransformed Harvest and Squared Root Inflows Data: 1962 and 1987 Omitted

N = 24 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.248204	0.214031	16.3094	296.9	218040	299.3	SQR_QMA
1	0.109932	0.069474	22.9875	301.0	258142	303.3	SQR_QND
1	0.063230	0.020649	25.2431	302.2	271687	304.6	SQR_QSO
1	0.057030	0.014168	25.5425	302.4	273485	304.7	SQR_QJF
2	0.367723	0.307506	12.5370	294.8	192109	298.3	SQR_QMA SQR_QJA
2	0.366152	0.305786	12.6129	294.8	192586	298.4	SQR_QMA SQR_QND
2	0.361985	0.301222	12.8141	295.0	193852	298.5	SQR_QMA SQR_QMJ
2	0.250454	0.179068	18.2007	298.9	227739	302.4	SQR_QJF SQR_QMA
3	0.565947	0.500839	4.9634	287.7	138475	292.5	SQR_QMA SQR_QJA SQR_QND
3	0.528619	0.457912	6.7662	289.7	150384	294.4	SQR_QMA SQR_QMJ SQR_QND
3	0.433800	0.348871	11.3457	294.1	180633	298.8	SQR_QMA SQR_QJA SQR_QSO
3	0.429596	0.344036	11.5487	294.3	181975	299.0	SQR_QMA SQR_QSO SQR_QND
4	0.623210	0.543886	4.1978	286.4	126533	292.2	SQR_QMA SQR_QMJ SQR_QJA SQR_QND
4	0.607039	0.524310	4.9788	287.4	131964	293.3	SQR_QMA SQR_QMJ SQR_QSO SQR_QND
4	0.568907	0.478151	6.8204	289.6	144769	295.5	SQR_QJF SQR_QMA SQR_QJA SQR_QND
4	0.567372	0.476293	6.8946	289.7	145285	295.6	SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.639407	0.539242	5.4155	287.3	127822	294.4	SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.630311	0.527619	5.8548	287.9	131046	295.0	SQR_QJF SQR_QMA SQR_QMJ SQR_QSO SQR_QND
5	0.628520	0.525331	5.9413	288.0	131681	295.1	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QND
5	0.570858	0.451653	8.7262	291.5	152120	298.5	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
6	0.648010	0.523779	7.0000	288.7	132111	297.0	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	4134668.579	689111.42984	5.216	0.0033
Error	17	2245891.1605	132111.24474		
C Total	23	6380559.7396			

Root MSE	363.47111	R-square	0.6480
Dep Mean	1712.12083	Adj R-sq	0.5238
C.V.	21.22929		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	434.113541	446.95680627	0.971	0.3450	0.00000000
SQR_QJF	1	-8.126437	12.60657971	-0.645	0.5278	2.05733767
SQR_QMA	1	47.675926	11.63667493	4.097	0.0008	2.75124604
SQR_QMJ	1	-16.047186	8.31316302	-1.930	0.0704	2.00370995
SQR_QJA	1	-12.326996	13.33261271	-0.925	0.3681	2.48175504
SQR_QSO	1	-12.882837	13.27827400	-0.970	0.3455	3.34478330
SQR_QND	1	30.991014	10.34555581	2.996	0.0081	2.26817311

Collinearity Diagnostics(intercept adjusted)

Number	Eigenvalue	Condition Index	Var Prop SQR_QJF	Var Prop SQR_QMA	Var Prop SQR_QMJ	Var Prop SQR_QJA	Var Prop SQR_QSO	Var Prop SQR_QND
1	3.02499	1.00000	0.0331	0.0188	0.0253	0.0263	0.0207	0.0113
2	1.20954	1.58144	0.0009	0.0649	0.0599	0.0001	0.0316	0.1853
3	0.66179	2.13798	0.1191	0.1414	0.1643	0.2123	0.0055	0.0011
4	0.52629	2.39746	0.0202	0.0051	0.3696	0.2170	0.0332	0.2003
5	0.45452	2.57981	0.5846	0.1122	0.0001	0.0053	0.1968	0.0075
6	0.12287	4.96170	0.2421	0.6575	0.3807	0.5391	0.7122	0.5945

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA	SQR_QMJ	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	CRAB	466.948	701.75	.	24.2900	.	.	.
2	MODEL1	PARMS	CRAB	508.077	1112.96	.	.	.	.	.
3	MODEL1	PARMS	CRAB	521.236	1303.24	.	.	.	.	12.6875
4	MODEL1	PARMS	CRAB	522.958	1127.30	14.5867	.	.	.	.
5	MODEL1	PARMS	CRAB	438.302	1076.46	.	30.1524	.	-21.5283	.
6	MODEL1	PARMS	CRAB	438.846	64.48	.	24.6861	.	.	.
7	MODEL1	PARMS	CRAB	440.286	1064.10	.	34.6859	-16.2870	.	.
8	MODEL1	PARMS	CRAB	477.220	777.02	-3.4922	25.8464	.	.	.
9	MODEL1	PARMS	CRAB	372.122	348.63	.	32.6544	.	-28.7678	.
10	MODEL1	PARMS	CRAB	387.793	372.27	.	37.3821	-19.7623	.	.
11	MODEL1	PARMS	CRAB	425.010	998.20	.	25.7207	.	-31.3381	16.8949
12	MODEL1	PARMS	CRAB	426.585	-70.71	.	32.8596	.	.	-18.8310
13	MODEL1	PARMS	CRAB	355.715	480.13	.	38.9938	-12.8927	-21.7515	.
14	MODEL1	PARMS	CRAB	363.268	236.24	.	47.0937	-20.7013	.	-20.9847
15	MODEL1	PARMS	CRAB	380.485	387.94	-4.7003	34.4152	.	-27.4520	.
16	MODEL1	PARMS	CRAB	381.162	311.90	.	33.6815	.	-27.4024	-3.2376
17	MODEL1	PARMS	CRAB	357.521	373.82	.	43.9051	-15.3881	-15.4956	-11.6141
18	MODEL1	PARMS	CRAB	362.003	371.43	-12.4237	51.8616	-20.0479	.	-19.9949
19	MODEL1	PARMS	CRAB	362.878	535.99	-6.3135	41.5065	-13.1929	-19.8208	.
20	MODEL1	PARMS	CRAB	390.026	348.31	-5.1335	35.7869	.	-25.7230	-3.8124
21	MODEL1	PARMS	CRAB	363.471	434.11	-8.1264	47.6759	-16.0472	-12.3270	-12.8828

OBS	SQR_QND	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	22	218040.00	0.24820	0.21403	16.3094	296.930	299.286
2	15.8284	-1	1	2	22	258142.40	0.10993	0.06947	22.9875	300.982	303.338
3	.	-1	1	2	22	271687.25	0.06323	0.02065	25.2431	302.209	304.566
4	.	-1	1	2	22	273485.17	0.05703	0.01417	25.5425	302.368	304.724
5	.	-1	2	3	21	192108.63	0.36772	0.30751	12.5370	294.775	298.309
6	16.4000	-1	2	3	21	192585.85	0.36615	0.30579	12.6129	294.834	298.369
7	.	-1	2	3	21	193852.08	0.36198	0.30122	12.8141	294.992	298.526
8	.	-1	2	3	21	227739.27	0.25045	0.17907	18.2007	298.858	302.392
9	21.9734	-1	3	4	20	138475.00	0.56595	0.50084	4.9634	287.747	292.459
10	19.7937	-1	3	4	20	150383.63	0.52862	0.45791	6.7662	289.727	294.439
11	.	-1	3	4	20	180633.50	0.43380	0.34887	11.3457	294.126	298.838
12	27.0217	-1	3	4	20	181974.73	0.42960	0.34404	11.5487	294.303	299.015
13	22.8281	-1	4	5	19	126533.15	0.62321	0.54389	4.1978	286.351	292.242
14	31.7915	-1	4	5	19	131963.91	0.60704	0.52431	4.9788	287.360	293.250
15	22.9797	-1	4	5	19	144769.08	0.56891	0.47815	6.8204	289.583	295.473
16	23.5351	-1	4	5	19	145284.53	0.56737	0.47629	6.8946	289.668	295.558
17	28.5956	-1	5	6	18	127821.54	0.63941	0.53924	5.4155	287.297	294.365
18	34.4545	-1	5	6	18	131045.83	0.63031	0.52762	5.8548	287.895	294.963
19	24.1996	-1	5	6	18	131680.60	0.62852	0.52533	5.9413	288.011	295.079
20	24.9113	-1	5	6	18	152120.17	0.57086	0.45165	8.7262	291.474	298.542
21	30.9910	-1	6	7	17	132111.24	0.64801	0.52378	7.0000	288.717	296.964

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Squared Root other Inflows Data: 1962 and 1987 Omitted

N = 24 Regression Models for Dependent Variable: CRAB

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.248204	0.214031	18.4847	296.9	218040	299.3	SQR_QMA
1	0.109932	0.069474	25.5629	301.0	258142	303.3	SQR_QND
1	0.066478	0.024045	27.7874	302.1	270745	304.5	QJF_LAG
1	0.063230	0.020649	27.9536	302.2	271687	304.6	SQR_QSO
2	0.375087	0.315572	13.9895	294.5	189871	298.0	SQR_QMA QMJ_LAG
2	0.367723	0.307506	14.3665	294.8	192109	298.3	SQR_QMA SQR_QJA
2	0.366152	0.305786	14.4469	294.8	192586	298.4	SQR_QMA SQR_QND
2	0.249688	0.178230	20.4087	298.9	227972	302.4	SQR_QMA SQR_QSO
3	0.565947	0.500839	6.2193	287.7	138475	292.5	SQR_QMA SQR_QJA SQR_QND
3	0.534225	0.464359	7.8432	289.4	148595	294.2	SQR_QMA QMJ_LAG SQR_QND
3	0.433800	0.348871	12.9840	294.1	180633	298.8	SQR_QMA SQR_QJA SQR_QSO
3	0.429596	0.344036	13.1992	294.3	181975	299.0	SQR_QMA SQR_QSO SQR_QND
4	0.638147	0.561968	4.5234	285.4	121517	291.3	SQR_QMA QMJ_LAG SQR_QJA SQR_QND
4	0.622781	0.543367	5.3100	286.4	126677	292.3	SQR_QMA QMJ_LAG SQR_QSO SQR_QND
4	0.572998	0.483103	7.8584	289.4	143395	295.2	QJF_LAG SQR_QMA QMJ_LAG SQR_QND
4	0.568051	0.477114	8.1116	289.6	145057	295.5	QJF_LAG SQR_QMA SQR_QJA SQR_QND
5	0.657485	0.562342	5.5335	286.1	121413	293.1	SQR_QMA QMJ_LAG SQR_QJA SQR_QSO SQR_QND
5	0.649543	0.552194	5.9400	286.6	124228	293.7	QJF_LAG SQR_QMA QMJ_LAG SQR_QSO SQR_QND
5	0.645278	0.546744	6.1583	286.9	125740	294.0	QJF_LAG SQR_QMA QMJ_LAG SQR_QJA SQR_QND
5	0.569715	0.450191	10.0265	291.5	152526	298.6	QJF_LAG SQR_QMA SQR_QJA SQR_QSO SQR_QND
6	0.667906	0.550697	7.0000	287.3	124644	295.6	QJF_LAG SQR_QMA QMJ_LAG SQR_QJA SQR_QSO SQR_QND

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	4261616.1935	710269.36558	5.698	0.0021
Error	17	2118943.5461	124643.738		
C Total	23	6380559.7396			

Root MSE	353.04920	R-square	0.6679
Dep Mean	1712.12083	Adj R-sq	0.5507
C.V.	20.62058		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-75.460341	472.98957985	-0.160	0.8751	0.00000000
QJF_LAG	1	-0.113065	0.15480244	-0.730	0.4751	2.11640124
SQR_QMA	1	49.130647	11.32543478	4.338	0.0004	2.76217196
QMJ_LAG	1	-0.185221	0.08261502	-2.242	0.0386	1.87844397
SQR_QJA	1	-12.197112	12.58025709	-0.970	0.3459	2.34194525
SQR_QSO	1	-13.847492	12.86626336	-1.076	0.2968	3.32857945
SQR_QND	1	31.729564	10.08566277	3.146	0.0059	2.28479241

Collinearity Diagnostics(intercept adjusted)

Number	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop SQR_QMA	Var Prop QMJ_LAG	Var Prop SQR_QJA	Var Prop SQR_QSO	Var Prop SQR_QND
1	2.97946	1.00000	0.0336	0.0192	0.0233	0.0281	0.0222	0.0123
2	1.22664	1.55851	0.0000	0.0651	0.0846	0.0002	0.0281	0.1674
3	0.67484	2.10120	0.1374	0.1282	0.2299	0.1631	0.0041	0.0042
4	0.56288	2.30071	0.0087	0.0150	0.2725	0.2963	0.0149	0.2019
5	0.43091	2.62950	0.5623	0.1088	0.0060	0.0065	0.2362	0.0076
6	0.12528	4.87680	0.2579	0.6637	0.3838	0.5058	0.6946	0.6066

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	SQR_QMA	QMJ_LAG	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	CRAB	466.948	701.75	.	24.2900	.	.	.
2	MODEL1	PARMS	CRAB	508.077	1112.96	.	.	.	.	.
3	MODEL1	PARMS	CRAB	520.332	1382.60	0.19630	.	.	.	.
4	MODEL1	PARMS	CRAB	521.236	1303.24	.	.	.	.	12.6875
5	MODEL1	PARMS	CRAB	435.742	717.90	.	34.8974	-0.18001	.	.
6	MODEL1	PARMS	CRAB	438.302	1076.46	.	30.1524	.	-21.5283	.
7	MODEL1	PARMS	CRAB	438.846	64.48	.	24.6861	.	.	.
8	MODEL1	PARMS	CRAB	477.464	669.92	.	23.3823	.	.	2.1592
9	MODEL1	PARMS	CRAB	372.122	348.63	.	32.6544	.	-28.7678	.
10	MODEL1	PARMS	CRAB	385.480	-27.49	.	37.0919	-0.20936	.	.
11	MODEL1	PARMS	CRAB	425.010	998.20	.	25.7207	.	-31.3381	16.8949
12	MODEL1	PARMS	CRAB	426.585	-70.71	.	32.8596	.	.	-18.8310
13	MODEL1	PARMS	CRAB	348.593	219.23	.	39.5324	-0.14680	-22.1954	.
14	MODEL1	PARMS	CRAB	355.917	-195.34	.	47.7763	-0.22576	.	-22.3770
15	MODEL1	PARMS	CRAB	378.676	-169.39	-0.20136	44.3683	-0.20953	.	.
16	MODEL1	PARMS	CRAB	380.863	302.83	-0.04992	34.1579	.	-27.6912	.
17	MODEL1	PARMS	CRAB	348.444	50.44	.	44.8727	-0.17474	-15.5857	-12.7065
18	MODEL1	PARMS	CRAB	352.460	-303.28	-0.16842	53.1785	-0.22485	.	-20.9447
19	MODEL1	PARMS	CRAB	354.599	128.29	-0.09284	42.6348	-0.15334	-19.9004	.
20	MODEL1	PARMS	CRAB	390.545	260.44	-0.05279	35.3561	.	-26.1513	-3.5051
21	MODEL1	PARMS	CRAB	353.049	-75.46	-0.11307	49.1306	-0.18522	-12.1971	-13.8475

OBS	SQR_QND	CRAB	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	22	218040.00	0.24820	0.21403	18.4847	296.930	299.286
2	15.8284	-1	1	2	22	258142.40	0.10993	0.06947	25.5629	300.982	303.338
3	.	-1	1	2	22	270745.26	0.06648	0.02404	27.7874	302.126	304.482
4	.	-1	1	2	22	271687.25	0.06323	0.02065	27.9536	302.209	304.566
5	.	-1	2	3	21	189871.12	0.37509	0.31557	13.9895	294.494	298.028
6	.	-1	2	3	21	192108.63	0.36772	0.30751	14.3665	294.775	298.309
7	16.4000	-1	2	3	21	192585.85	0.36615	0.30579	14.4469	294.834	298.369
8	.	-1	2	3	21	227971.80	0.24969	0.17823	20.4087	298.883	302.417
9	21.9734	-1	3	4	20	138475.00	0.56595	0.50084	6.2193	287.747	292.459
10	19.2504	-1	3	4	20	148595.10	0.53423	0.46436	7.8432	289.440	294.152
11	.	-1	3	4	20	180633.50	0.43380	0.34887	12.9840	294.126	298.838
12	27.0217	-1	3	4	20	181974.73	0.42960	0.34404	13.1992	294.303	299.015
13	22.6987	-1	4	5	19	121516.95	0.63815	0.56197	4.5234	285.381	291.271
14	32.0955	-1	4	5	19	126677.18	0.62278	0.54337	5.3100	286.379	292.269
15	23.9436	-1	4	5	19	143395.23	0.57300	0.48310	7.8584	289.354	295.244
16	22.9279	-1	4	5	19	145056.69	0.56805	0.47711	8.1116	289.630	295.521
17	28.9657	-1	5	6	18	121413.11	0.65749	0.56234	5.5335	286.063	293.131
18	35.1988	-1	5	6	18	124228.37	0.64954	0.55219	5.9400	286.613	293.681
19	24.5060	-1	5	6	18	125740.21	0.64528	0.54674	6.1583	286.903	293.971
20	24.6734	-1	5	6	18	152525.66	0.56971	0.45019	10.0265	291.538	298.606
21	31.7296	-1	6	7	17	124643.74	0.66791	0.55070	7.0000	287.321	295.567

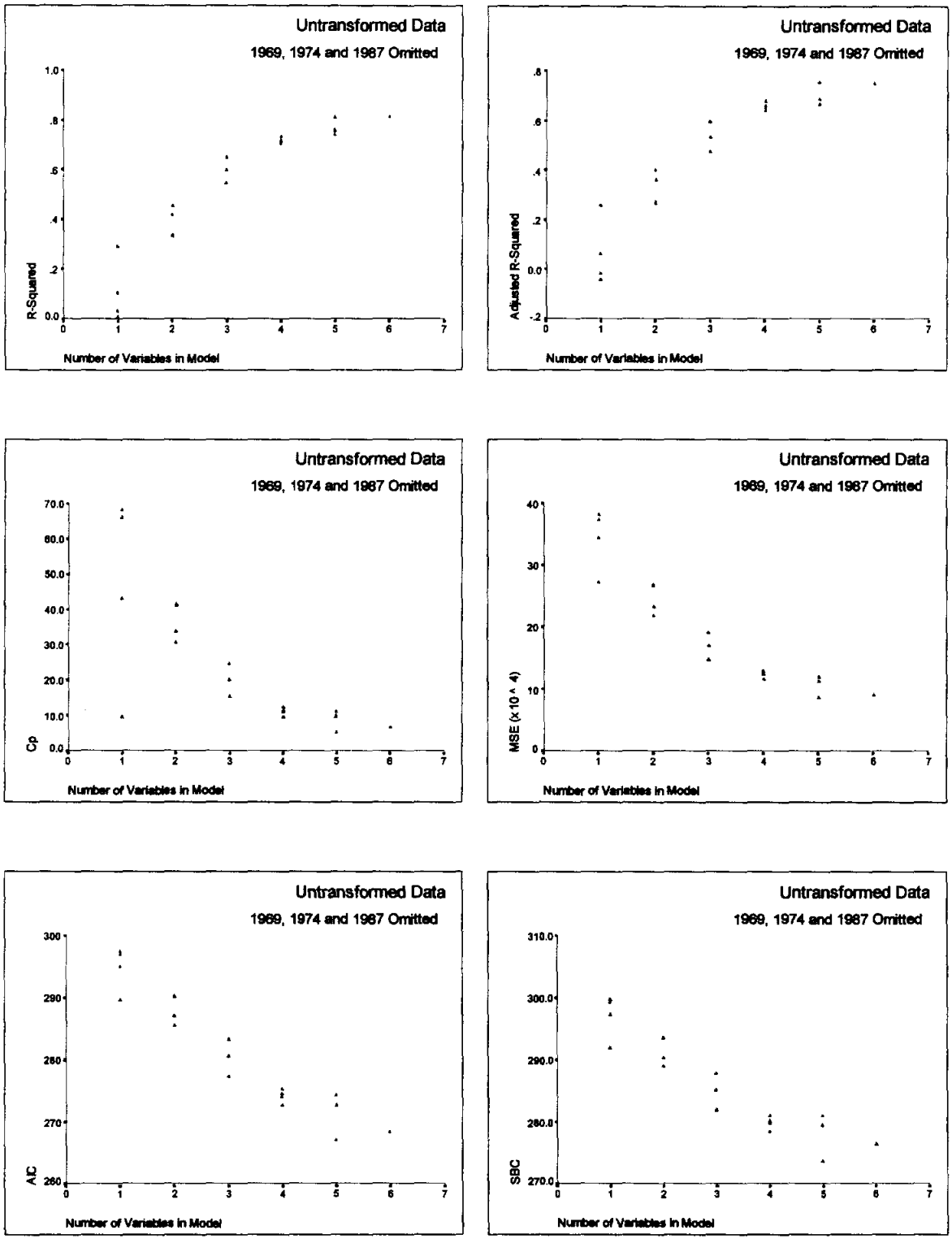


Fig. 9.1. Examining Subsets of Untransformed Data:
1969, 1974 and 1987 Omitted.

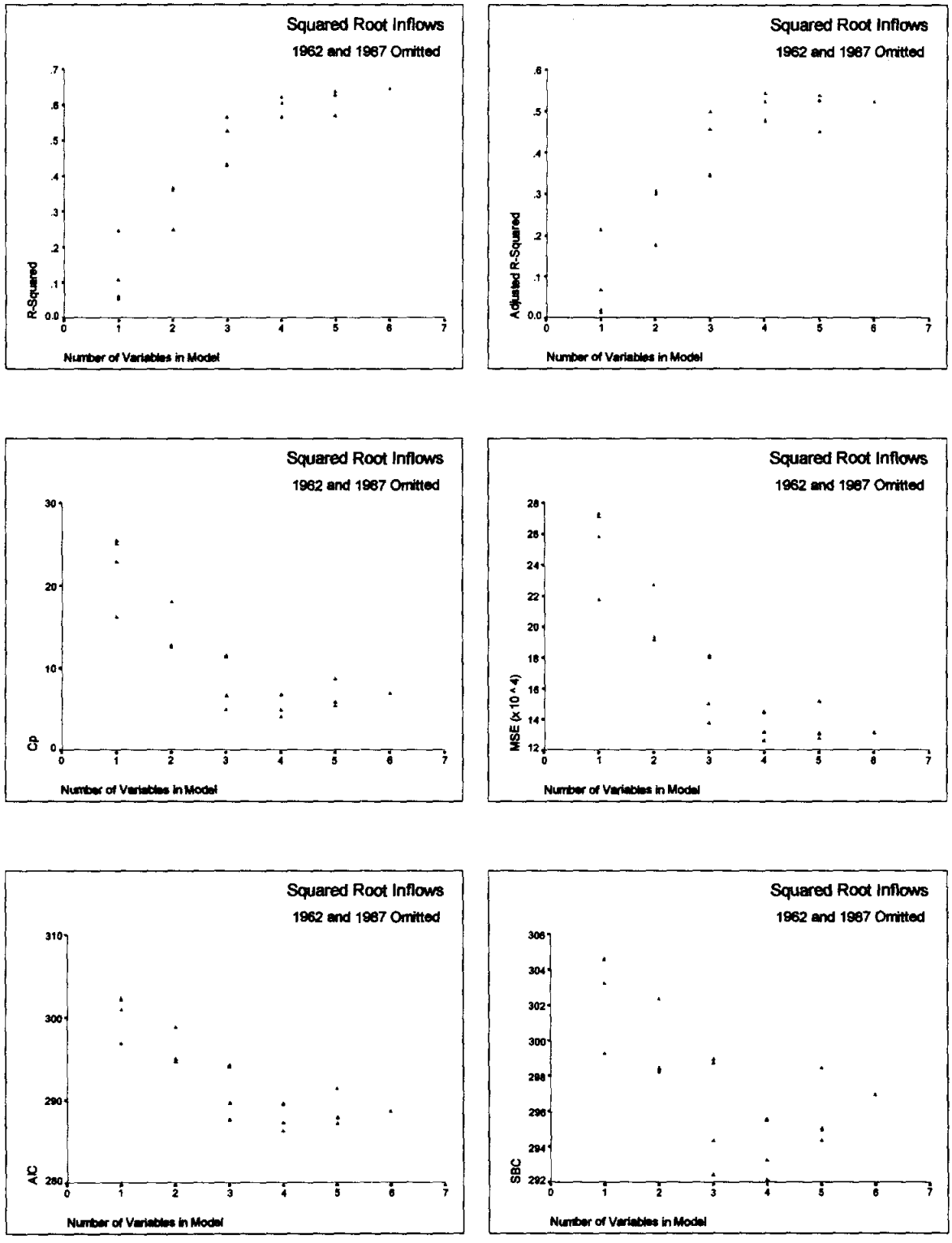


Fig. 9.2. Examining Subsets of Squared Root Inflows Data:
1962 and 1987 Omitted.

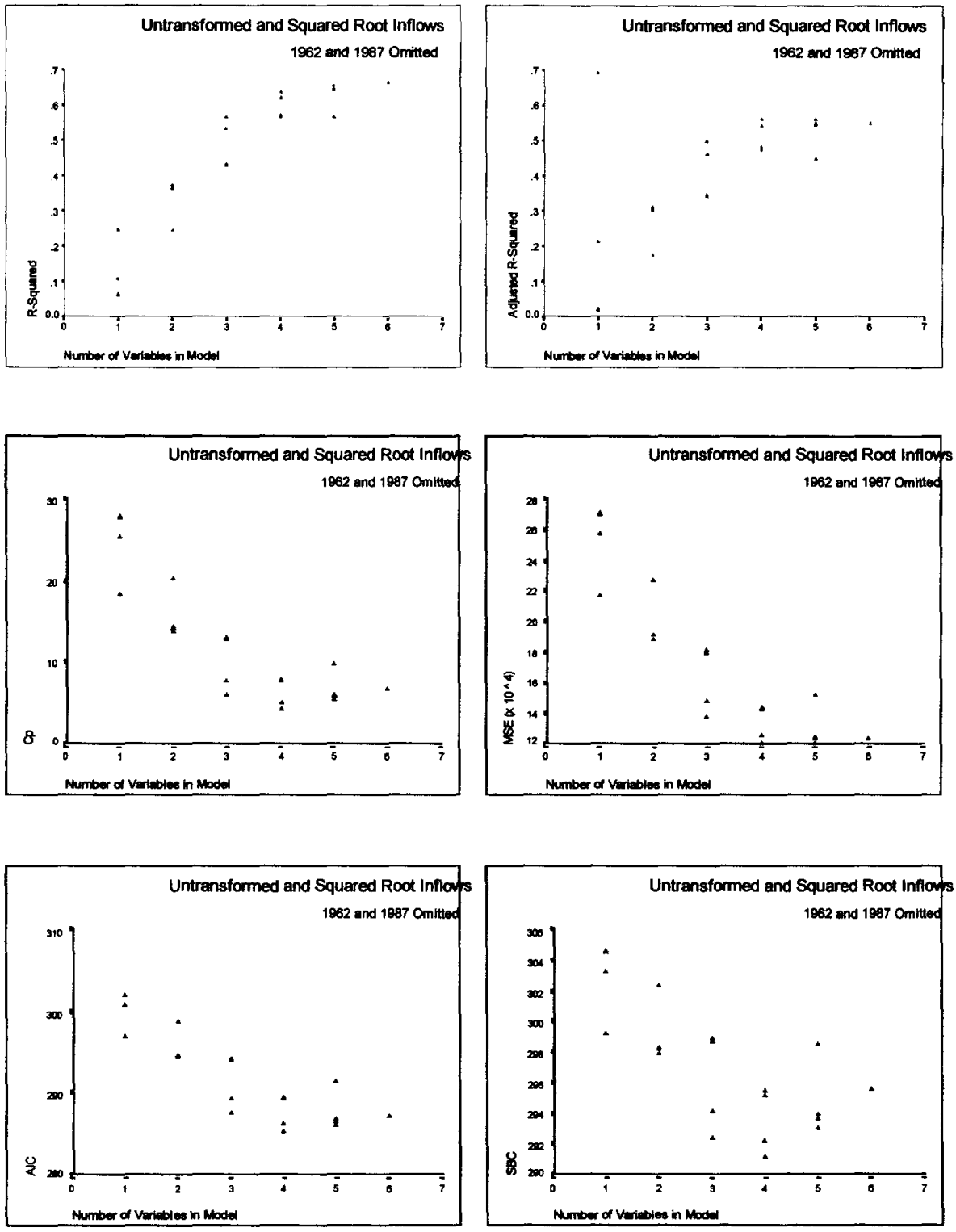


Fig. 9.3. Examining Subsets of Untransformed and Squared Root Inflows Data: 1969, 1974 and 1987 Omitted.

Oyster Harvests in Galveston Bay: A Regression Analysis

Harvest vs. Freshwater Inflows

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Table of Contents

Summary Report 1

Description of the Problem 1

Constructing Models -General Discussion 1

Detecting Influential Points and Outliers 1

Variable Selection 2

Multicollinearity 2

Other Procedures 2

How the Final Model Was Chosen 2

Selecting the Data Set Used 2

Selecting the Points to be Omitted 3

Selecting the Final Candidate Models 4

Selecting the Final Models 4

Exploring the Data 8

Listing of Data 8

Summary Information for Individual Variables 9

50, 90 and 95 % Prediction Ellipses and 95% Confidence Ellipses 32

Box-Cox Analysis 39

Model Choice Diagnostics 40

Untransformed Data 40

Logged Inflows 42

All Variables Logged 44

Squared Root Inflows 46

All Variables Squared Root 48

Untransformed Harvest, Jan-Feb and May-Jun Inflows, and Logged the others Inflows 50

Regression –Untransformed Data 52

ANOVA and Parameter Estimates 52

Collinearity Diagnostics 53

Residuals Diagnostics 54

Summary Information 54

Case Values for Residuals Diagnostics 55

Graphics 56

Prediction Intervals for Crab Harvest 59

Outlier and Influential Point Detection 60

Calculated Quantities 60

Graphics 62

Regression – Logged Inflows Data 63
ANOVA and Parameter Estimates 63
Collinearity Diagnostics 64
Residuals Diagnostics 65
Summary Information 65
Case Values for Residuals Diagnostics 66
Graphics 67
Prediction Intervals for Crab Harvest 70
Outlier and Influential Point Detection 71
Calculated Quantities 71
Graphics 73
Regression – Logged All Variables 74
ANOVA and Parameter Estimates 74
Collinearity Diagnostics 75
Residuals Diagnostics 76
Summary Information 76
Case Values for Residuals Diagnostics 77
Graphics 78
Prediction Intervals for Crab Harvest 81
Outlier and Influential Point Detection 82
Calculated Quantities 82
Graphics 84
Regression – Squared Root Inflows 85
ANOVA and Parameter Estimates 85
Collinearity Diagnostics 86
Residuals Diagnostics 87
Summary Information 87
Case Values for Residuals Diagnostics 88
Graphics 89
Prediction Intervals for Crab Harvest 92
Outlier and Influential Point Detection 93
Calculated Quantities 93
Graphics 95
Regression – All Variables Squared Root 96
ANOVA and Parameter Estimates 96
Collinearity Diagnostics 97

Residuals Diagnostics 98
Summary Information 98
Case Values for Residuals Diagnostics 99
Graphics 100
Prediction Intervals for Crab Harvest 103
Outlier and Influential Point Detection 104
Calculated Quantities 104
Graphics 106
Regression – Untransformed Harvest, January-February and May-June Inflows, and Logged others Inflows 107
ANOVA and Parameter Estimates 107
Collinearity Diagnostics 108
Residuals Diagnostics 109
Summary Information 109
Case Values for Residuals Diagnostics 110
Graphics 111
Prediction Intervals for Crab Harvest 114
Outlier and Influential Point Detection 115
Calculated Quantities 115
Graphics 117
Examining Subsets of the Data 118
All Variables Logged: 1979 Omitted 118
All Variables Squared Root: 1983 Omitted 120
All Variables Squared Root: 1979 Omitted 122
All Variables Squared Root: 1983 and 1979 Omitted 124
Scree Plots 126

Summary Report

Description of the Problem[1]

Bimonthly freshwater inflows into Galveston Bay were recorded for the years 1962 to 1987. These variables, and various transformations of them, were used to construct a model for the annual harvest of oyster.

Constructing Models - General Discussion

Stability of coefficient estimates and accuracy of predicted values are primary goals in constructing models for prediction. To this end, the data must be examined from three points of view: individual observations (to detect outliers or influential points); variables, individually and in groups (to select an optimal set of predictors); and the interaction of these two, which produces the overall structure of the data set (to determine whether multicollinearity is present or not). The first two of these were examined by both graphic and quantitative means; the third by quantitative means only.

Detecting Influential Points and Outliers

The structures of individual variables were examined via box plots and histograms, as well as by all the usual numerical measures. For each pair of variables, 50, 90 and 95 % prediction ellipses and 95% confidence ellipses were plotted in a further effort to look for unusual points. For example, suppose large values of Variable A are generally associated with large values for Variable B. If an observation consisted of a large value for Variable A but a small value for Variable B, that point would be considered unusual, even though it was well within the range of data for both variables and could not be considered an outlier.

In addition, a number of residual analysis techniques were employed. A large *residual* indicates a point not well-fit by the model. The *deleted residual*, however, is somewhat more useful in the search for influential points. The model is fitted without a given observation, and the predicted response and corresponding residual are calculated for that observation. The *Studentized deleted residual* is scaled to have a Student's t distribution. Histograms and normal P-P plots of the residuals were also examined.

Other quantities, such as the Mahalanobis distance, Cook's distance, the leverage value, standarized values for the Dffits (to measure the influence of a given observation on the predicted response) and the Dfbetas (to measure the influence of a given observation on the calculated coefficients) were also used to build a general picture of the influence of individual points. Plots were made of the standardized Dffits value for each model against the Dfbeta values for each predictor in the model. Points which were extreme indicated observations which had strong effects on both predicted values and coefficient estimates.

---

[1] The following discussion, prepared by Jacqueline Kiffe, was taken from Seatrout Harvests in Galveston Bay: A Regression Analysis, by F. Michael Speed, Sr. And Jacqueline Kiffe.

Variable Selection

For each regression, residuals were plotted against each of the independent variables to look for nonlinear relationships between the response variable and individual predictors. Partial residual plots were employed to examine the overall relationship between the response and individual predictors. A partial residual is a corollary to the deleted residual. That is, the model is fitted without a given variable and the predicted response and corresponding residual are calculated for each observation. This seeks to answer the question, "What is the relationship of this predictor to the response variable, taking all other variables into account?" Thus, it examines the marginal relationship of a given predictor to the response.

Numerous measures have been developed over the years to assess the adequacy of a given model. We examined a number of these, including R^2 and mean squared error (MSE), and several others which directly incorporate penalties for having too many predictors in the model, such as adjusted R^2, C_p, AIC, and SBC. It is well-established that too many predictors in a model can lead to bad prediction, just as too few can, and these measures are used as part of the attempt to find an optimal model.

Multicollinearity

Multicollinearity arises when one or more variables are nearly closely approximated by linear combinations of the remaining variables, resulting in unstable coefficient estimates. The variance inflation factor (VIF) was calculated for each coefficient estimate to measure this instability, which is not usually considered profound for VIF's less than 10. No problems were found with this data. Additionally, the condition index (a ratio of eigenvalues of the covariance matrix, with the largest eigenvalue always on top) was calculated. A ratio greater than 30 is considered cause for concern. Again, no evidence of multicollinearity was found.

Other Procedures

Several other miscellaneous diagnostics, including the Durbin-Watson test for serial autocorrelation were performed, and no general problems were detected. The Box-Cox procedure, used to find a transformation to normality, was also performed.

How the Final Model Was Chosen

Selecting the Data Set Used. First, the variables were explored thoroughly, individually and in pairs, in a first effort to detect outliers. The SAS programming language allows a number of diagnostics to be calculated for a group of models on a given data set without actually performing a formal regression, thus allowing one to examine a large number of models quite efficiently. The Box-Cox procedure was performed to find if a transformation to normallity was suggested. The log transform was suggested for some variables, and the squared root for others. At this point, there were several data sets for which the diagnostic series was calculated:

1. Untransformed data
2. Harvest untransformed, and natural log of inflow variables
3. All variables logged
4. Harvest untransformed, and squared root of inflows variables
5. All variables squared root.
6. Harvest, Jan-Feb, May-Jun Inflows untransformed, logged others inflows

Selecting the Points to be Omitted. The full regression with all diagnostics was performed for these models, each one contained all variables in its corresponding data set. All diagnostics were generated, and influential points were determined for each model.

Data Set	R^2	Adjusted R^2
1	0.372	0.174
2	0.343	0.136
3	**0.479**	**0.315**
4	0.356	0.153
5	**0.442**	**0.265**
6	0.362	0.160

Data sets 3, and 5 presented the highest R^2 values. These two models were considered final candidates. The observations flagged as potentially influential are given in the summary table below, for each model.

Year	Variable
1969	Mar-Apr Inflows
1971	Ln(Jan-Feb Inflows)
1975	Nov-Dec Inflows
1979	Ln(Harvest)
1983	Harvest, Jul-Aug Inflows
1987	Nov-Dec Inflows

Summary of points flagged by Boxplots

Year	Variable
1975	Jan-Feb vs. Sept-Oct Inflows
	Mar-Apr vs. Sept-Oct Inflows
	May-Jun vs. Sept-Oct Inflows
	Jul-Aug vs. Sept-Oct Inflows
	Sept-Oct vs. Nov-Dec Inflows
1983	Harvest vs. Jan-Feb Inflows
	Harvest vs. Mar-Apr Inflows
	Harvest vs. May-Jun Inflows
	Harvest vs. Jul-Aug Inflows
	Harvest vs. Sept-Oct Inflows
	Harvest vs. Nov-Dec Inflows
	Jan-Feb vs. Jul-Aug Inflows
	Mar-Apr vs. Jul-Aug Inflows
	May-Jun vs. Jul-Aug Inflows
	Jul-Aug vs. Sept-Oct Inflows
	Jul-Aug vs. Nov-Dec Inflows
1987	Jan-Feb vs. Nov-Dec Inflows

Summary of points flagged by 95% Prediction Ellipses

Data Set 3

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
1971	1			1					2
1979	1	1	1			1	1	5	10
1983							1	1	2

Data Set 5

	BOX	SRE	SDR	LEV	MAH	COO	SDF	SDB	TOTAL
1979			1				1	1	3
1983			1				1	2	4
1987							1		1

Summary of Points flagged by diagnostic measures

Key to Abbreviations:

BOX Box plot
SRE Studentized residual
SDR Studentized deleted residual
LEV Leverage value
MAH Mahalanobis distance
COO Cook's distance
SDF Standardized Dffits value
SDB Standardized Dfbeta value

Selecting the Final Candidate Models. After the subset analysis led us to two models: Data Set 3 (all variables logged), 1979 omitted; and Data Set 5 (all variables squared root), 1983 and/or 1979 omitted.

	Observations omitted	R^2	Adjusted R^2
Data Set 3	1979	0.480	0.306
Data Set 5	**1983**	0.611	0.481
	1979	0.428	0.237
	1979 & 1983	0.556	0.400

Selecting the Final Models. It is clearly that Data set 5 with 1983 omitted is the best model. Regression was performed using this model, and the deleted residuals were calculated.

Best Candidate Model	**R^2**	**Adjusted R^2**	**Prob>F**
SQRT (Oyster Harvest) = 80.878 - 1.116*SQRT(Jan-Feb Inflows) + 0.45*SQRT(May-Jun Inflows) - 0.869*SQRT(Jul-Aug Inflows) + 0.381*SQRT(Nov-Dec Inflows)	0.60	0.52	0.001

All Variables Squared Root

Summary Information

Descriptive Statistics

	Mean	Std. Deviation	N
SQRT (Oyster Harvest)	47.4574	14.8242	25
SQRT (January-February Inflows)	40.5504	8.8711	25
SQRT (May-June Inflows)	48.6587	12.9957	25
SQRT (July-August Inflows)	28.2210	7.8759	25
SQRT (November-December Inflows)	37.8882	10.7900	25

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (November-December Inflows), SQRT (May-June Inflows), SQRT (July-August Inflows), SQRT (January-February Inflows)[c,d]	.	.775	.601	.521	10.2574	1.529

a. Dependent Variable: SQRT (Oyster Harvest)

b. Method: Enter

c. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (May-June Inflows), SQRT (July-August Inflows), SQRT (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3169.886	4	792.472	7.532	.001[b]
	Residual	2104.288	20	105.214		
	Total	5274.175	24			

a. Dependent Variable: SQRT (Oyster Harvest)

b. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (May-June Inflows), SQRT (July-August Inflows), SQRT (January-February Inflows)

Coefficients[a]

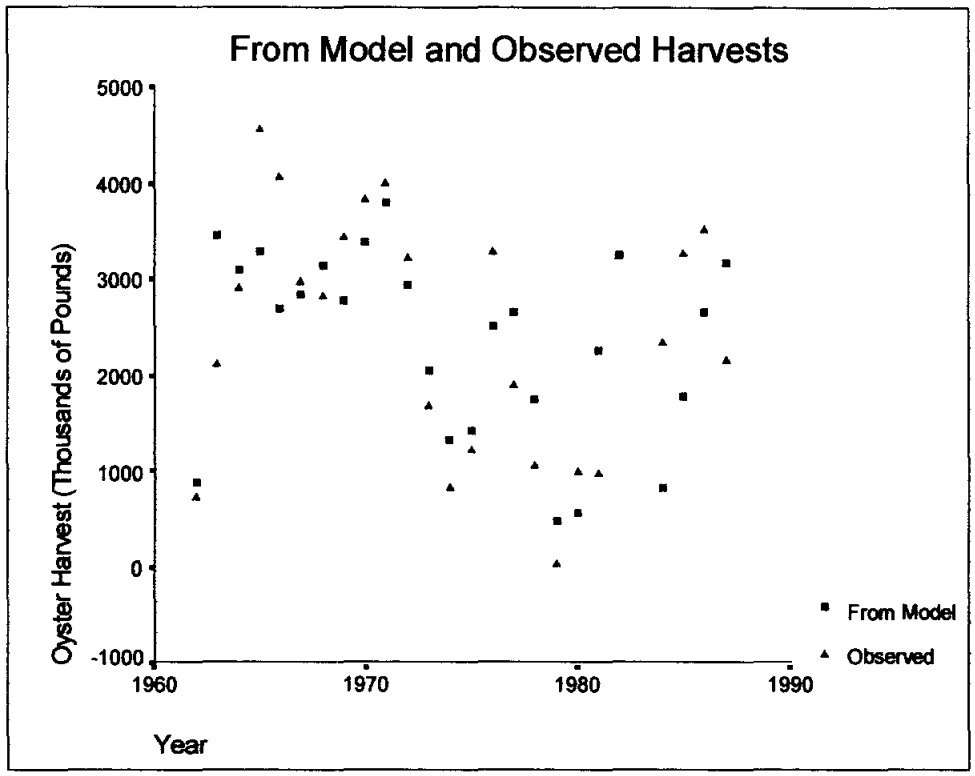
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	80.878	11.330		7.138	.000	57.243	104.513
	SQRT (January-February Inflows)	-1.116	.318	-.668	-3.515	.002	-1.778	-.454
	SQRT (May-June Inflows)	.450	.190	.395	2.367	.028	.054	.847
	SQRT (July-August Inflows)	-.869	.347	-.462	-2.507	.021	-1.592	-.146
	SQRT (November-December Inflows)	.381	.234	.277	1.628	.119	-.107	.870

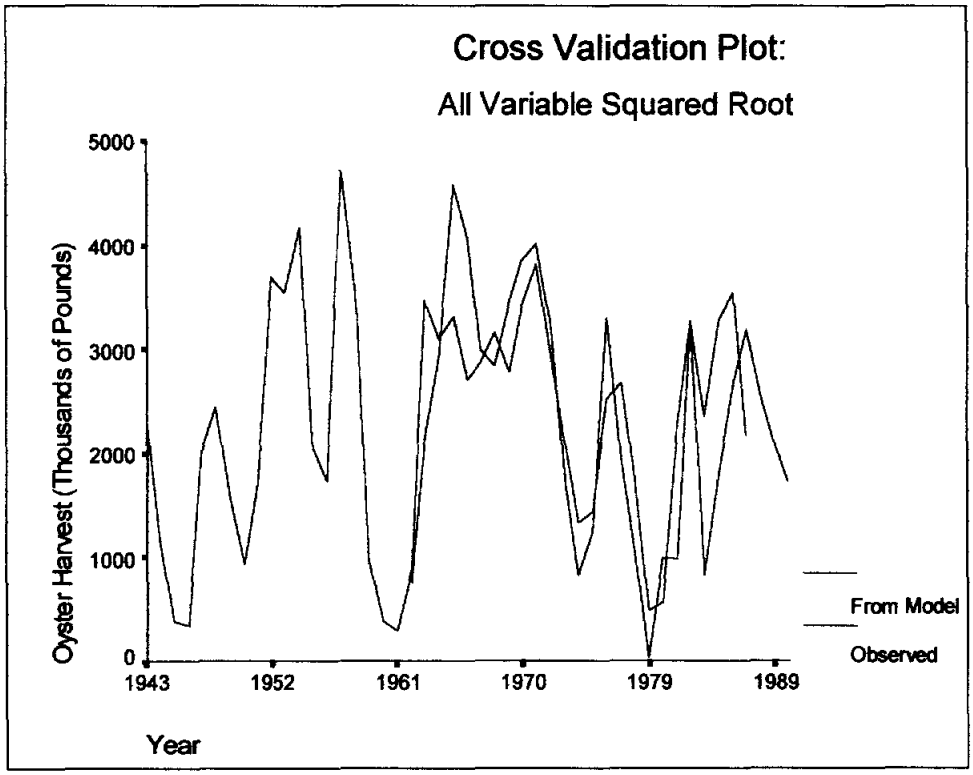
a. Dependent Variable: SQRT (Oyster Harvest)

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	22.1680	61.7712	47.4574	11.4925	25
Std. Predicted Value	-2.201	1.245	.000	1.000	25
Standard Error of Predicted Value	2.8369	6.5596	4.4675	1.0628	25
Adjusted Predicted Value	19.1685	61.7778	47.4599	12.0495	25
Residual	-16.4183	19.6293	-2.E-14	9.3637	25
Std. Residual	-1.601	1.914	.000	.913	25
Stud. Residual	-1.854	2.343	.000	1.036	25
Deleted Residual	-23.1691	29.4134	-2.E-03	12.1501	25
Stud. Deleted Residual	-1.985	2.680	.006	1.090	25
Mahal. Distance	.876	8.855	3.840	2.255	25
Cook's Distance	.000	.547	.063	.122	25
Centered Leverage Value	.036	.369	.160	.094	25

a. Dependent Variable: SQRT (Oyster Harvest)


From Model and Observed Harvests
Oyster Harvest (Thousands of Pounds)
5000
4000
3000
2000
1000
0
-1000
1960
1970
1980
1990
Year
From Model
Observed


Cross Validation Plot:
All Variable Squared Root
Oyster Harvest (Thousands of Pounds)
5000
4000
3000
2000
1000
0
1943
1952
1961
1970
1979
1989
Year
From Model
Observed

Exploring the Data

Listing of Data

Obs.	YEAR	OYSTER	JF_LAG	MA_LAG	MJ_LAG	JA_LAG	SO_LAG	ND_LAG
1	1962	749.90	2954.20	1045.00	1507.05	985.43	1658.99	2603.60
2	1963	2131.30	915.25	503.40	916.45	367.34	1571.22	1519.35
3	1964	2920.80	977.03	709.20	620.95	208.60	552.67	847.05
4	1965	4583.30	1159.28	1048.65	1390.30	229.70	357.73	837.60
5	1966	4083.30	1796.50	1506.80	3868.55	732.35	424.64	1343.55
6	1967	2992.60	1191.97	1280.87	3075.70	802.31	395.08	812.45
7	1968	2838.70	1193.37	1910.42	3503.55	656.56	522.30	628.35
8	1969	3447.20	1896.15	3669.45	5140.75	709.21	536.00	891.47
9	1970	3850.20	1207.70	3388.15	2824.15	446.00	476.12	782.52
10	1971	4021.70	443.30	1490.24	948.92	425.88	1011.38	491.33
11	1972	3242.60	1088.25	510.89	1119.91	445.71	1187.93	1265.65
12	1973	1703.30	2116.37	3049.16	3859.81	1019.84	656.82	1708.29
13	1974	836.70	2766.28	3164.87	3633.59	1081.86	2393.69	1737.41
14	1975	1236.80	3240.49	1594.75	2713.05	909.19	3097.29	3763.55
15	1976	3298.90	1719.70	1508.26	2901.65	1104.96	1270.46	2834.55
16	1977	1917.50	1159.13	1992.32	1636.66	685.40	642.39	1235.49
17	1978	1076.80	2068.95	1908.49	1027.73	401.86	594.52	1518.63
18	1979	43.10	2496.04	2675.62	2305.49	1705.39	445.47	879.19
19	1980	1004.20	2677.83	3231.60	2983.10	1701.37	1608.58	1001.19
20	1981	985.40	1407.75	1056.13	3306.17	1019.45	1901.76	781.13
21	1982	3253.80	856.42	990.37	4067.47	1572.64	1665.50	1487.45
22	1983	6967.10	2023.75	1736.94	3035.88	2302.66	1332.93	2629.44
23	1984	2360.20	1963.01	1585.36	1671.18	1820.12	1175.47	1801.08
24	1985	3285.10	1863.89	1977.23	1291.46	575.53	2018.63	1445.47
25	1986	3541.10	2059.82	1721.08	3138.40	734.34	1690.87	2729.59
26	1987	2174.90	1778.48	1363.56	3793.13	1058.29	1473.80	3736.27

OYSTER Oyster harvest (thousands of pounds)
JF_LAG Lagged January-February inflows (thousands of acre-feet)
MA_LAG Lagged March-April inflows (thousands of acre-feet)
MJ_LAG Lagged May-June inflows (thousands of acre-feet)
JA_LAG Lagged July-August inflows (thousands of acre-feet)
SO_LAG Lagged September-October inflows (thousands of acre-feet)
ND_LAG Lagged November-December inflows (thousands of acre-feet)

Summary Information for Individual Variables

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Oyster Harvest	.093	26	.200*	.950	26	.308
January-February Inflows	.155	26	.112	.963	26	.475
March-April Inflows	.181	26	.028	.919	26	.048
May-June Inflows	.150	26	.139	.942	26	.218
July-August Inflows	.166	26	.063	.915	26	.040
September-October Inflows	.192	26	.015	.904	26	.020
November-December Inflows	.184	26	.024	.865	26	.010**
Ln (Oyster Harvest)	.175	26	.039	.755	26	.010**
Ln (January-February Inflows)	.150	26	.137	.948	26	.289
Ln (March-April Inflows)	.112	26	.200*	.950	26	.307
Ln (May-June Inflows)	.214	26	.004	.912	26	.035
Ln (July-August Inflows)	.092	26	.200*	.970	26	.620
Ln (September-October Inflows)	.158	26	.095	.925	26	.070
Ln (November-December Inflows)	.128	26	.200*	.959	26	.425
SQRT (Oyster Harvest)	.147	26	.156	.960	26	.434
SQRT (January-February Inflows)	.137	26	.200*	.973	26	.686
SQRT (March-April Inflows)	.137	26	.200*	.954	26	.366
SQRT (May-June Inflows)	.175	26	.039	.936	26	.133
SQRT (July-August Inflows)	.119	26	.200*	.967	26	.542
SQRT (September-October Inflows)	.182	26	.026	.928	26	.082
SQRT (November-December Inflows)	.133	26	.200*	.924	26	.064

*. This is a lower bound of the true significance.

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

			Statistic	Std. Error
Oyster Harvest	Mean		2636.40	295.0886
	95% Confidence Interval for Mean	Lower Bound	2028.66	
		Upper Bound	3244.15	
	5% Trimmed Mean		2561.38	
	Median		2879.75	
	Variance		2264009	
	Std. Deviation		1504.66	
	Minimum		43.10	
	Maximum		6967.10	
	Range		6924.00	
	Interquartile Range		2273.88	
	Skewness		.657	.456
	Kurtosis		1.287	.887

Extreme Values

			Case Number	Year	Value
Oyster Harvest	Highest	1	22	1983	6967.10
		2	4	1965	4583.30
		3	5	1966	4083.30
		4	10	1971	4021.70
		5	9	1970	3850.20
	Lowest	1	18	1979	43.10
		2	1	1962	749.90
		3	13	1974	836.70
		4	20	1981	985.40
		5	19	1980	1004.20

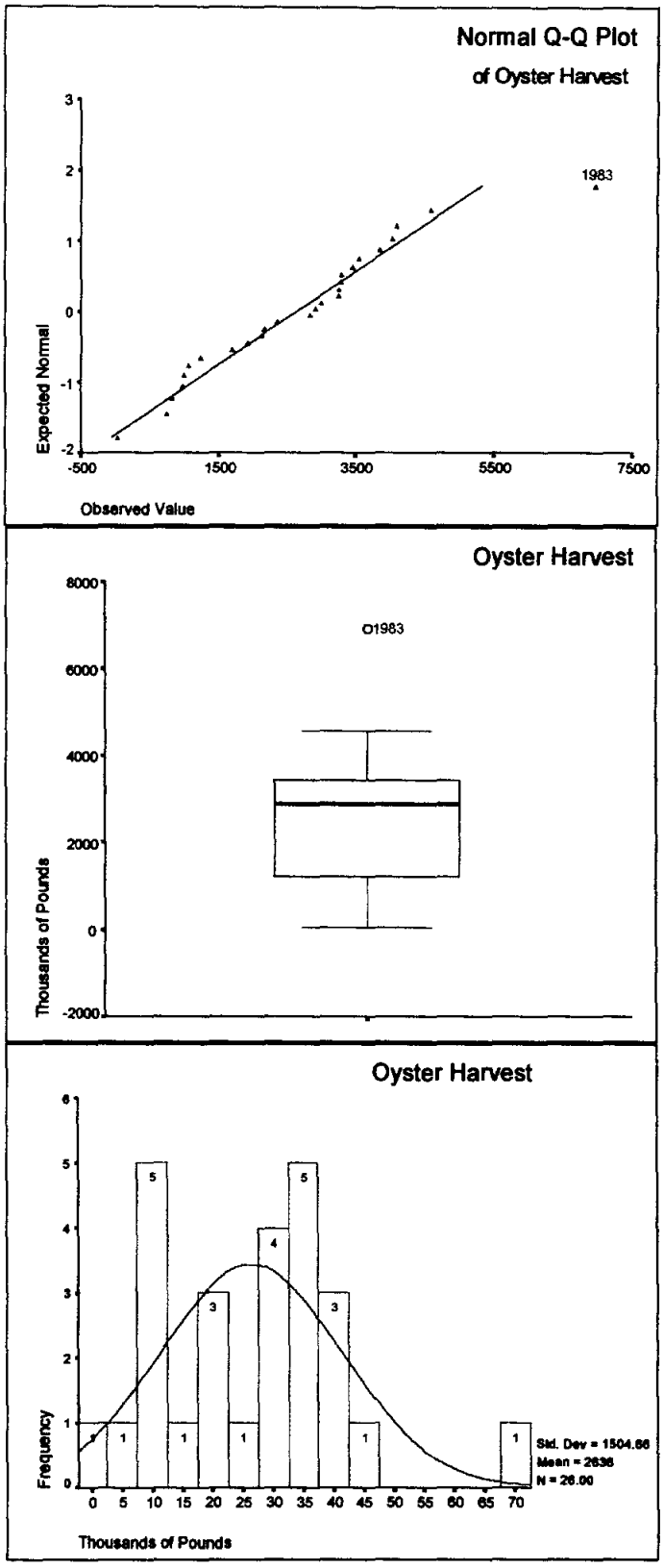


Fig. 1.1a. Exploratory Plots of Oyster Harvest.

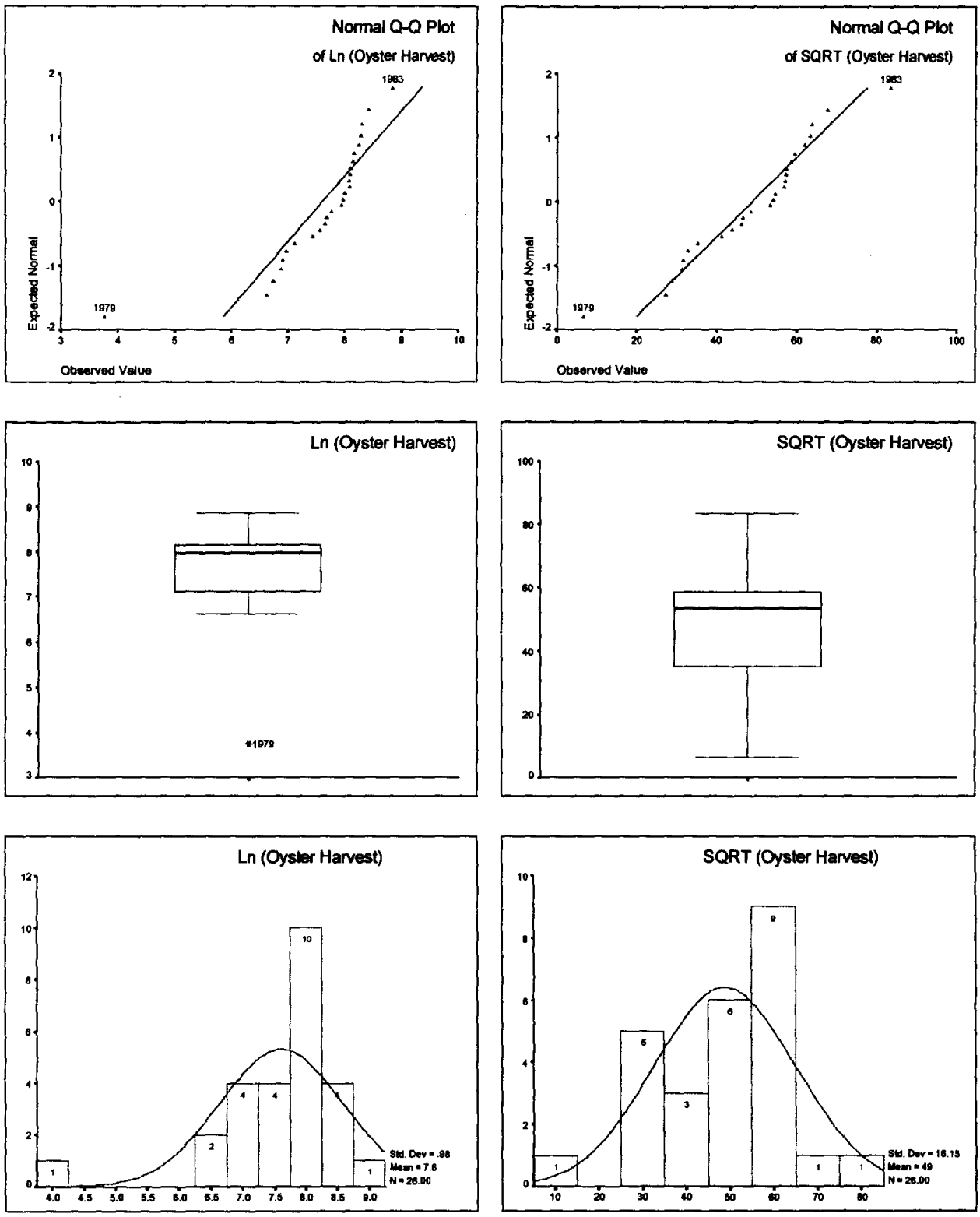


Fig. 1.1b. Exploratory Plots of Transformed Oyster Harvest.

Descriptives

			Statistic	Std. Error
January-February Inflows	Mean		1731.57	139.0755
	95% Confidence Interval for Mean	Lower Bound	1445.14	
		Upper Bound	2018.00	
	5% Trimmed Mean		1717.69	
	Median		1787.49	
	Variance		502892	
	Std. Deviation		709.1485	
	Minimum		443.30	
	Maximum		3240.49	
	Range		2797.19	
	Interquartile Range		921.5675	
	Skewness		.356	.456
	Kurtosis		-.477	.887

Extreme Values

			Case Number	Year	Value
January-February Inflows	Highest	1	14	1975	3240.49
		2	1	1962	2954.20
		3	13	1974	2766.28
		4	19	1980	2677.83
		5	18	1979	2496.04
	Lowest	1	10	1971	443.30
		2	21	1982	856.42
		3	2	1963	915.25
		4	3	1964	977.03
		5	11	1972	1088.25

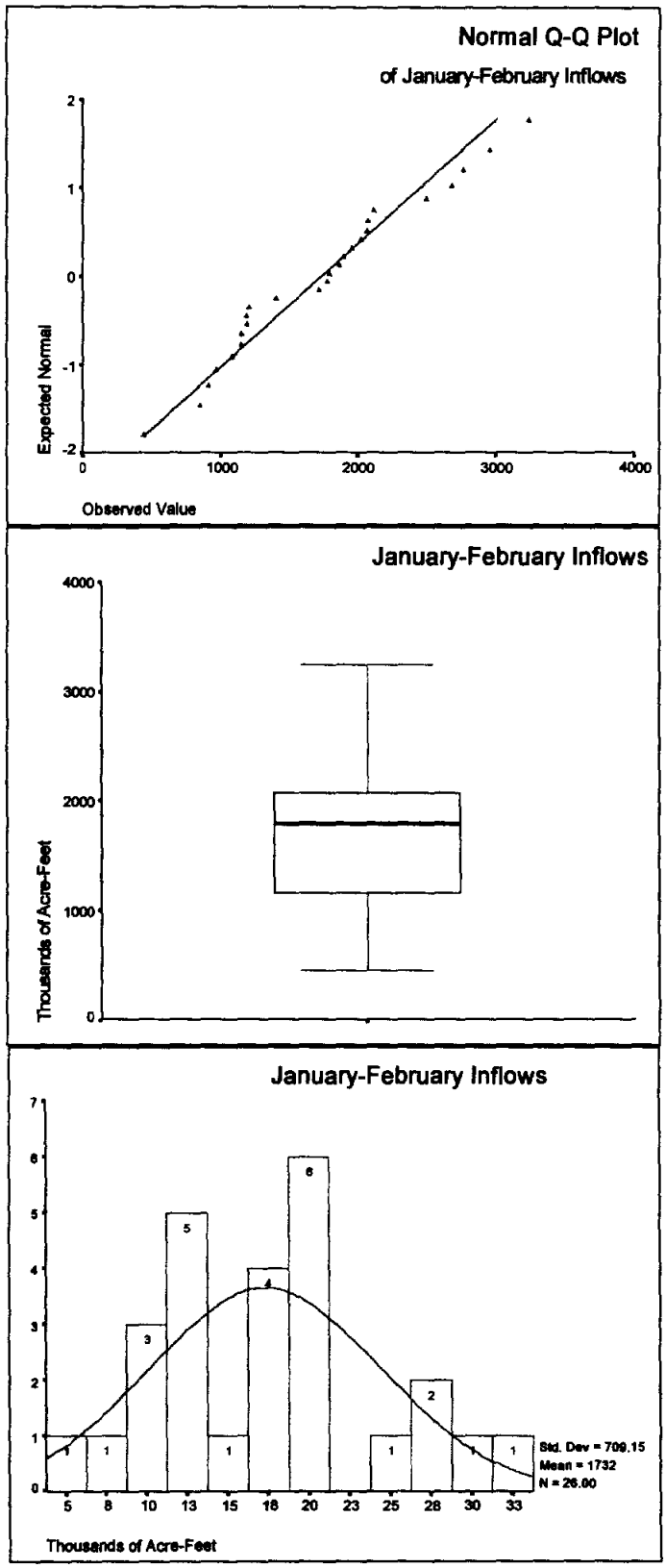


Fig. 1.2a. Exploratory Plots of January-February Inflows.

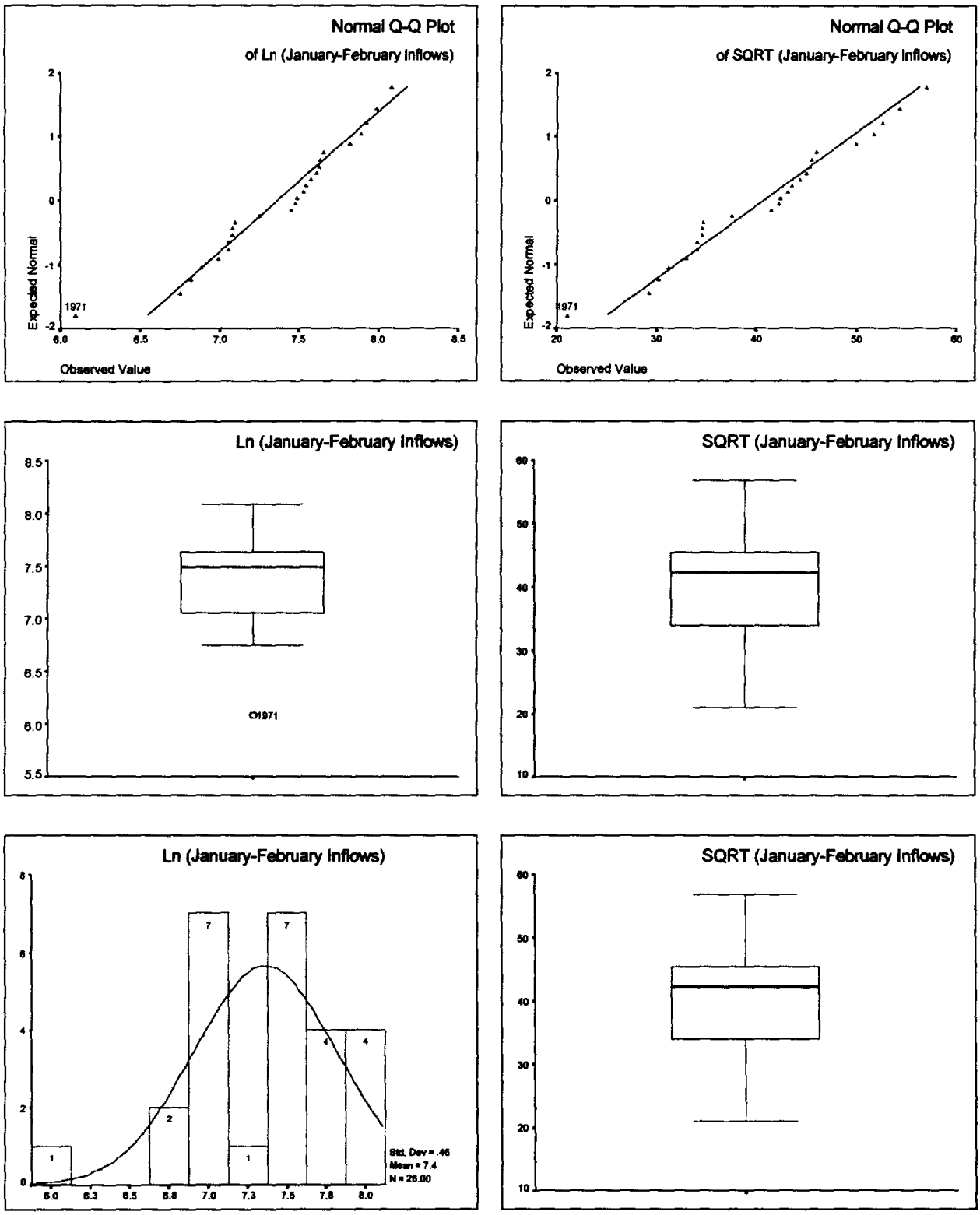


Fig. 1.2b. Exploratory Plots of Transformed January-February Inflows.

Descriptives

			Statistic	Std. Error
March-April Inflows	Mean		1793.03	175.6272
	95% Confidence Interval for Mean	Lower Bound	1431.32	
		Upper Bound	2154.74	
	5% Trimmed Mean		1763.94	
	Median		1590.05	
	Variance		801968	
	Std. Deviation		895.5268	
	Minimum		503.40	
	Maximum		3669.45	
	Range		3166.05	
	Interquartile Range		1108.88	
	Skewness		.684	.456
	Kurtosis		-.383	.887

Extreme Values

			Case Number	Year	Value
March-April Inflows	Highest	1	8	1969	3669.45
		2	9	1970	3388.15
		3	19	1980	3231.60
		4	13	1974	3164.87
		5	12	1973	3049.16
	Lowest	1	2	1963	503.40
		2	11	1972	510.89
		3	3	1964	709.20
		4	21	1982	990.37
		5	1	1962	1045.00

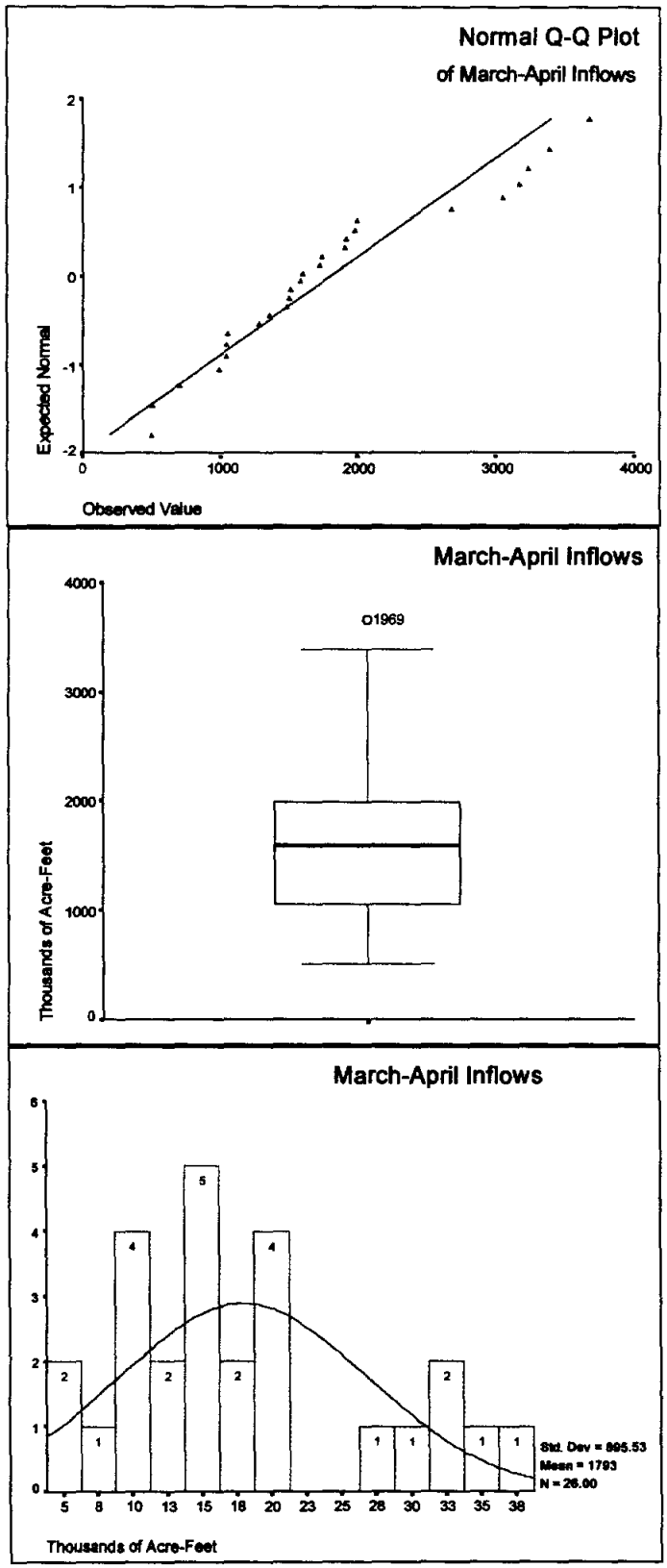


Fig. 1.3a. Exploratory Plots of March-April Inflows.

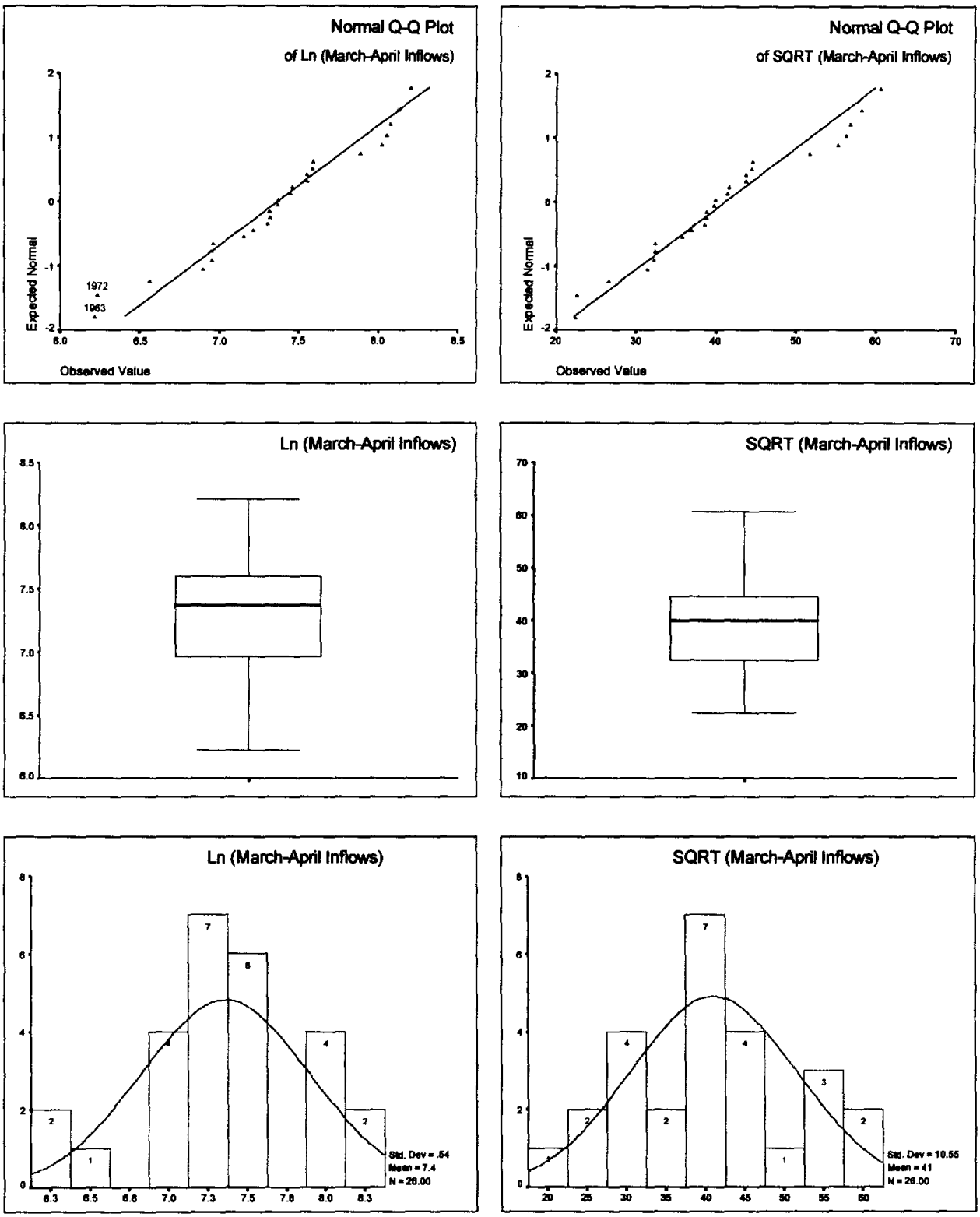


Fig. 1.3b. Exploratory Plots of Transformed March-April Inflows.

Descriptives

			Statistic	Std. Error
May-June Inflows	Mean		2549.27	238.3907
	95% Confidence Interval for Mean	Lower Bound	2058.29	
		Upper Bound	3040.24	
	5% Trimmed Mean		2522.40	
	Median		2862.90	
	Variance		1477583	
	Std. Deviation		1215.56	
	Minimum		620.95	
	Maximum		5140.75	
	Range		4519.80	
	Interquartile Range		2170.47	
	Skewness		.057	.456
	Kurtosis		-.940	.887

Extreme Values

			Case Number	Year	Value
May-June Inflows	Highest	1	8	1969	5140.75
		2	21	1982	4067.47
		3	5	1966	3868.55
		4	12	1973	3859.81
		5	26	1987	3793.13
	Lowest	1	3	1964	620.95
		2	2	1963	916.45
		3	10	1971	948.92
		4	17	1978	1027.73
		5	11	1972	1119.91

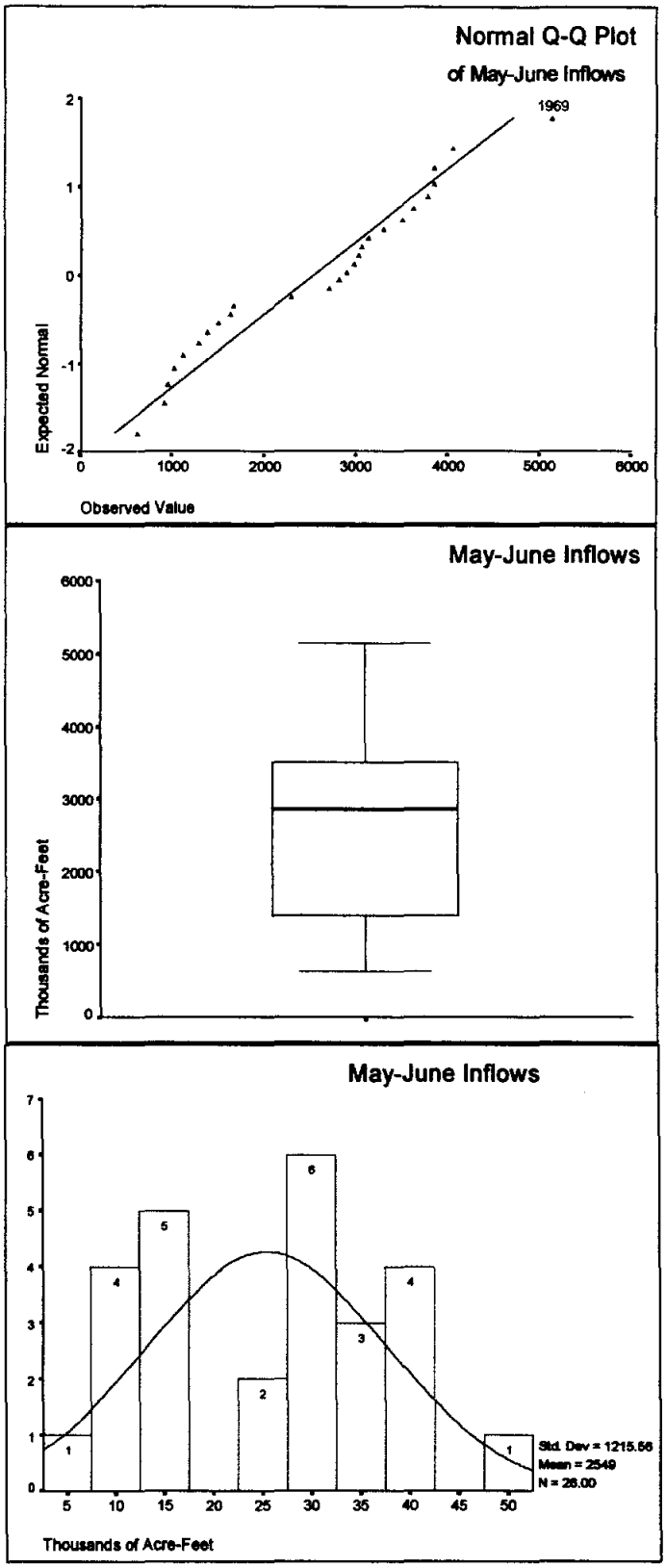


Fig. 1.4a. Exploratory Plots of May-June Inflows.

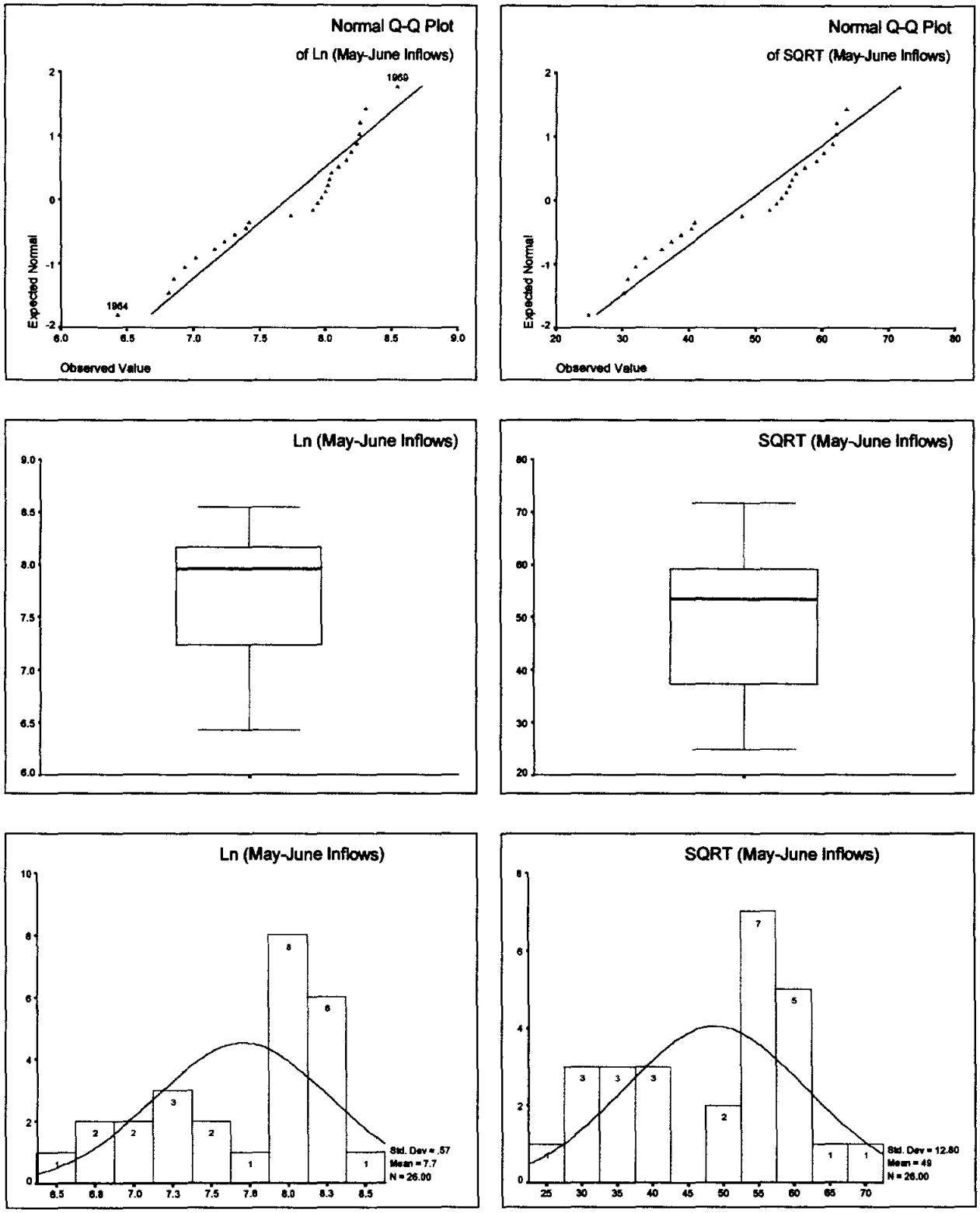


Fig. 1.4b. Exploratory Plots of Transformed May-June Inflows.

Descriptives

			Statistic	Std. Error
July-August Inflows	Mean		911.6129	104.5030
	95% Confidence Interval for Mean	Lower Bound	696.3850	
		Upper Bound	1126.84	
	5% Trimmed Mean		879.3051	
	Median		768.3225	
	Variance		283943	
	Std. Deviation		532.8626	
	Minimum		208.60	
	Maximum		2302.66	
	Range		2094.06	
	Interquartile Range		641.7063	
	Skewness		.968	.456
	Kurtosis		.512	.887

Extreme Values

			Case Number	Year	Value
July-August Inflows	Highest	1	22	1983	2302.66
		2	23	1984	1820.12
		3	18	1979	1705.39
		4	19	1980	1701.37
		5	21	1982	1572.64
	Lowest	1	3	1964	208.60
		2	4	1965	229.70
		3	2	1963	367.34
		4	17	1978	401.86
		5	10	1971	425.88

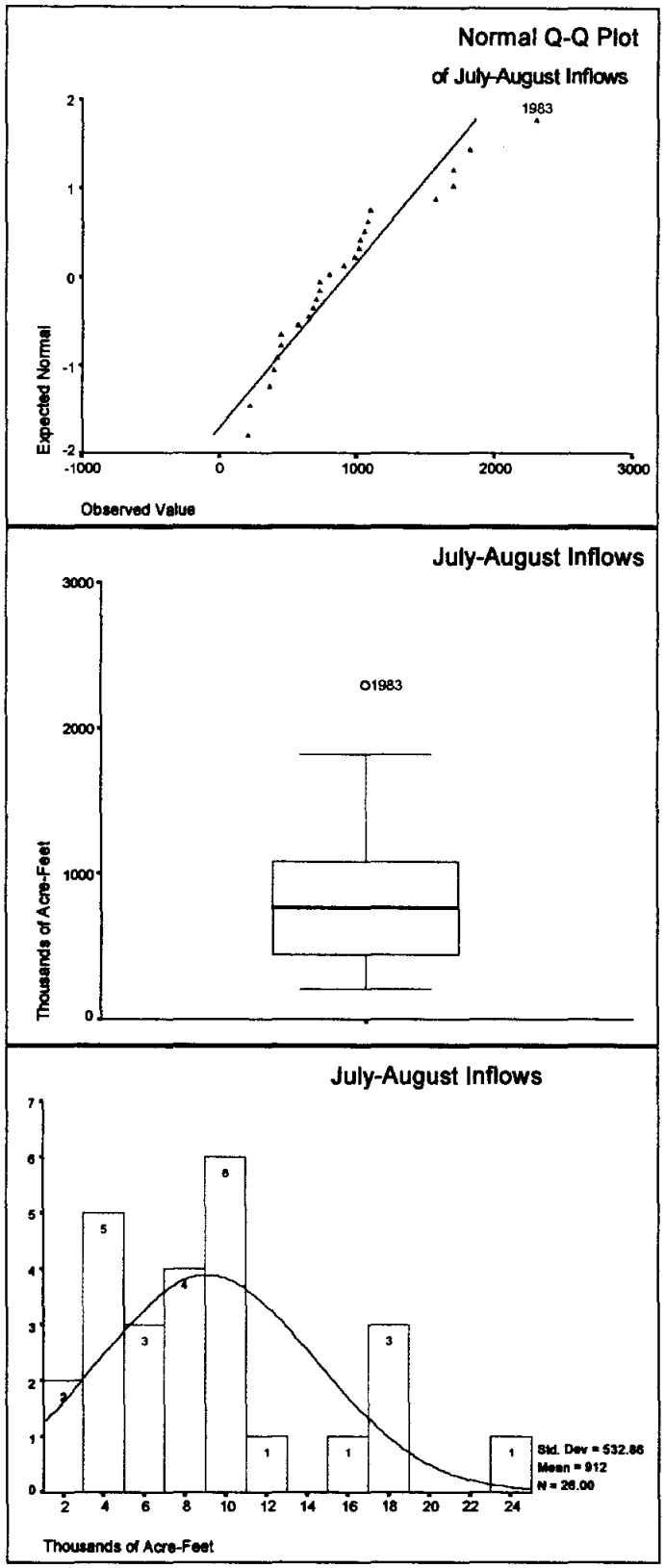


Fig. 1.5a. Exploratory Plots of July-August Inflows.

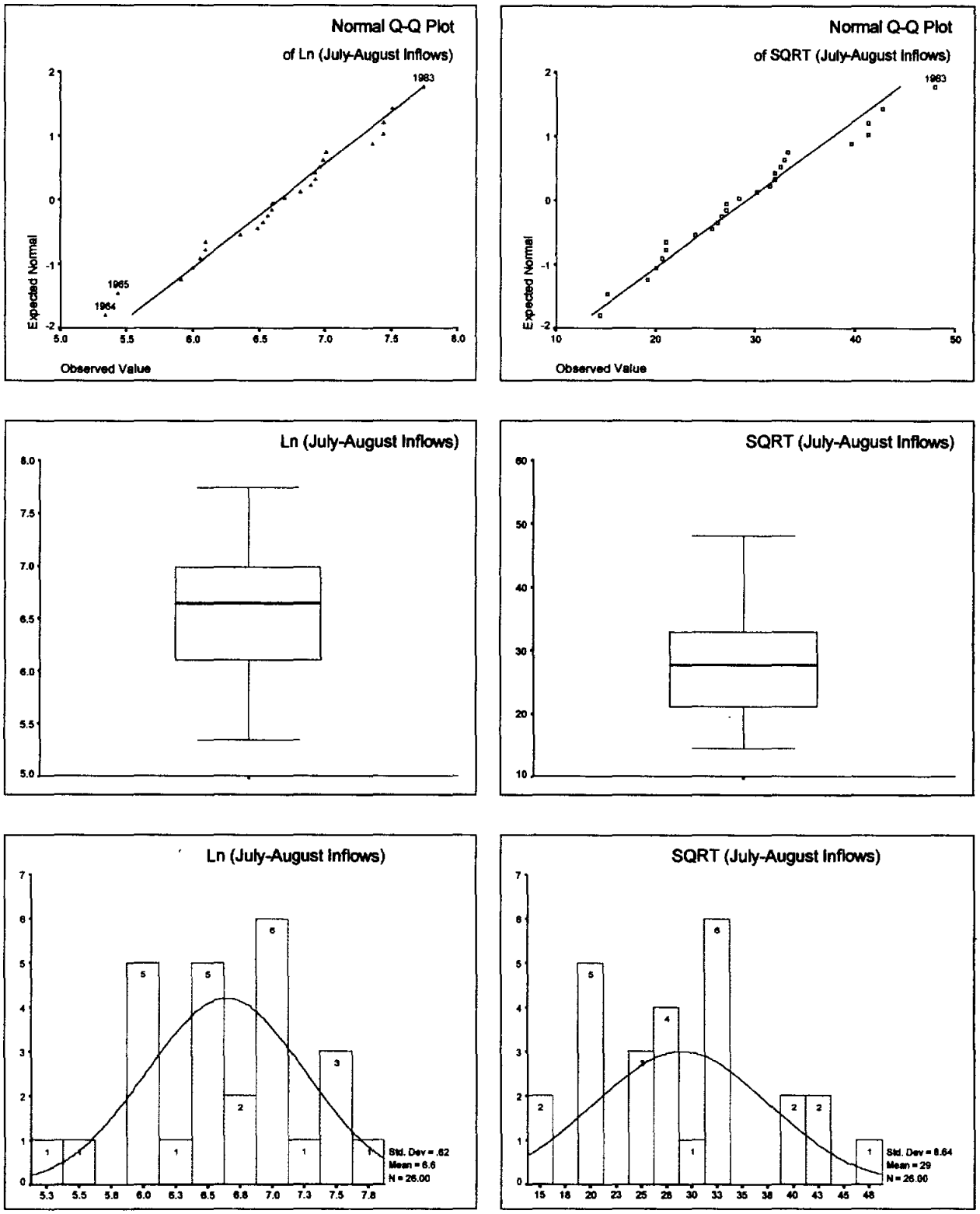


Fig. 1.5b. Exploratory Plots of Transformed July-August Inflows.

Descriptives

			Statistic	Std. Error
September-October Inflows	Mean		1179.31	139.3761
	95% Confidence Interval for Mean	Lower Bound	892.2641	
		Upper Bound	1466.37	
	5% Trimmed Mean		1126.95	
	Median		1181.70	
	Variance		505068	
	Std. Deviation		710.6816	
	Minimum		357.73	
	Maximum		3097.29	
	Range		2739.56	
	Interquartile Range		1128.05	
	Skewness		.825	.456
	Kurtosis		.432	.887

Extreme Values

			Case Number	Year	Value
September-October Inflows	Highest	1	14	1975	3097.29
		2	13	1974	2393.69
		3	24	1985	2018.63
		4	20	1981	1901.76
		5	25	1986	1690.87
	Lowest	1	4	1965	357.73
		2	6	1967	395.08
		3	5	1966	424.64
		4	18	1979	445.47
		5	9	1970	476.12

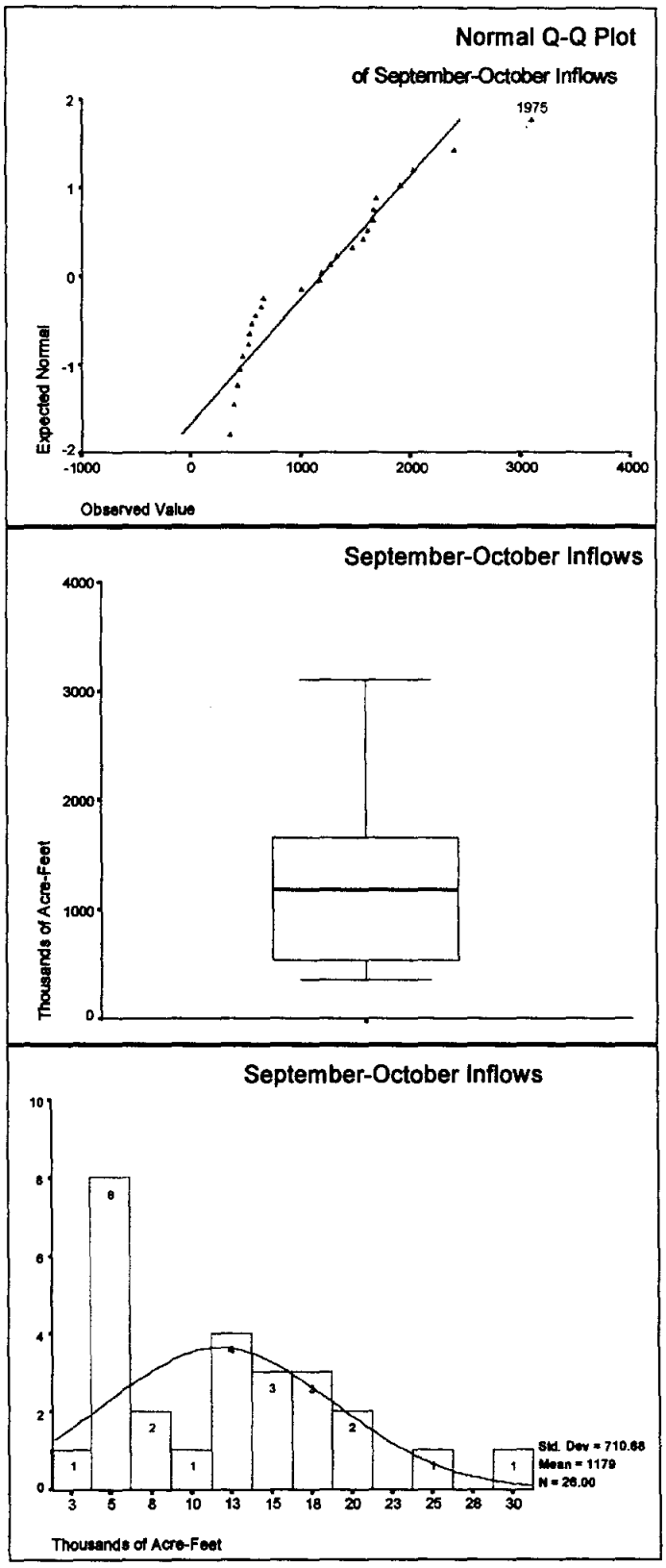


Fig. 1.6a. Exploratory Plots of September-October Inflows.

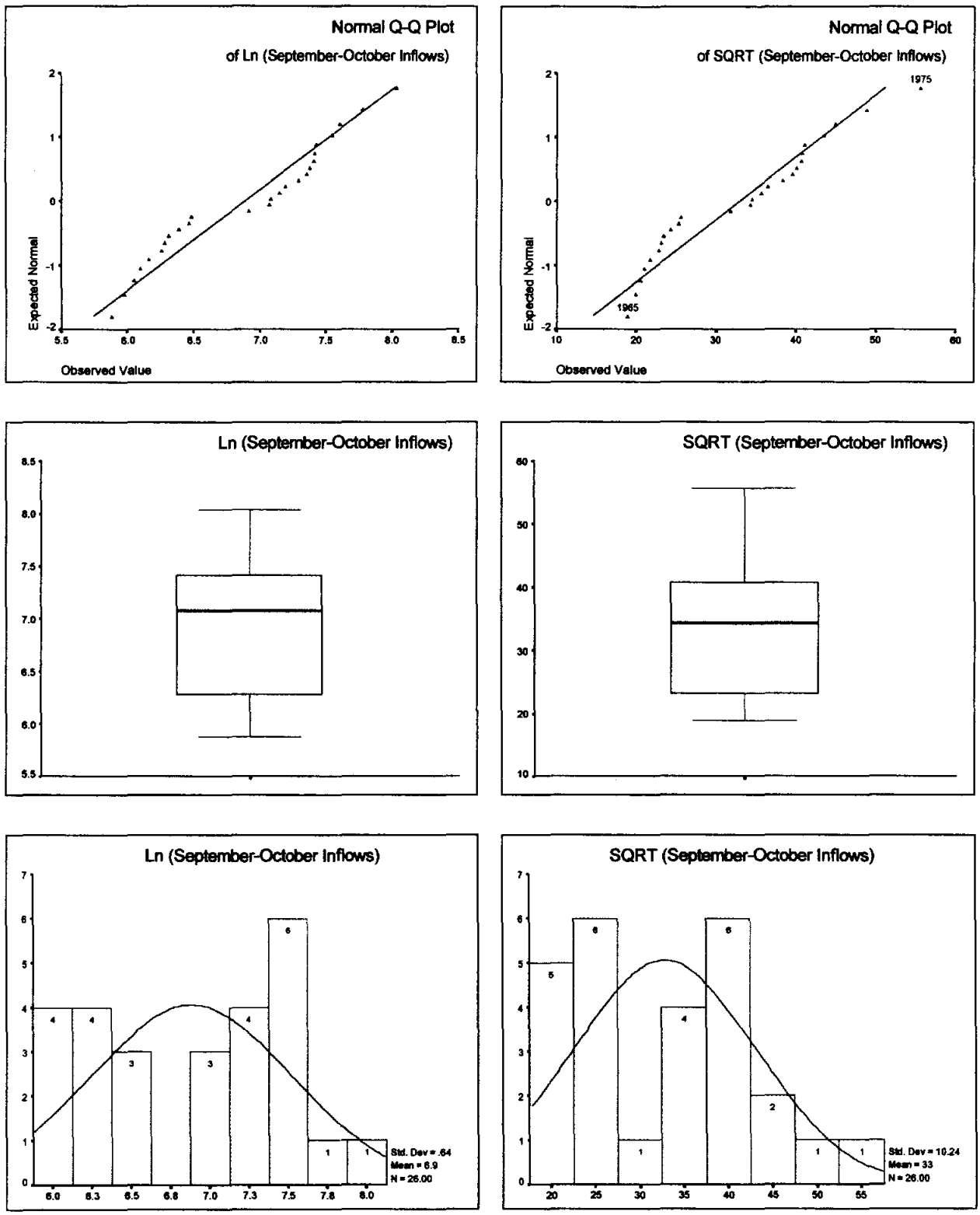


Fig. 1.6b. Exploratory Plots of Transformed September-October Inflows.

Descriptives

			Statistic	Std. Error
SQRT (November-December Inflows)	Mean		38.4032	2.1363
	95% Confidence Interval for Mean	Lower Bound	34.0034	
		Upper Bound	42.8031	
	5% Trimmed Mean		37.9963	
	Median		37.3369	
	Variance		118.664	
	Std. Deviation		10.8933	
	Minimum		22.17	
	Maximum		61.35	
	Range		39.18	
	Interquartile Range		15.5223	
	Skewness		.697	.456
	Kurtosis		-.342	.887

Extreme Values

			Case Number	Year	Value
November-December Inflows	Highest	1	14	1975	3763.55
		2	26	1987	3736.27
		3	15	1976	2834.55
		4	25	1986	2729.59
		5	22	1983	2629.44
	Lowest	1	10	1971	491.33
		2	7	1968	628.35
		3	20	1981	781.13
		4	9	1970	782.52
		5	6	1967	812.45

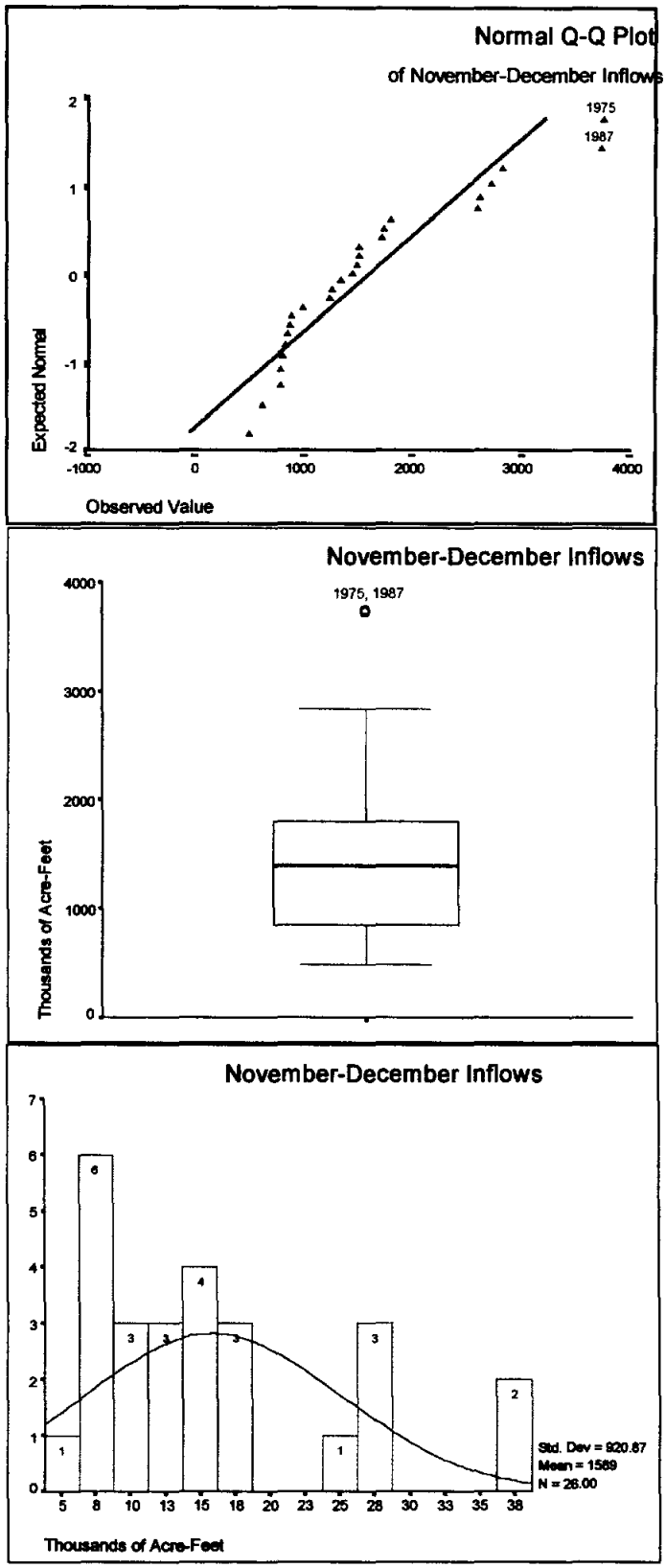


Fig. 1.7a. Exploratory Plots of November-December Inflows.

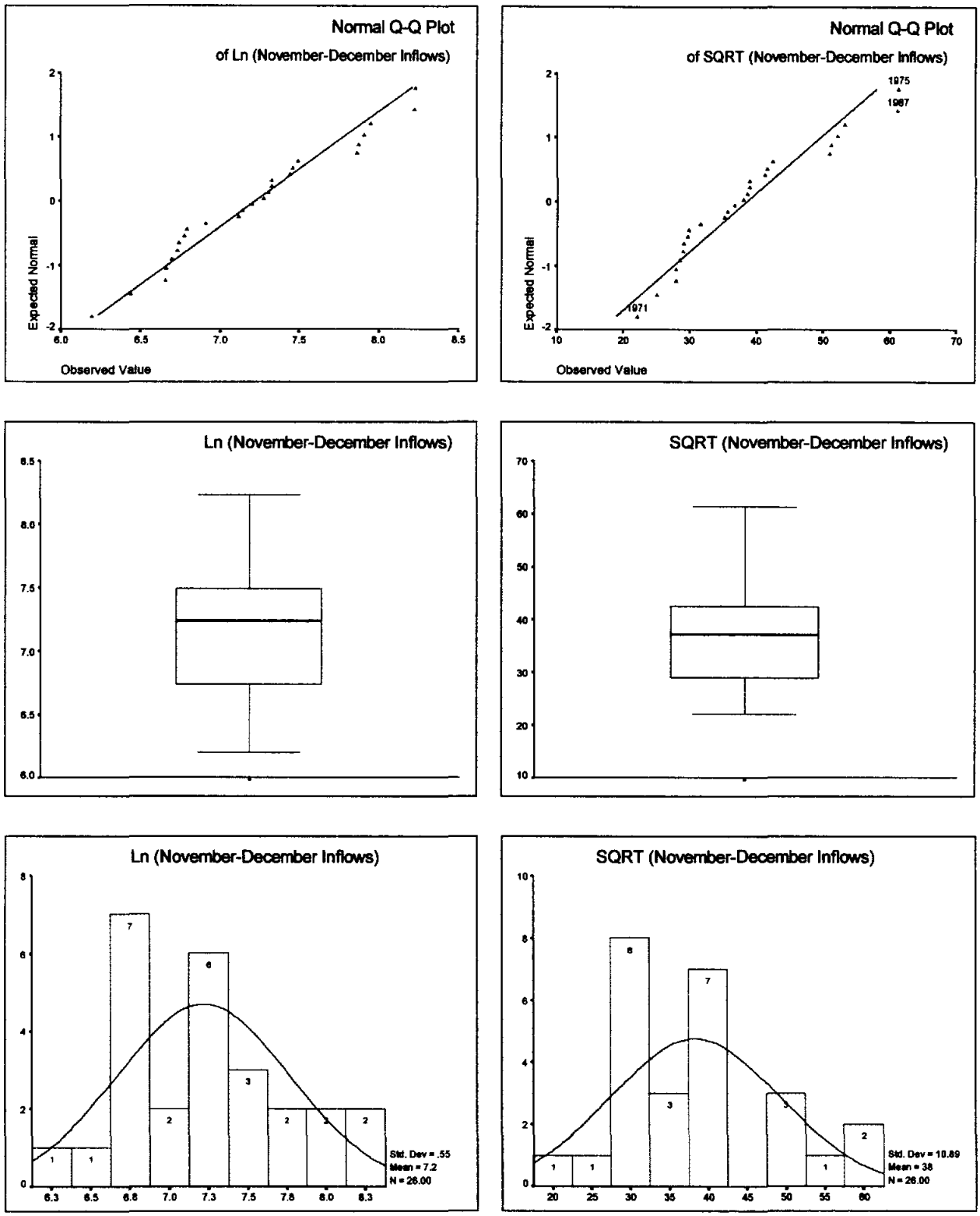


Fig. 1.7b. Exploratory Plots of Transformed November-December Inflows.

Percentiles

		Percentiles						
		5	10	25	50	75	90	95
Weighted Average (Definition 1)	Oyster Harvest	290.4800	810.6600	1196.80	2879.75	3470.68	4233.30	6132.77
	January-February Inflows	587.8903	897.5995	1159.24	1787.49	2080.80	2822.65	3140.29
	March-April Inflows	506.0215	649.7070	1054.26	1590.05	2163.14	3278.56	3570.99
	May-June Inflows	724.3750	939.1790	1365.59	2862.90	3536.06	3928.22	4765.10
	July-August Inflows	215.9818	326.0480	445.9275	768.3225	1087.63	1739.81	2133.77
	September-October Inflows	370.7975	415.7670	532.5713	1181.70	1660.62	2131.15	2851.03
	November-December Inflows	539.2820	735.2945	844.6875	1394.51	2001.71	3105.07	3754.00
	Ln (Oyster Harvest)	4.7633	6.6966	7.0856	7.9654	8.1520	8.3493	8.7024
	Ln (January-February Inflows)	6.3247	6.7993	7.0555	7.4886	7.6405	7.9450	8.0511
	Ln (March-April Inflows)	6.2266	6.4657	6.9606	7.3715	7.6708	8.0949	8.1799
	Ln (May-June Inflows)	6.5675	6.8449	7.2188	7.9595	8.1706	8.2757	8.4630
	Ln (July-August Inflows)	5.3741	5.7654	6.1002	6.6432	6.9917	7.4611	7.6595
	Ln (September-October Inflows)	5.9145	6.0296	6.2777	7.0747	7.4149	7.6613	7.9481
	Ln (November-December Inflows)	6.2832	6.5954	6.7390	7.2396	7.5883	8.0325	8.2306
	SQRT (Oyster Harvest)	13.8518	28.4633	34.5798	53.6619	58.9114	65.0405	77.9500
	SQRT (January-February Inflows)	23.9281	29.9565	34.0476	42.2786	45.6153	53.1225	56.0248
	SQRT (March-April Inflows)	22.4948	25.4224	32.4693	39.8754	46.4081	57.2553	59.7471
	SQRT (May-June Inflows)	26.7928	30.6451	36.9493	53.5048	59.4629	62.6714	68.9262
	SQRT (July-August Inflows)	14.6924	17.9630	21.1170	27.7118	32.9789	41.7063	46.1229
	SQRT (September-October Inflows)	19.2506	20.3876	23.0771	34.3757	40.7506	46.1280	53.2985
	SQRT (November-December Inflows)	23.1812	27.0841	29.0634	37.3369	44.5857	55.6059	61.2698
Tukey's Hinges	Oyster Harvest			1236.80	2879.75	3447.20		
	January-February Inflows			1159.28	1787.49	2068.95		
	March-April Inflows			1056.13	1590.05	1992.32		
	May-June Inflows			1390.30	2862.90	3503.55		
	July-August Inflows			446.0000	768.3225	1081.86		
	September-October Inflows			535.9950	1181.70	1658.99		
	November-December Inflows			847.0500	1394.51	1801.08		
	Ln (Oyster Harvest)			7.1203	7.9654	8.1453		
	Ln (January-February Inflows)			7.0556	7.4886	7.6348		
	Ln (March-April Inflows)			6.9624	7.3715	7.5971		
	Ln (May-June Inflows)			7.2373	7.9595	8.1615		
	Ln (July-August Inflows)			6.1003	6.6432	6.9864		
	Ln (September-October Inflows)			6.2841	7.0747	7.4140		
	Ln (November-December Inflows)			6.7418	7.2396	7.4961		
	SQRT (Oyster Harvest)			35.1682	53.6619	58.7129		
	SQRT (January-February Inflows)			34.0481	42.2786	45.4857		
	SQRT (March-April Inflows)			32.4982	39.8754	44.6354		
	SQRT (May-June Inflows)			37.2867	53.5048	59.1908		
	SQRT (July-August Inflows)			21.1187	27.7118	32.8916		
	SQRT (September-October Inflows)			23.1516	34.3757	40.7307		
	SQRT (November-December Inflows)			29.1041	37.3369	42.4391		

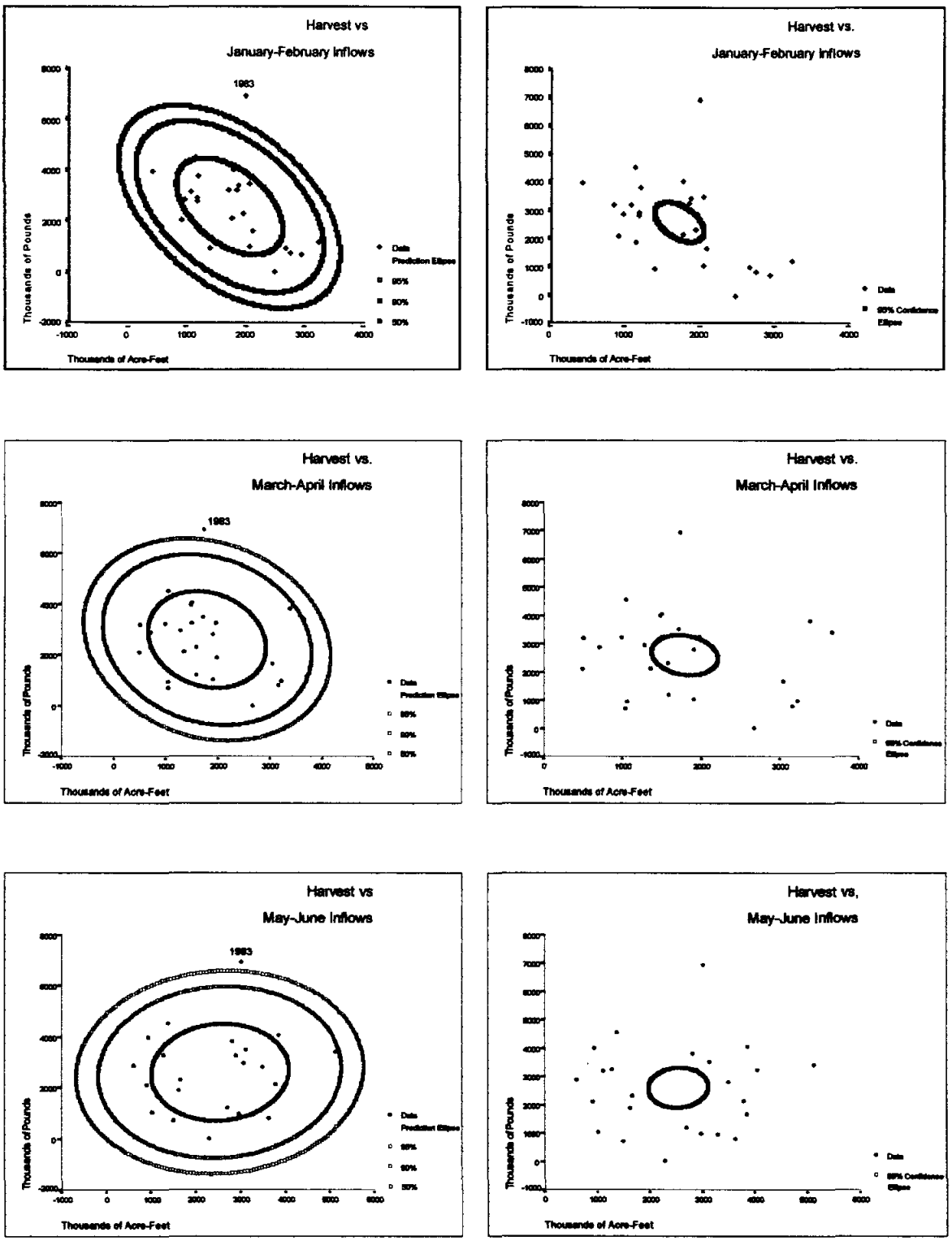


Fig. 2.1. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

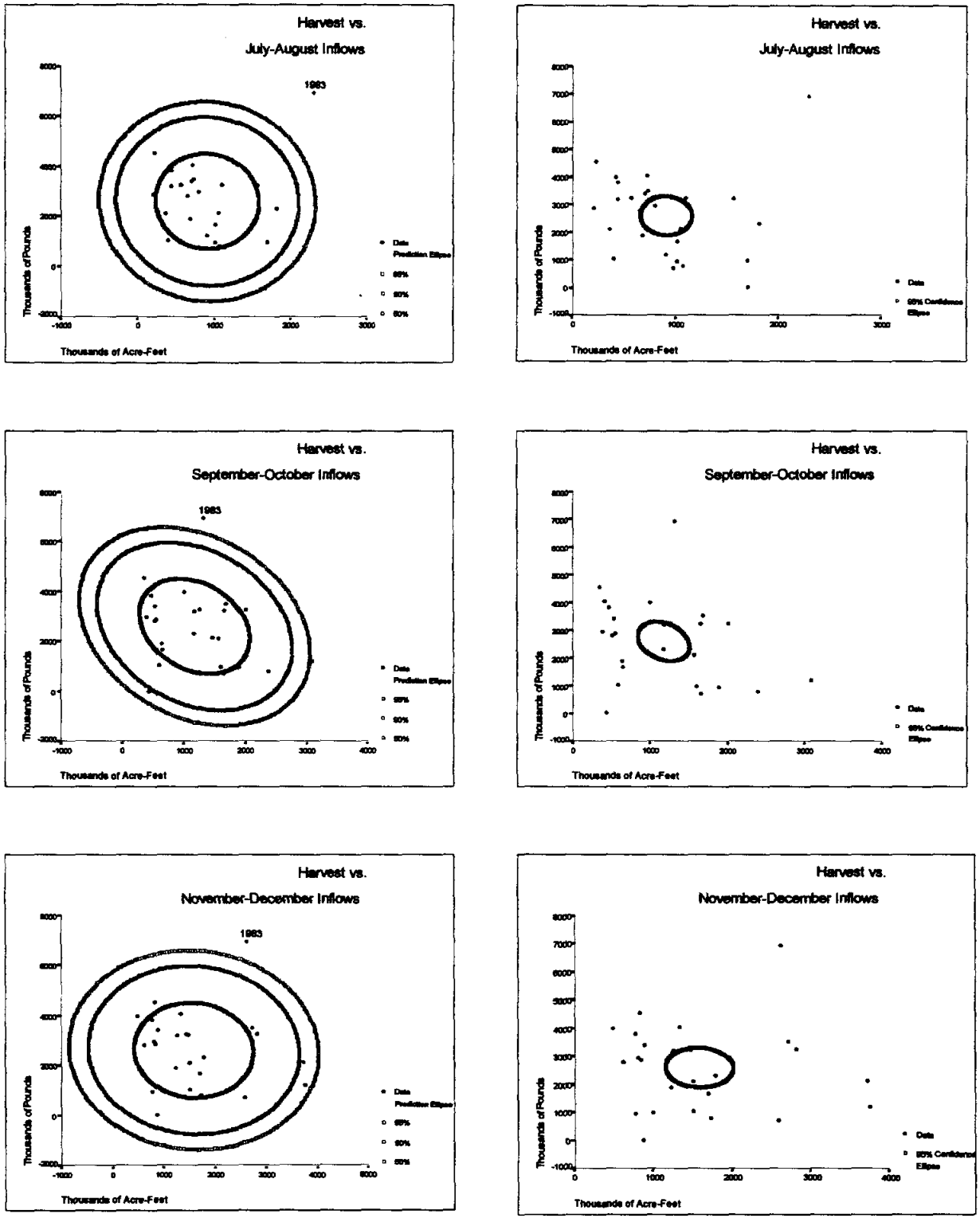


Fig. 2.2. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

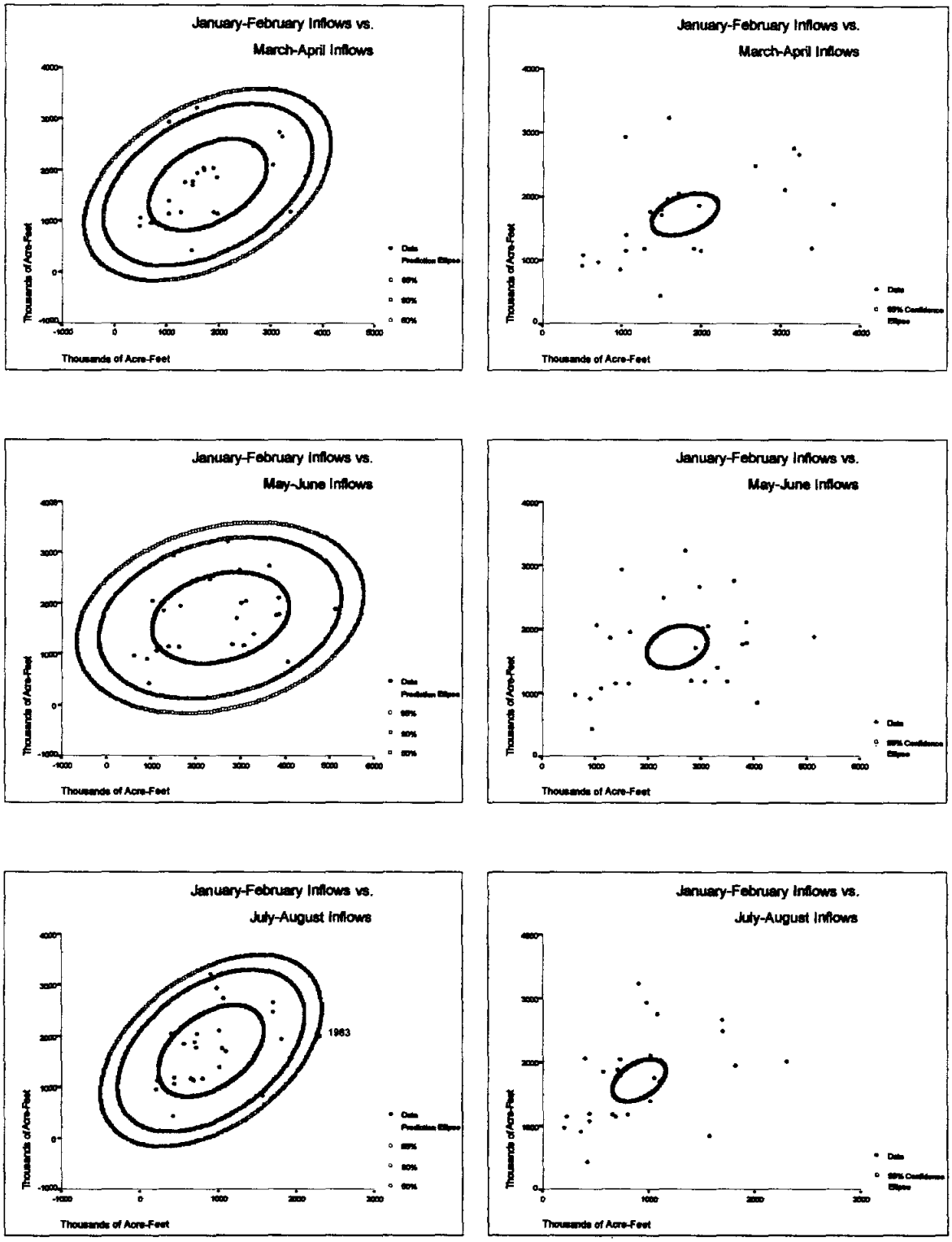


Fig. 2.3. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

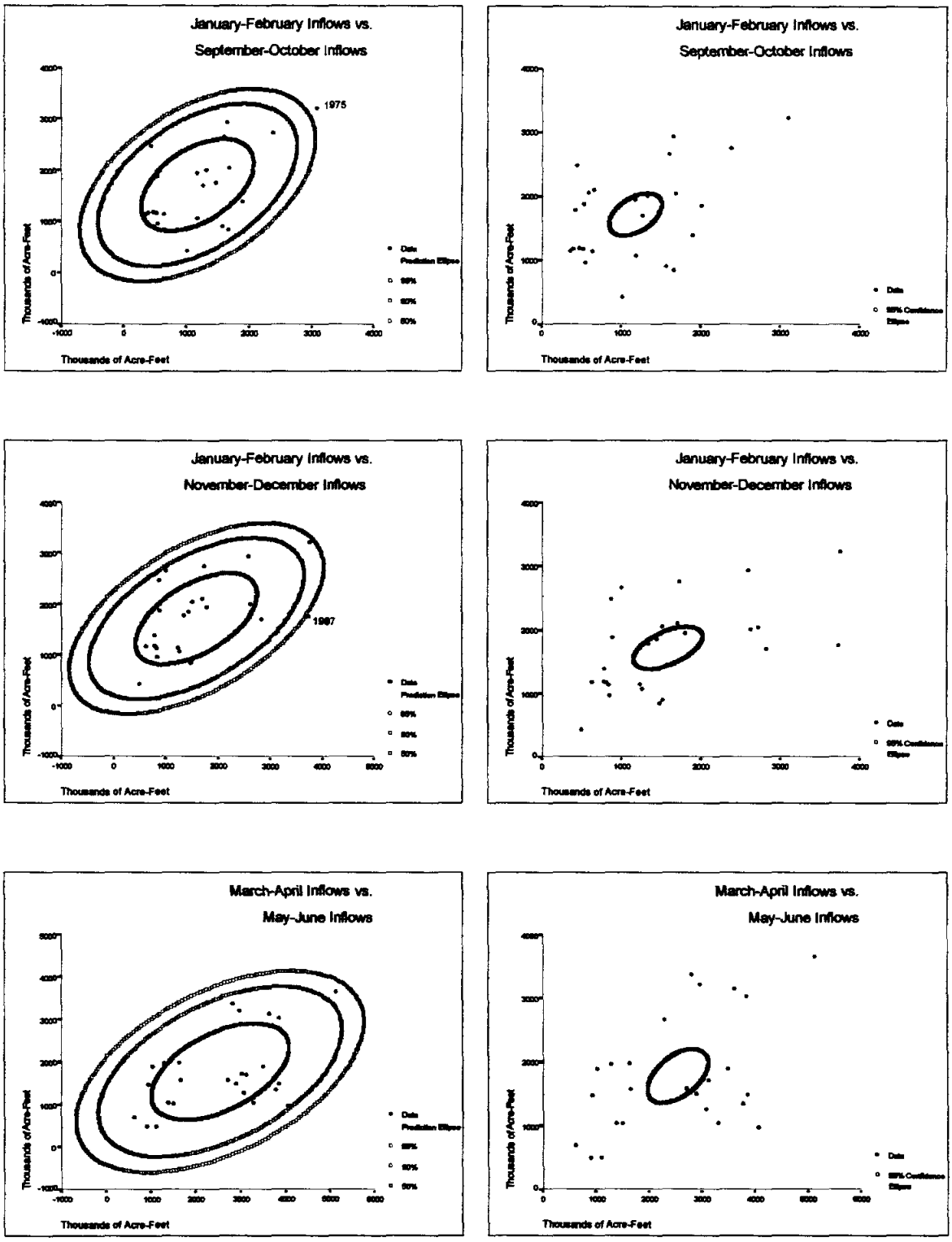


Fig. 2.4. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

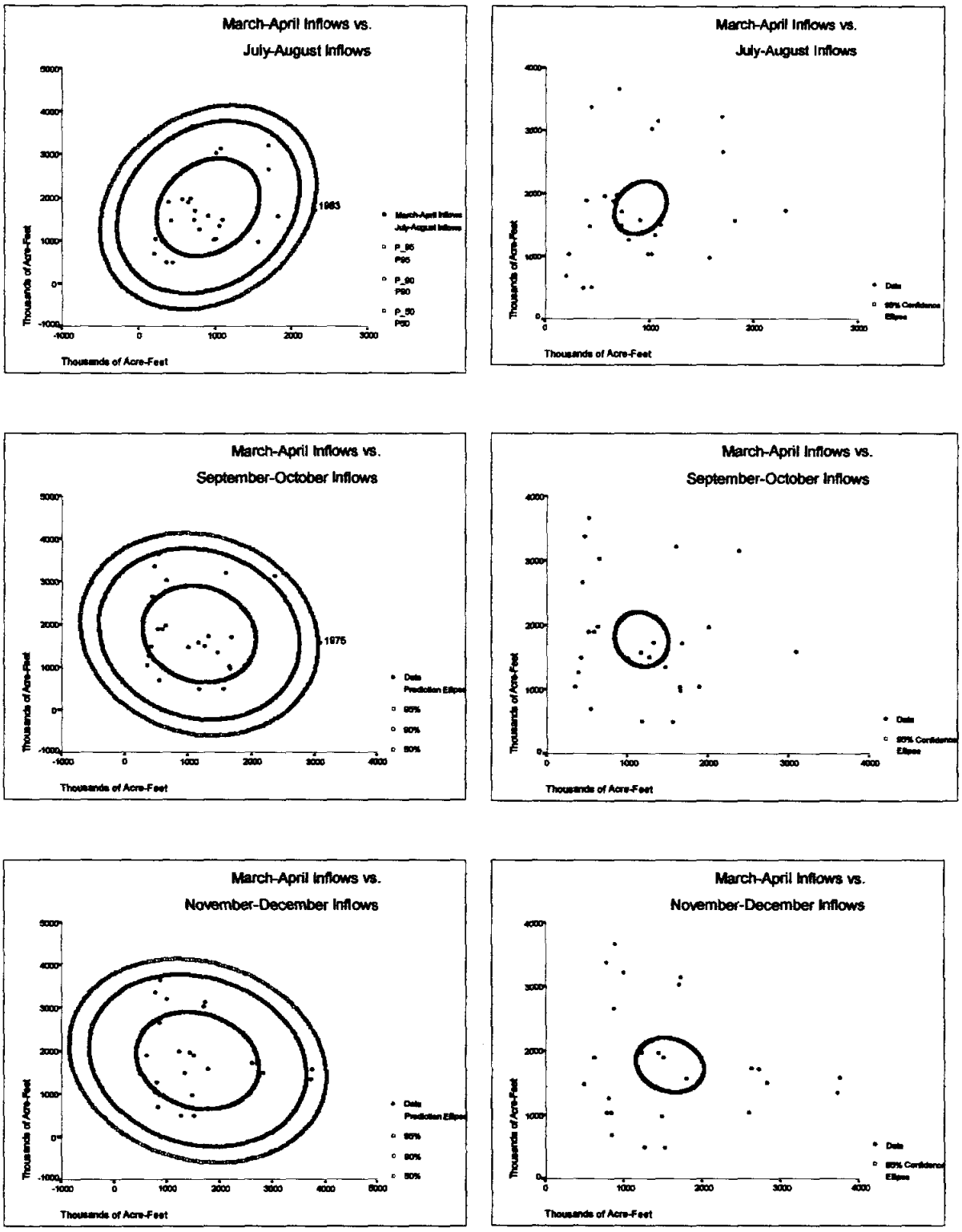


Fig. 2.5. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

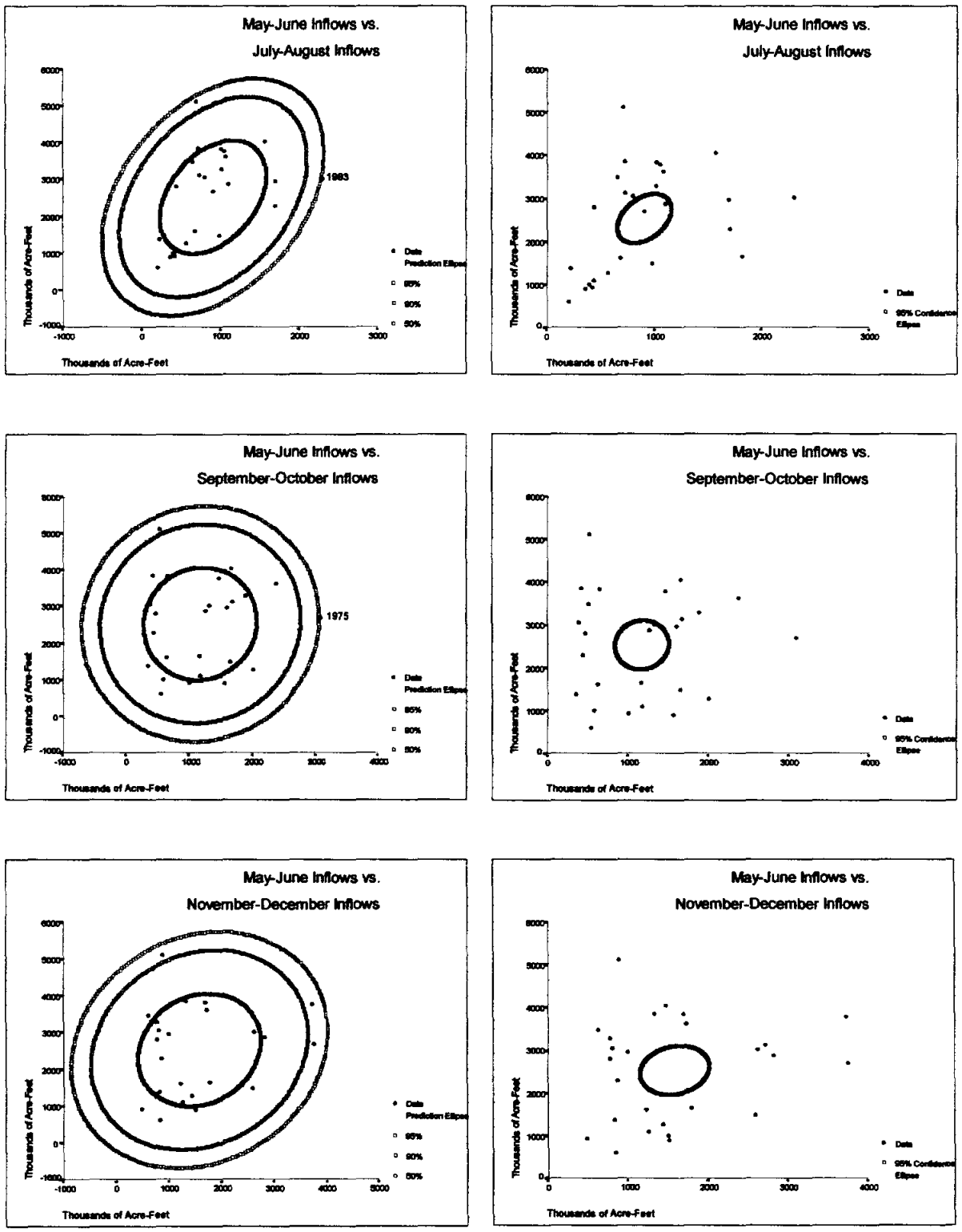


Fig. 2.6. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

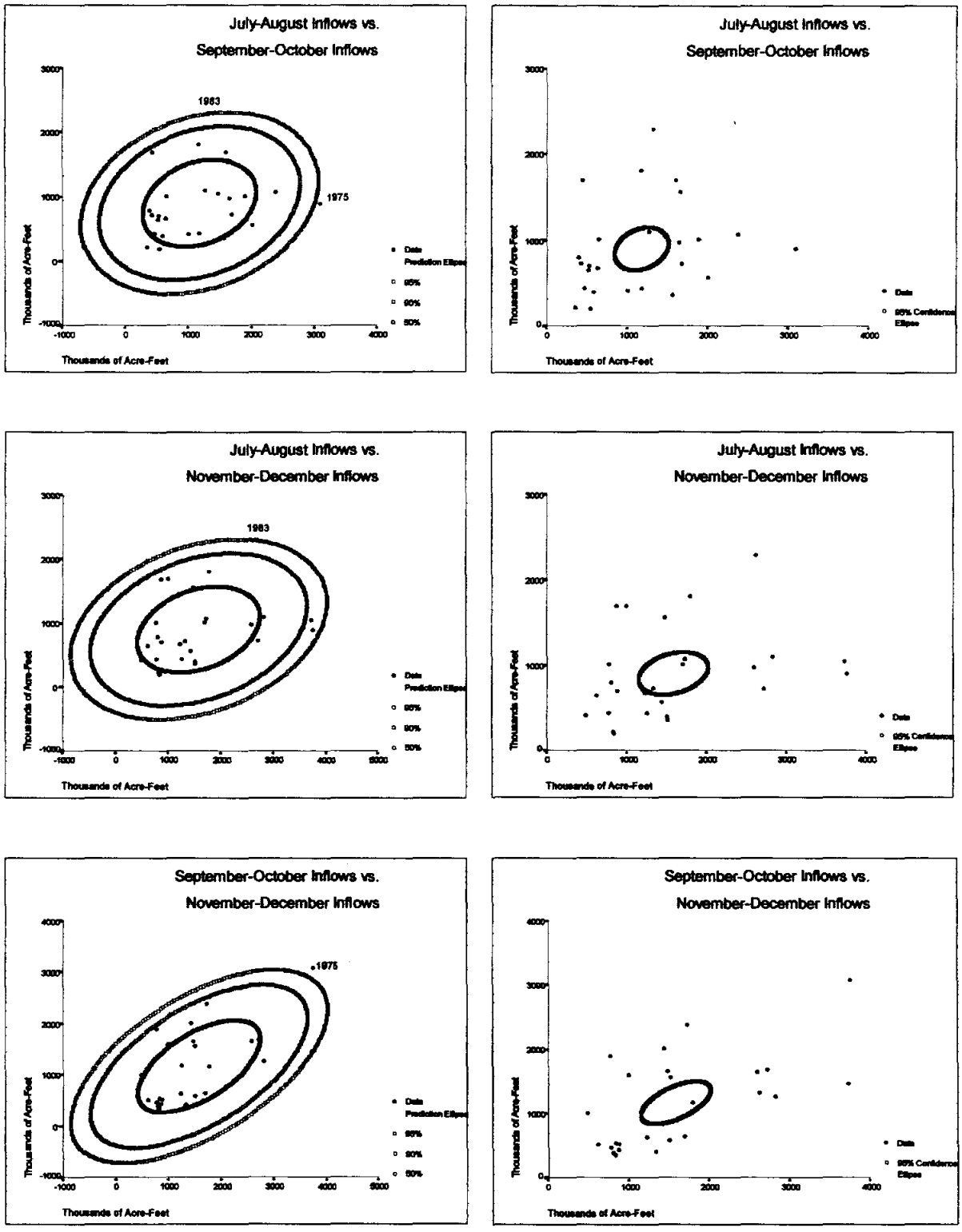


Fig. 2.7. Prediction and Confidence Ellipses.

The 95% (outmost) prediction ellipse encloses a region which should contain approximately 95% of the observations if the data are bivariately normally distributed.

Box-Cox Analysis

Numerical Results

Oyster	QJF_Lag	QMA_Lag	QMJ_Lag	QJA_Lag	QSO_Lag	QND_Lag	LAMBDA
1.901068118	.000036731	.000039694	.000095470	.000015678	.000011061	.000013979	-.000000020
.975143103	.000031443	.000034694	.000083047	.000013404	.000010104	.000012740	-.000000019
.502872485	.000027044	.000030436	.000072586	.000011511	.000009261	.000011661	-.000000018
.260858528	.000023377	.000026805	.000063756	.000009932	.000008518	.000010721	-.000000017
.136202069	.000020315	.000023707	.000056285	.000008613	.000007862	.000009902	-.000000016
.071632396	.000017753	.000021059	.000049948	.000007509	.000007284	.000009189	-.000000015
.037979414	.000015607	.000018795	.000044560	.000006584	.000006774	.000008568	-.000000014
.020320169	.000013805	.000016857	.000039970	.000005807	.000006325	.000008030	-.000000013
.010983733	.000012290	.000015199	.000036049	.000005155	.000005929	.000007564	-.000000012
.006006417	.000011015	.000013779	.000032695	.000004607	.000005581	.000007163	-.000000011
.003328478	.000009939	.000012563	.000029820	.000004146	.000005276	.000006819	-.000000010
.001872928	.000009032	.000011524	.000027351	.000003759	.000005009	.000006528	-.000000009
.001072819	.000008266	.000010637	.000025229	.000003434	.000004777	.000006284	-.000000008
.000627488	.000007619	.000009883	.000023404	.000003162	.000004577	.000006084	-.000000007
.000376195	.000007073	.000009243	.000021834	.000002935	.000004406	.000005924	-.000000006
.000232247	.000006613	.000008704	.000020483	.000002748	.000004263	.000005801	-.000000005
.000148433	.000006227	.000008255	.000019324	.000002595	.000004144	.000005715	-.000000004
.000098776	.000005904	.000007884	.000018331	.000002472	.000004050	.000005663	-.000000003
.000068815	.000005635	.000007583	.000017485	.000002375	.000003979	**.000005645**	**-.000000002**
.000050407	.000005414	.000007347	.000016768	.000002302	.000003930	.000005660	-.000000001
.000038901	.000005235	.000007169	.000016166	.000002252	.000003903	.000005709	.000000000
.000031608	.000005092	.000007044	.000015668	.000002222	**.000003898**	.000005792	**.000000001**
.000026949	.000004983	.000006970	.000015265	**.000002211**	.000003915	.000005911	**.000000002**
.000023984	.000004904	**.000006943**	.000014947	.000002220	.000003956	.000006066	**.000000003**
.000022147	.000004851	.000006962	.000014710	.000002247	.000004021	.000006262	.000000004
.000021096	.000004824	.000007026	.000014548	.000002293	.000004112	.000006500	.000000005
.000020619	**.000004821**	.000007134	.000014457	.000002358	.000004232	.000006783	**.000000006**
.000020592	.000004841	.000007286	**.000014436**	.000002444	.000004381	.000007118	**.000000007**
.000020940	.000004882	.000007483	.000014482	.000002552	.000004565	.000007508	.000000008
.000021627	.000004945	.000007727	.000014595	.000002683	.000004787	.000007959	.000000009
.000022640	.000005029	.000008020	.000014776	.000002839	.000005051	.000008480	.000000010
.000023987	.000005134	.000008363	.000015025	.000003025	.000005363	.000009078	.000000011
.000025692	.000005261	.000008761	.000015345	.000003242	.000005730	.000009764	.000000012
.000027791	.000005410	.000009217	.000015739	.000003495	.000006161	.000010549	.000000013
.000030339	.000005583	.000009737	.000016210	.000003788	.000006664	.000011446	.000000014
.000033404	.000005780	.000010324	.000016764	.000004128	.000007252	.000012471	.000000015
.000037073	.000006002	.000010987	.000017407	.000004520	.000007938	.000013642	.000000016
.000041455	.000006251	.000011731	.000018145	.000004974	.000008738	.000014981	.000000017
.000046680	.000006530	.000012566	.000018988	.000005497	.000009673	.000016513	.000000018
.000052912	.000006840	.000013500	.000019944	.000006102	.000010765	.000018265	.000000019
.000060348	.000007184	.000014545	.000021025	.000006800	.000012042	.000020272	.000000020

Model Choice Diagnostics

Untransformed Data

N = 26 Regression Models for Dependent Variable: OYSTER

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.220733	0.188264	1.5781	376.9	1837778	379.5	QJF_LAG
1	0.071809	0.033135	6.0841	381.5	2188992	384.0	QSO_LAG
1	0.028944	-.011516	7.3810	382.7	2290082	385.2	QMA_LAG
1	0.003210	-.038323	8.1597	383.3	2350773	385.9	QMJ_LAG
2	0.285459	0.223325	1.6197	376.7	1758399	380.5	QJF_LAG QND_LAG
2	0.262295	0.198146	2.3206	377.5	1815404	381.3	QJF_LAG QJA_LAG
2	0.252134	0.187103	2.6280	377.9	1840407	381.6	QJF_LAG QMJ_LAG
2	0.223298	0.155758	3.5005	378.9	1911371	382.6	QJF_LAG QSO_LAG
3	0.319993	0.227265	2.5748	377.4	1749479	382.4	QJF_LAG QSO_LAG QND_LAG
3	0.319527	0.226735	2.5889	377.4	1750679	382.5	QJF_LAG QMA_LAG QND_LAG
3	0.319044	0.226187	2.6035	377.4	1751920	382.5	QJF_LAG QJA_LAG QND_LAG
3	0.314102	0.220571	2.7530	377.6	1764634	382.7	QJF_LAG QMJ_LAG QND_LAG
4	0.354402	0.231431	3.5337	378.1	1740046	384.3	QJF_LAG QJA_LAG QSO_LAG QND_LAG
4	0.346885	0.222482	3.7612	378.4	1760309	384.6	QJF_LAG QMA_LAG QJA_LAG QND_LAG
4	0.342734	0.217541	3.8867	378.5	1771495	384.8	QJF_LAG QMJ_LAG QSO_LAG QND_LAG
4	0.341693	0.216301	3.9182	378.6	1774301	384.8	QJF_LAG QMA_LAG QSO_LAG QND_LAG
5	0.370853	0.213566	5.0360	379.4	1780494	386.9	QJF_LAG QMA_LAG QJA_LAG QSO_LAG QND_LAG
5	0.363811	0.204763	5.2490	379.7	1800422	387.2	QJF_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG
5	0.349017	0.186271	5.6967	380.3	1842290	387.8	QJF_LAG QMA_LAG QMJ_LAG QSO_LAG QND_LAG
5	0.347994	0.184993	5.7276	380.3	1845184	387.9	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QND_LAG
6	0.372041	0.173739	7.0000	381.3	1870663	390.1	QJF_LAG QMA_LAG QMJ_LAG QJA_LAG QSO_LAG QND_LAG

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	QMA_LAG	QMJ_LAG	QJA_LAG	QSO_LAG
1	MODEL1	PARMS	OYSTER	1355.65	4362.54	-0.99686	.	.	.	.
2	MODEL1	PARMS	OYSTER	1479.52	3305.49	.	.	.	.	-0.56735
3	MODEL1	PARMS	OYSTER	1513.30	3148.94	.	-0.28585	.	.	.
4	MODEL1	PARMS	OYSTER	1533.22	2457.62	.	.	0.07013	.	.
5	MODEL1	PARMS	OYSTER	1326.05	4179.06	-1.34467	.	.	.	.
6	MODEL1	PARMS	OYSTER	1347.37	4148.97	-1.21200	.	.	0.64293	.
7	MODEL1	PARMS	OYSTER	1356.62	3950.35	-1.09191	.	0.22625	.	.
8	MODEL1	PARMS	OYSTER	1382.52	4405.70	-0.93878	.	.	.	-0.12188
9	MODEL1	PARMS	OYSTER	1322.68	4288.65	-1.23453	.	.	.	-0.50151
10	MODEL1	PARMS	OYSTER	1323.13	3755.66	-1.70332	0.39630	.	.	.
11	MODEL1	PARMS	OYSTER	1323.60	3997.47	-1.51775	.	.	0.57998	.
12	MODEL1	PARMS	OYSTER	1328.40	3789.05	-1.42817	.	0.21619	.	.
13	MODEL1	PARMS	OYSTER	1319.11	4106.14	-1.40842	.	.	0.58710	-0.50749
14	MODEL1	PARMS	OYSTER	1326.77	3629.59	-1.82759	0.36010	.	0.52617	.
15	MODEL1	PARMS	OYSTER	1330.98	3930.00	-1.31864	.	0.19368	.	-0.45912
16	MODEL1	PARMS	OYSTER	1332.03	3922.67	-1.54764	0.32422	.	.	-0.41188
17	MODEL1	PARMS	OYSTER	1334.35	3799.19	-1.66971	0.28391	.	0.54356	-0.42856
18	MODEL1	PARMS	OYSTER	1341.80	3894.80	-1.43507	.	0.13135	0.48448	-0.47770
19	MODEL1	PARMS	OYSTER	1357.31	3815.82	-1.48981	0.20598	0.12977	.	-0.41616
20	MODEL1	PARMS	OYSTER	1358.38	3593.41	-1.79644	0.31439	0.05311	0.49167	.
21	MODEL1	PARMS	OYSTER	1367.72	3762.03	-1.63720	0.23647	0.05498	0.50788	-0.42928

OBS	QND_LAG	OYSTER	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	1837777.70	0.22073	0.18826	1.57809	376.945	379.461
2	.	-1	1	2	24	2188991.60	0.07181	0.03313	6.08406	381.492	384.008
3	.	-1	1	2	24	2290082.12	0.02894	-0.01152	7.38101	382.665	385.182
4	.	-1	1	2	24	2350772.61	0.00321	-0.03832	8.15965	383.346	385.862
5	0.49451	-1	2	3	23	1758399.13	0.28546	0.22332	1.61971	376.690	380.464
6	.	-1	2	3	23	1815403.59	0.26229	0.19815	2.32058	377.520	381.294
7	.	-1	2	3	23	1840406.76	0.25213	0.18710	2.62800	377.875	381.650
8	.	-1	2	3	23	1911370.53	0.22330	0.15576	3.50051	378.859	382.633
9	0.67774	-1	3	4	22	1749478.84	0.31999	0.22726	2.57481	377.402	382.435
10	0.70463	-1	3	4	22	1750678.63	0.31953	0.22674	2.58892	377.420	382.452
11	0.46466	-1	3	4	22	1751919.79	0.31904	0.22619	2.60352	377.438	382.471
12	0.48410	-1	3	4	22	1764634.45	0.31410	0.22057	2.75305	377.626	382.659
13	0.64971	-1	4	5	21	1740046.08	0.35440	0.23143	3.53370	378.052	384.343
14	0.65837	-1	4	5	21	1760308.56	0.34688	0.22248	3.76117	378.353	384.644
15	0.65293	-1	4	5	21	1771494.87	0.34273	0.21754	3.88674	378.518	384.808
16	0.81690	-1	4	5	21	1774301.36	0.34169	0.21630	3.91825	378.559	384.849
17	0.77365	-1	5	6	20	1780494.08	0.37085	0.21357	5.03597	379.381	386.930
18	0.63778	-1	5	6	20	1800422.43	0.36381	0.20476	5.24903	379.670	387.219
19	0.74952	-1	5	6	20	1842289.94	0.34902	0.18627	5.69665	380.268	387.817
20	0.63335	-1	5	6	20	1845183.66	0.34799	0.18499	5.72759	380.309	387.857
21	0.74794	-1	6	7	19	1870662.79	0.37204	0.17374	7.00000	381.332	390.138

Logged Inflows

N = 26 Regression Models for Dependent Variable: OYSTER

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.171878	0.137373	1.9473	378.5	1952996	381.0	LN_QJF
1	0.048586	0.008943	5.5126	382.1	2243761	384.7	LN_QSO
1	0.026913	-.013633	6.1393	382.7	2294873	385.2	LN_QJA
1	0.018617	-.022274	6.3792	382.9	2314437	385.5	LN_QMA
2	0.222484	0.154874	2.4839	378.9	1913372	382.7	LN_QJF LN_QND
2	0.213720	0.145348	2.7373	379.2	1934939	383.0	LN_QJF LN_QMJ
2	0.182889	0.111836	3.6289	380.2	2010811	384.0	LN_QJF LN_QSO
2	0.176418	0.104802	3.8160	380.4	2026735	384.2	LN_QJF LN_QMA
3	0.294441	0.198228	2.4031	378.4	1815219	383.4	LN_QJF LN_QSO LN_QND
3	0.268832	0.169127	3.1436	379.3	1881103	384.3	LN_QJF LN_QMJ LN_QND
3	0.262621	0.162069	3.3232	379.5	1897082	384.5	LN_QJF LN_QMA LN_QND
3	0.223513	0.117629	4.4541	380.9	1997696	385.9	LN_QJF LN_QJA LN_QND
4	0.334952	0.208276	3.2316	378.8	1792469	385.1	LN_QJF LN_QMJ LN_QSO LN_QND
4	0.323997	0.195235	3.5484	379.2	1821995	385.5	LN_QJF LN_QMA LN_QSO LN_QND
4	0.304718	0.172283	4.1059	380.0	1873958	386.3	LN_QJF LN_QJA LN_QSO LN_QND
4	0.280904	0.143934	4.7945	380.9	1938142	387.1	LN_QJF LN_QMA LN_QMJ LN_QND
5	0.342270	0.177837	5.0200	380.5	1861384	388.1	LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND
5	0.335383	0.169228	5.2191	380.8	1880875	388.4	LN_QJF LN_QMJ LN_QJA LN_QSO LN_QND
5	0.326261	0.157827	5.4829	381.2	1906688	388.7	LN_QJF LN_QMA LN_QJA LN_QSO LN_QND
5	0.292614	0.115768	6.4559	382.4	2001909	390.0	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND
6	0.342960	0.135474	7.0000	382.5	1957295	391.3	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA	LN_QMJ	LN_QJA	LN_QSO
1	MODEL1	PARMS	OYSTER	1397.50	12674.51	-1362.84	.	.	.	.
2	MODEL1	PARMS	OYSTER	1497.92	6218.25	.	.	.	.	-520.077
3	MODEL1	PARMS	OYSTER	1514.88	5293.16	.	.	.	-399.834	.
4	MODEL1	PARMS	OYSTER	1521.33	5452.14	.	-382.402	.	.	.
5	MODEL1	PARMS	OYSTER	1383.25	11162.54	-1901.89	.	.	.	.
6	MODEL1	PARMS	OYSTER	1391.02	10303.49	-1653.93	.	585.931	.	.
7	MODEL1	PARMS	OYSTER	1418.03	13687.79	-1258.55	.	.	.	-258.658
8	MODEL1	PARMS	OYSTER	1423.63	11971.24	-1481.55	214.258	.	.	.
9	MODEL1	PARMS	OYSTER	1347.30	13084.45	-1996.20	.	.	.	-784.636
10	MODEL1	PARMS	OYSTER	1371.53	8596.84	-2232.68	.	617.339	.	.
11	MODEL1	PARMS	OYSTER	1377.35	8038.24	-2568.01	726.682	.	.	.
12	MODEL1	PARMS	OYSTER	1413.40	11059.65	-1956.80	.	.	92.718	.
13	MODEL1	PARMS	OYSTER	1338.83	10605.33	-2302.13	.	577.987	.	-753.215
14	MODEL1	PARMS	OYSTER	1349.81	10250.93	-2564.63	627.390	.	.	-729.071
15	MODEL1	PARMS	OYSTER	1368.93	12933.77	-2184.34	.	.	302.359	-860.112
16	MODEL1	PARMS	OYSTER	1392.17	7362.98	-2556.78	455.428	443.085	.	.
17	MODEL1	PARMS	OYSTER	1364.33	9575.68	-2553.40	356.225	442.954	.	-729.007
18	MODEL1	PARMS	OYSTER	1371.45	10458.08	-2277.44	.	621.197	-76.440	-731.785
19	MODEL1	PARMS	OYSTER	1380.83	10448.58	-2603.44	567.051	.	150.233	-771.916
20	MODEL1	PARMS	OYSTER	1414.89	6885.39	-2453.98	468.051	645.382	-376.156	.
21	MODEL1	PARMS	OYSTER	1399.03	9368.49	-2527.01	363.247	495.137	-97.020	-701.330

OBS	LN_QND	OYSTER	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	1952995.51	0.17188	0.13737	1.94729	378.526	381.042
2	.	-1	1	2	24	2243760.84	0.04859	0.00894	5.51260	382.134	384.650
3	.	-1	1	2	24	2294873.47	0.02691	-0.01363	6.13933	382.720	385.236
4	.	-1	1	2	24	2314436.87	0.01862	-0.02227	6.37922	382.940	385.457
5	759.12	-1	2	3	23	1913371.69	0.22248	0.15487	2.48387	378.886	382.660
6	.	-1	2	3	23	1934939.00	0.21372	0.14535	2.73730	379.178	382.952
7	.	-1	2	3	23	2010810.72	0.18289	0.11184	3.62886	380.178	383.952
8	.	-1	2	3	23	2026734.98	0.17642	0.10480	3.81599	380.383	384.157
9	1337.44	-1	3	4	22	1815219.04	0.29444	0.19823	2.40307	378.361	383.394
10	793.05	-1	3	4	22	1881103.23	0.26883	0.16913	3.14361	379.288	384.321
11	1130.19	-1	3	4	22	1897082.01	0.26262	0.16207	3.32321	379.508	384.540
12	744.06	-1	3	4	22	1997695.74	0.22351	0.11763	4.45411	380.852	385.884
13	1346.05	-1	4	5	21	1792469.24	0.33495	0.20828	3.23157	378.824	385.114
14	1616.85	-1	4	5	21	1821995.11	0.32400	0.19523	3.54836	379.249	385.539
15	1343.97	-1	4	5	21	1873958.15	0.30472	0.17228	4.10588	379.980	386.270
16	1016.03	-1	4	5	21	1938141.88	0.28090	0.14393	4.79451	380.855	387.146
17	1502.68	-1	5	6	20	1861384.14	0.34227	0.17784	5.01997	380.536	388.085
18	1345.04	-1	5	6	20	1880874.55	0.33538	0.16923	5.21913	380.807	388.356
19	1593.22	-1	5	6	20	1906688.08	0.32626	0.15783	5.48289	381.161	388.710
20	1094.68	-1	5	6	20	2001909.08	0.29261	0.11577	6.45588	382.428	389.977
21	1504.49	-1	6	7	19	1957294.55	0.34296	0.13547	7.00000	382.509	391.315

Logged All Variables

N = 26 Regression Models for Dependent Variable: LN_OYSTE

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.207950	0.174947	6.8987	-4.3707	0.785129	-1.8545	LN_QJF
1	0.104136	0.066809	10.6865	-1.1685	0.888035	1.3477	LN_QJA
1	0.054097	0.014684	12.5122	0.2447	0.937637	2.7609	LN_QMA
1	0.001627	-.039972	14.4266	1.6483	0.989648	4.1645	LN_QSO
2	0.332930	0.274924	4.3387	-6.8357	0.689990	-3.0614	LN_QJF LN_QND
2	0.241620	0.175674	7.6702	-3.5002	0.784438	0.2741	LN_QJF LN_QMJ
2	0.217565	0.149527	8.5479	-2.6883	0.809319	1.0860	LN_QJF LN_QJA
2	0.217114	0.149037	8.5644	-2.6733	0.809786	1.1010	LN_QJF LN_QSO
3	0.373013	0.287515	4.8762	-6.4469	0.678008	-1.4145	LN_QJF LN_QMJ LN_QND
3	0.362449	0.275510	5.2617	-6.0125	0.689433	-0.9801	LN_QJF LN_QMA LN_QND
3	0.354886	0.266916	5.5376	-5.7058	0.697611	-0.6735	LN_QJF LN_QJA LN_QND
3	0.345534	0.256288	5.8788	-5.3316	0.707724	-0.2993	LN_QJF LN_QSO LN_QND
4	0.470177	0.369259	3.3311	-8.8249	0.600220	-2.5344	LN_QJF LN_QMJ LN_QJA LN_QND
4	0.405160	0.291857	5.7033	-5.8154	0.673876	0.4751	LN_QJF LN_QMA LN_QJA LN_QND
4	0.383364	0.265910	6.4986	-4.8797	0.698568	1.4108	LN_QJF LN_QMJ LN_QSO LN_QND
4	0.380342	0.262312	6.6088	-4.7526	0.701992	1.5379	LN_QJF LN_QMA LN_QMJ LN_QND
5	0.479091	0.348864	5.0059	-7.2660	0.619628	0.2826	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND
5	0.470182	0.337727	5.3310	-6.8251	0.630226	0.7235	LN_QJF LN_QMJ LN_QJA LN_QSO LN_QND
5	0.406387	0.257984	7.6586	-3.8690	0.706111	3.6795	LN_QJF LN_QMA LN_QJA LN_QSO LN_QND
5	0.389167	0.236459	8.2868	-3.1255	0.726594	4.4230	LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND
6	0.479252	0.314805	7.0000	-5.2740	0.652038	3.5326	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA	LN_QMJ	LN_QJA	LN_QSO
1	MODEL1	PARMS	LN_OYSTE	0.88607	14.7701	-0.97186	.	.	.	.
2	MODEL1	PARMS	LN_OYSTE	0.94236	11.0000	.	.	.	-0.50991	.
3	MODEL1	PARMS	LN_OYSTE	0.96832	10.7236	.	-0.42261	.	.	.
4	MODEL1	PARMS	LN_OYSTE	0.99481	8.0367	.	.	.	.	-0.06170
5	MODEL1	PARMS	LN_OYSTE	0.83066	13.2296	-1.52107	.	.	.	.
6	MODEL1	PARMS	LN_OYSTE	0.88568	13.3912	-1.14115	.	0.34076	.	.
7	MODEL1	PARMS	LN_OYSTE	0.89962	15.0309	-0.84309	.	.	-0.18200	.
8	MODEL1	PARMS	LN_OYSTE	0.89988	14.1708	-1.03354	.	.	.	0.15298
9	MODEL1	PARMS	LN_OYSTE	0.82341	11.6827	-1.72051	.	0.37220	.	.
10	MODEL1	PARMS	LN_OYSTE	0.83032	11.4926	-1.89143	0.40403	.	.	.
11	MODEL1	PARMS	LN_OYSTE	0.83523	13.5378	-1.35664	.	.	-0.27766	.
12	MODEL1	PARMS	LN_OYSTE	0.84126	13.7511	-1.54666	.	.	.	-0.21290
13	MODEL1	PARMS	LN_OYSTE	0.77474	10.8550	-1.51184	.	0.75886	-0.70220	.
14	MODEL1	PARMS	LN_OYSTE	0.82090	11.3105	-1.78638	0.55079	.	-0.40454	.
15	MODEL1	PARMS	LN_OYSTE	0.83580	12.1979	-1.73833	.	0.36211	.	-0.19321
16	MODEL1	PARMS	LN_OYSTE	0.83785	11.0595	-1.88423	0.23005	0.28418	.	.
17	MODEL1	PARMS	LN_OYSTE	0.78716	10.1603	-1.69069	0.25382	0.66504	-0.70818	.
18	MODEL1	PARMS	LN_OYSTE	0.79387	10.8422	-1.51098	.	0.75997	-0.70382	0.00411
19	MODEL1	PARMS	LN_OYSTE	0.84030	11.5320	-1.79151	0.53367	.	-0.38357	-0.06989
20	MODEL1	PARMS	LN_OYSTE	0.85240	11.6035	-1.88340	0.20566	0.28415	.	-0.17924
21	MODEL1	PARMS	LN_OYSTE	0.80749	10.0693	-1.68801	0.25766	0.67055	-0.71841	0.02571

OBS	LN_QND	LN_OYSTE	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	0.78513	0.20795	0.17495	6.8987	-4.37071	-1.85451
2	.	-1	1	2	24	0.88803	0.10414	0.06681	10.6865	-1.16846	1.34773
3	.	-1	1	2	24	0.93764	0.05410	0.01468	12.5122	0.24468	2.76088
4	.	-1	1	2	24	0.98965	0.00163	-0.03997	14.4266	1.64835	4.16454
5	0.77343	-1	2	3	23	0.68999	0.33293	0.27492	4.3387	-6.83570	-3.06141
6	.	-1	2	3	23	0.78444	0.24162	0.17567	7.6702	-3.50016	0.27413
7	.	-1	2	3	23	0.80932	0.21756	0.14953	8.5479	-2.68826	1.08602
8	.	-1	2	3	23	0.80979	0.21711	0.14904	8.5644	-2.67328	1.10101
9	0.79389	-1	3	4	22	0.67801	0.37301	0.28752	4.8762	-6.44690	-1.41451
10	0.97974	-1	3	4	22	0.68943	0.36245	0.27551	5.2617	-6.01245	-0.98007
11	0.81852	-1	3	4	22	0.69761	0.35489	0.26692	5.5376	-5.70585	-0.67346
12	0.93034	-1	3	4	22	0.70772	0.34553	0.25629	5.8788	-5.33164	-0.29925
13	0.92917	-1	4	5	21	0.60022	0.47018	0.36926	3.3311	-8.82486	-2.53438
14	1.12038	-1	4	5	21	0.67388	0.40516	0.29186	5.7033	-5.81536	0.47512
15	0.93574	-1	4	5	21	0.69857	0.38336	0.26591	6.4986	-4.87972	1.41077
16	0.90652	-1	4	5	21	0.70199	0.38034	0.26231	6.6088	-4.75259	1.53789
17	1.05459	-1	5	6	20	0.61963	0.47909	0.34886	5.0059	-7.26601	0.28257
18	0.92647	-1	5	6	20	0.63023	0.47018	0.33773	5.3310	-6.82506	0.72352
19	1.15973	-1	5	6	20	0.70611	0.40639	0.25798	7.6586	-3.86904	3.67954
20	1.02617	-1	5	6	20	0.72659	0.38917	0.23646	8.2868	-3.12555	4.42303
21	1.03957	-1	6	7	19	0.65204	0.47925	0.31481	7.0000	-5.27404	3.53263

Squared Root Inflows

N = 26 Regression Models for Dependent Variable: OYSTER

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.198202	0.164794	1.6690	377.7	1890913	380.2	SQR_QJF
1	0.059309	0.020114	5.7691	381.8	2218470	384.4	SQR_QSO
1	0.024769	-.015865	6.7888	382.8	2299928	385.3	SQR_QMA
1	0.010358	-.030877	7.2142	383.2	2333915	385.7	SQR_QJA
2	0.258625	0.194157	1.8854	377.6	1824435	381.4	SQR_QJF SQR_QND
2	0.236237	0.169822	2.5463	378.4	1879530	382.2	SQR_QJF SQR_QMJ
2	0.217780	0.149761	3.0911	379.0	1924949	382.8	SQR_QJF SQR_QJA
2	0.204259	0.135064	3.4902	379.5	1958223	383.3	SQR_QJF SQR_QSO
3	0.311677	0.217814	2.3193	377.7	1770875	382.8	SQR_QJF SQR_QSO SQR_QND
3	0.301050	0.205738	2.6330	378.1	1798215	383.1	SQR_QJF SQR_QMA SQR_QND
3	0.296898	0.201020	2.7555	378.3	1808897	383.3	SQR_QJF SQR_QMJ SQR_QND
3	0.271248	0.171872	3.5127	379.2	1874888	384.2	SQR_QJF SQR_QJA SQR_QND
4	0.342497	0.217259	3.4094	378.5	1772133	384.8	SQR_QJF SQR_QMJ SQR_QSO SQR_QND
4	0.339632	0.213848	3.4940	378.6	1779855	384.9	SQR_QJF SQR_QMA SQR_QSO SQR_QND
4	0.332115	0.204899	3.7159	378.9	1800115	385.2	SQR_QJF SQR_QJA SQR_QSO SQR_QND
4	0.312269	0.181272	4.3018	379.7	1853607	386.0	SQR_QJF SQR_QMA SQR_QMJ SQR_QND
5	0.351926	0.189908	5.1311	380.2	1834055	387.7	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.350900	0.188625	5.1614	380.2	1836961	387.7	SQR_QJF SQR_QMA SQR_QMJ SQR_QSO SQR_QND
5	0.347638	0.184548	5.2577	380.3	1846191	387.9	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.313663	0.142079	6.2606	381.6	1942340	389.2	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QND
6	0.356367	0.153115	7.0000	382.0	1917355	390.8	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA	SQR_QMJ	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	OYSTER	1375.10	5759.15	-76.686	.	.	.	.
2	MODEL1	PARMS	OYSTER	1489.45	3811.03	.	.	.	.	-35.7692
3	MODEL1	PARMS	OYSTER	1516.55	3557.74	.	-22.4386	.	.	.
4	MODEL1	PARMS	OYSTER	1527.72	3150.32	.	.	.	-17.7329	.
5	MODEL1	PARMS	OYSTER	1350.72	5357.33	-105.588	.	.	.	.
6	MODEL1	PARMS	OYSTER	1370.96	5042.02	-88.188	.	24.2401	.	.
7	MODEL1	PARMS	OYSTER	1387.43	5510.57	-90.626	.	.	28.1633	.
8	MODEL1	PARMS	OYSTER	1399.37	5937.76	-71.081	.	.	.	-12.3891
9	MODEL1	PARMS	OYSTER	1330.74	5750.94	-101.972	.	.	.	-42.2469
10	MODEL1	PARMS	OYSTER	1340.98	4457.22	-141.067	38.3165	.	.	.
11	MODEL1	PARMS	OYSTER	1344.95	4637.16	-117.183	.	24.3162	.	.
12	MODEL1	PARMS	OYSTER	1369.27	5177.69	-115.324	.	.	22.7660	.
13	MODEL1	PARMS	OYSTER	1331.21	5074.82	-112.670	.	21.9103	.	-39.3280
14	MODEL1	PARMS	OYSTER	1334.11	4955.75	-131.733	31.6214	.	.	-36.6278
15	MODEL1	PARMS	OYSTER	1341.68	5551.94	-114.175	.	.	29.2087	-45.6263
16	MODEL1	PARMS	OYSTER	1361.47	4276.86	-137.633	26.7459	15.2672	.	.
17	MODEL1	PARMS	OYSTER	1354.27	4909.12	-137.247	27.2037	.	23.1506	-40.0913
18	MODEL1	PARMS	OYSTER	1355.35	4775.32	-128.286	20.0217	15.3001	.	-36.6508
19	MODEL1	PARMS	OYSTER	1358.75	5102.06	-117.322	.	17.4072	16.3989	-41.8253
20	MODEL1	PARMS	OYSTER	1393.68	4270.85	-140.489	27.1706	12.8938	8.4050	.
21	MODEL1	PARMS	OYSTER	1384.69	4797.55	-133.391	20.4135	10.5253	16.9173	-39.1746

OBS	SQR_QND	OYSTER	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	1890913.33	0.19820	0.16479	1.66902	377.686	380.202
2	.	-1	1	2	24	2218470.34	0.05931	0.02011	5.76913	381.839	384.356
3	.	-1	1	2	24	2299928.09	0.02477	-0.01587	6.78875	382.777	385.293
4	.	-1	1	2	24	2333915.06	0.01036	-0.03088	7.21418	383.158	385.675
5	41.1088	-1	2	3	23	1824434.68	0.25862	0.19416	1.88535	377.649	381.423
6	.	-1	2	3	23	1879529.52	0.23624	0.16982	2.54625	378.422	382.196
7	.	-1	2	3	23	1924949.35	0.21778	0.14976	3.09109	379.043	382.817
8	.	-1	2	3	23	1958222.88	0.20426	0.13506	3.49023	379.489	383.263
9	63.1519	-1	3	4	22	1770875.38	0.31168	0.21781	2.31927	377.718	382.751
10	61.2000	-1	3	4	22	1798215.23	0.30105	0.20574	2.63297	378.117	383.149
11	41.1901	-1	3	4	22	1808896.93	0.29690	0.20102	2.75553	378.271	383.303
12	38.9299	-1	3	4	22	1874888.14	0.27125	0.17187	3.51272	379.202	384.235
13	61.7022	-1	4	5	21	1772132.79	0.34250	0.21726	3.40944	378.527	384.818
14	76.8007	-1	4	5	21	1779854.94	0.33963	0.21385	3.49401	378.640	384.931
15	62.1196	-1	4	5	21	1800114.88	0.33212	0.20490	3.71591	378.934	385.225
16	55.1840	-1	4	5	21	1853606.90	0.31227	0.18127	4.30179	379.696	385.986
17	74.0757	-1	5	6	20	1834055.18	0.35193	0.18991	5.13109	380.152	387.700
18	70.7815	-1	5	6	20	1836961.11	0.35090	0.18862	5.16140	380.193	387.741
19	61.4206	-1	5	6	20	1846191.19	0.34764	0.18455	5.25768	380.323	387.872
20	54.5944	-1	5	6	20	1942339.83	0.31366	0.14208	6.26061	381.643	389.192
21	70.6687	-1	6	7	19	1917355.40	0.35637	0.15311	7.00000	381.973	390.779

Squared Root All Variables

N = 26 Regression Models for Dependent Variable: SQR_OYST

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.265254	0.234639	2.9946	139.6	199.641	142.1	SQR_QJF
1	0.046862	0.007148	10.4238	146.4	258.981	148.9	SQR_QJA
1	0.044493	0.004680	10.5044	146.5	259.625	149.0	SQR_QSO
1	0.042755	0.002870	10.5636	146.5	260.097	149.0	SQR_QMA
2	0.356132	0.300143	1.9031	138.2	182.555	142.0	SQR_QJF SQR_QND
2	0.308118	0.247954	3.5365	140.1	196.168	143.8	SQR_QJF SQR_QMJ
2	0.267539	0.203846	4.9169	141.5	207.673	145.3	SQR_QJF SQR_QJA
2	0.266459	0.202673	4.9536	141.6	207.979	145.4	SQR_QJF SQR_QMA
3	0.402794	0.321357	2.3157	138.2	177.021	143.3	SQR_QJF SQR_QMA SQR_QND
3	0.399307	0.317394	2.4344	138.4	178.055	143.4	SQR_QJF SQR_QMJ SQR_QND
3	0.391409	0.308420	2.7030	138.7	180.396	143.8	SQR_QJF SQR_QSO SQR_QND
3	0.356305	0.268528	3.8972	140.2	190.801	145.2	SQR_QJF SQR_QJA SQR_QND
4	0.428125	0.319196	3.4541	139.1	177.585	145.4	SQR_QJF SQR_QMJ SQR_QSO SQR_QND
4	0.425708	0.316318	3.5363	139.2	178.335	145.5	SQR_QJF SQR_QMA SQR_QSO SQR_QND
4	0.415816	0.304543	3.8728	139.7	181.407	146.0	SQR_QJF SQR_QMA SQR_QMJ SQR_QND
4	0.406544	0.293505	4.1882	140.1	184.286	146.4	SQR_QJF SQR_QMJ SQR_QJA SQR_QND
5	0.438770	0.298462	5.0919	140.6	182.993	148.2	SQR_QJF SQR_QMA SQR_QMJ SQR_QSO SQR_QND
5	0.431092	0.288865	5.3531	141.0	185.496	148.5	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.425708	0.282135	5.5363	141.2	187.252	148.8	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.421965	0.277457	5.6636	141.4	188.472	148.9	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QND
6	0.441472	0.265095	7.0000	142.5	191.697	151.3	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA	SQR_QMJ	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	SQR_OYST	14.1294	87.6187	-0.95224	.	.	.	.
2	MODEL1	PARMS	SQR_OYST	16.0929	60.5760	.	.	.	-0.40486	.
3	MODEL1	PARMS	SQR_OYST	16.1129	59.7628	.	.	.	.	-0.33254
4	MODEL1	PARMS	SQR_OYST	16.1275	61.8354	.	-0.31644	.	.	.
5	MODEL1	PARMS	SQR_OYST	13.5113	82.3293	-1.33269	.	.	.	.
6	MODEL1	PARMS	SQR_OYST	14.0060	79.4471	-1.08331	.	0.27622	.	.
7	MODEL1	PARMS	SQR_OYST	14.4109	86.7072	-1.00336	.	.	0.10327	.
8	MODEL1	PARMS	SQR_OYST	14.4215	86.5190	-0.98561	0.05988	.	.	.
9	MODEL1	PARMS	SQR_OYST	13.3049	72.1966	-1.73208	0.43133	.	.	.
10	MODEL1	PARMS	SQR_OYST	13.3437	74.1190	-1.46489	.	0.27722	.	.
11	MODEL1	PARMS	SQR_OYST	13.4311	85.7745	-1.30105	.	.	.	-0.36978
12	MODEL1	PARMS	SQR_OYST	13.8131	82.1034	-1.34494	.	.	0.02862	.
13	MODEL1	PARMS	SQR_OYST	13.3261	77.8536	-1.42638	.	0.25669	.	-0.33559
14	MODEL1	PARMS	SQR_OYST	13.3542	76.3203	-1.65488	0.37595	.	.	-0.30298
15	MODEL1	PARMS	SQR_OYST	13.4687	70.1109	-1.69238	0.29753	0.17655	.	.
16	MODEL1	PARMS	SQR_OYST	13.5752	74.1259	-1.40308	.	0.33166	-0.20521	.
17	MODEL1	PARMS	SQR_OYST	13.5275	74.2351	-1.61504	0.24189	0.17682	.	-0.30324
18	MODEL1	PARMS	SQR_OYST	13.6197	77.6315	-1.38844	.	0.29341	-0.13374	-0.31522
19	MODEL1	PARMS	SQR_OYST	13.6840	76.3236	-1.65450	0.37626	.	-0.00161	-0.30274
20	MODEL1	PARMS	SQR_OYST	13.7285	70.2463	-1.62801	0.28796	0.23004	-0.18942	.
21	MODEL1	PARMS	SQR_OYST	13.8455	74.0673	-1.57652	0.23894	0.21286	-0.12767	-0.28420

OBS	SQR_QND	SQR_OYST	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	199.641	0.26525	0.23464	2.9946	139.628	142.145
2	.	-1	1	2	24	258.981	0.04686	0.00715	10.4238	146.395	148.911
3	.	-1	1	2	24	259.625	0.04449	0.00468	10.5044	146.459	148.975
4	.	-1	1	2	24	260.097	0.04276	0.00287	10.5636	146.506	149.023
5	0.54115	-1	2	3	23	182.555	0.35613	0.30014	1.9031	138.196	141.970
6	.	-1	2	3	23	196.168	0.30812	0.24795	3.5365	140.066	143.840
7	.	-1	2	3	23	207.673	0.26754	0.20385	4.9169	141.547	145.322
8	.	-1	2	3	23	207.979	0.26646	0.20267	4.9536	141.586	145.360
9	0.76732	-1	3	4	22	177.021	0.40279	0.32136	2.3157	138.240	143.272
10	0.54208	-1	3	4	22	178.055	0.39931	0.31739	2.4344	138.391	143.423
11	0.73409	-1	3	4	22	180.396	0.39141	0.30842	2.7030	138.731	143.763
12	0.53841	-1	3	4	22	190.801	0.35630	0.26853	3.8972	140.189	145.221
13	0.71711	-1	4	5	21	177.585	0.42812	0.31920	3.4541	139.113	145.403
14	0.89636	-1	4	5	21	178.335	0.42571	0.31632	3.5363	139.222	145.513
15	0.69775	-1	4	5	21	181.407	0.41582	0.30454	3.8728	139.666	145.957
16	0.56190	-1	4	5	21	184.286	0.40654	0.29350	4.1882	140.076	146.366
17	0.82680	-1	5	6	20	182.993	0.43877	0.29846	5.0919	140.624	148.173
18	0.71940	-1	5	6	20	185.496	0.43109	0.28887	5.3531	140.977	148.526
19	0.89655	-1	5	6	20	187.252	0.42571	0.28214	5.5363	141.222	148.771
20	0.71104	-1	5	6	20	188.472	0.42197	0.27746	5.6636	141.391	148.940
21	0.82765	-1	6	7	19	191.697	0.44147	0.26510	7.0000	142.499	151.305

Untransformed and Logged Inflows

N = 26 Regression Models for Dependent Variable: OYSTER

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.220733	0.188264	1.1908	376.9	1837778	379.5	QJF_LAG
1	0.048586	0.008943	6.3138	382.1	2243761	384.7	LN_QSO
1	0.026913	-.013633	6.9588	382.7	2294873	385.2	LN_QJA
1	0.018617	-.022274	7.2057	382.9	2314437	385.5	LN_QMA
2	0.283735	0.221451	1.3159	376.8	1762642	380.5	QJF_LAG LN_QND
2	0.252134	0.187103	2.2563	377.9	1840407	381.6	QJF_LAG QMJ_LAG
2	0.229727	0.162747	2.9231	378.6	1895549	382.4	QJF_LAG LN_QJA
2	0.229382	0.162372	2.9334	378.7	1896398	382.4	QJF_LAG LN_QMA
3	0.337873	0.247583	1.7047	376.7	1703478	381.7	QJF_LAG LN_QMA LN_QND
3	0.319245	0.226415	2.2591	377.4	1751403	382.5	QJF_LAG LN_QSO LN_QND
3	0.315169	0.221783	2.3804	377.6	1761889	382.6	QJF_LAG QMJ_LAG LN_QND
3	0.287046	0.189825	3.2173	378.6	1834243	383.7	QJF_LAG LN_QJA LN_QND
4	0.356852	0.234348	3.1399	378.0	1733442	384.2	QJF_LAG LN_QMA LN_QSO LN_QND
4	0.344143	0.219218	3.5181	378.5	1767697	384.8	QJF_LAG QMJ_LAG LN_QSO LN_QND
4	0.342271	0.216990	3.5738	378.5	1772742	384.8	QJF_LAG LN_QMA QMJ_LAG LN_QND
4	0.338004	0.211909	3.7008	378.7	1784244	385.0	QJF_LAG LN_QMA LN_QJA LN_QND
5	0.361541	0.201926	5.0004	379.8	1806846	387.3	QJF_LAG LN_QMA QMJ_LAG LN_QSO LN_QND
5	0.357543	0.196929	5.1193	379.9	1818160	387.5	QJF_LAG LN_QMA LN_QJA LN_QSO LN_QND
5	0.344276	0.180345	5.5142	380.5	1855705	388.0	QJF_LAG QMJ_LAG LN_QJA LN_QSO LN_QND
5	0.344134	0.180167	5.5184	380.5	1856109	388.0	QJF_LAG LN_QMA QMJ_LAG LN_QJA LN_QND
6	0.361553	0.159938	7.0000	381.8	1901907	390.6	QJF_LAG LN_QMA QMJ_LAG LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	QJF_LAG	LN_QMA	QMJ_LAG	LN_QJA	LN_QSO
1	MODEL1	PARMS	OYSTER	1355.65	4362.54	-0.99686	.	.	.	.
2	MODEL1	PARMS	OYSTER	1497.92	6218.25	.	.	.	.	-520.077
3	MODEL1	PARMS	OYSTER	1514.88	5293.16	.	.	.	-399.834	.
4	MODEL1	PARMS	OYSTER	1521.33	5452.14	.	-382.402	.	.	.
5	MODEL1	PARMS	OYSTER	1327.65	-1018.48	-1.36761	.	.	.	.
6	MODEL1	PARMS	OYSTER	1356.62	3950.35	-1.09191	.	0.22625	.	.
7	MODEL1	PARMS	OYSTER	1376.79	2775.59	-1.11982	.	.	270.874	.
8	MODEL1	PARMS	OYSTER	1377.10	2373.78	-1.10067	294.504	.	.	.
9	MODEL1	PARMS	OYSTER	1305.17	-9154.79	-1.83487	827.447	.	.	.
10	MODEL1	PARMS	OYSTER	1323.41	205.22	-1.33153	.	.	.	-550.661
11	MODEL1	PARMS	OYSTER	1327.36	-1432.32	-1.46280	.	0.22637	.	.
12	MODEL1	PARMS	OYSTER	1354.34	-1803.93	-1.43008	.	.	166.275	.
13	MODEL1	PARMS	OYSTER	1316.60	-7073.63	-1.74107	709.382	.	.	-414.098
14	MODEL1	PARMS	OYSTER	1329.55	-277.06	-1.42005	.	0.20266	.	-500.354
15	MODEL1	PARMS	OYSTER	1331.44	-7930.59	-1.79580	684.541	0.09900	.	.
16	MODEL1	PARMS	OYSTER	1335.76	-9114.63	-1.82895	839.955	.	-34.540	.
17	MODEL1	PARMS	OYSTER	1344.19	-5793.40	-1.70000	560.902	0.10223	.	-417.304
18	MODEL1	PARMS	OYSTER	1348.39	-7059.61	-1.75023	673.295	.	82.438	-435.962
19	MODEL1	PARMS	OYSTER	1362.24	-427.45	-1.43055	.	0.19350	39.843	-509.837
20	MODEL1	PARMS	OYSTER	1362.39	-7396.25	-1.75948	693.696	0.12871	-143.667	.
21	MODEL1	PARMS	OYSTER	1379.10	-5764.14	-1.69764	562.618	0.10473	-12.220	-414.142

OBS	LN_QND	OYSTER	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	24	1837777.70	0.22073	0.18826	1.19076	376.945	379.461
2	.	-1	1	2	24	2243760.84	0.04859	0.00894	6.31383	382.134	384.650
3	.	-1	1	2	24	2294873.47	0.02691	-0.01363	6.95882	382.720	385.236
4	.	-1	1	2	24	2314436.87	0.01862	-0.02227	7.20568	382.940	385.457
5	833.97	-1	2	3	23	1762641.92	0.28373	0.22145	1.31585	376.753	380.527
6	.	-1	2	3	23	1840406.76	0.25213	0.18710	2.25627	377.875	381.650
7	.	-1	2	3	23	1895548.81	0.22973	0.16275	2.92311	378.643	382.417
8	.	-1	2	3	23	1896398.18	0.22938	0.16237	2.93339	378.654	382.429
9	1228.96	-1	3	4	22	1703477.99	0.33787	0.24758	1.70471	376.709	381.742
10	1181.00	-1	3	4	22	1751402.80	0.31925	0.22642	2.25907	377.431	382.463
11	834.19	-1	3	4	22	1761889.30	0.31517	0.22178	2.38037	377.586	382.618
12	804.72	-1	3	4	22	1834242.70	0.28705	0.18983	3.21731	378.632	383.665
13	1433.57	-1	4	5	21	1733442.36	0.35685	0.23435	3.13989	377.953	384.244
14	1149.50	-1	4	5	21	1767697.44	0.34414	0.21922	3.51812	378.462	384.752
15	1160.84	-1	4	5	21	1772742.18	0.34227	0.21699	3.57382	378.536	384.827
16	1241.01	-1	4	5	21	1784244.22	0.33800	0.21191	3.70082	378.704	384.995
17	1364.81	-1	5	6	20	1806846.28	0.36154	0.20193	5.00037	379.763	387.312
18	1415.63	-1	5	6	20	1818160.08	0.35754	0.19693	5.11934	379.925	387.474
19	1148.46	-1	5	6	20	1855705.37	0.34428	0.18035	5.51416	380.457	388.005
20	1190.51	-1	5	6	20	1856109.00	0.34413	0.18017	5.51840	380.462	388.011
21	1365.79	-1	6	7	19	1901906.61	0.36155	0.15994	7.00000	381.762	390.569

Regression -Untransformed Data

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows[c,d]	.	.610	.372	.174	1367.72	1.729

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows[c,d]	.	.610	.372	.174	1367.72	1.729

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), November-December Inflows, March-April Inflows, July-August Inflows, May-June Inflows, September-October Inflows, January-February Inflows

d. All requested variables entered.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3762.032	898.020		4.189	.000	1882.455	5641.610
	January-February Inflows	-1.637	.646	-.772	-2.533	.020	-2.990	-.284
	March-April Inflows	.236	.474	.141	.499	.623	-.755	1.228
	May-June Inflows	5.5E-02	.290	.044	.190	.852	-.552	.662
	July-August Inflows	.508	.608	.180	.835	.414	-.766	1.781
	September-October Inflows	-.429	.503	-.203	-.853	.404	-1.483	.624
	November-December Inflows	.748	.455	.458	1.644	.117	-.204	1.700

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	3762.032283	898.02008478	4.189	0.0005	0.00000000
QJF_LAG	1	-1.637196	0.64634877	-2.533	0.0203	2.80771323
QMA_LAG	1	0.236465	0.47384835	0.499	0.6235	2.40646961
QMJ_LAG	1	0.054978	0.28987910	0.190	0.8516	1.65932002
QJA_LAG	1	0.507883	0.60849194	0.835	0.4143	1.40502695
QSO_LAG	1	-0.429280	0.50326444	-0.853	0.4043	1.70957076
QND_LAG	1	0.747943	0.45495372	1.644	0.1166	2.34574136

Number	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop QMA_LAG	Var Prop QMJ_LAG	Var Prop QJA_LAG	Var Prop QSO_LAG	Var Prop QND_LAG
1	2.51838	1.00000	0.0401	0.0098	0.0268	0.0526	0.0377	0.0332
2	1.59734	1.25563	0.0000	0.1033	0.0802	0.0078	0.0725	0.0467
3	0.70621	1.88839	0.1165	0.1314	0.1432	0.3558	0.0158	0.0035
4	0.59010	2.06584	0.0342	0.0003	0.4207	0.5056	0.0307	0.0584
5	0.41533	2.46244	0.0536	0.0099	0.0037	0.0148	0.8214	0.3420
6	0.17264	3.81934	0.7556	0.7452	0.3253	0.0634	0.0219	0.5163

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	930.0552	4080.625	2636.40	917.7718	26
Std. Predicted Value	-1.859	1.574	.000	1.000	26
Standard Error of Predicted Value	507.1635	910.9368	697.9301	131.1295	26
Adjusted Predicted Value	685.5081	5384.494	2631.23	1095.994	26
Residual	-1905.72	3376.760	-3.E-13	1192.352	26
Std. Residual	-1.393	2.469	.000	.872	26
Stud. Residual	-1.808	3.192	.002	1.063	26
Deleted Residual	-3209.59	5644.624	5.1773	1789.533	26
Stud. Deleted Residual	-1.934	4.562	.050	1.260	26
Mahal. Distance	2.476	10.128	5.769	2.452	26
Cook's Distance	.000	.978	.080	.196	26
Centered Leverage Value	.099	.405	.231	.098	26

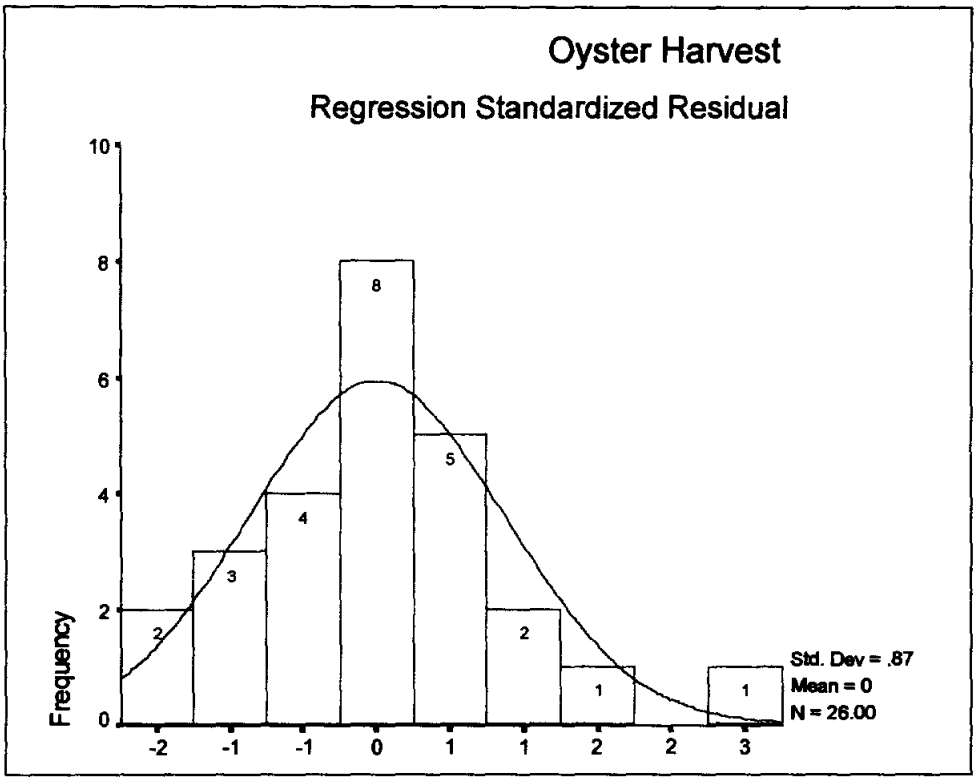
a. Dependent Variable: Oyster Harvest

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	991.04213	-241.14213	-361.47762	1111.37762	-1.79278	-.17631	-.21586	-.21036
1963	3081.46965	-950.16965	-1187.95349	3319.25349	.48494	-.69471	-.77679	-.76837
1964	2866.52947	54.27053	67.46793	2853.33207	.25074	.03968	.04424	.04306
1965	2778.05060	1805.24940	2183.40429	2399.89571	.15434	1.31990	1.45157	1.49838
1966	2584.35772	1498.94228	2133.63223	1949.66777	-.05671	1.09594	1.30754	1.33410
1967	3128.06973	-135.46973	-163.80851	3156.40851	.53572	-.09905	-.10892	-.10604
1968	3031.83141	-193.13141	-227.06070	3065.76070	.43086	-.14121	-.15311	-.14912
1969	2604.86133	842.33867	1320.20534	2126.99466	-.03437	.61587	.77102	.76248
1970	3348.64394	501.55606	762.26035	3087.93965	.77605	.36671	.45208	.44241
1971	3590.43829	431.26171	612.78039	3408.91961	1.03951	.31531	.37586	.36720
1972	2825.79003	416.80997	488.16151	2754.43849	.20635	.30475	.32980	.32193
1973	2744.04488	-1040.74488	-1247.31896	2950.61896	.11729	-.76093	-.83303	-.82604
1974	1002.62259	-165.92259	-244.58930	1081.28930	-1.78016	-.12131	-.14729	-.14344
1975	930.05521	306.74479	551.29195	685.50805	-1.85923	.22427	.30066	.29334
1976	3598.61784	-299.71784	-361.22231	3660.12231	1.04842	-.21914	-.24057	-.23451
1977	3421.82859	-1504.32859	-1765.62190	3683.12190	.85580	-1.09988	-1.19158	-1.20572
1978	1967.28038	-890.48038	-1152.13026	2228.93026	-.72907	-.65107	-.74057	-.73145
1979	1767.45479	-1724.35479	-2649.92722	2693.02722	-.94680	-1.26075	-1.56290	-1.62957
1980	1228.47074	-224.27074	-324.30001	1328.50001	-1.53408	-.16397	-.19718	-.19212
1981	2174.39935	-1188.99935	-1870.88027	2856.28027	-.50340	-.86933	-1.09048	-1.09625
1982	4013.99767	-760.19767	-1286.91699	4540.71699	1.50102	-.55581	-.72317	-.71377
1983	3590.34026	3376.75974	5644.62346	1322.47654	1.03940	2.46889	**3.19205**	**4.56245**
1984	2781.87098	-421.67098	-566.97475	2927.17475	.15850	-.30830	-.35750	-.34914
1985	1755.89940	1529.20060	1966.56969	1318.53031	-.95939	1.11806	1.26791	1.28987
1986	2657.90844	883.19156	1023.98939	2517.11061	.02343	.64574	.69531	.68554
1987	4080.62457	-1905.72457	-3209.59416	5384.49416	1.57362	-1.39336	-1.80825	-1.93431

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$



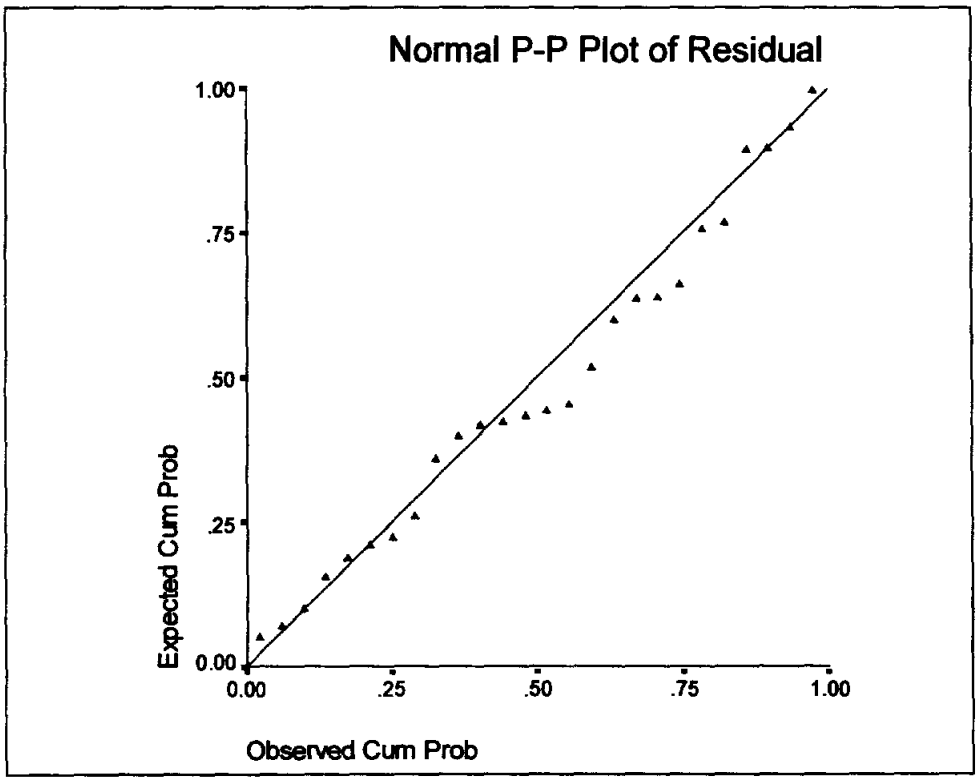


Fig. 3.1. Exploratory Plots of Oyster Harvest Standardized Residual.

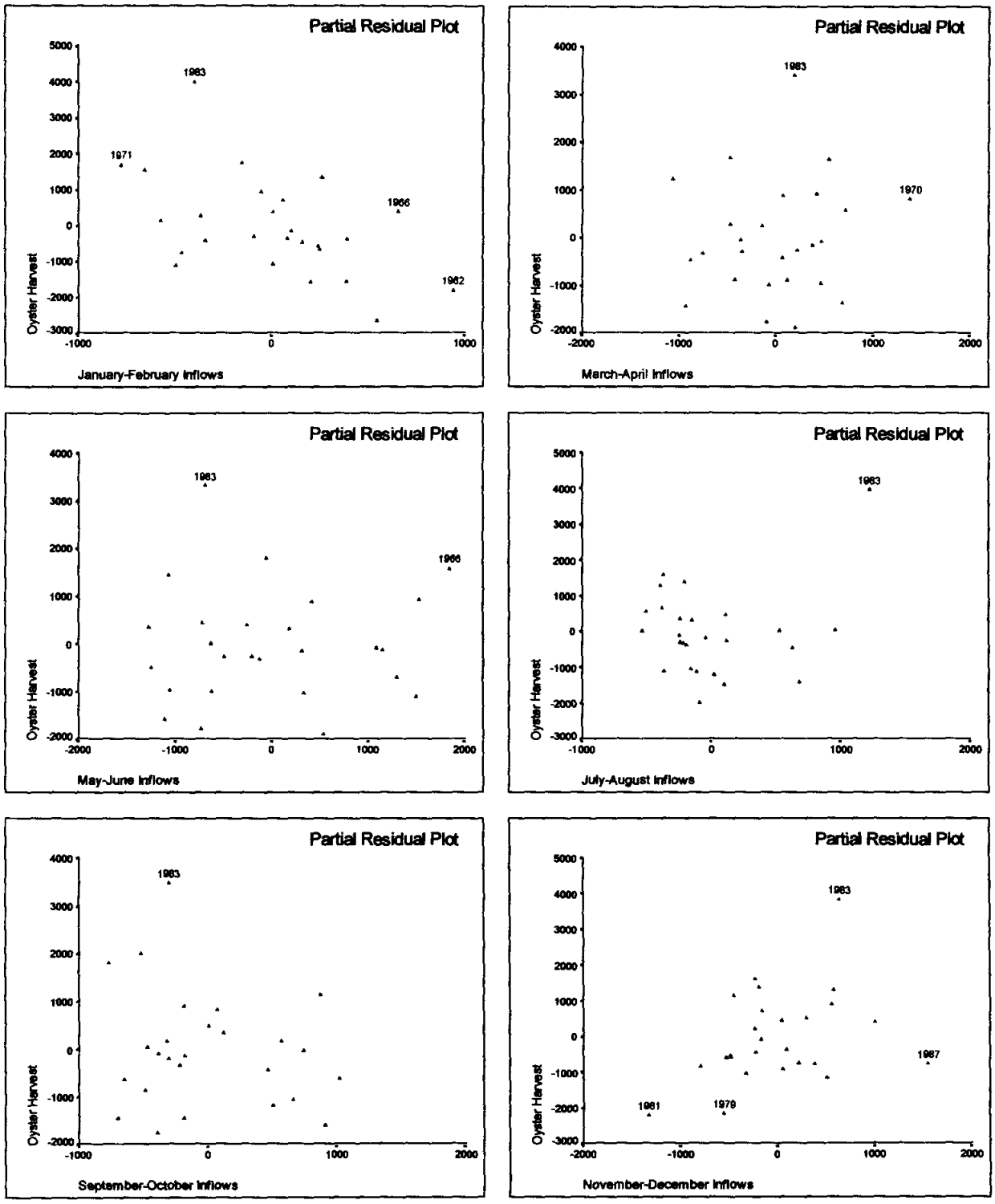


Fig. 3.2. Partial Residual Plots of Oyster Harvest vs. Inflows

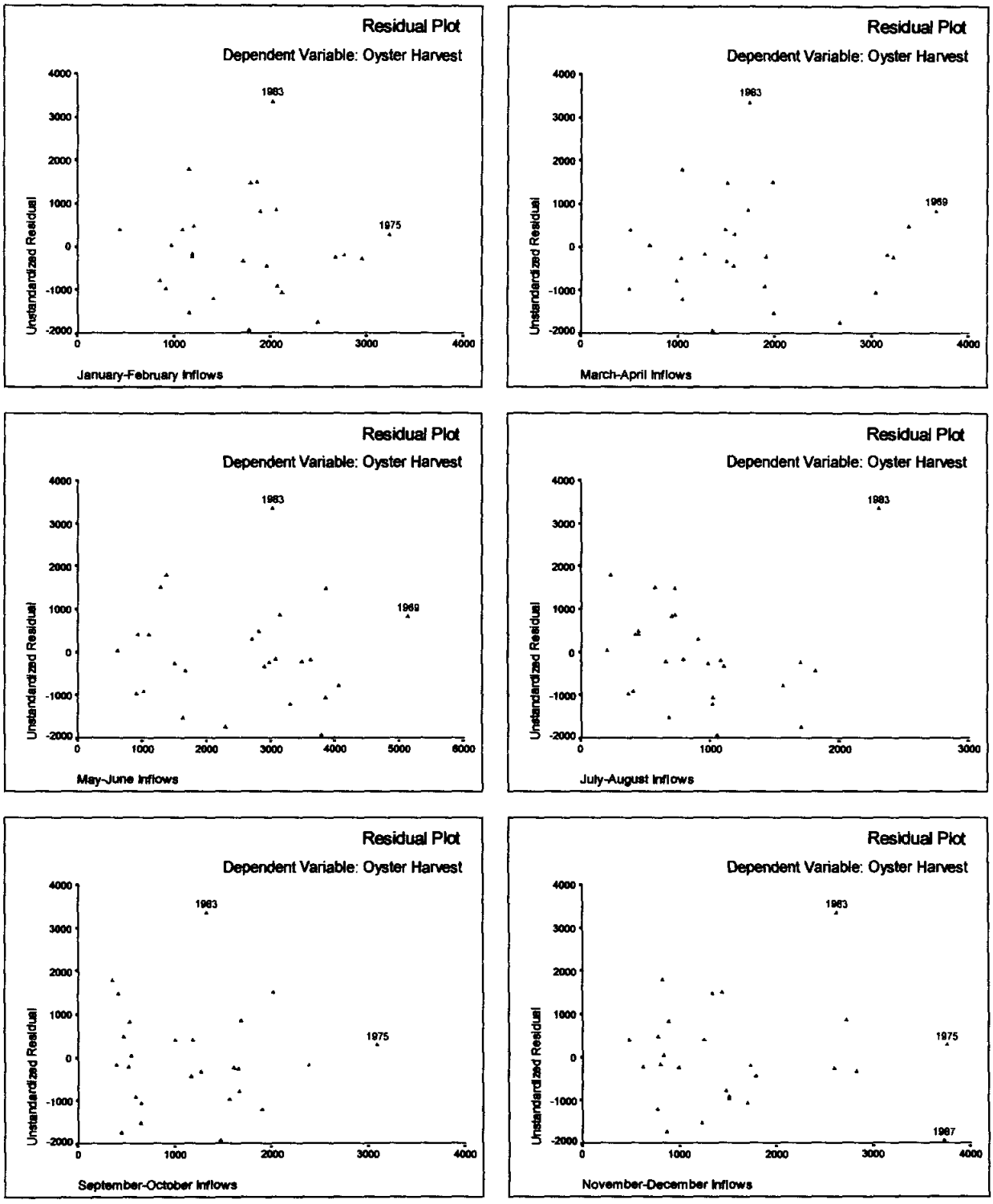


Fig. 3.3. Residual Plots of Oyster Harvest vs. Inflows

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3526.52156	5508.60582
1963	2131.30	-1205.25638	7368.19567
1964	2920.80	-1412.05853	7145.11748
1965	4583.30	-1460.24070	7016.34190
1966	4083.30	-1872.76118	7041.47663
1967	2992.60	-1109.86819	7366.00765
1968	2838.70	-1163.31024	7226.97305
1969	3447.20	-1961.69147	7171.41414
1970	3850.20	-1184.34157	7881.62945
1971	4021.70	-864.53683	8045.41342
1972	3242.60	-1363.39002	7014.97008
1973	1703.30	-1480.53134	6968.62111
1974	836.70	-3495.80012	5501.04530
1975	1236.80	-3771.34798	5631.45839
1976	3298.90	-634.38233	7831.61800
1977	1917.50	-770.68638	7614.34356
1978	1076.80	-2367.28774	6301.84850
1979	43.10	-2777.78795	6312.69753
1980	1004.20	-3247.46354	5704.40502
1981	985.40	-2396.35396	6745.15265
1982	3253.80	-631.21412	8659.20946
1983	6967.10	-1042.47206	8223.15258
1984	2360.20	-1603.92826	7167.67023
1985	3285.10	-2570.36160	6082.16039
1986	3541.10	-1515.40741	6831.22429
1987	2174.90	-559.56372	8720.81286

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	7.36093	.00332	.29444	.392	.000
1963	4.04253	.02157	.16170	.775	.000
1964	3.92871	.00007	.15715	.788	.000
1965	3.36834	.06305	.13473	.849	.001
1966	6.47519	.10342	.25901	.485	.003
1967	3.36345	.00035	.13454	.849	.000
1968	2.77417	.00059	.11097	.905	.000
1969	8.08756	.04818	.32350	.325	.000
1970	7.58883	.01518	.30355	.370	.000
1971	6.44400	.00849	.25776	.489	.000
1972	2.69256	.00266	.10770	.912	.000
1973	3.17882	.01968	.12715	.868	.000
1974	7.07916	.00147	.28317	.421	.000
1975	10.12819	.01030	.40513	.181	.000
1976	3.29515	.00170	.13181	.856	.000
1977	2.73820	.03523	.10953	.908	.000
1978	4.71599	.02302	.18864	.695	.000
1979	7.77052	.18731	.31082	.353	.015
1980	6.74963	.00248	.26999	.455	.000
1981	8.15023	.09742	.32601	.320	.002
1982	9.27065	.05177	.37083	.234	.000
1983	9.08281	.97759	.36331	.247	**.525**
1984	5.44544	.00629	.21782	.606	.000
1985	4.59851	.06568	.18394	.709	.001
1986	2.47594	.01101	.09904	.929	.000
1987	9.19449	.31959	.36778	.239	.064

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

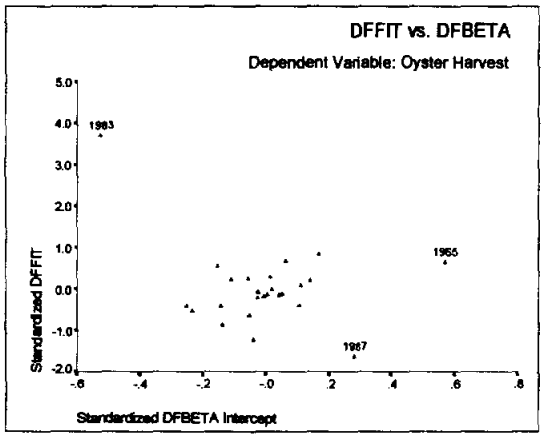
[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

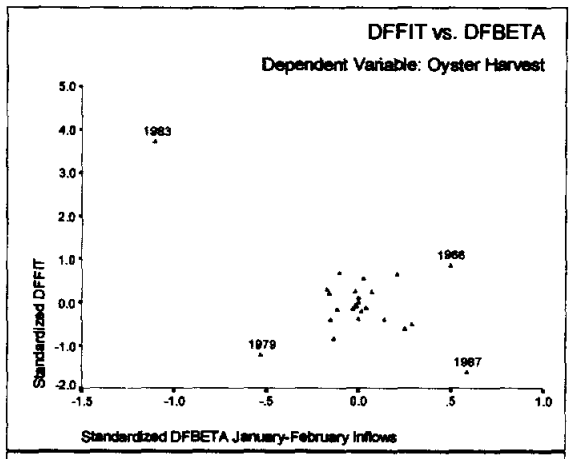
[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

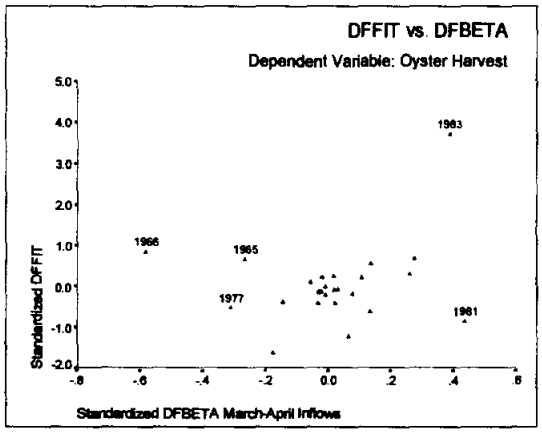
YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.14860	-.00710	-.11514	.07837	.01104	.02154	.03590	.01895
1963	-.38438	-.25177	.13840	.02099	.11326	.05895	-.16023	-.01818
1964	.02124	.01968	.00240	-.00598	-.00639	-.00527	-.00549	-.00256
1965	.68578	.57153	.20680	-.26638	-.01762	-.26853	-.31110	-.11770
1966	.86812	.16755	.49533	-.58144	.62261	-.27569	-.44756	-.23329
1967	-.04850	-.02609	-.01353	.03046	-.02703	.00199	.02008	.01869
1968	-.06250	-.02335	-.00646	.01894	-.03968	.01528	.01036	.02532
1969	.57430	-.15444	.02773	.13959	.31061	-.21251	-.06364	-.04787
1970	.31896	.01361	-.16816	.26234	-.08359	-.05766	.00248	.10248
1971	.23823	.13804	-.16075	.10941	-.11784	.02208	.09233	.00838
1972	.13320	.11096	.00186	-.05619	-.01845	-.02246	.01598	-.02634
1973	-.36802	.10533	-.00419	-.14514	-.06417	.04342	.15935	-.11812
1974	-.09877	.05079	-.01337	-.02847	-.01168	.01853	-.06593	.03025
1975	.26192	-.10999	.07376	-.01845	.01558	-.09319	.10724	.04027
1976	-.10623	.00376	.04416	-.02049	.00643	-.01392	.02818	-.08673
1977	-.50250	-.23203	.28700	-.31062	.30565	-.05883	.08726	-.22503
1978	-.39649	-.14112	-.15396	-.03331	.18522	.13375	.19727	-.06166
1979	**-1.19389**	-.04137	-.52441	.06611	.31129	-.61291	.51785	.36553
1980	-.12830	.04098	-.02744	-.03056	.02406	-.05430	-.03949	.06018
1981	-.83018	-.13653	-.13561	.43938	-.43706	-.01833	-.46403	.60491
1982	-.59414	-.05178	.24938	.13746	-.25697	-.26070	-.22576	.09717
1983	**3.73901**	-.52664	**-1.10219**	.39010	-.85438	**3.21227**	-.64544	**1.26984**
1984	-.20495	-.02789	.01677	-.00927	.10732	-.17248	.03196	-.01347
1985	.68982	.06293	-.10507	.27827	-.32997	-.12978	.47370	-.08814
1986	.27372	-.05818	-.01864	.01938	.06576	-.12491	.02074	.14367
1987	**-1.59997**	.27996	.58570	-.17732	-.28688	.10072	.35567	**-1.30490**

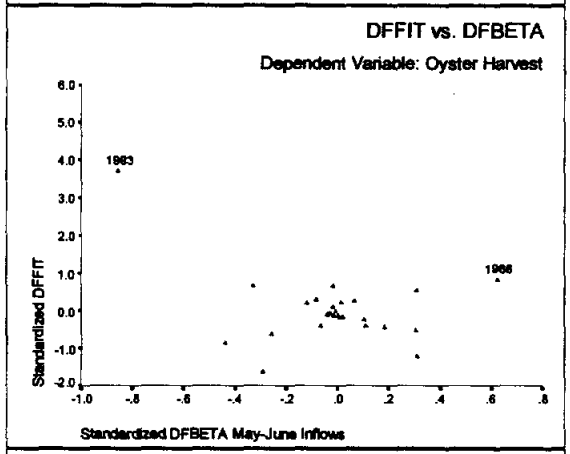
SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the January-February inflows
SDFB_2	Standardized dfbeta for the March-April inflows
SDFB_3	Standardized dfbeta for the May-June inflows
SDFB_4	Standardized dfbeta for the July-August inflows
SDFB_5	Standardized dfbeta for the September-October inflows
SDFB_6	Standardized dfbeta for the November-December inflows

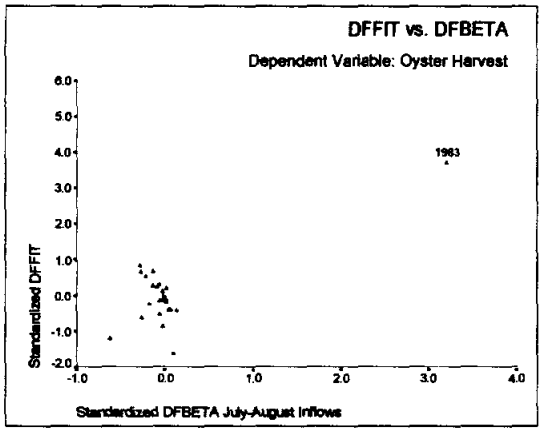
Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

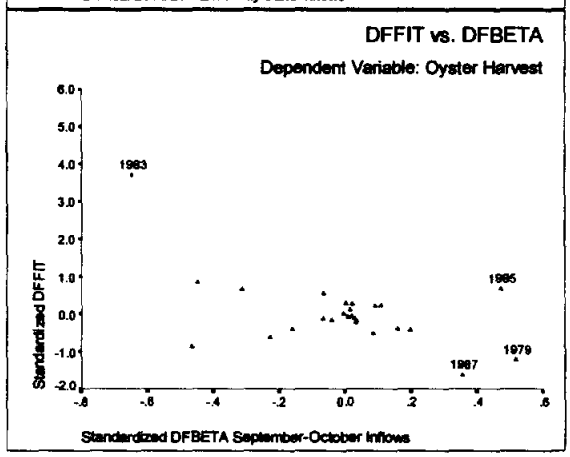












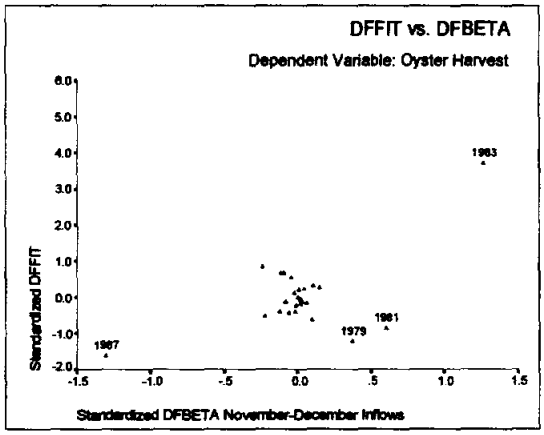


Fig. 3.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Harvest and Logged Inflows
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)[c,d]	.	.586	.343	.135	1399.03	1.696

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.9E+07	6	3235270	1.653	.187[b]
	Residual	3.7E+07	19	1957295		
	Total	5.7E+07	25			

a. Dependent Variable: Oyster Harvest

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	9368.492	6007.651		1.559	.135	-3205.67	21942.6
	Ln (January-February Inflows)	-2527.01	994.815	-.769	-2.540	.020	-4609.19	-444.844
	Ln (March-April Inflows)	363.247	775.988	.130	.468	.645	-1260.91	1987.408
	Ln (May-June Inflows)	495.137	712.524	.188	.695	.496	-996.193	1986.466
	Ln (July-August Inflows)	-97.020	686.557	-.040	-.141	.889	-1534.00	1339.959
	Ln (September-October Inflows)	-701.330	581.245	-.297	-1.207	.242	-1917.89	515.231
	Ln (November-December Inflows)	1504.494	818.955	.552	1.837	.082	-209.598	3218.587

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	9368.491708	6007.6505358	1.559	0.1354	0.00000000
LN_QJF	1	-2527.014954	994.81458499	-2.540	0.0200	2.64836975
LN_QMA	1	363.246987	775.98766906	0.468	0.6450	2.21689358
LN_QMJ	1	495.136789	712.52385629	0.695	0.4955	2.12463263
LN_QJA	1	-97.020017	686.55651251	-0.141	0.8891	2.29461527
LN_QSO	1	-701.329618	581.24528943	-1.207	0.2424	1.75490557
LN_QND	1	1504.494334	818.95495488	1.837	0.0819	2.60822341

Number	Eigenvalue	Condition Index	Var Prop LN_QJF	Var Prop LN_QMA	Var Prop LN_QMJ	Var Prop LN_QJA	Var Prop LN_QSO	Var Prop LN_QND
1	2.83834	1.00000	0.0314	0.0160	0.0295	0.0379	0.0170	0.0208
2	1.58514	1.33813	0.0000	0.0902	0.0390	0.0008	0.1144	0.0557
3	0.66112	2.07202	0.2207	0.0499	0.1333	0.1340	0.0710	0.0392
4	0.43241	2.56204	0.0002	0.2660	0.1818	0.0006	0.5048	0.1721
5	0.30215	3.06493	0.0591	0.0833	0.3867	0.7304	0.1828	0.0575
6	0.18084	3.96169	0.6886	0.4946	0.2297	0.0962	0.1101	0.6547

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	814.8476	3998.415	2636.40	881.1724	26
Std. Predicted Value	-2.067	1.546	.000	1.000	26
Standard Error of Predicted Value	538.7929	1069.926	716.7382	117.3896	26
Adjusted Predicted Value	730.2727	4453.173	2662.42	945.0065	26
Residual	-1588.72	4106.213	8.3E-13	1219.649	26
Std. Residual	-1.136	2.935	.000	.872	26
Stud. Residual	-1.351	3.381	-.007	1.011	26
Deleted Residual	-2450.88	5448.506	-26.0187	1644.783	26
Stud. Deleted Residual	-1.383	5.214	.062	1.287	26
Mahal. Distance	2.746	13.660	5.769	2.355	26
Cook's Distance	.000	.534	.050	.106	26
Centered Leverage Value	.110	.546	.231	.094	26

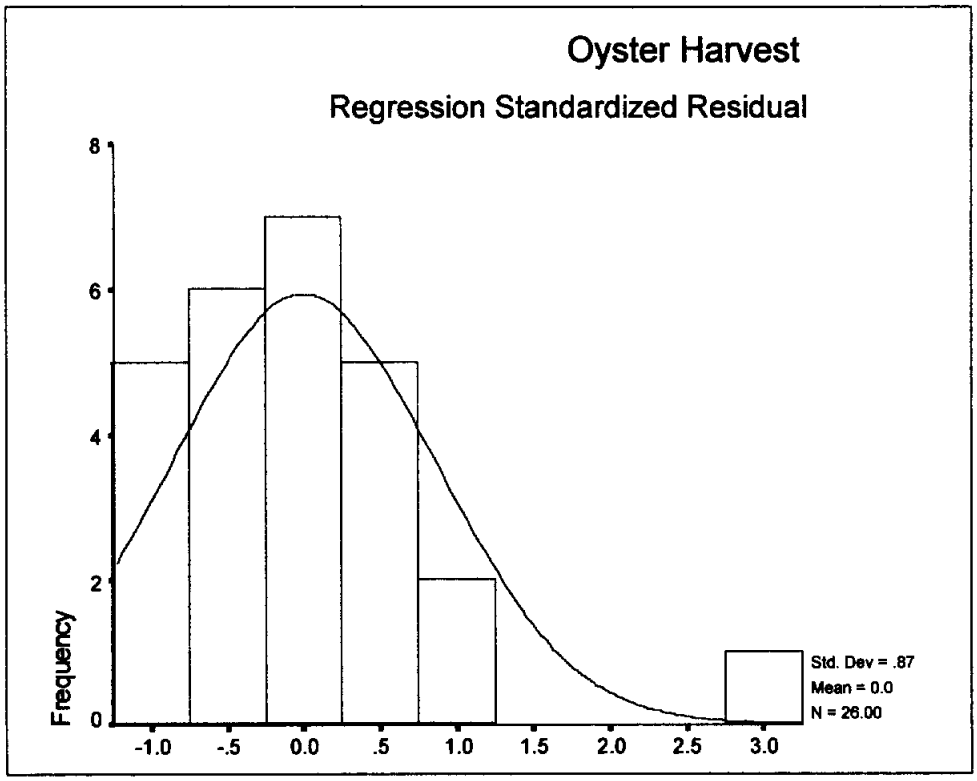
a. Dependent Variable: Oyster Harvest

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	1287.65734	-537.75734	-710.15205	1460.05205	-1.53063	-.38438	-.44171	-.43216
1963	3060.70536	-929.40536	-1240.22247	3371.52247	.48152	-.66432	-.76740	-.75879
1964	2736.06977	184.73023	261.27333	2659.52667	.11311	.13204	.15703	.15294
1965	3123.86033	1459.43967	1972.59224	2610.70776	.55319	1.04318	1.21278	1.22896
1966	3133.45983	949.84017	1229.15573	2854.14427	.56408	.67893	.77233	.76381
1967	3282.52428	-289.92428	-369.02899	3361.62899	.73325	-.20723	-.23380	-.22789
1968	2926.33726	-87.63726	-107.07512	2945.77512	.32903	-.06264	-.06924	-.06740
1969	2683.76108	763.43892	1018.49896	2428.70104	.05374	.54569	.63029	.61999
1970	3430.12539	420.07461	566.96426	3283.23574	.90076	.30026	.34883	.34062
1971	3900.28312	121.41688	292.47120	3729.22880	1.43432	.08679	.13470	.13117
1972	2630.34799	612.25201	797.46421	2445.13579	-.00687	.43763	.49945	.48935
1973	2997.61423	-1294.31423	-1519.71155	3223.01155	.40992	-.92515	-1.00247	-1.00261
1974	1417.25957	-580.55957	-790.24490	1626.94490	-1.38355	-.41497	-.48415	-.47417
1975	1622.87722	-386.07722	-538.04168	1774.84168	-1.15020	-.27596	-.32577	-.31797
1976	3416.53456	-117.63456	-139.62739	3438.52739	.88533	-.08408	-.09161	-.08918
1977	3506.22375	-1588.72375	-1924.61438	3842.11438	.98712	-1.13559	-1.24988	-1.26987
1978	2212.67200	-1135.87200	-1541.52937	2618.32937	-.48087	-.81190	-.94583	-.94307
1979	1501.09420	-1457.99420	-2450.87718	2493.97718	-1.28841	-1.04214	-1.35117	-1.38327
1980	814.84758	189.35242	273.92727	730.27273	-2.06720	.13535	.16279	.15856
1981	1643.27719	-657.87719	-1157.05735	2142.45735	-1.12705	-.47024	-.62362	-.61330
1982	3998.41461	-744.61461	-1199.37345	4453.17345	1.54568	-.53224	-.67548	-.66551
1983	2860.88716	4106.21284	5448.50656	1518.59344	.25476	2.93504	**3.38089**	**5.21353**
1984	2150.84371	209.35629	286.43575	2073.76425	-.55104	.14964	.17504	.17051
1985	1635.92983	1649.17017	2150.26817	1134.83183	-1.13539	1.17879	1.34602	1.37744
1986	2829.65670	711.44330	858.04673	2683.05327	.21931	.50852	.55847	.54809
1987	3743.23593	-1568.33593	-2144.53491	4319.43491	1.25609	-1.12101	-1.31087	-1.33783

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$



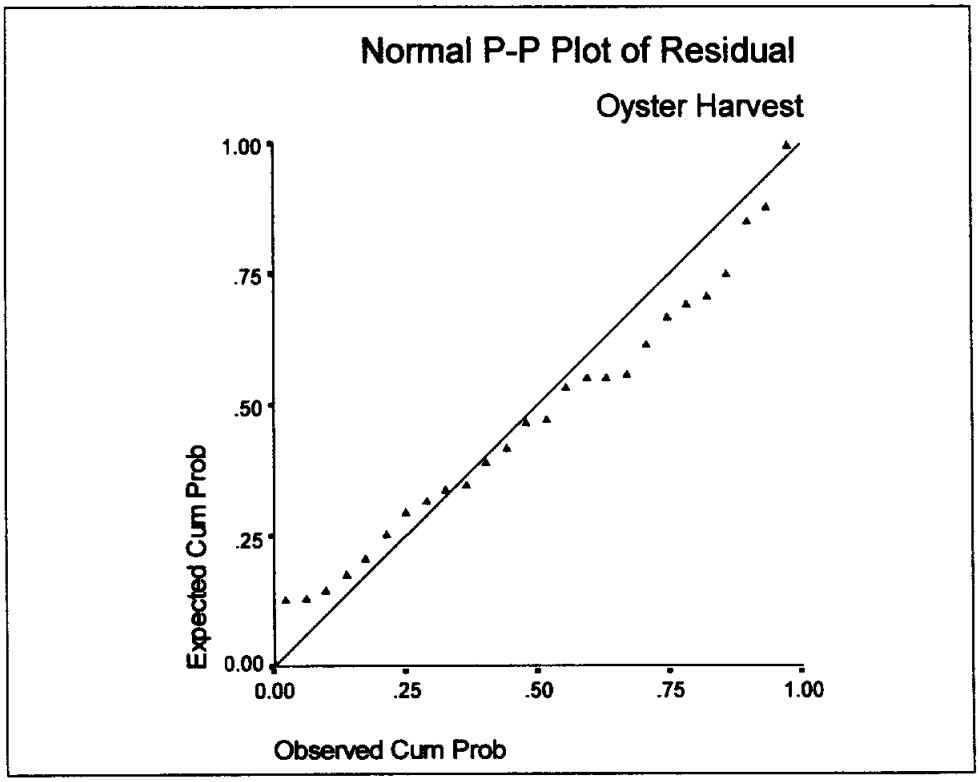


Fig. 4.1. Exploratory Plots of Oyster Harvest Standardized Residual.

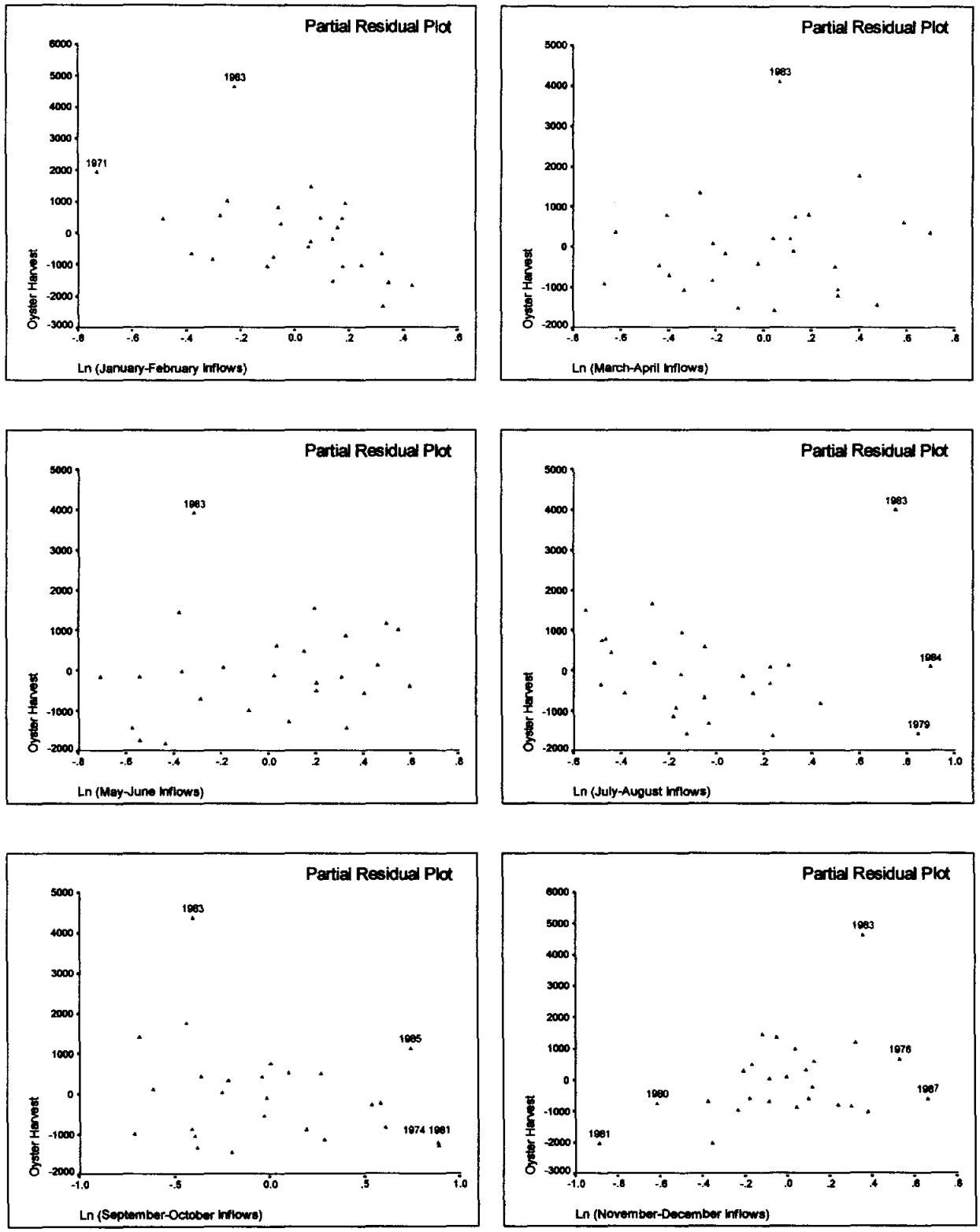


Fig. 4.2. Partial Residual Plots of Oyster Harvest vs. Logged Inflows

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3174.33904	5749.65372
1963	2131.30	-1415.37285	7536.78357
1964	2920.80	-1815.16116	7287.30071
1965	4583.30	-1369.23502	7616.95568
1966	4083.30	-1300.59535	7567.51501
1967	2992.60	-1128.19667	7693.24523
1968	2838.70	-1424.36422	7277.03874
1969	3447.20	-1791.98319	7159.50534
1970	3850.20	-1061.07935	7921.33013
1971	4021.70	-1138.56533	8939.13158
1972	3242.60	-1812.74794	7073.44392
1973	1703.30	-1291.49104	7286.71949
1974	836.70	-3085.09840	5919.61754
1975	1236.80	-2909.79740	6155.55183
1976	3298.90	-889.70864	7722.77777
1977	1917.50	-831.55001	7843.99752
1978	1076.80	-2285.78863	6711.13263
1979	43.10	-3243.41943	6245.60783
1980	1004.20	-3764.08506	5393.78022
1981	985.40	-3145.44773	6432.00210
1982	3253.80	-702.08399	8698.91322
1983	6967.10	-1607.57170	7329.34602
1984	2360.20	-2358.19231	6659.87973
1985	3285.10	-2808.58712	6080.44678
1986	3541.10	-1501.34129	7160.65469
1987	2174.90	-765.06084	8251.53270

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	5.10740	.00894	.20430	.647	.000
1963	5.30381	.02814	.21215	.623	.000
1964	6.36251	.00146	.25450	.498	.000
1965	5.54199	.07388	.22168	.594	.001
1966	4.71951	.02506	.18878	.694	.000
1967	4.39744	.00213	.17590	.733	.000
1968	3.57683	.00015	.14307	.827	.000
1969	5.29915	.01896	.21197	.624	.000
1970	5.51549	.00608	.22062	.597	.000
1971	13.65993	.00365	**.54640**	.058	.000
1972	4.84475	.01078	.19379	.679	.000
1973	2.74636	.02500	.10985	.907	.000
1974	5.67202	.01209	.22688	.579	.000
1975	6.09946	.00597	.24398	.528	.000
1976	2.97623	.00022	.11905	.887	.000
1977	3.40155	.04718	.13606	.846	.000
1978	5.61728	.04564	.22469	.585	.000
1979	9.16629	.17761	.36665	.241	.013
1980	6.75719	.00169	.27029	.455	.000
1981	9.82402	.04216	.39296	.199	.000
1982	8.51755	.03981	.34070	.289	.000
1983	5.19746	.53379	.20790	.636	.202
1984	5.76593	.00161	.23064	.567	.000
1985	4.86446	.07864	.19458	.677	.001
1986	3.30989	.00918	.13240	.855	.000
1987	5.75552	.09019	.23022	.569	.002

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.24469	.01391	-.15326	.10864	.07237	-.03765	.00557	.02436
1963	-.43880	-.21648	.04883	.16149	.03670	.07212	-.10502	-.02319
1964	.09845	.06787	.01802	-.02131	-.03373	-.02301	-.01626	-.00895
1965	.72873	.34830	.19130	-.20937	.14493	-.38245	-.25706	-.04109
1966	.41420	.04408	.10934	-.19360	.22202	-.05948	-.24553	.02066
1967	-.11904	-.06000	-.00951	.06200	-.04062	-.02882	.06525	.02626
1968	-.03174	-.00734	-.00318	.00657	-.01753	.00535	.00043	.01622
1969	.35836	-.12044	.04970	.07700	.20086	-.16250	.00141	-.06919
1970	.20142	-.02283	-.06949	.12973	.03084	-.08533	-.00660	.02920
1971	.15569	.05898	-.10541	.07885	-.05602	.02266	.04591	-.00018
1972	.26915	.16141	.06365	-.19222	.01002	-.01290	.02360	-.06735
1973	-.41840	.18059	.07783	-.18957	-.04890	.01686	.17794	-.19464
1974	-.28497	.20315	-.06948	-.09245	-.05799	.10448	-.20366	.07510
1975	-.19949	.13076	-.06563	.00430	-.03924	.08897	-.09557	-.02658
1976	-.03856	.01049	.01901	-.00676	-.00119	-.00533	.01010	-.03018
1977	-.58389	-.11664	.37879	-.37121	.30893	-.16417	.22009	-.31402
1978	-.56359	-.03078	-.11192	-.19109	.32094	.09731	.18728	-.15522
1979	**-1.14151**	-.20813	-.41791	.10334	.49392	-.74583	.53032	.37081
1980	.10597	-.03117	.04351	.01185	-.01836	.02854	.04659	-.06846
1981	-.53423	-.05015	-.20193	.30051	-.24813	.01987	-.30150	.42247
1982	-.52009	-.06684	.29154	.10017	-.17430	-.18150	-.06798	-.04994
1983	**2.98082**	-.40254	-.95598	.22800	-.94847	**2.22481**	**-1.00514**	**1.27237**
1984	.10346	.01410	-.00701	.00464	-.07180	.08795	-.02971	.01062
1985	.75928	-.19810	.07117	.35060	-.29806	-.20542	.48445	-.10409
1986	.24880	-.14823	-.02646	.04564	.10040	-.14134	.06893	.11388
1987	-.81090	.28953	.33875	-.03869	-.26440	.09584	.13010	-.60714

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the logged January-February inflows
SDFB_2	Standardized dfbeta for the logged March-April inflows
SDFB_3	Standardized dfbeta for the logged May-June inflows
SDFB_4	Standardized dfbeta for the logged July-August inflows
SDFB_5	Standardized dfbeta for the logged September-October inflows
SDFB_6	Standardized dfbeta for the logged November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

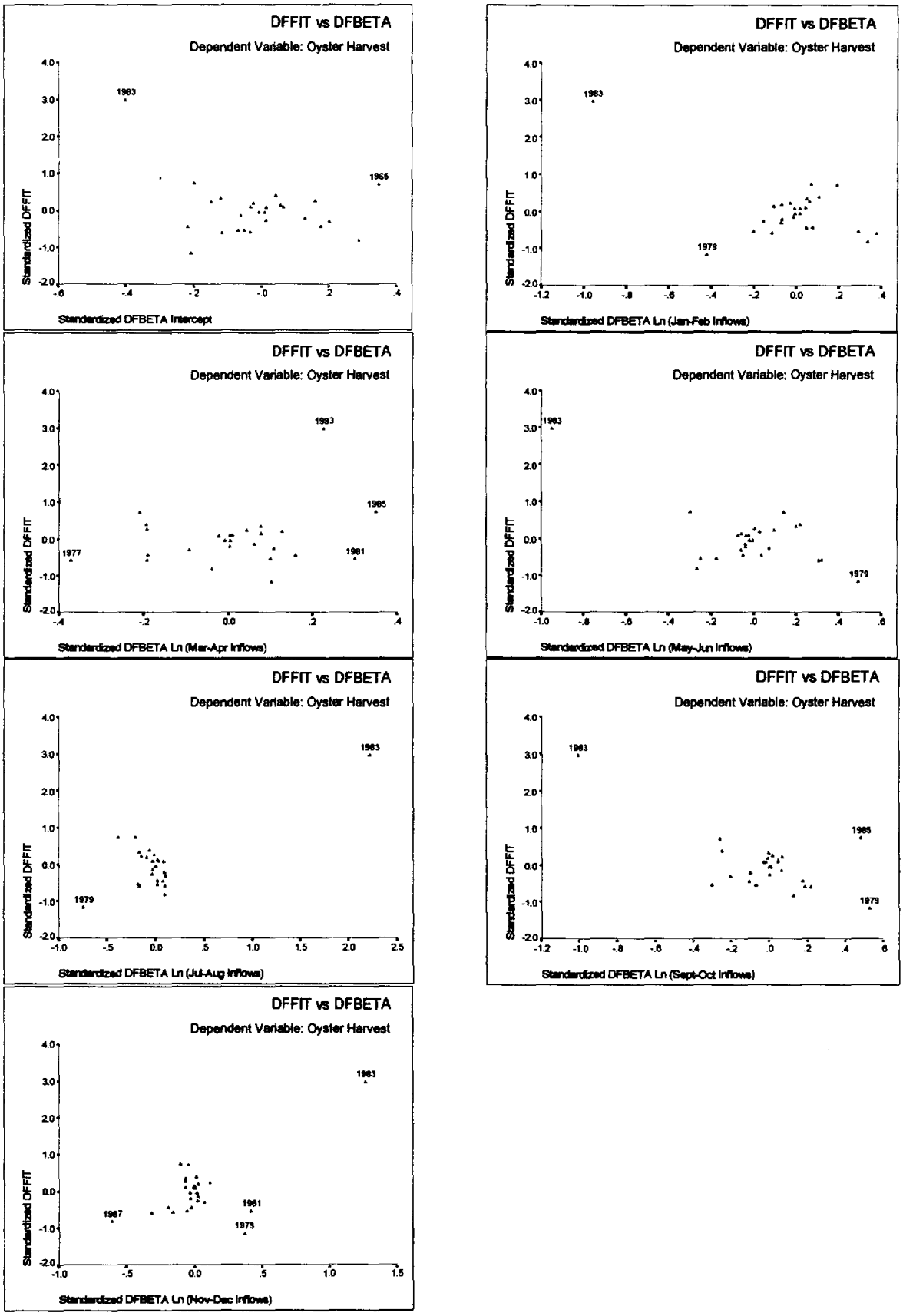


Fig. 4.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Logged All Variables
Box-Cox Transformation

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)[c,d]	.	.692	.479	.315	.8075	1.673

a. Dependent Variable: Ln (Oyster Harvest)

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.402	6	1.900	2.914	.035[b]
	Residual	12.389	19	.652		
	Total	23.790	25			

a. Dependent Variable: Ln (Oyster Harvest)

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), Ln (July-August Inflows), Ln (September-October Inflows), Ln (May-June Inflows), Ln (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	10.069	3.467		2.904	.009	2.812	17.327
	Ln (January-February Inflows)	-1.688	.574	-.792	-2.940	.008	-2.890	-.486
	Ln (March-April Inflows)	.258	.448	.142	.575	.572	-.680	1.195
	Ln (May-June Inflows)	.671	.411	.393	1.631	.119	-.190	1.531
	Ln (July-August Inflows)	-.718	.396	-.455	-1.813	.086	-1.548	.111
	Ln (September-October Inflows)	2.6E-02	.335	.017	.077	.940	-.676	.728
	Ln (November-December Inflows)	1.040	.473	.588	2.199	.040	.050	2.029

a. Dependent Variable: Ln (Oyster Harvest)

Collinearity Diagnostics

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	10.069304	3.46747359	2.904	0.0091	0.00000000
LN_QJF	1	-1.688009	0.57418342	-2.940	0.0084	2.64836975
LN_QMA	1	0.257659	0.44788170	0.575	0.5719	2.21689358
LN_QMJ	1	0.670550	0.41125189	1.631	0.1195	2.12463263
LN_QJA	1	-0.718413	0.39626416	-1.813	0.0857	2.29461527
LN_QSO	1	0.025708	0.33548101	0.077	0.9397	1.75490557
LN_QND	1	1.039570	0.47268140	2.199	0.0404	2.60822341

Number	Eigenvalue	Condition Index	Var Prop LN_QJF	Var Prop LN_QMA	Var Prop LN_QMJ	Var Prop LN_QJA	Var Prop LN_QSO	Var Prop LN_QND
1	2.83834	1.00000	0.0314	0.0160	0.0295	0.0379	0.0170	0.0208
2	1.58514	1.33813	0.0000	0.0902	0.0390	0.0008	0.1144	0.0557
3	0.66112	2.07202	0.2207	0.0499	0.1333	0.1340	0.0710	0.0392
4	0.43241	2.56204	0.0002	0.2660	0.1818	0.0006	0.5048	0.1721
5	0.30215	3.06493	0.0591	0.0833	0.3867	0.7304	0.1828	0.0575
6	0.18084	3.96169	0.6886	0.4946	0.2297	0.0962	0.1101	0.6547

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.9484	8.5584	7.6118	.6753	26
Std. Predicted Value	-2.463	1.402	.000	1.000	26
Standard Error of Predicted Value	.3110	.6175	.4137	6.78E-02	26
Adjusted Predicted Value	5.9123	8.8793	7.6583	.7198	26
Residual	-2.1849	1.5220	1.2E-15	.7040	26
Std. Residual	-2.706	1.885	.000	.872	26
Stud. Residual	-3.508	2.171	-.023	1.062	26
Deleted Residual	-3.6727	2.0195	-5.E-02	1.0510	26
Stud. Deleted Residual	-5.753	2.437	-.097	1.415	26
Mahal. Distance	2.746	13.660	5.769	2.355	26
Cook's Distance	.000	1.197	.078	.233	26
Centered Leverage Value	.110	.546	.231	.094	26

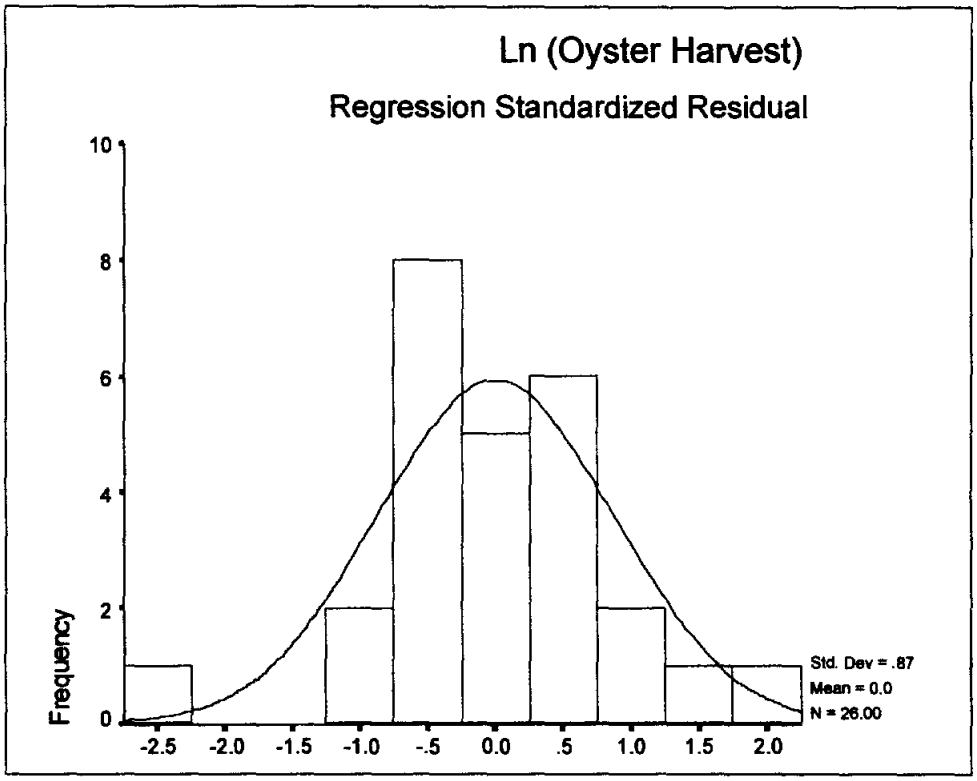
a. Dependent Variable: Ln (Oyster Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	6.69304	-.07310	-.09653	6.71647	-1.36044	-.09053	-.10403	-.10129
1963	8.29690	-.63241	-.84391	8.50839	1.01451	-.78318	-.90471	-.90018
1964	7.78623	.19338	.27351	7.70610	.25832	.23949	.28481	.27781
1965	8.04668	.38349	.51833	7.91185	.64400	.47492	.55213	.54177
1966	7.74952	.56514	.73133	7.58334	.20397	.69987	.79615	.78818
1967	7.65603	.34786	.44278	7.56112	.06553	.43080	.48603	.47603
1968	7.72847	.22263	.27201	7.67910	.17280	.27570	.30475	.29735
1969	7.68099	.46432	.61945	7.52587	.10249	.57502	.66417	.65409
1970	8.21493	.04095	.05527	8.20061	.89313	.05071	.05891	.05735
1971	8.53245	-.23299	-.56122	8.86068	1.36330	-.28853	-.44781	-.43819
1972	7.80687	.27727	.36114	7.72299	.28888	.34337	.39188	.38298
1973	7.67601	-.23569	-.27673	7.71706	.09512	-.29188	-.31627	-.30865
1974	7.20147	-.47200	-.64248	7.37195	-.60757	-.58453	-.68197	-.67206
1975	7.49699	-.37671	-.52498	7.64526	-.16998	-.46651	-.55073	-.54037
1976	8.13947	-.03813	-.04525	8.14660	.78139	-.04722	-.05144	-.05007
1977	7.95539	-.39661	-.48046	8.03924	.50880	-.49116	-.54060	-.53027
1978	7.25038	-.26863	-.36457	7.34632	-.53515	-.33267	-.38755	-.37872
1979	5.94838	-2.18486	-3.67273	7.43626	-2.46311	-2.70575	**-3.50808**	**-5.75287**
1980	6.22093	.69101	.99966	5.91229	-2.05953	.85576	1.02928	1.03098
1981	7.20137	-.30832	-.54227	7.43532	-.60772	-.38183	-.50638	-.49623
1982	8.51741	-.42983	-.69235	8.77993	1.34104	-.53231	-.67558	-.66560
1983	7.32700	1.52196	2.01947	6.82948	-.42170	1.88480	2.17112	2.43703
1984	6.72696	1.03954	1.42227	6.34423	-1.31021	1.28737	1.50582	1.56182
1985	7.31090	.78625	1.02515	7.07200	-.44553	.97370	1.11183	1.11920
1986	8.18310	-.01091	-.01315	8.18535	.84599	-.01351	-.01483	-.01444
1987	8.55835	-.87362	-1.19458	8.87932	1.40166	-1.08189	-1.26512	-1.28676

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



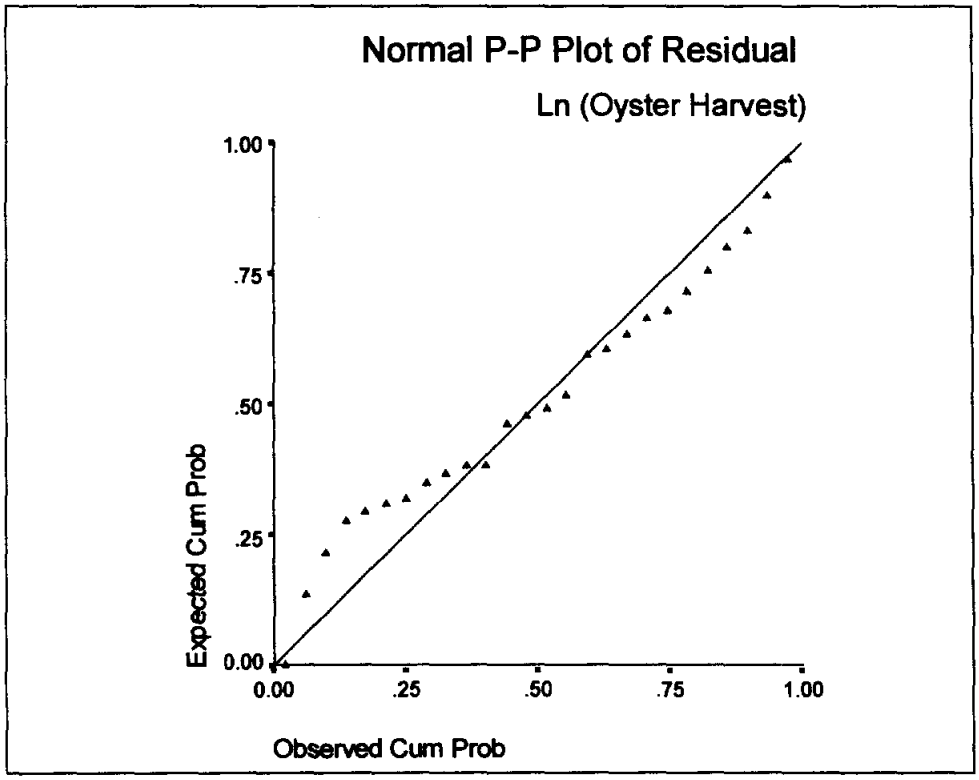


Fig. 5.1. Exploratory Plots of Ln (Oyster Harvest) Standardized Residual.

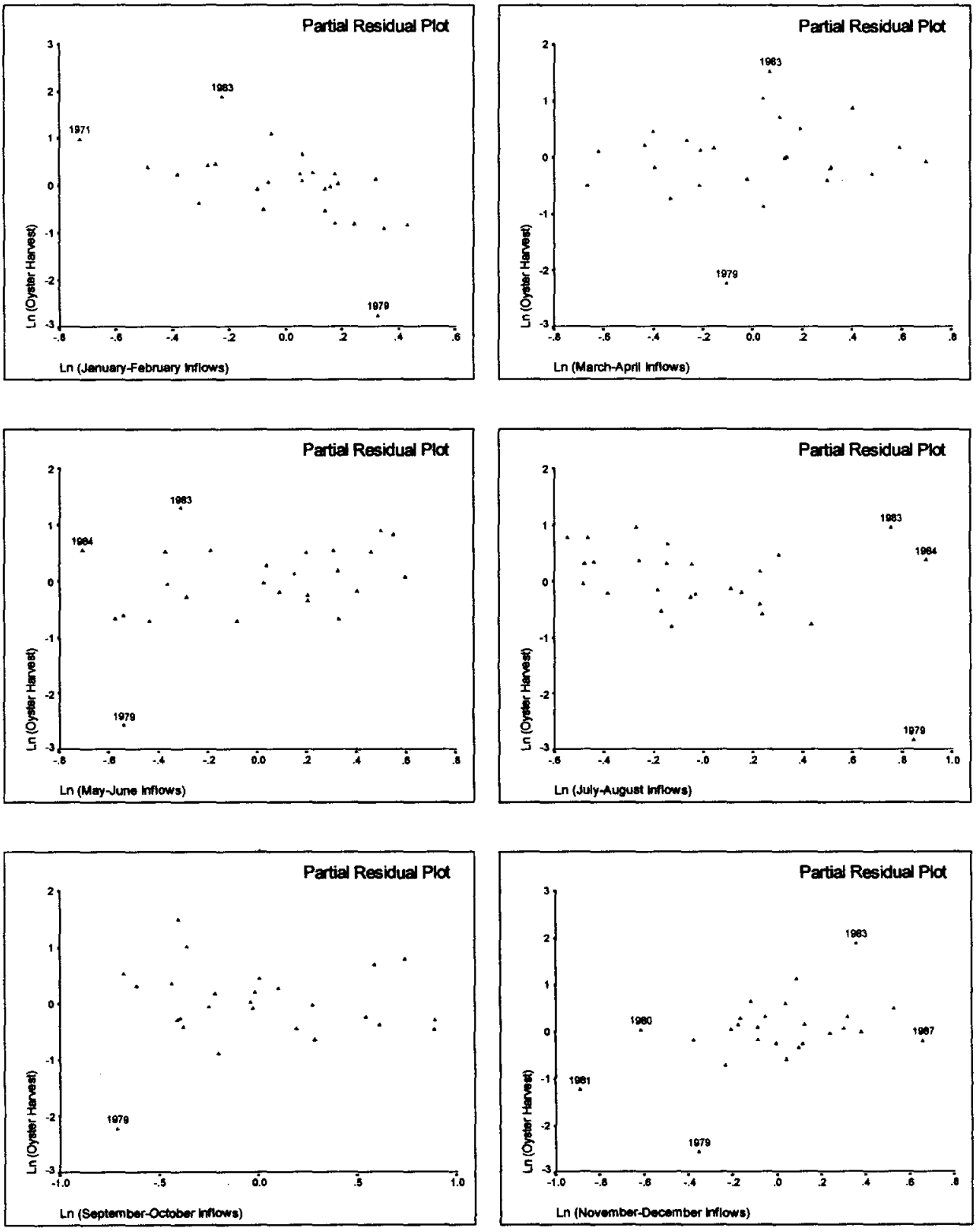


Fig 5.2. Partial Residual Plots of Ln (Oyster Harvest) vs. Logged Inflows.

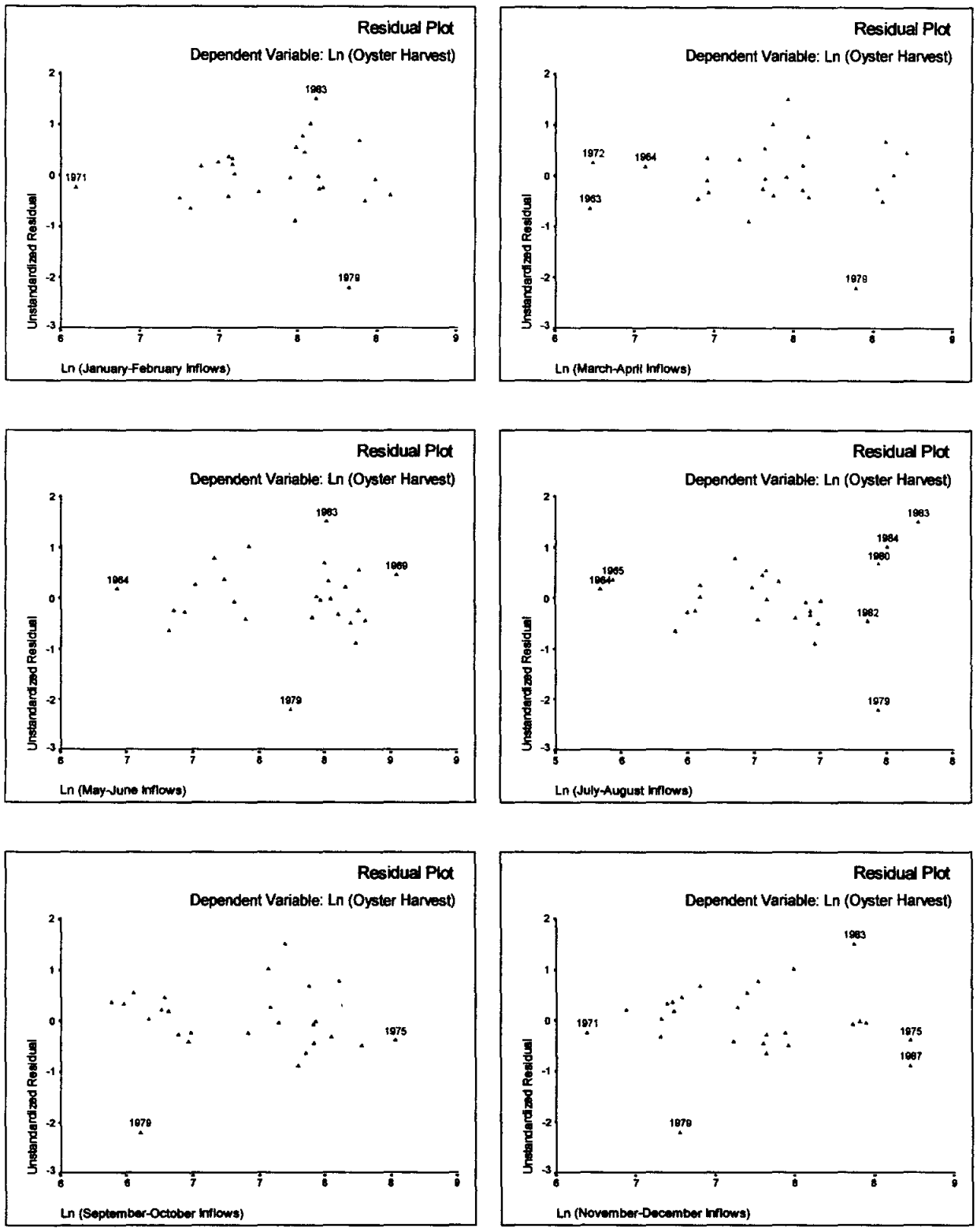


Fig 5.3. Residual Plots of Ln (Oyster Harvest) vs. Logged Inflows.

Prediction Intervals for Oyster Harvest

YEAR	Ln_OYSTER	LICI	UICI
1962	6.62	4.11768	9.26840
1963	7.66	5.71341	10.88038
1964	7.98	5.15937	10.41309
1965	8.43	5.45338	10.63999
1966	8.31	5.19029	10.30875
1967	8.00	5.11027	10.20180
1968	7.95	5.21735	10.23960
1969	8.15	5.09770	10.26429
1970	8.26	5.62272	10.80715
1971	8.30	5.62414	11.44075
1972	8.08	5.24242	10.37132
1973	7.44	5.20044	10.15158
1974	6.73	4.60282	9.80012
1975	7.12	4.88084	10.11314
1976	8.10	5.65401	10.62493
1977	7.56	5.45173	10.45905
1978	6.98	4.65397	9.84678
1979	3.76	3.20996	8.68680
1980	6.91	3.57808	8.86378
1981	6.89	4.43743	9.96531
1982	8.09	5.80440	11.23043
1983	8.85	4.74791	9.90609
1984	7.77	4.12446	9.32947
1985	8.10	4.74563	9.87617
1986	8.17	5.68335	10.68285
1987	7.68	5.95627	11.16044

Ln_OYSTER	Logged oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	5.10740	.00050	.20430	.647	.0000
1963	5.30381	.03910	.21215	.623	.0001
1964	6.36251	.00480	.25450	.498	.0000
1965	5.54199	.01531	.22168	.594	.0000
1966	4.71951	.02663	.18878	.694	.0000
1967	4.39744	.00921	.17590	.733	.0000
1968	3.57683	.00294	.14307	.827	.0000
1969	5.29915	.02105	.21197	.624	.0000
1970	5.51549	.00017	.22062	.597	.0000
1971	13.65993	.04036	**.54640**	.058	.0001
1972	4.84475	.00664	.19379	.679	.0000
1973	2.74636	.00249	.10985	.907	.0000
1974	5.67202	.02400	.22688	.579	.0000
1975	6.09946	.01705	.24398	.528	.0000
1976	2.97623	.00007	.11905	.887	.0000
1977	3.40155	.00883	.13606	.846	.0000
1978	5.61728	.00766	.22469	.585	.0000
1979	9.16629	1.19725	.36665	.241	**.6491**
1980	6.75719	.06760	.27029	.455	.0007
1981	9.82402	.02779	.39296	.199	.0000
1982	8.51755	.03982	.34070	.289	.0001
1983	5.19746	.22013	.20790	.636	.0241
1984	5.76593	.11926	.23064	.567	.0040
1985	4.86446	.05366	.19458	.677	.0003
1986	3.30989	.00001	.13240	.855	.0000
1987	5.75552	.08400	.23022	.569	.0013

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.05735	.00326	-.03592	.02546	.01696	-.00882	.00131	.00571
1963	-.52057	-.25682	.05792	.19158	.04354	.08555	-.12459	-.02752
1964	.17883	.12329	.03273	-.03871	-.06127	-.04180	-.02954	-.01627
1965	.32125	.15354	.08433	-.09230	.06389	-.16860	-.11332	-.01812
1966	.42741	.04549	.11282	-.19978	.22910	-.06138	-.25337	.02132
1967	.24865	.12533	.01986	-.12950	.08485	.06019	-.13629	-.05486
1968	.14004	.03238	.01401	-.02899	.07734	-.02359	-.00191	-.07157
1969	.37807	-.12706	.05244	.08123	.21191	-.17144	.00149	-.07300
1970	.03391	-.00384	-.01170	.02184	.00519	-.01437	-.00111	.00492
1971	-.52010	-.19702	.35213	-.26340	.18716	-.07570	-.15337	.00060
1972	.21064	.12632	.04981	-.15043	.00784	-.01010	.01847	-.05271
1973	-.12880	.05559	.02396	-.05836	-.01505	.00519	.05478	-.05992
1974	-.40390	.28793	-.09848	-.13104	-.08219	.14808	-.28866	.10645
1975	-.33902	.22222	-.11154	.00731	-.06669	.15119	-.16241	-.04518
1976	-.02165	.00589	.01067	-.00379	-.00067	-.00299	.00567	-.01695
1977	-.24382	-.04871	.15817	-.15501	.12900	-.06855	.09190	-.13113
1978	-.22632	-.01236	-.04494	-.07674	.12888	.03908	.07521	-.06233
1979	**-4.74740**	-.86559	**-1.73806**	.42977	**2.05418**	**-3.10184**	**2.20556**	**1.54217**
1980	.68903	-.20269	.28293	.07704	-.11937	.18560	.30292	-.44515
1981	-.43226	-.04058	-.16338	.24315	-.20077	.01608	-.24395	.34183
1982	-.52016	-.06685	.29159	.10019	-.17433	-.18153	-.06799	-.04995
1983	**1.39336**	-.18816	-.44687	.10658	-.44335	**1.03997**	-.46984	.59476
1984	.94767	.12918	-.06423	.04248	-.65768	.80563	-.27215	.09728
1985	.61693	-.16096	.05783	.28487	-.24218	-.16691	.39362	-.08458
1986	-.00655	.00390	.00070	-.00120	-.00264	.00372	-.00182	-.00300
1987	-.77995	.27848	.32582	-.03722	-.25431	.09218	.12513	-.58397

SDFFITS	Standardized dffits value
SDFB_0	Standardized dfbeta for the intercept term
SDFB_1	Standardized dfbeta for the logged January-February inflows
SDFB_2	Standardized dfbeta for the logged March-April inflows
SDFB_3	Standardized dfbeta for the logged May-June inflows
SDFB_4	Standardized dfbeta for the logged July-August inflows
SDFB_5	Standardized dfbeta for the logged September-October inflows
SDFB_6	Standardized dfbeta for the logged November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

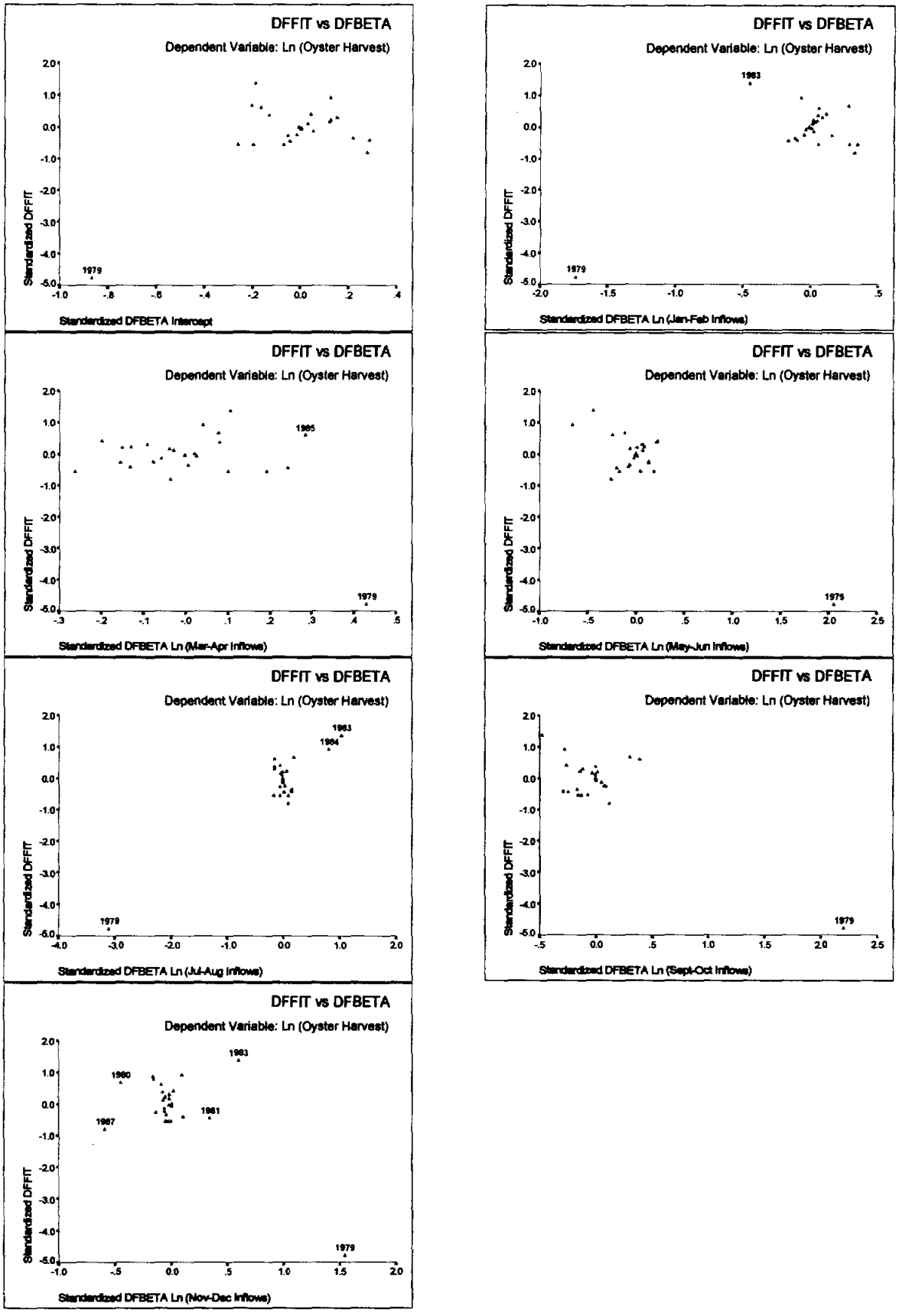


Fig. 5.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Squared Root Inflows
Box-Cox Transformation

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)[c,d]	.	.597	.356	.153	1384.69	1.733

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.0E+07	6	3361744	1.753	.163[b]
	Residual	3.6E+07	19	1917355		
	Total	5.7E+07	25			

a. Dependent Variable: Oyster Harvest

b. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4797.552	1672.428		2.869	.010	1297.120	8297.983
	SQRT (January-February Inflows)	-133.391	52.461	-.774	-2.543	.020	-243.193	-23.589
	SQRT (March-April Inflows)	20.413	40.214	.143	.508	.618	-63.755	104.582
	SQRT (May-June Inflows)	10.525	29.070	.090	.362	.721	-50.319	71.369
	SQRT (July-August Inflows)	16.917	42.109	.097	.402	.692	-71.217	105.052
	SQRT (September-October Inflows)	-39.175	34.891	-.267	-1.123	.276	-112.202	33.853
	SQRT (November-December Inflows)	70.669	39.906	.512	1.771	.093	-12.855	154.192

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	4797.551692	1672.4276015	2.869	0.0098	0.00000000
SQR_QJF	1	-133.390981	52.46090641	-2.543	0.0199	2.73816974
SQR_QMA	1	20.413477	40.21365283	0.508	0.6176	2.34845703
SQR_QMJ	1	10.525271	29.06995157	0.362	0.7213	1.80405860
SQR_QJA	1	16.917289	42.10882411	0.402	0.6923	1.72413316
SQR_QSO	1	-39.174601	34.89101647	-1.123	0.2755	1.66589742
SQR_QND	1	70.668701	39.90555424	1.771	0.0926	2.46389117

Number	Eigenvalue	Condition Index	Var Prop SQR_QJF	Var Prop SQR_QMA	Var Prop SQR_QMJ	Var Prop SQR_QJA	Var Prop SQR_QSO	Var Prop SQR_QND
1	2.69228	1.00000	0.0350	0.0130	0.0303	0.0483	0.0261	0.0259
2	1.59322	1.29994	0.0000	0.0951	0.0573	0.0028	0.0995	0.0528
3	0.66487	2.01229	0.1812	0.1146	0.2175	0.1941	0.0032	0.0026
4	0.44998	2.44604	0.0016	0.0071	0.3617	0.4946	0.0703	0.2349
5	0.42278	2.52350	0.0469	0.0967	0.0608	0.1947	0.7968	0.0963
6	0.17687	3.90150	0.7353	0.6736	0.2723	0.0656	0.0041	0.5874

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	992.8782	4005.259	2636.40	898.2308	26
Std. Predicted Value	-1.830	1.524	.000	1.000	26
Standard Error of Predicted Value	546.0120	903.5179	710.0881	111.6484	26
Adjusted Predicted Value	987.6855	4832.696	2650.74	1008.990	26
Residual	-1765.38	3734.285	-8.E-13	1207.141	26
Std. Residual	-1.275	2.697	.000	.872	26
Stud. Residual	-1.564	3.287	-.004	1.037	26
Deleted Residual	-2657.80	5548.712	-14.3378	1716.019	26
Stud. Deleted Residual	-1.631	4.873	.055	1.269	26
Mahal. Distance	2.926	9.683	5.769	2.083	26
Cook's Distance	.000	.750	.063	.149	26
Centered Leverage Value	.117	.387	.231	.083	26

a. Dependent Variable: Oyster Harvest

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	1157.26008	-407.36008	-572.06663	1321.96663	-1.64673	-.29419	-.34863	-.34042
1963	3064.69617	-933.39617	-1195.71268	3327.01268	.47682	-.67409	-.76295	-.75424
1964	2814.13679	106.66321	139.97236	2780.82764	.19787	.07703	.08824	.08591
1965	2870.04635	1713.25365	2165.71664	2417.58336	.26011	1.23729	1.39111	1.42872
1966	2831.68329	1251.61671	1699.49484	2383.80516	.21740	.90390	1.05328	1.05650
1967	3221.37909	-228.77909	-283.18982	3275.78982	.65125	-.16522	-.18382	-.17908
1968	3014.40672	-175.70672	-210.14522	3048.84522	.42083	-.12689	-.13877	-.13514
1969	2633.84696	813.35304	1171.22625	2275.97375	-.00285	.58739	.70487	.69522
1970	3388.84664	461.35336	656.51462	3193.68538	.83769	.33318	.39745	.38847
1971	3771.01946	250.68054	436.54769	3585.15231	1.26317	.18104	.23890	.23288
1972	2731.86685	510.73315	622.05882	2620.54118	.10628	.36884	.40706	.39794
1973	2899.25880	-1195.95880	-1423.75705	3127.05705	.29264	-.86370	-.94238	-.93946
1974	1150.09475	-313.39475	-446.34327	1283.04327	-1.65471	-.22633	-.27010	-.26340
1975	1232.93262	3.86738	6.05936	1230.74064	-1.56248	.00279	.00350	.00340
1976	3554.14253	-255.24253	-307.18877	3606.08877	1.02172	-.18433	-.20222	-.19704
1977	3527.07974	-1609.57974	-1929.86259	3847.36259	.99159	-1.16241	-1.27282	-1.29533
1978	2097.25519	-1020.45519	-1353.20186	2430.00186	-.60023	-.73696	-.84865	-.84213
1979	1661.78101	-1618.68101	-2607.21876	2650.31876	-1.08505	-1.16899	-1.48360	-1.53573
1980	992.87822	11.32178	16.51454	987.68546	-1.82974	.00818	.00988	.00961
1981	1868.20534	-882.80534	-1486.16890	2471.56890	-.85524	-.63755	-.82721	-.82005
1982	4005.25843	-751.45843	-1249.14335	4502.94335	1.52395	-.54269	-.69969	-.68998
1983	3232.81536	3734.28464	5548.71262	1418.38738	.66398	2.69685	3.28737	4.87257
1984	2508.37068	-148.17068	-203.22351	2563.42351	-.14254	-.10701	-.12532	-.12203
1985	1657.18524	1627.91476	2116.87528	1168.22472	-1.09016	1.17566	1.34064	1.37136
1986	2719.77760	821.32240	972.54281	2568.55719	.09282	.59315	.64545	.63523
1987	3940.27610	-1765.37610	-2657.79605	4832.69605	1.45160	-1.27493	-1.56433	-1.63128

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$

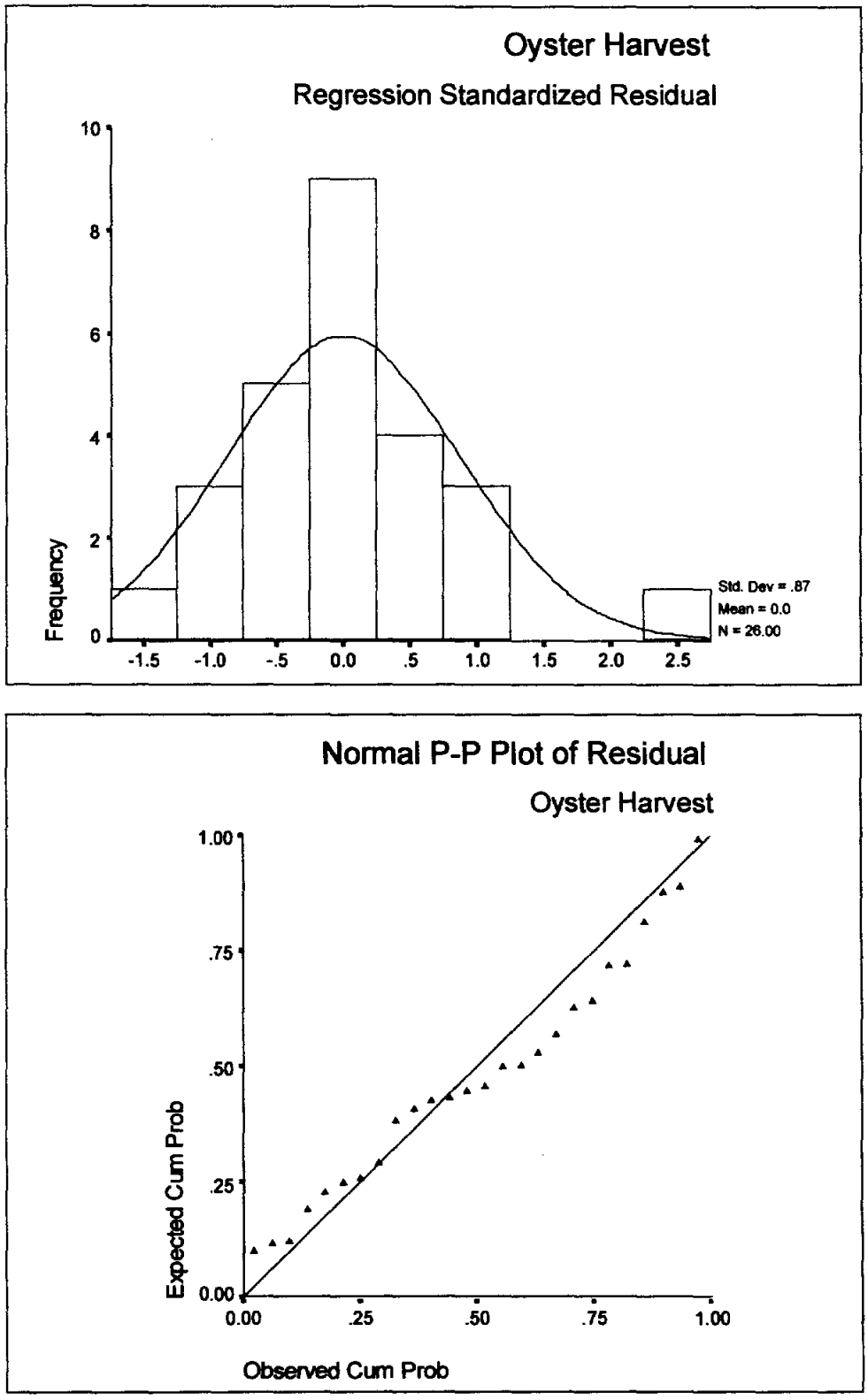


Fig. 6.1. Exploratory Plots of Oyster Harvest Standardized Residual.

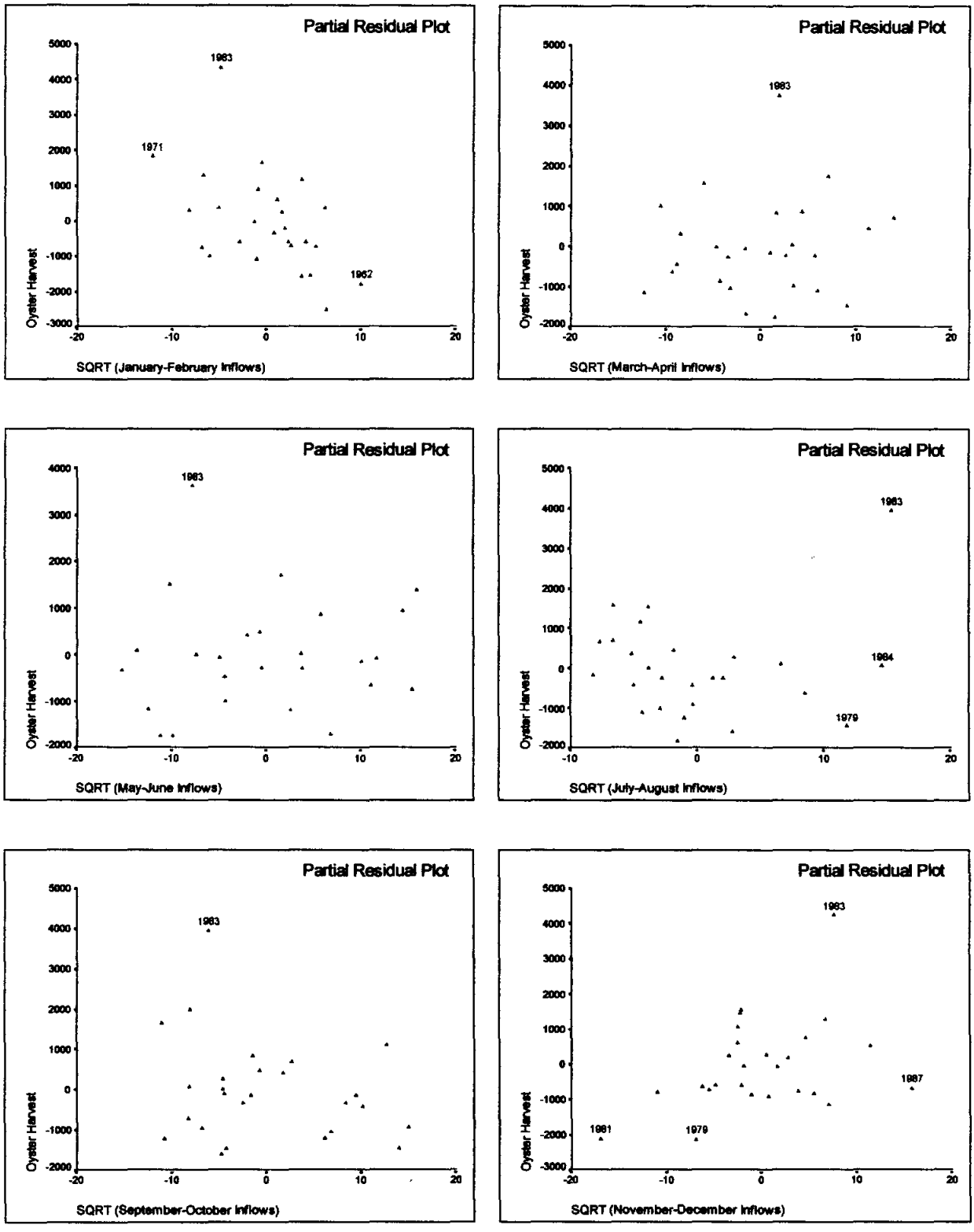


Fig. 6.2. Partial Residual Plots of Oyster Harvest vs. Squared Root Inflows

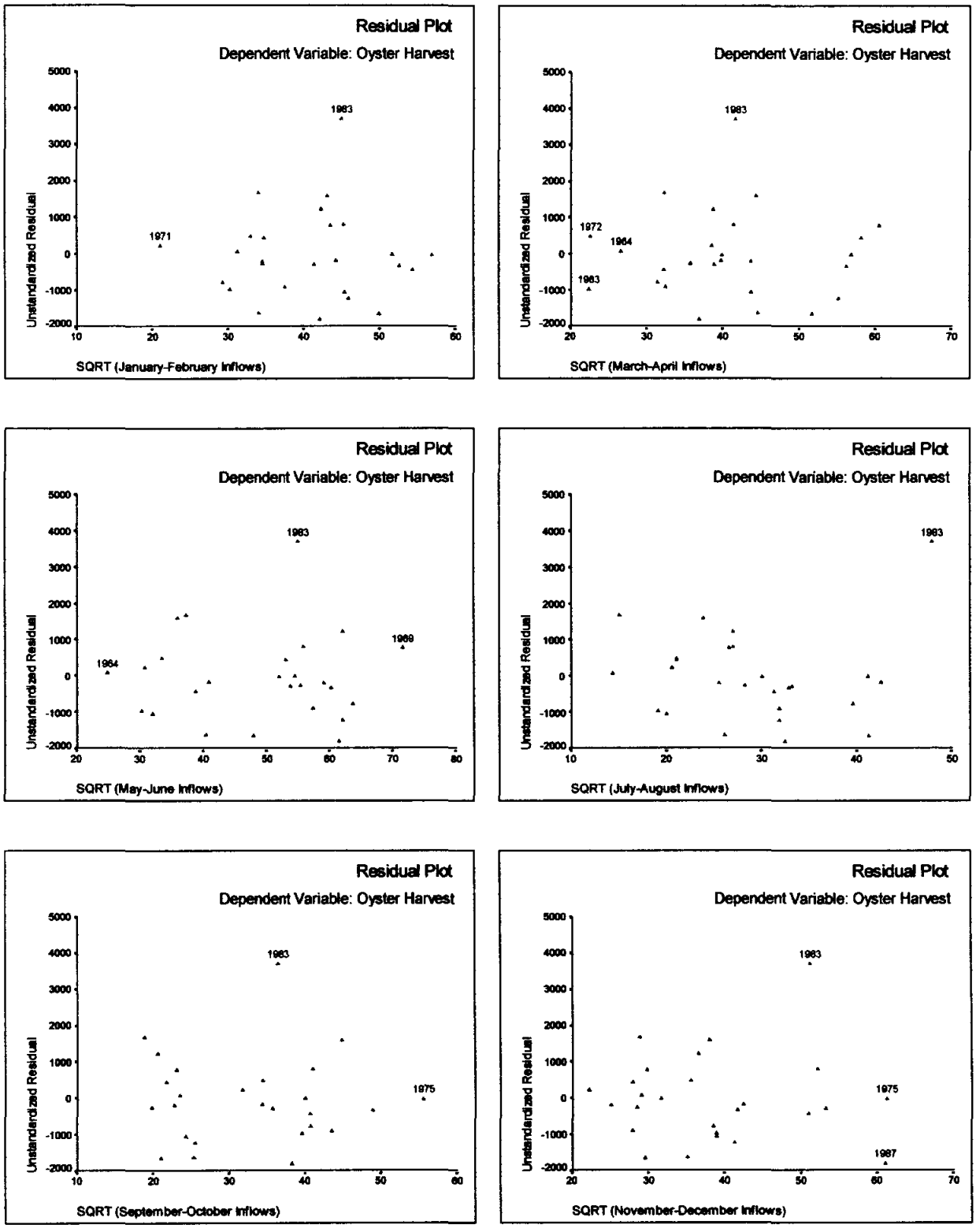


Fig. 6.3. Residual Plots of Oyster Harvest vs. Squared Root Inflows

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3338.49704	5653.01719
1963	2131.30	-1309.80901	7439.20135
1964	2920.80	-1593.58541	7221.85900
1965	4583.30	-1485.65551	7225.74820
1966	4083.30	-1621.32043	7284.68701
1967	2992.60	-1103.97831	7546.73648
1968	2838.70	-1259.38402	7288.19746
1969	3447.20	-1892.59245	7160.28637
1970	3850.20	-1123.20660	7900.89988
1971	4021.70	-959.22259	8501.26152
1972	3242.60	-1569.52866	7033.26237
1973	1703.30	-1367.39945	7165.91705
1974	836.70	-3362.98944	5663.17894
1975	1236.80	-3389.89919	5855.76443
1976	3298.90	-729.22606	7837.51112
1977	1917.50	-750.53181	7804.69129
1978	1076.80	-2324.55508	6519.06547
1979	43.10	-2990.49682	6314.05885
1980	1004.20	-3548.93174	5534.68819
1981	985.40	-2829.11002	6565.52070
1982	3253.80	-679.40299	8689.91985
1983	6967.10	-1330.64910	7796.27982
1984	2360.20	-1957.58674	6974.32810
1985	3285.10	-2738.08041	6052.45090
1986	3541.10	-1538.58154	6978.13673
1987	2174.90	-638.25117	8518.80336

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.23634	.00702	.24945	.512	.0000
1963	4.52298	.02337	.18092	.718	.0000
1964	4.98770	.00035	.19951	.661	.0000
1965	4.26148	.07301	.17046	.749	.0008
1966	5.62686	.05671	.22507	.584	.0004
1967	3.84184	.00115	.15367	.798	.0000
1968	3.13545	.00054	.12542	.872	.0000
1969	6.67732	.03123	.26709	.463	.0001
1970	6.47018	.00955	.25881	.486	.0000
1971	9.68261	.00605	.38730	.207	.0000
1972	3.51254	.00516	.14050	.834	.0000
1973	3.03841	.02416	.12154	.881	.0000
1974	6.48500	.00442	.25940	.484	.0000
1975	8.08224	.00000	.32329	.325	.0000
1976	3.26601	.00119	.13064	.859	.0000
1977	3.18750	.04605	.12750	.867	.0002
1978	5.18586	.03355	.20743	.637	.0001
1979	8.51731	.19203	.34069	.289	.0164
1980	6.89936	.00001	.27597	.439	.0000
1981	9.18811	.06681	.36752	.239	.0006
1982	8.99899	.04632	.35996	.253	.0002
1983	7.21346	.75012	.28854	.407	.3660
1984	5.81091	.00083	.23244	.562	.0000
1985	4.81302	.07712	.19252	.683	.0010
1986	2.92570	.01096	.11703	.892	.0000
1987	7.43282	.17672	.29731	.385	.0129

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.21646	.00378	-.15417	.10848	.03628	.00393	.02437	.02488
1963	-.39984	-.23055	.09155	.07952	.07590	.07390	-.13453	-.02004
1964	.04801	.04047	.00756	-.01339	-.01516	-.01135	-.01136	-.00525
1965	.73422	.52798	.23412	-.27772	.05300	-.32204	-.32498	-.09723
1966	.63199	.11484	.29342	-.37408	.41314	-.16429	-.34069	-.08625
1967	-.08733	-.04591	-.01767	.05085	-.04244	-.00752	.04091	.02780
1968	-.05983	-.01919	-.00482	.01451	-.03645	.01239	.00590	.02643
1969	.46116	-.12703	.03842	.10709	.25485	-.19487	-.03022	-.05997
1970	.25266	-.00591	-.11574	.18926	-.01888	-.07253	-.00859	.06167
1971	.20053	.08752	-.13949	.10196	-.08784	.02715	.07344	.00471
1972	.18579	.13429	.02771	-.10758	-.00599	-.02443	.01971	-.04374
1973	-.41001	.15065	.03945	-.17887	-.05803	.03079	.17485	-.16372
1974	-.17156	.10608	-.03198	-.05194	-.02602	.04734	-.11920	.04941
1975	.00256	-.00134	.00086	-.00019	.00033	-.00106	.00110	.00035
1976	-.08889	.01500	.04099	-.01701	.00187	-.01357	.02412	-.07166
1977	-.57782	-.16726	.36301	-.37733	.33181	-.12167	.15135	-.29033
1978	-.48088	-.09878	-.14071	-.09821	.25297	.12677	.19979	-.10894
1979	**-1.20013**	-.08076	-.47707	.08389	.40385	-.70144	.52578	.38586
1980	.00651	-.00220	.00188	.00114	-.00119	.00235	.00247	-.00366
1981	-.67795	-.09190	-.19025	.37705	-.34669	.00799	-.37647	.51900
1982	-.56151	-.05720	.27408	.10863	-.20878	-.23057	-.15478	.02543
1983	**3.39644**	-.56259	**-1.07296**	.33870	-.96586	**2.77273**	-.90311	**1.31439**
1984	-.07438	-.00631	.00665	-.00417	.04559	-.06342	.01632	-.00684
1985	.75157	-.07744	-.02479	.32325	-.33276	-.18035	.50009	-.09645
1986	.27257	-.10844	-.02346	.03321	.08568	-.13907	.04649	.13579
1987	**-1.15983**	.29646	.45303	-.09030	-.29021	.09389	.23971	-.91205

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the squared root January-February inflows
SDFB_2 Standardized dfbeta for the squared root March-April inflows
SDFB_3 Standardized dfbeta for the squared root May-June inflows
SDFB_4 Standardized dfbeta for the squared root July-August inflows
SDFB_5 Standardized dfbeta for the squared root September-October inflows
SDFB_6 Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

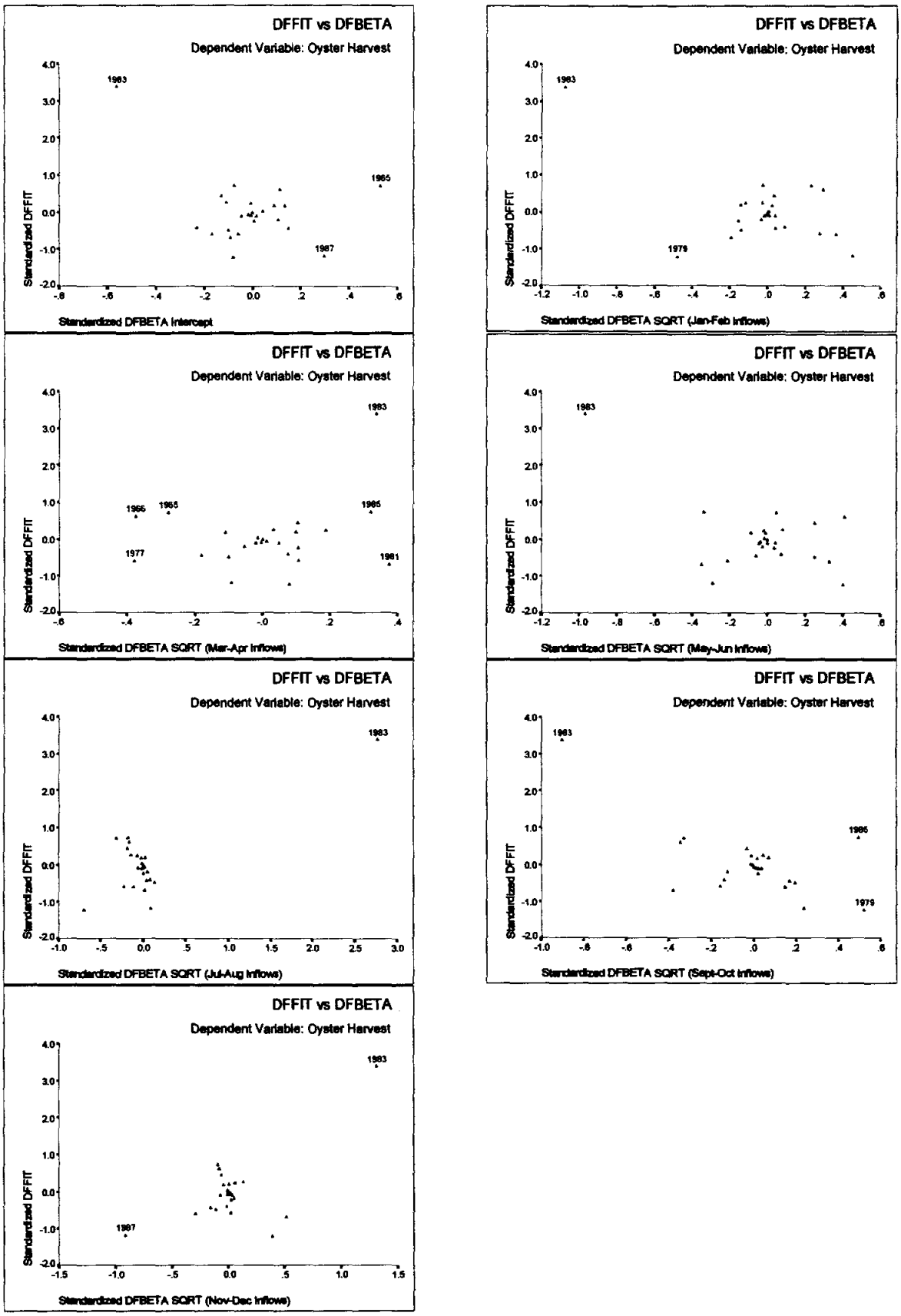


Fig. 6.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Squared Root all Variables
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)[c,d]	.	.664	.441	.265	13.8455	1.541

a. Dependent Variable: SQRT (Oyster Harvest)

b. Method: Enter

c. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2878.902	6	479.817	2.503	.059[b]
	Residual	3642.238	19	191.697		
	Total	6521.140	25			

a. Dependent Variable: SQRT (Oyster Harvest)

b. Independent Variables: (Constant), SQRT (November-December Inflows), SQRT (March-April Inflows), SQRT (July-August Inflows), SQRT (September-October Inflows), SQRT (May-June Inflows), SQRT (January-February Inflows)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	74.067	16.723		4.429	.000	39.066	109.068
	SQRT (January-February Inflows)	-1.577	.525	-.853	-3.005	.007	-2.674	-.479
	SQRT (March-April Inflows)	.239	.402	.156	.594	.559	-.603	1.081
	SQRT (May-June Inflows)	.213	.291	.169	.732	.473	-.396	.821
	SQRT (July-August Inflows)	-.128	.421	-.068	-.303	.765	-1.009	.754
	SQRT (September-October Inflows)	-.284	.349	-.180	-.815	.425	-1.014	.446
	SQRT (November-December Inflows)	.828	.399	.558	2.074	.052	-.007	1.663

a. Dependent Variable: SQRT (Oyster Harvest)

Collinearity Diagnostics

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	74.067260	16.72258262	4.429	0.0003	0.00000000
SQR_QJF	1	-1.576520	0.52455595	-3.005	0.0073	2.73816974
SQR_QMA	1	0.238936	0.40209581	0.594	0.5594	2.34845703
SQR_QMJ	1	0.212858	0.29067008	0.732	0.4729	1.80405860
SQR_QJA	1	-0.127667	0.42104560	-0.303	0.7650	1.72413316
SQR_QSO	1	-0.284197	0.34887484	-0.815	0.4254	1.66589742
SQR_QND	1	0.827652	0.39901514	2.074	0.0519	2.46389117

Number	Eigenvalue	Condition Index	Var Prop SQR_QJF	Var Prop SQR_QMA	Var Prop SQR_QMJ	Var Prop SQR_QJA	Var Prop SQR_QSO	Var Prop SQR_QND
1	2.69228	1.00000	0.0350	0.0130	0.0303	0.0483	0.0261	0.0259
2	1.59322	1.29994	0.0000	0.0951	0.0573	0.0028	0.0995	0.0528
3	0.66487	2.01229	0.1812	0.1146	0.2175	0.1941	0.0032	0.0026
4	0.44998	2.44604	0.0016	0.0071	0.3617	0.4946	0.0703	0.2349
5	0.42278	2.52350	0.0469	0.0967	0.0608	0.1947	0.7968	0.0963
6	0.17687	3.90150	0.7353	0.6736	0.2723	0.0656	0.0041	0.5874

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	27.2186	65.0417	48.8425	10.7311	26
Std. Predicted Value	-2.015	1.510	.000	1.000	26
Standard Error of Predicted Value	5.4596	9.0343	7.1002	1.1164	26
Adjusted Predicted Value	25.1682	74.3461	49.1752	11.7511	26
Residual	-24.5888	32.6988	-4.E-15	12.0702	26
Std. Residual	-1.776	2.362	.000	.872	26
Stud. Residual	-2.254	2.879	-.010	1.045	26
Deleted Residual	-39.6053	48.5866	-.3326	17.4288	26
Stud. Deleted Residual	-2.563	3.732	.010	1.180	26
Mahal. Distance	2.926	9.683	5.769	2.083	26
Cook's Distance	.000	.575	.068	.138	26
Centered Leverage Value	.117	.387	.231	.083	26

a. Dependent Variable: SQRT (Oyster Harvest)

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	31.01481	-3.63051	-5.09842	32.48272	-1.66131	-.26222	-.31074	-.30322
1963	56.72627	-10.56027	-13.52806	59.69407	.73467	-.76272	-.86327	-.85723
1964	52.01969	2.02474	2.65703	51.38739	.29607	.14624	.16752	.16318
1965	52.70719	14.99288	18.95244	48.74764	.36014	1.08287	1.21750	1.23414
1966	50.78634	13.11437	17.80721	46.09350	.18114	.94720	1.10373	1.11049
1967	54.32031	.38436	.47577	54.22889	.51046	.02776	.03089	.03006
1968	53.62930	-.34984	-.41841	53.69787	.44607	-.02527	-.02763	-.02690
1969	49.88567	8.82719	12.71113	46.00173	.09721	.63755	.76506	.75640
1970	58.75490	3.29508	4.68896	57.36102	.92371	.23799	.28390	.27691
1971	63.32782	.08906	.15509	63.26179	1.34985	.00643	.00849	.00826
1972	51.53812	5.40571	6.58401	50.35982	.25120	.39043	.43089	.42146
1973	50.80666	-9.53560	-11.35188	52.62294	.18303	-.68872	-.75145	-.74253
1974	33.81717	-4.89141	-6.96644	35.89221	-1.40017	-.35329	-.42161	-.41230
1975	36.06088	-.89272	-1.39869	36.56686	-1.19108	-.06448	-.08071	-.07857
1976	59.12672	-1.69067	-2.03475	59.47080	.95836	-.12211	-.13396	-.13045
1977	58.21573	-14.42646	-17.29712	61.08638	.87346	-1.04196	-1.14093	-1.15062
1978	42.38472	-9.57009	-12.69067	45.50530	-.60178	-.69121	-.79596	-.78798
1979	31.15386	-24.58880	-39.60532	46.17038	-1.64836	-1.77595	-2.25392	**-2.56305**
1980	27.21862	4.47049	6.52090	25.16822	-2.01507	.32289	.38996	.38109
1981	41.58251	-10.19143	-17.15687	48.54796	-.67654	-.73608	-.95506	-.95273
1982	64.28520	-7.24311	-12.04017	69.08226	1.43906	-.52314	-.67448	-.66450
1983	50.77039	32.69877	48.58657	34.88259	.17965	2.36170	2.87883	**3.73174**
1984	42.36794	6.21395	8.52274	40.05915	-.60335	.44881	.52561	.51535
1985	39.91379	17.40200	22.62887	34.68692	-.83204	1.25687	1.43326	1.47717
1986	52.44894	7.05820	8.35774	51.14940	.33607	.50978	.55473	.54436
1987	65.04173	-18.40590	-27.71032	74.34615	1.50956	-1.32938	-1.63114	-1.71203

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,\alpha} = t_{18,0.01} = 2.552$

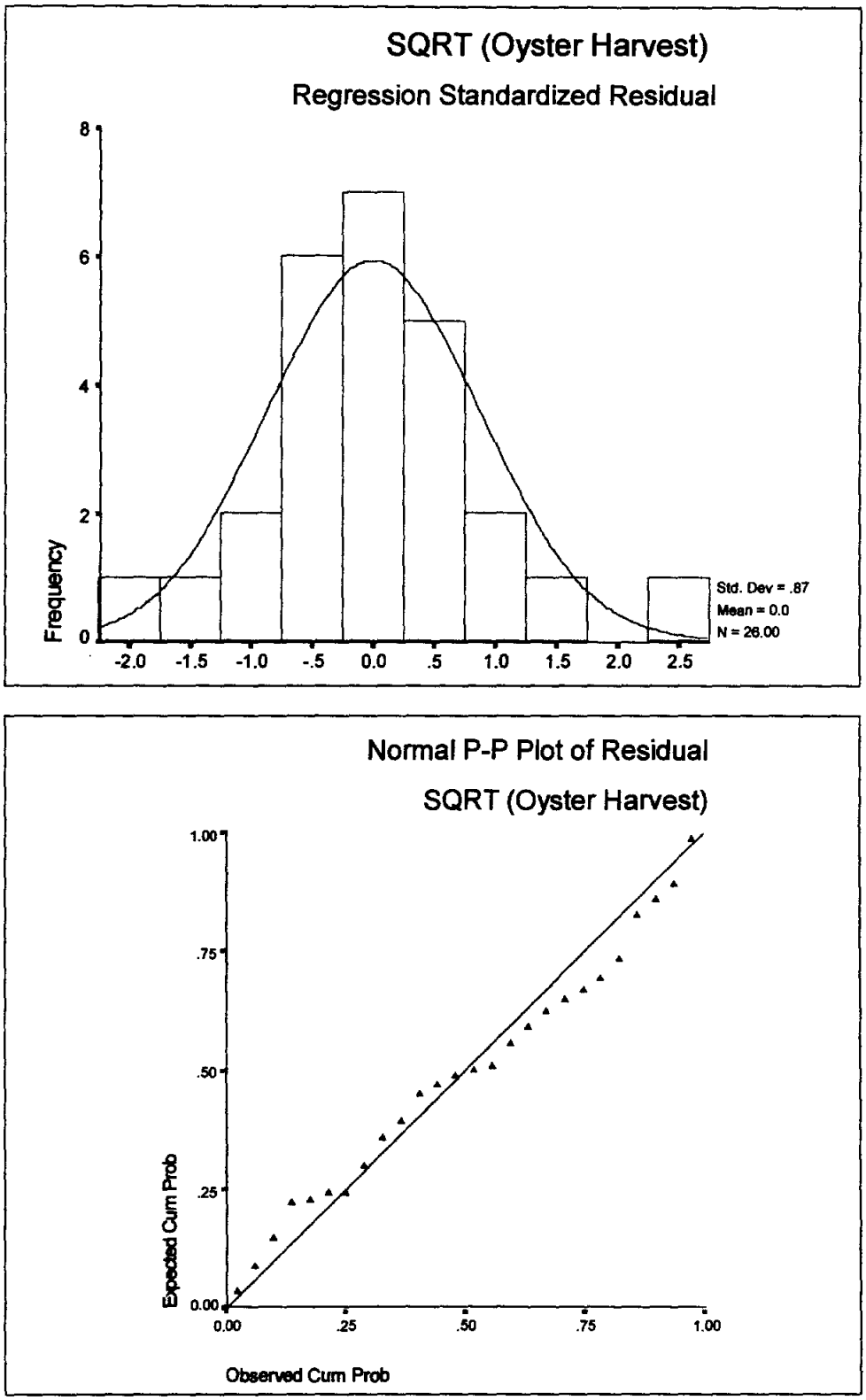


Fig. 7.1. Exploratory Plots of SQRT (Oyster Harvest) Standardized Residual.

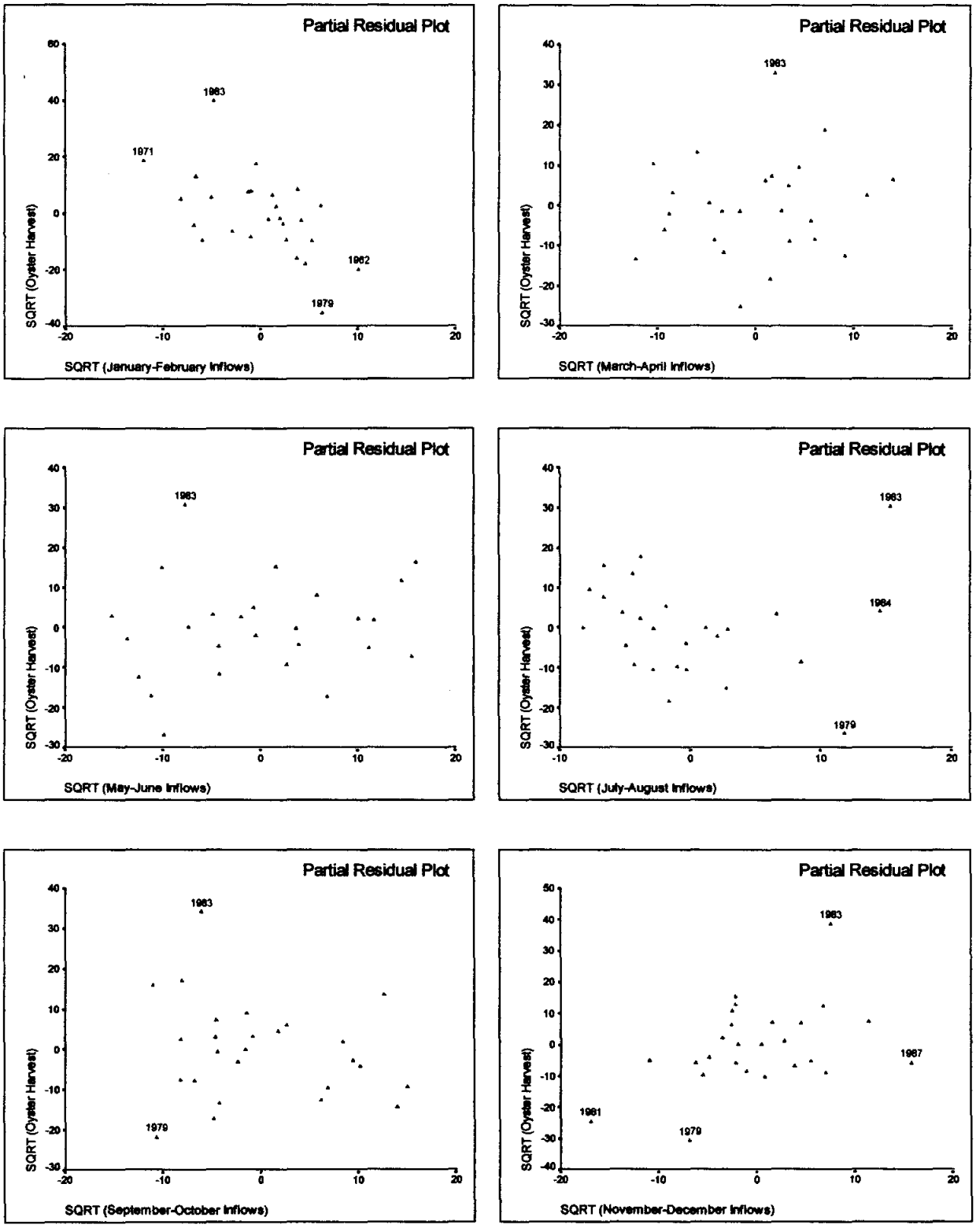


Fig. 7.2. Partial Residual Plots of SQRT (Oyster Harvest) vs. Squared Root Inflows.

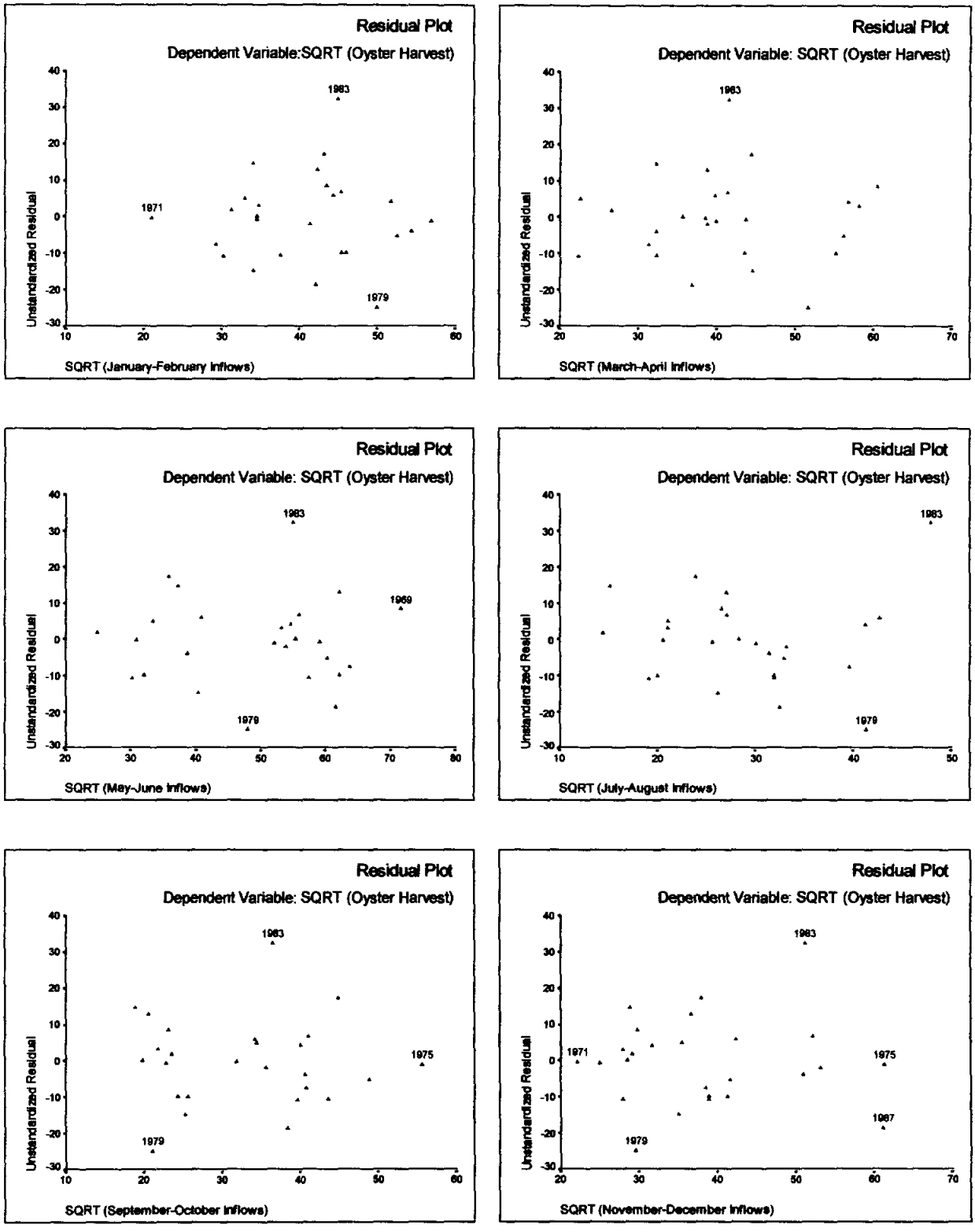


Fig. 7.3. Residual Plots of SQRT (Oyster Harvest) vs. Squared Root Inflows.

Prediction Intervals for Oyster Harvest

YEAR	SQRT_OYSTER	LICI	UICI
1962	27.38	-13.93821	75.96783
1963	46.17	12.98565	100.46689
1964	54.04	7.94693	96.09244
1965	67.70	9.15458	96.25980
1966	63.90	6.26081	95.31186
1967	54.70	11.07111	97.56950
1968	53.28	10.89572	96.36288
1969	58.71	4.62586	95.14548
1970	62.05	13.63894	103.87086
1971	63.42	16.03019	110.62545
1972	56.94	8.52852	94.54772
1973	41.27	8.14440	93.46892
1974	28.93	-11.30910	78.94344
1975	35.17	-10.16275	82.28452
1976	57.44	16.29737	101.95607
1977	43.79	15.44395	100.98751
1978	32.81	-1.82891	86.59834
1979	6.57	-15.36421	77.67192
1980	31.69	-18.19488	72.63212
1981	31.39	-5.38589	88.55091
1982	57.04	17.44333	111.12708
1983	83.47	5.14036	96.40041
1984	48.58	-2.28711	87.02299
1985	57.32	-4.03442	83.86199
1986	59.51	9.86966	95.02822
1987	46.64	19.26109	110.82236

OYSTER	Squared Root Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.23634	.00558	.24945	.512	.0000
1963	4.52298	.02992	.18092	.718	.0000
1964	4.98770	.00125	.19951	.661	.0000
1965	4.26148	.05592	.17046	.749	.0004
1966	5.62686	.06228	.22507	.584	.0005
1967	3.84184	.00003	.15367	.798	.0000
1968	3.13545	.00002	.12542	.872	.0000
1969	6.67732	.03679	.26709	.463	.0001
1970	6.47018	.00487	.25881	.486	.0000
1971	9.68261	.00001	.38730	.207	.0000
1972	3.51254	.00578	.14050	.834	.0000
1973	3.03841	.01537	.12154	.881	.0000
1974	6.48500	.01077	.25940	.484	.0000
1975	8.08224	.00053	.32329	.325	.0000
1976	3.26601	.00052	.13064	.859	.0000
1977	3.18750	.03700	.12750	.867	.0001
1978	5.18586	.02951	.20743	.637	.0000
1979	8.51731	.44321	.34069	.289	.1374
1980	6.89936	.00996	.27597	.439	.0000
1981	9.18811	.08906	.36752	.239	.0016
1982	8.99899	.04304	.35996	.253	.0001
1983	7.21346	.57526	.28854	.407	.2328
1984	5.81091	.01466	.23244	.562	.0000
1985	4.81302	.08814	.19252	.683	.0015
1986	2.92570	.00809	.11703	.892	.0000
1987	7.43282	.19214	.29731	.385	.0165

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.19281	.00337	-.13732	.09663	.03231	.00350	.02171	.02216
1963	-.45444	-.26203	.10405	.09038	.08626	.08399	-.15289	-.02277
1964	.09119	.07687	.01435	-.02544	-.02880	-.02156	-.02157	-.00998
1965	.63423	.45608	.20224	-.23990	.04578	-.27818	-.28072	-.08399
1966	.66429	.12071	.30842	-.39319	.43425	-.17268	-.35810	-.09066
1967	.01466	.00771	.00297	-.00854	.00713	.00126	-.00687	-.00467
1968	-.01191	-.00382	-.00096	.00289	-.00726	.00247	.00118	.00526
1969	.50174	-.13821	.04180	.11651	.27728	-.21202	-.03288	-.06524
1970	.18011	-.00421	-.08251	.13491	-.01346	-.05170	-.00612	.04396
1971	.00711	.00310	-.00495	.00362	-.00312	.00096	.00261	.00017
1972	.19677	.14223	.02934	-.11393	-.00634	-.02587	.02087	-.04632
1973	-.32406	.11907	.03118	-.14137	-.04586	.02434	.13820	-.12940
1974	-.26854	.16605	-.05006	-.08130	-.04072	.07410	-.18658	.07734
1975	-.05915	.03104	-.01976	.00447	-.00766	.02452	-.02529	-.00807
1976	-.05885	.00993	.02714	-.01126	.00124	-.00899	.01597	-.04744
1977	-.51326	-.14857	.32246	-.33517	.29474	-.10808	.13444	-.25789
1978	-.44996	-.09243	-.13166	-.09190	.23670	.11862	.18694	-.10194
1979	**-2.00296**	-.13479	-.79620	.14001	.67400	**-1.17067**	.87750	.64397
1980	.25809	-.08709	.07438	.04510	-.04712	.09313	.09797	-.14493
1981	-.78764	-.10677	-.22103	.43806	-.40278	.00929	-.43739	.60298
1982	-.54078	-.05509	.26396	.10462	-.20107	-.22205	-.14907	.02449
1983	**2.60122**	-.43087	-.82175	.25940	-.73972	**2.12354**	-.69166	**1.00665**
1984	.31413	.02667	-.02810	.01760	-.19252	.26786	-.06892	.02891
1985	.80956	-.08342	-.02670	.34819	-.35843	-.19426	.53868	-.10389
1986	.23358	-.09293	-.02010	.02846	.07343	-.11918	.03984	.11637
1987	**-1.21724**	.31113	.47545	-.09477	-.30458	.09854	.25158	-.95720

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the squared root January-February inflows
SDFB_2 Standardized dfbeta for the squared root March-April inflows
SDFB_3 Standardized dfbeta for the squared root May-June inflows
SDFB_4 Standardized dfbeta for the squared root July-August inflows
SDFB_5 Standardized dfbeta for the squared root September-October inflows
SDFB_6 Standardized dfbeta for the squared root November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

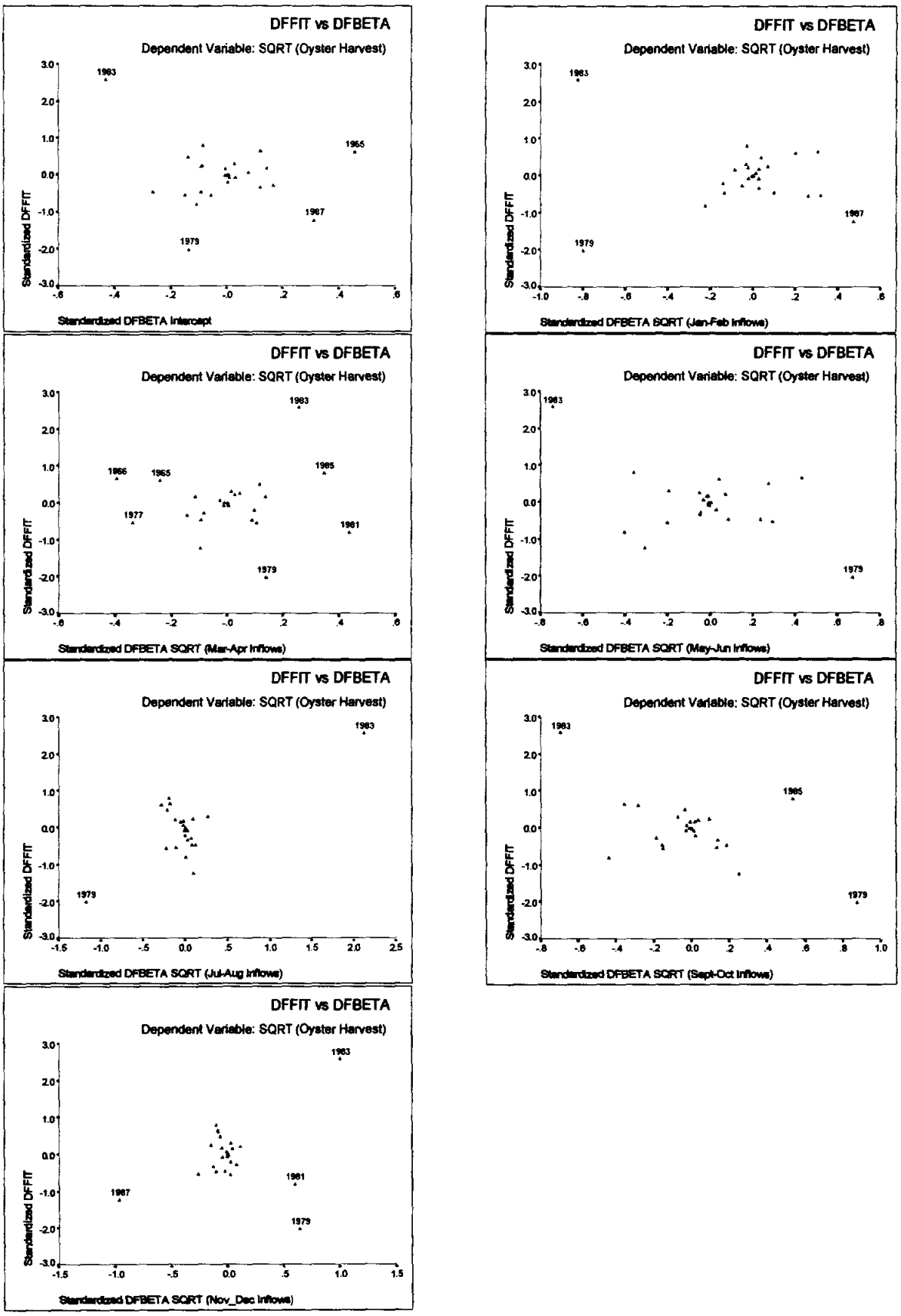


Fig. 7.4. Standardized DFFIT vs. Standardized DFBETA.

Regression –Untransformed and Logged Variables
(Box-Cox Transformation)

ANOVA and Parameter Estimates

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	Ln (November-December Inflows), Ln (March-April Inflows), May-June Inflows, Ln (September-October Inflows), Ln (July-August Inflows), January-February Inflows[c,d]	.	.601	.362	.160	1379.10	1.721

a. Dependent Variable: Oyster Harvest

b. Method: Enter

c. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), May-June Inflows, Ln (September-October Inflows), Ln (July-August Inflows), January-February Inflows

d. All requested variables entered.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.0E+07	6	3410665	1.793	.154[b]
	Residual	3.6E+07	19	1901907		
	Total	5.7E+07	25			

a. Dependent Variable: Oyster Harvest

b. Independent Variables: (Constant), Ln (November-December Inflows), Ln (March-April Inflows), May-June Inflows, Ln (September-October Inflows), Ln (July-August Inflows), January-February Inflows

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-5764.14	8876.900		-.649	.524	-24343.7	12815.4
	January-February Inflows	-1.698	.635	-.800	-2.674	.015	-3.026	-.369
	Ln (March-April Inflows)	562.618	784.630	.201	.717	.482	-1079.63	2204.868
	May-June Inflows	.105	.303	.085	.345	.734	-.530	.739
	Ln (July-August Inflows)	-12.220	636.990	-.005	-.019	.985	-1345.46	1321.016
	Ln (September-October Inflows)	-414.142	575.195	-.176	-.720	.480	-1618.04	789.755
	Ln (November-December Inflows)	1365.792	760.524	.501	1.796	.088	-226.002	2957.586

a. Dependent Variable: Oyster Harvest

Collinearity Diagnostics

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variance Inflation
INTERCEP	1	-5764.144584	8876.9000814	-0.649	0.5239	0.00000000
QJF_LAG	1	-1.697640	0.63477763	-2.674	0.0150	2.66359652
LN_QMA	1	562.618102	784.63040651	0.717	0.4821	2.33255810
QMJ_LAG	1	0.104735	0.30317589	0.345	0.7335	1.78522100
LN_QJA	1	-12.219564	636.99025611	-0.019	0.9849	2.03277763
LN_QSO	1	-414.141526	575.19479945	-0.720	0.4803	1.76860870
LN_QND	1	1365.792104	760.52351765	1.796	0.0884	2.31481908

Number	Eigenvalue	Condition Index	Var Prop QJF_LAG	Var Prop LN_QMA	Var Prop QMJ_LAG	Var Prop LN_QJA	Var Prop LN_QSO	Var Prop LN_QND
1	2.72132	1.00000	0.0341	0.0147	0.0254	0.0452	0.0237	0.0273
2	1.60919	1.30043	0.0004	0.0878	0.0676	0.0029	0.0960	0.0515
3	0.69651	1.97663	0.1914	0.0996	0.2692	0.0798	0.0278	0.0008
4	0.44315	2.47807	0.0051	0.0414	0.1641	0.1535	0.3584	0.3920
5	0.34037	2.82757	0.0048	0.1080	0.2138	0.6936	0.4940	0.0034
6	0.18945	3.79003	0.7642	0.6485	0.2599	0.0250	0.0000	0.5251

Residuals Diagnostics

Summary Information

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	836.2997	3903.824	2636.40	904.7429	26
Std. Predicted Value	-1.990	1.401	.000	1.000	26
Standard Error of Predicted Value	535.3875	902.5812	709.1658	97.4736	26
Adjusted Predicted Value	763.5756	4430.541	2650.58	979.1477	26
Residual	-1762.32	3971.259	-1.E-12	1202.268	26
Std. Residual	-1.278	2.880	.000	.872	26
Stud. Residual	-1.451	3.319	-.004	1.016	26
Deleted Residual	-2270.90	5275.292	-14.1740	1639.128	26
Stud. Deleted Residual	-1.497	4.983	.056	1.262	26
Mahal. Distance	2.806	9.747	5.769	1.833	26
Cook's Distance	.000	.517	.052	.103	26
Centered Leverage Value	.112	.390	.231	.073	26

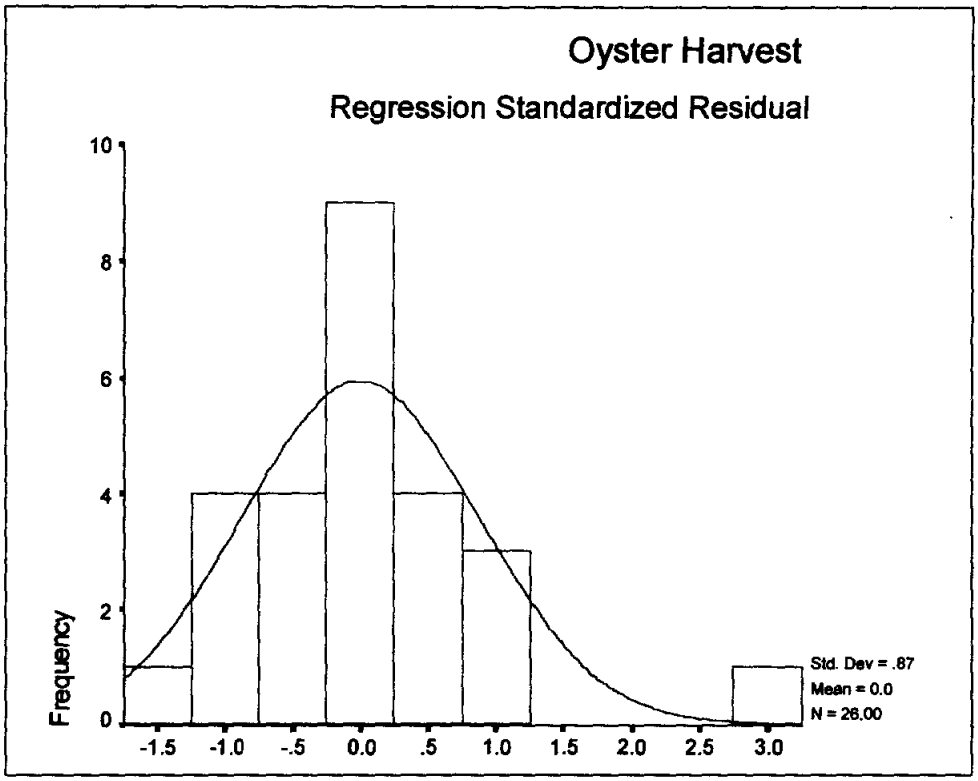
a. Dependent Variable: Oyster Harvest

Case Values for Residuals Diagnostics

YEAR	PRE	RES	DRE	ADJ	ZPR	ZRE	SRE [1]	SDR [2]
1962	876.53699	-126.63699	-184.69206	934.59206	-1.94516	-.09183	-.11089	-.10797
1963	3164.09155	-1032.79155	-1379.76781	3511.06781	.58325	-.74889	-.86560	-.85963
1964	2862.74011	58.05989	78.51199	2842.28801	.25017	.04210	.04896	.04765
1965	3017.62043	1565.67957	2086.67849	2496.62151	.42135	1.13529	1.31064	1.33758
1966	2959.53899	1123.76101	1484.27101	2599.02899	.35716	.81485	.93648	.93330
1967	3153.12743	-160.52743	-201.04744	3193.64744	.57113	-.11640	-.13027	-.12685
1968	2956.37061	-117.67061	-140.52907	2979.22907	.35365	-.08532	-.09324	-.09078
1969	2768.06716	679.13284	1046.19823	2401.00177	.14553	.49245	.61121	.60084
1970	3525.99702	324.20298	444.22305	3405.97695	.98326	.23508	.27518	.26837
1971	3218.05816	803.64184	1330.51473	2691.18527	.64289	.58273	.74980	.74085
1972	2763.94997	478.65003	616.66952	2625.93048	.14097	.34708	.39395	.38502
1973	2955.52008	-1252.22008	-1474.43475	3177.73475	.35271	-.90800	-.98528	-.98448
1974	1336.28149	-499.58149	-688.83963	1525.53963	-1.43701	-.36225	-.42537	-.41601
1975	1000.32434	236.47566	362.81772	873.98228	-1.80834	.17147	.21239	.20698
1976	3549.97236	-251.07236	-303.68979	3602.58979	1.00975	-.18206	-.20023	-.19509
1977	3679.81682	-1762.31682	-2270.89750	4188.39750	1.15327	-1.27788	-1.45059	-1.49725
1978	2367.71040	-1290.91040	-1692.30064	2769.10064	-.29698	-.93606	-1.07175	-1.07620
1979	1321.95791	-1278.85791	-2237.07525	2280.17525	-1.45284	-.92732	-1.22647	-1.24402
1980	836.29967	167.90033	240.62436	763.57564	-1.98963	.12175	.14575	.14194
1981	1994.98843	-1009.58843	-1583.46676	2568.86676	-.70895	-.73207	-.91682	-.91278
1982	3903.82452	-650.02452	-1029.97647	4283.77647	1.40086	-.47134	-.59331	-.58291
1983	2995.84096	3971.25904	5275.29130	1691.80870	.39728	2.87961	**3.31889**	**4.98302**
1984	2442.79425	-82.59425	-113.12604	2473.32604	-.21399	-.05989	-.07009	-.06823
1985	2185.27739	1099.82261	1464.04792	1821.05208	-.49862	.79750	.92012	.91622
1986	2906.70041	634.39959	757.11239	2783.98761	.29876	.46001	.50254	.49242
1987	3803.09255	-1628.19255	-2255.64078	4430.54078	1.28953	-1.18062	-1.38961	-1.42701

PRE Predicted value of harvest
RES Ordinary residual of harvest; observed minus predicted
DRE Deleted residual; residual obtained when the model is fitted without that observation
ADJ Adjusted predicted value; predicted value of harvest when the model is fitted without that observation.
ZPR Z-score of the predicted value of harvest
ZRE Z-score of the residual
SRE Studentized residual
SDR Studentized deleted residuals

[1] Values greater than 3 are flagged.
[2] This is flagged if it exceeds $t_{n-p-2,a} = t_{18,0.01} = 2.552$



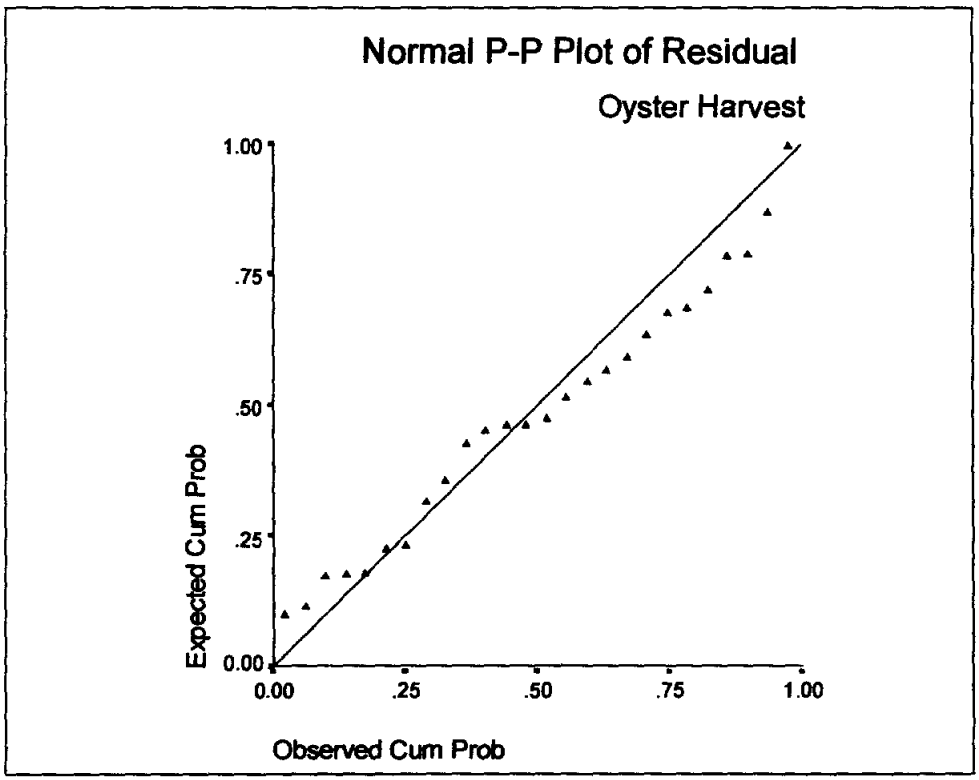


Fig. 8.1. Exploratory Plots of Oyster Harvest Standardized Residual.

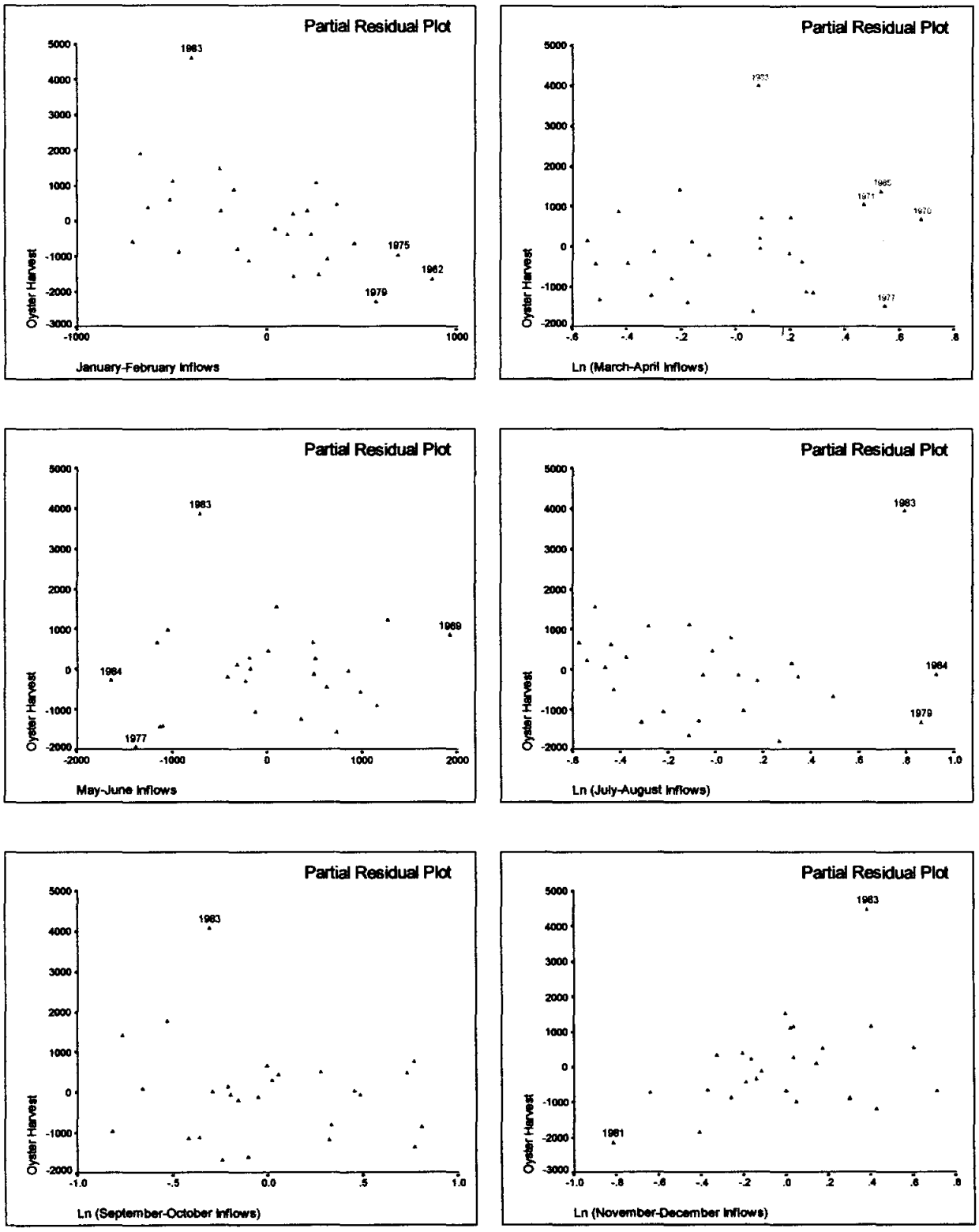


Fig. 8.2. Partial Residual Plots of Oyster Harvest vs. Untransformed and Logged Inflows.

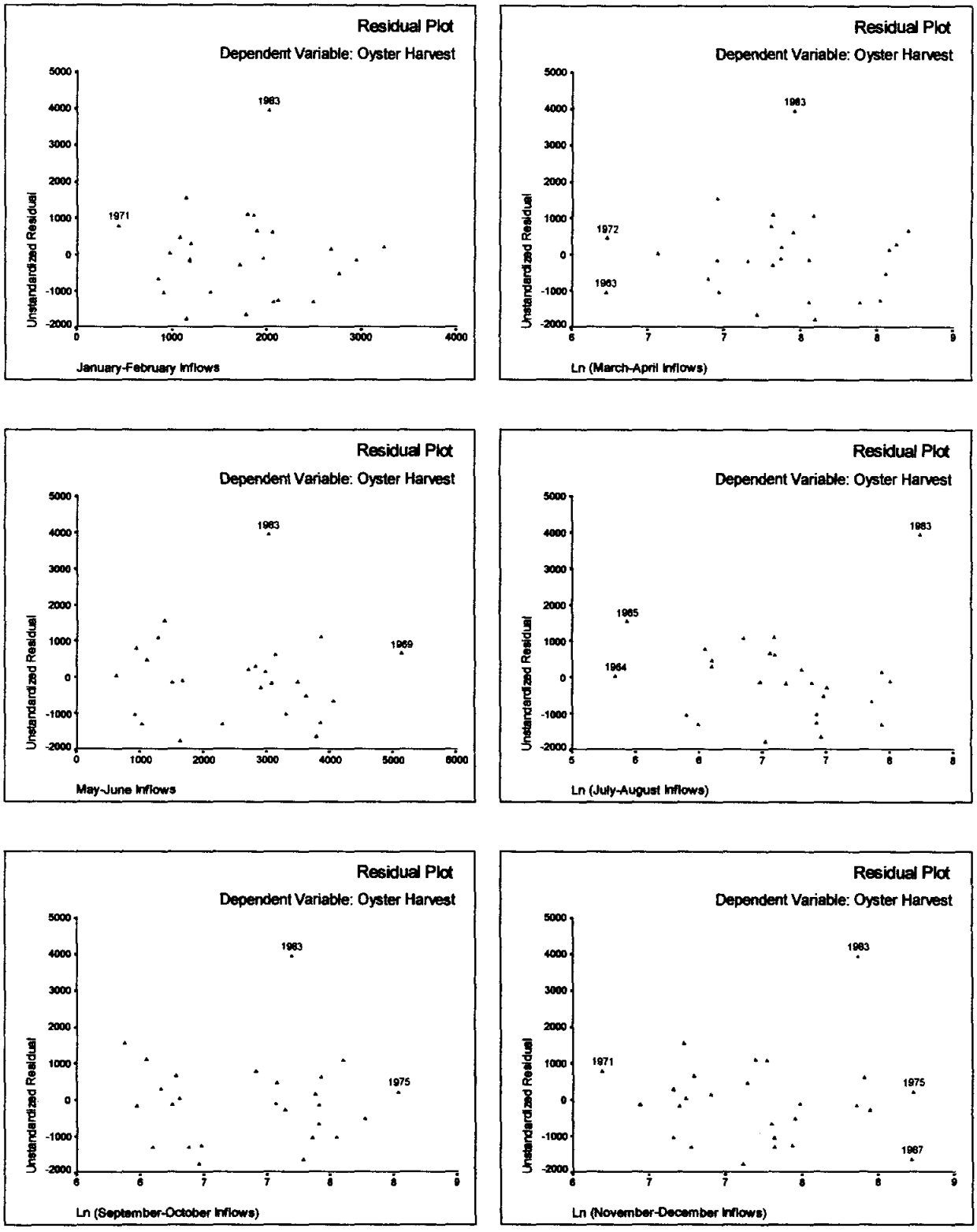


Fig. 8.3. Residual Plots of Oyster Harvest vs. Untransformed and Logged Inflows.

Prediction Intervals for Oyster Harvest

YEAR	OYSTER	LICI	UICI
1962	749.90	-3646.76377	5399.83775
1963	2131.30	-1249.71717	7577.90026
1964	2920.80	-1566.94998	7292.43020
1965	4583.30	-1393.02034	7428.26121
1966	4083.30	-1439.10013	7358.17811
1967	2992.60	-1171.73662	7477.99148
1968	2838.70	-1297.93705	7210.67827
1969	3447.20	-1817.64852	7353.78283
1970	3850.20	-920.67519	7972.66922
1971	4021.70	-1443.63791	7879.75422
1972	3242.60	-1600.80931	7128.70925
1973	1703.30	-1276.87112	7187.91129
1974	836.70	-3118.38197	5790.94495
1975	1236.80	-3580.92207	5581.57076
1976	3298.90	-723.68540	7823.63012
1977	1917.50	-685.19469	8044.82834
1978	1076.80	-2020.82946	6756.25026
1979	43.10	-3393.43130	6037.34711
1980	1004.20	-3666.12511	5338.72446
1981	985.40	-2610.31086	6600.28773
1982	3253.80	-712.40513	8520.05417
1983	6967.10	-1410.41706	7402.09898
1984	2360.20	-2003.37395	6888.96244
1985	3285.10	-2223.77673	6594.33151
1986	3541.10	-1346.54600	7159.94681
1987	2174.90	-657.54137	8263.72646

OYSTER	Oyster harvest
LICI	Lower limit for 99% prediction interval for oyster harvest
UICI	Upper limit for 99% prediction interval for oyster harvest

Outlier and Influential Point Detection

Calculated Quantities

YEAR	MAH	COO	LEV [1]	MAHA_PV [2]	COOK_PV [3]
1962	6.89682	.00081	.27587	.440	.0000
1963	5.32532	.03596	.21301	.620	.0001
1964	5.55087	.00012	.22203	.593	.0000
1965	5.28043	.08166	.21122	.626	.0012
1966	5.11063	.04019	.20443	.646	.0001
1967	4.07707	.00061	.16308	.771	.0000
1968	3.10496	.00024	.12420	.875	.0000
1969	7.80987	.02884	.31239	.350	.0000
1970	5.79295	.00400	.23172	.564	.0000
1971	8.93826	.05265	.35753	.257	.0003
1972	4.63382	.00639	.18535	.705	.0000
1973	2.80626	.02461	.11225	.902	.0000
1974	5.90719	.00979	.23629	.551	.0000
1975	7.74408	.00344	.30976	.356	.0000
1976	3.36997	.00120	.13480	.849	.0000
1977	4.63736	.08675	.18549	.704	.0015
1978	4.96811	.05102	.19872	.664	.0003
1979	9.74683	.16101	.38987	.203	.0099
1980	6.59423	.00131	.26377	.472	.0000
1981	8.09893	.06826	.32396	.324	.0007
1982	8.26081	.02939	.33043	.310	.0000
1983	5.21837	.51671	.20873	.633	.1892
1984	5.78576	.00026	.23143	.565	.0000
1985	5.25795	.04005	.21032	.629	.0001
1986	3.09046	.00698	.12362	.877	.0000
1987	5.99267	.10631	.23971	.541	.0028

MAH	Mahalonobis distance
COO	Cook's distance
LEV	Leverage value
MAHA_PV	P-value associated with the Mahalanobis distance
COOK_PV	P-value associated with Cook's distance

[1] This is flagged if it exceeds (2p+1)/n or 0.5, whichever is smaller.

[2] MAHA_PV = 1 - F(MAH), where F is the CDF of a Chi-squared variable with p + 1 degrees of freedom. Small values indicate a problem.

[3] COOK_PV = F(COO), where F is the CDF of an F-ratio random variable with p + 1 numerator degree of freedom and n - p - 1 denominator degree of freedom. A value greater than 0.5 indicates a problem. A value less than 0.2 indicates no problem. Values in between are inconclusive.

YEAR	SDFFIT	SDFB_0	SDFB_1	SDFB_2	SDFB_3	SDFB_4	SDFB_5	SDFB_6
1962	-.07311	-.02824	-.05252	.03803	.01186	-.00574	.01072	.00990
1963	-.49826	-.09958	.07142	.17407	.02615	.09934	-.13625	-.02801
1964	.02828	.01584	.00606	-.00942	-.00213	-.01190	-.00478	-.00345
1965	.77159	.42293	.18916	-.17830	.03412	-.35847	-.33924	-.00280
1966	.52862	.29088	.18427	-.26214	.30150	-.05292	-.34011	.02276
1967	-.06373	-.03499	-.00723	.03190	-.01547	-.02265	.03881	.01471
1968	-.04001	-.01687	-.00189	.00545	-.01883	.00233	.00219	.02023
1969	.44173	.08649	.07375	.04098	.31691	-.19670	-.00096	-.08276
1970	.16329	-.06161	-.07119	.12182	-.01301	-.05444	.00319	.03020
1971	.59986	-.14309	-.28936	.25577	-.24297	.02993	.29222	-.17030
1972	.20675	.10774	.02890	-.13511	.00085	-.00268	.01015	-.03895
1973	-.41472	.12215	.04512	-.15873	-.08524	.03296	.15863	-.17760
1974	-.25605	.04159	-.07291	-.06854	-.06785	.09666	-.16563	.06926
1975	.15129	.00923	.08198	-.02336	.02912	-.06369	.04893	.00542
1976	-.08931	.05350	.05038	-.02407	.01068	-.01723	.01388	-.07154
1977	-.80432	.49539	.55250	-.53049	.51653	-.21000	.16686	-.40081
1978	-.60011	.05528	-.08259	-.20030	.30362	.17536	.21349	-.20586
1979	**-1.07683**	-.25949	-.43911	.16358	.39503	-.65670	.55885	.36670
1980	.09341	.00170	.03611	.00867	-.01176	.02501	.03453	-.05998
1981	-.68818	-.29579	-.14669	.32308	-.29354	-.06312	-.37028	.51354
1982	-.44566	.04684	.20993	.09739	-.16043	-.16797	-.10400	-.00022
1983	**2.85543**	**-1.38263**	**-1.04063**	.27446	-.89214	**2.11040**	-.72170	**1.22937**
1984	-.04148	.01459	.00881	-.00414	.02877	-.03420	.00969	-.00644
1985	.52726	-.26138	-.11820	.32023	-.24260	-.13703	.33993	.01402
1986	.21657	-.08731	-.04206	.06188	.05775	-.10896	.06308	.11997
1987	-.88585	.34557	.35854	-.06085	-.27310	.08501	.06929	-.65952

SDFFITS Standardized dffits value
SDFB_0 Standardized dfbeta for the intercept term
SDFB_1 Standardized dfbeta for the January-February inflows
SDFB_2 Standardized dfbeta for the logged March-April inflows
SDFB_3 Standardized dfbeta for the May-June inflows
SDFB_4 Standardized dfbeta for the logged July-August inflows
SDFB_5 Standardized dfbeta for the logged September-October inflows
SDFB_6 Standardized dfbeta for the logged November-December inflows

Items in **bold** are flagged if |sdffits| or |sdfbeta| exceed 1.0 for a small data set or $2\sqrt{(p+1)/n}$ for a large data set. The cutoff used here is 1.

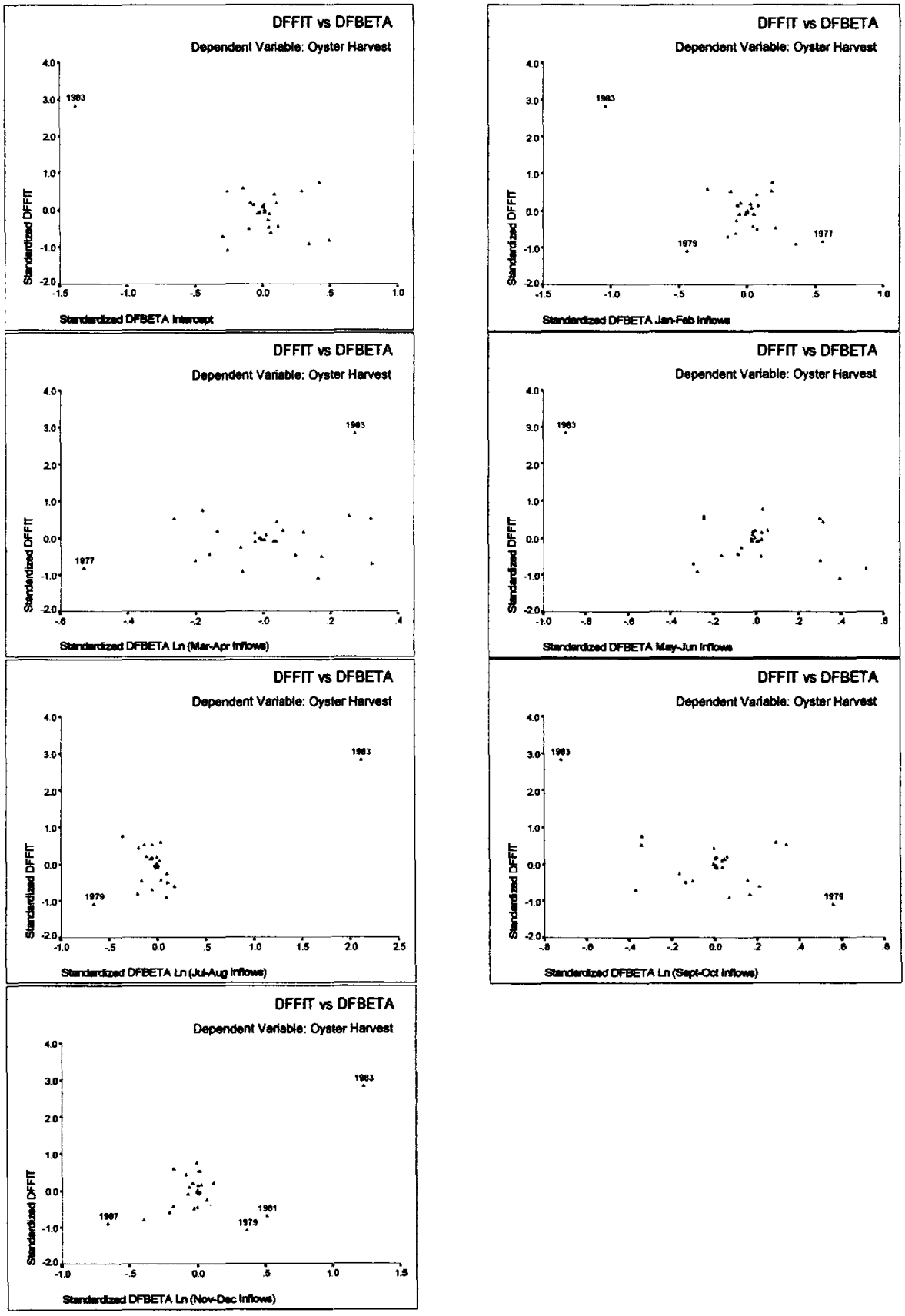


Fig. 5.4. Standardized DFFIT vs. Standardized DFBETA.

Examining Subsets of the Data

All Variables Logged: 1979 Omitted

N = 25 Regression Models for Dependent Variable: LN_OYSTE

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.252635	0.220141	4.8577	-30.5794	0.272588	-28.1417	LN_QJF
1	0.178995	0.143299	7.4056	-28.2300	0.299447	-25.7922	LN_QSO
1	0.038347	-.003464	12.2717	-24.2769	0.350745	-21.8392	LN_QND
1	0.037456	-.004393	12.3026	-24.2538	0.351070	-21.8160	LN_QJA
2	0.320083	0.258273	4.5241	-30.9440	0.259259	-27.2874	LN_QJF LN_QSO
2	0.299937	0.236295	5.2211	-30.2140	0.266941	-26.5574	LN_QJF LN_QMJ
2	0.280688	0.215296	5.8871	-29.5358	0.274281	-25.8792	LN_QJF LN_QND
2	0.266215	0.199507	6.3879	-29.0378	0.279800	-25.3812	LN_QJF LN_QMA
3	0.429744	0.348279	2.7300	-33.3411	0.227799	-28.4656	LN_QJF LN_QSO LN_QND
3	0.357046	0.265196	5.2452	-30.3414	0.256840	-25.4659	LN_QJF LN_QMJ LN_QSO
3	0.350413	0.257615	5.4747	-30.0848	0.259489	-25.2093	LN_QJF LN_QJA LN_QSO
3	0.334264	0.239159	6.0335	-29.4709	0.265940	-24.5954	LN_QJF LN_QMJ LN_QND
4	0.471415	0.365698	3.2882	-33.2382	0.221711	-27.1438	LN_QJF LN_QMJ LN_QSO LN_QND
4	0.460648	0.352778	3.6608	-32.7340	0.226227	-26.6397	LN_QJF LN_QMA LN_QSO LN_QND
4	0.453795	0.344555	3.8979	-32.4184	0.229101	-26.3240	LN_QJF LN_QJA LN_QSO LN_QND
4	0.361113	0.233335	7.1045	-28.5000	0.267976	-22.4057	LN_QJF LN_QMJ LN_QJA LN_QSO
5	0.479375	0.342368	5.0128	-31.6175	0.229865	-24.3042	LN_QJF LN_QMA LN_QMJ LN_QSO LN_QND
5	0.472164	0.333259	5.2623	-31.2736	0.233049	-23.9603	LN_QJF LN_QMJ LN_QJA LN_QSO LN_QND
5	0.469903	0.330403	5.3406	-31.1667	0.234047	-23.8535	LN_QJF LN_QMA LN_QJA LN_QSO LN_QND
5	0.370736	0.205140	8.7716	-26.8795	0.277831	-19.5662	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QND
6	0.479746	0.306328	7.0000	-29.6353	0.242462	-21.1032	LN_QJF LN_QMA LN_QMJ LN_QJA LN_QSO LN_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	LN_QJF	LN_QMA	LN_QMJ	LN_QJA	LN_QSO
1	MODEL1	PARMS	LN_OYSTE	0.52210	12.5393	-0.64970	.	.	.	.
2	MODEL1	PARMS	LN_OYSTE	0.54722	10.5133	.	.	.	.	-0.39712
3	MODEL1	PARMS	LN_OYSTE	0.59224	9.2744	.	.	.	.	.
4	MODEL1	PARMS	LN_OYSTE	0.59251	9.0105	.	.	.	-0.18824	.
5	MODEL1	PARMS	LN_OYSTE	0.50918	13.3963	-0.52033	.	.	.	-0.26125
6	MODEL1	PARMS	LN_OYSTE	0.51666	11.5959	-0.77351	.	0.24052	.	.
7	MODEL1	PARMS	LN_OYSTE	0.52372	12.1923	-0.83215	.	.	.	.
8	MODEL1	PARMS	LN_OYSTE	0.52896	12.0416	-0.72558	0.14371	.	.	.
9	MODEL1	PARMS	LN_OYSTE	0.47728	13.2079	-0.84122	.	.	.	-0.44169
10	MODEL1	PARMS	LN_OYSTE	0.50679	12.4937	-0.64006	.	0.21371	.	-0.24163
11	MODEL1	PARMS	LN_OYSTE	0.50940	13.2581	-0.62521	.	.	0.21030	-0.33091
12	MODEL1	PARMS	LN_OYSTE	0.51569	11.1470	-0.98434	.	0.25678	.	.
13	MODEL1	PARMS	LN_OYSTE	0.47086	12.2448	-0.97545	.	0.22705	.	-0.42479
14	MODEL1	PARMS	LN_OYSTE	0.47563	12.0956	-1.07498	0.24785	.	.	-0.41675
15	MODEL1	PARMS	LN_OYSTE	0.47864	13.0898	-0.92598	.	.	0.18759	-0.49888
16	MODEL1	PARMS	LN_OYSTE	0.51766	12.6864	-0.65644	.	0.15222	0.10194	-0.28104
17	MODEL1	PARMS	LN_OYSTE	0.47944	11.8310	-1.07859	0.14312	0.17319	.	-0.41440
18	MODEL1	PARMS	LN_OYSTE	0.48275	12.3302	-0.97957	.	0.20040	0.04399	-0.44018
19	MODEL1	PARMS	LN_OYSTE	0.48378	12.2627	-1.07997	0.19301	.	0.12551	-0.46054
20	MODEL1	PARMS	LN_OYSTE	0.52710	10.3649	-1.11436	0.20990	0.29713	-0.20711	.
21	MODEL1	PARMS	LN_OYSTE	0.49240	11.8996	-1.07945	0.14028	0.15540	0.03112	-0.42549

OBS	LN_QND	LN_OYSTE	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	23	0.27259	0.25264	0.22014	4.8577	-30.5794	-28.1417
2	.	-1	1	2	23	0.29945	0.17899	0.14330	7.4056	-28.2300	-25.7922
3	-0.20839	-1	1	2	23	0.35075	0.03835	-0.00346	12.2717	-24.2769	-21.8392
4	.	-1	1	2	23	0.35107	0.03746	-0.00439	12.3026	-24.2538	-21.8160
5	.	-1	2	3	22	0.25926	0.32008	0.25827	4.5241	-30.9440	-27.2874
6	.	-1	2	3	22	0.26694	0.29994	0.23630	5.2211	-30.2140	-26.5574
7	0.23309	-1	2	3	22	0.27428	0.28069	0.21530	5.8871	-29.5358	-25.8792
8	.	-1	2	3	22	0.27980	0.26621	0.19951	6.3879	-29.0378	-25.3812
9	0.52411	-1	3	4	21	0.22780	0.42974	0.34828	2.7300	-33.3411	-28.4656
10	.	-1	3	4	21	0.25684	0.35705	0.26520	5.2452	-30.3414	-25.4659
11	.	-1	3	4	21	0.25949	0.35041	0.25761	5.4747	-30.0848	-25.2093
12	0.25865	-1	3	4	21	0.26594	0.33426	0.23916	6.0335	-29.4709	-24.5954
13	0.53558	-1	4	5	20	0.22171	0.47142	0.36570	3.2882	-33.2382	-27.1438
14	0.63979	-1	4	5	20	0.22623	0.46065	0.35278	3.6608	-32.7340	-26.6397
15	0.50976	-1	4	5	20	0.22910	0.45380	0.34455	3.8979	-32.4184	-26.3240
16	.	-1	4	5	20	0.26798	0.36111	0.23334	7.1045	-28.5000	-22.4057
17	0.59966	-1	5	6	19	0.22987	0.47937	0.34237	5.0128	-31.6175	-24.3042
18	0.53087	-1	5	6	19	0.23305	0.47216	0.33326	5.2623	-31.2736	-23.9603
19	0.60459	-1	5	6	19	0.23405	0.46990	0.33040	5.3406	-31.1667	-23.8535
20	0.43200	-1	5	6	19	0.27783	0.37074	0.20514	8.7716	-26.8795	-19.5662
21	0.59505	-1	6	7	18	0.24246	0.47975	0.30633	7.0000	-29.6353	-21.1032

All Variables Squared Root: 1983 Omitted

N = 25 Regression Models for Dependent Variable: SQRT_OYSTER

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.389638	0.363101	7.2173	125.4	139.963	127.9	SQR_QJF
1	0.263803	0.231794	13.0348	130.1	168.819	132.6	SQR_QJA
1	0.073333	0.033043	21.8403	135.9	212.496	138.3	SQR_QSO
1	0.055569	0.014507	22.6616	136.4	216.569	138.8	SQR_QMA
2	0.440451	0.389583	6.8682	125.3	134.144	128.9	SQR_QJF SQR_QJA
2	0.437138	0.385969	7.0214	125.4	134.938	129.1	SQR_QJF SQR_QND
2	0.426562	0.374431	7.5104	125.9	137.473	129.5	SQR_QJF SQR_QMJ
2	0.393201	0.338037	9.0527	127.3	145.471	131.0	SQR_QJF SQR_QMA
3	0.548147	0.483597	3.8894	121.9	113.483	126.8	SQR_QJF SQR_QMJ SQR_QJA
3	0.489214	0.416245	6.6139	125.0	128.284	129.9	SQR_QJF SQR_QJA SQR_QND
3	0.476361	0.401555	7.2081	125.6	131.513	130.5	SQR_QJF SQR_QMA SQR_QND
3	0.475675	0.400772	7.2398	125.7	131.685	130.5	SQR_QJF SQR_QMJ SQR_QND
4	0.601020	0.521224	3.4450	120.8	105.214	126.9	SQR_QJF SQR_QMJ SQR_QJA SQR_QND
4	0.552098	0.462517	5.7068	123.7	118.116	129.8	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO
4	0.551710	0.462051	5.7247	123.7	118.218	129.8	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA
4	0.545064	0.454077	6.0319	124.1	119.971	130.2	SQR_QJF SQR_QMA SQR_QJA SQR_QND
5	0.607872	0.504680	5.1283	122.4	108.850	129.7	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QND
5	0.605028	0.501088	5.2597	122.6	109.639	129.9	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.553594	0.436119	7.6376	125.6	123.917	132.9	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO
5	0.551275	0.433189	7.7448	125.8	124.561	133.1	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
6	0.610647	0.480862	7.0000	124.2	114.084	132.7	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA	SQR_QMJ	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	SQR_OYST	11.8306	89.7556	-1.04310	.	.	.	.
2	MODEL1	PARMS	SQR_OYST	12.9930	74.7398	.	.	.	-0.96674	.
3	MODEL1	PARMS	SQR_OYST	14.5772	60.0430	.	.	.	.	-0.38497
4	MODEL1	PARMS	SQR_OYST	14.7163	60.7716	.	-0.32445	.	.	.
5	MODEL1	PARMS	SQR_OYST	11.5820	94.5789	-0.81810	.	.	-0.49421	.
6	MODEL1	PARMS	SQR_OYST	11.6163	86.0290	-1.28860	.	.	.	.
7	MODEL1	PARMS	SQR_OYST	11.7249	82.8647	-1.15051	.	0.23113	.	.
8	MODEL1	PARMS	SQR_OYST	12.0611	88.0630	-1.09512	0.09265	.	.	.
9	MODEL1	PARMS	SQR_OYST	10.6529	84.9355	-0.85891	.	0.44168	-0.85541	.
10	MODEL1	PARMS	SQR_OYST	11.3263	90.8627	-1.06406	.	.	-0.50036	.
11	MODEL1	PARMS	SQR_OYST	11.4679	77.5058	-1.62083	0.35706	.	.	.
12	MODEL1	PARMS	SQR_OYST	11.4754	78.9244	-1.40253	.	0.23617	.	.
13	MODEL1	PARMS	SQR_OYST	10.2574	80.8784	-1.11591	.	0.45020	-0.86877	.
14	MODEL1	PARMS	SQR_OYST	10.8681	83.3855	-0.89408	.	0.45715	-0.89212	0.09970
15	MODEL1	PARMS	SQR_OYST	10.8728	85.8013	-0.81273	-0.10375	0.48051	-0.86852	.
16	MODEL1	PARMS	SQR_OYST	10.9531	81.3538	-1.42883	0.43129	.	-0.58176	.
17	MODEL1	PARMS	SQR_OYST	10.4331	78.4486	-1.25534	0.17342	0.38736	-0.85008	.
18	MODEL1	PARMS	SQR_OYST	10.4709	82.0310	-1.11669	.	0.43347	-0.82796	-0.11676
19	MODEL1	PARMS	SQR_OYST	11.1318	84.3847	-0.85282	-0.07270	0.48044	-0.89202	0.07446
20	MODEL1	PARMS	SQR_OYST	11.1607	83.0087	-1.40619	0.40052	.	-0.54207	-0.14585
21	MODEL1	PARMS	SQR_OYST	10.6810	79.6258	-1.24399	0.15847	0.37873	-0.81742	-0.09804

OBS	SQR_QND	SQR_OYST	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	23	139.963	0.38964	0.36310	7.2173	125.450	127.888
2	.	-1	1	2	23	168.819	0.26380	0.23179	13.0348	130.136	132.574
3	.	-1	1	2	23	212.496	0.07333	0.03304	21.8403	135.889	138.326
4	.	-1	1	2	23	216.569	0.05557	0.01451	22.6616	136.363	138.801
5	.	-1	2	3	22	134.144	0.44045	0.38958	6.8682	125.277	128.934
6	0.36110	-1	2	3	22	134.938	0.43714	0.38597	7.0214	125.425	129.081
7	.	-1	2	3	22	137.473	0.42656	0.37443	7.5104	125.890	129.547
8	.	-1	2	3	22	145.471	0.39320	0.33804	9.0527	127.304	130.960
9	.	-1	3	4	21	113.483	0.54815	0.48360	3.8894	121.933	126.808
10	0.36590	-1	3	4	21	128.284	0.48921	0.41624	6.6139	124.997	129.873
11	0.55492	-1	3	4	21	131.513	0.47636	0.40156	7.2081	125.619	130.494
12	0.36725	-1	3	4	21	131.685	0.47568	0.40077	7.2398	125.651	130.527
13	0.38116	-1	4	5	20	105.214	0.60102	0.52122	3.4450	120.821	126.916
14	.	-1	4	5	20	118.116	0.55210	0.46252	5.7068	123.713	129.807
15	.	-1	4	5	20	118.218	0.55171	0.46205	5.7247	123.735	129.829
16	0.60079	-1	4	5	20	119.971	0.54506	0.45408	6.0319	124.103	130.197
17	0.47347	-1	5	6	19	108.850	0.60787	0.50468	5.1283	122.388	129.702
18	0.44340	-1	5	6	19	109.639	0.60503	0.50109	5.2597	122.569	129.882
19	.	-1	5	6	19	123.917	0.55359	0.43612	7.6376	125.629	132.943
20	0.66249	-1	5	6	19	124.561	0.55127	0.43319	7.7448	125.759	133.072
21	0.51779	-1	6	7	18	114.084	0.61065	0.48086	7.0000	124.211	132.743

All Variables Squared Root: 1979 Omitted

N = 25 Regression Models for Dependent Variable: SQR_OYST

In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.234539	0.201258	3.0737	128.0	155.164	130.5	SQR_QJF
1	0.166674	0.130442	5.2081	130.2	168.921	132.6	SQR_QSO
1	0.023867	-.018574	9.6993	134.1	197.869	136.5	SQR_QND
1	0.013664	-.029220	10.0202	134.4	199.937	136.8	SQR_QMA
2	0.278288	0.212678	3.6978	128.6	152.946	132.2	SQR_QJF SQR_QSO
2	0.274168	0.208184	3.8274	128.7	153.819	132.4	SQR_QJF SQR_QMJ
2	0.269651	0.203256	3.9694	128.9	154.776	132.5	SQR_QJF SQR_QND
2	0.263906	0.196989	4.1501	129.0	155.994	132.7	SQR_QJF SQR_QJA
3	0.371470	0.281680	2.7672	127.1	139.541	132.0	SQR_QJF SQR_QSO SQR_QND
3	0.333800	0.238628	3.9520	128.6	147.905	133.4	SQR_QJF SQR_QJA SQR_QSO
3	0.321533	0.224610	4.3377	129.0	150.628	133.9	SQR_QJF SQR_QMA SQR_QND
3	0.312169	0.213907	4.6322	129.4	152.707	134.2	SQR_QJF SQR_QMJ SQR_QND
4	0.412680	0.295216	3.4712	127.4	136.912	133.5	SQR_QJF SQR_QJA SQR_QSO SQR_QND
4	0.400604	0.280724	3.8510	127.9	139.727	134.0	SQR_QJF SQR_QMJ SQR_QSO SQR_QND
4	0.399447	0.279337	3.8873	128.0	139.997	134.1	SQR_QJF SQR_QMA SQR_QSO SQR_QND
4	0.337735	0.205282	5.8282	130.4	154.383	136.5	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO
5	0.426912	0.276100	5.0236	128.8	140.625	136.1	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.418563	0.265554	5.2861	129.2	142.674	136.5	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.409718	0.254381	5.5643	129.5	144.845	136.8	SQR_QJF SQR_QMA SQR_QMJ SQR_QSO SQR_QND
5	0.339720	0.165962	7.7658	132.3	162.021	139.6	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO
6	0.427662	0.236882	7.0000	130.8	148.244	139.3	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA	SQR_QMJ	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	SQR_OYST	12.4565	81.8209	-0.77537	.	.	.	.
2	MODEL1	PARMS	SQR_OYST	12.9970	69.1762	.	.	.	.	-0.55970
3	MODEL1	PARMS	SQR_OYST	14.0666	58.1419	.	.	.	.	.
4	MODEL1	PARMS	SQR_OYST	14.1399	56.8146	.	-0.15458	.	.	.
5	MODEL1	PARMS	SQR_OYST	12.3671	85.5854	-0.60218	.	.	.	-0.32283
6	MODEL1	PARMS	SQR_OYST	12.4024	75.3555	-0.88866	.	0.22550	.	.
7	MODEL1	PARMS	SQR_OYST	12.4409	79.6514	-1.01367	.	.	.	.
8	MODEL1	PARMS	SQR_OYST	12.4897	78.5607	-0.92096	.	.	0.32066	.
9	MODEL1	PARMS	SQR_OYST	11.8128	84.2612	-0.91236	.	.	.	-0.54411
10	MODEL1	PARMS	SQR_OYST	12.1616	82.1072	-0.75593	.	.	0.45739	-0.42334
11	MODEL1	PARMS	SQR_OYST	12.2731	70.6974	-1.38267	0.38547	.	.	.
12	MODEL1	PARMS	SQR_OYST	12.3575	72.8609	-1.14087	.	0.23374	.	.
13	MODEL1	PARMS	SQR_OYST	11.7009	81.3440	-1.02264	.	.	0.39653	-0.61483
14	MODEL1	PARMS	SQR_OYST	11.8206	78.3177	-1.02462	.	0.19477	.	-0.51046
15	MODEL1	PARMS	SQR_OYST	11.8320	77.0562	-1.19979	0.28892	.	.	-0.48581
16	MODEL1	PARMS	SQR_OYST	12.4251	80.1105	-0.78057	.	0.08355	0.38404	-0.39360
17	MODEL1	PARMS	SQR_OYST	11.8586	76.4819	-1.21755	0.21316	.	0.33486	-0.56082
18	MODEL1	PARMS	SQR_OYST	11.9446	78.8893	-1.05639	.	0.10229	0.30592	-0.58100
19	MODEL1	PARMS	SQR_OYST	12.0351	75.4756	-1.17762	0.18960	0.13296	.	-0.48288
20	MODEL1	PARMS	SQR_OYST	12.7287	81.2043	-0.73669	-0.07877	0.11055	0.37852	-0.41844
21	MODEL1	PARMS	SQR_OYST	12.1755	76.0495	-1.20924	0.18943	0.04057	0.30579	-0.55341

OBS	SQR_QND	SQR_OYST	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	23	155.164	0.23454	0.20126	3.0737	128.028	130.465
2	.	-1	1	2	23	168.921	0.16667	0.13044	5.2081	130.151	132.589
3	-0.19633	-1	1	2	23	197.869	0.02387	-0.01857	9.6993	134.106	136.543
4	.	-1	1	2	23	199.937	0.01366	-0.02922	10.0202	134.366	136.803
5	.	-1	2	3	22	152.946	0.27829	0.21268	3.6978	128.556	132.213
6	.	-1	2	3	22	153.819	0.27417	0.20818	3.8274	128.699	132.355
7	0.30411	-1	2	3	22	154.776	0.26965	0.20326	3.9694	128.854	132.510
8	.	-1	2	3	22	155.994	0.26391	0.19699	4.1501	129.050	132.706
9	0.54733	-1	3	4	21	139.541	0.37147	0.28168	2.7672	127.100	131.976
10	.	-1	3	4	21	147.905	0.33380	0.23863	3.9520	128.555	133.431
11	0.51521	-1	3	4	21	150.628	0.32153	0.22461	4.3377	129.011	133.887
12	0.31659	-1	3	4	21	152.707	0.31217	0.21391	4.6322	129.354	134.230
13	0.50671	-1	4	5	20	136.912	0.41268	0.29522	3.4712	127.405	133.499
14	0.54269	-1	4	5	20	139.727	0.40060	0.28072	3.8510	127.914	134.008
15	0.67949	-1	4	5	20	139.997	0.39945	0.27934	3.8873	127.962	134.056
16	.	-1	4	5	20	154.383	0.33773	0.20528	5.8282	130.407	136.502
17	0.61053	-1	5	6	19	140.625	0.42691	0.27610	5.0236	128.792	136.105
18	0.51355	-1	5	6	19	142.674	0.41856	0.26555	5.2861	129.153	136.466
19	0.63089	-1	5	6	19	144.845	0.40972	0.25438	5.5643	129.531	136.844
20	.	-1	5	6	19	162.021	0.33972	0.16596	7.7658	132.332	139.645
21	0.60169	-1	6	7	18	148.244	0.42766	0.23688	7.0000	130.759	139.291

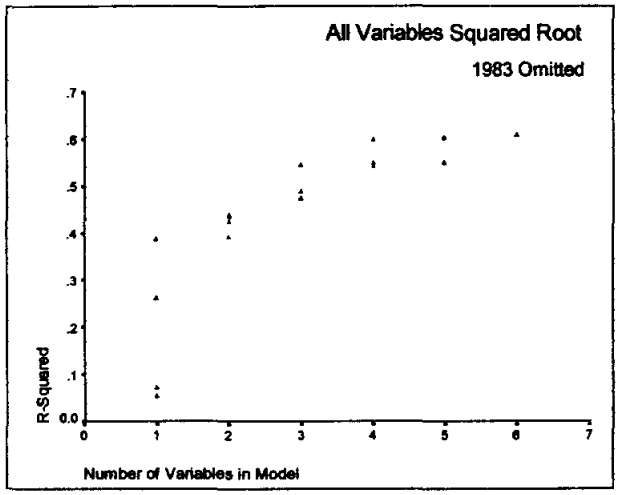
All Variables Squared Root: 1983 and 1979 Omitted

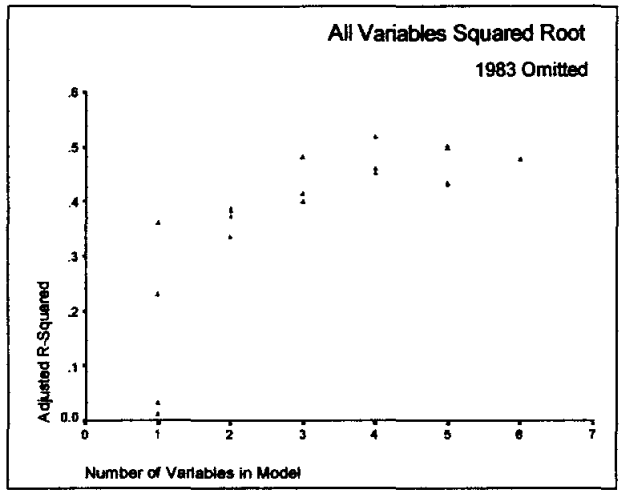
N = 24 Regression Models for Dependent Variable: SQR_OYST

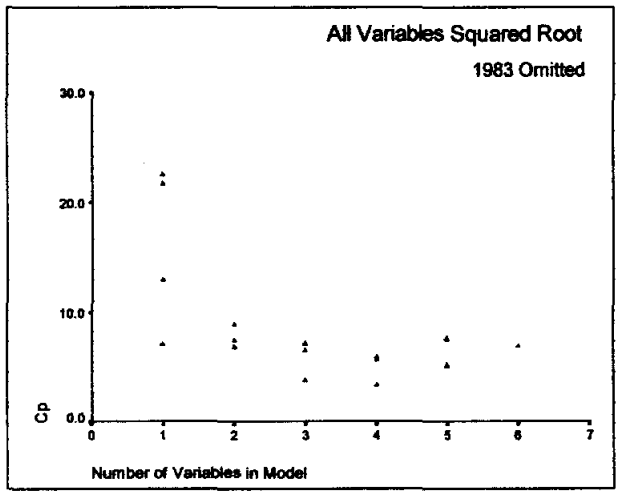
In	R-square	Adj Rsq	C(p)	AIC	MSE	SBC	Variables in Model
1	0.388080	0.360265	3.4326	112.0	98.250	114.4	SQR_QJF
1	0.257275	0.223515	8.4415	116.7	119.252	119.0	SQR_QSO
1	0.168128	0.130316	11.8553	119.4	133.565	121.7	SQR_QJA
1	0.103216	0.062453	14.3410	121.2	143.987	123.5	SQR_QND
2	0.450983	0.398696	3.0238	111.4	92.348	114.9	SQR_QJF SQR_QSO
2	0.423400	0.368486	4.0800	112.6	96.987	116.1	SQR_QJF SQR_QMJ
2	0.407723	0.351316	4.6804	113.2	99.624	116.8	SQR_QJF SQR_QMA
2	0.404598	0.347893	4.8000	113.4	100.150	116.9	SQR_QJF SQR_QJA
3	0.494657	0.418856	3.3514	111.4	89.251	116.1	SQR_QJF SQR_QSO SQR_QND
3	0.488228	0.411462	3.5976	111.7	90.387	116.4	SQR_QJF SQR_QMJ SQR_QJA
3	0.476182	0.397609	4.0588	112.3	92.514	117.0	SQR_QJF SQR_QMJ SQR_QSO
3	0.454206	0.372337	4.9004	113.3	96.396	118.0	SQR_QJF SQR_QJA SQR_QSO
4	0.519894	0.418819	4.3850	112.2	89.257	118.1	SQR_QJF SQR_QMJ SQR_QSO SQR_QND
4	0.517122	0.415464	4.4911	112.3	89.772	118.2	SQR_QJF SQR_QMA SQR_QSO SQR_QND
4	0.506967	0.403171	4.8800	112.8	91.660	118.7	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO
4	0.506617	0.402747	4.8934	112.8	91.725	118.7	SQR_QJF SQR_QMJ SQR_QJA SQR_QND
5	0.550093	0.425119	5.2285	112.6	88.290	119.7	SQR_QJF SQR_QMJ SQR_QJA SQR_QSO SQR_QND
5	0.526703	0.395232	6.1242	113.8	92.880	120.9	SQR_QJF SQR_QMA SQR_QMJ SQR_QSO SQR_QND
5	0.526386	0.394827	6.1363	113.9	92.942	120.9	SQR_QJF SQR_QMA SQR_QJA SQR_QSO SQR_QND
5	0.517737	0.383775	6.4675	114.3	94.639	121.4	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QND
6	0.556061	0.399376	7.0000	114.3	92.243	122.6	SQR_QJF SQR_QMA SQR_QMJ SQR_QJA SQR_QSO SQR_QND

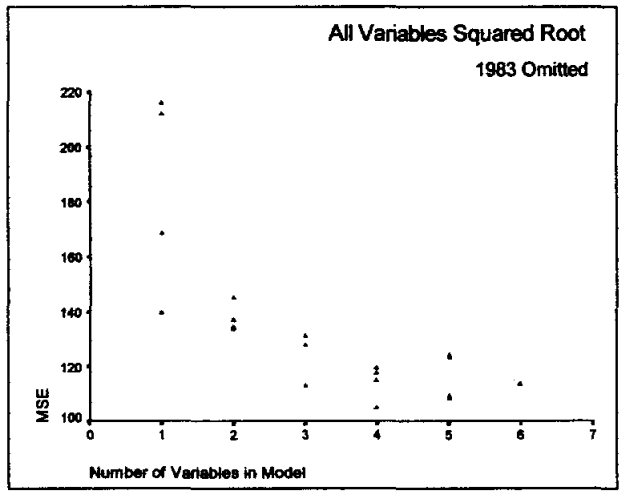
OBS	_MODEL_	_TYPE_	_DEPVAR_	_RMSE_	INTERCEP	SQR_QJF	SQR_QMA	SQR_QMJ	SQR_QJA	SQR_QSO
1	MODEL1	PARMS	SQR_OYST	9.9121	84.2411	-0.87354	.	.	.	.
2	MODEL1	PARMS	SQR_OYST	10.9202	69.2845	.	.	.	.	-0.60658
3	MODEL1	PARMS	SQR_OYST	11.5570	67.7914	.	.	.	-0.67315	.
4	MODEL1	PARMS	SQR_OYST	11.9995	63.1494	.	.	.	.	.
5	MODEL1	PARMS	SQR_OYST	9.6098	88.1867	-0.69340	.	.	.	-0.33699
6	MODEL1	PARMS	SQR_OYST	9.8482	78.8698	-0.96492	.	0.18570	.	.
7	MODEL1	PARMS	SQR_OYST	9.9812	80.7921	-0.96895	0.17937	.	.	.
8	MODEL1	PARMS	SQR_OYST	10.0075	86.9582	-0.77576	.	.	-0.24005	.
9	MODEL1	PARMS	SQR_OYST	9.4473	87.1712	-0.87627	.	.	.	-0.47144
10	MODEL1	PARMS	SQR_OYST	9.5072	80.9261	-0.81249	.	0.32865	-0.54695	.
11	MODEL1	PARMS	SQR_OYST	9.6184	83.3116	-0.78506	.	0.15801	.	-0.31097
12	MODEL1	PARMS	SQR_OYST	9.8181	89.1663	-0.66083	.	.	-0.11102	-0.31333
13	MODEL1	PARMS	SQR_OYST	9.4476	82.2921	-0.96808	.	0.15813	.	-0.44546
14	MODEL1	PARMS	SQR_OYST	9.4748	81.4780	-1.10180	0.22599	.	.	-0.42728
15	MODEL1	PARMS	SQR_OYST	9.5739	83.3309	-0.73196	.	0.27574	-0.41377	-0.20341
16	MODEL1	PARMS	SQR_OYST	9.5773	79.3674	-0.95349	.	0.34901	-0.59734	.
17	MODEL1	PARMS	SQR_OYST	9.3962	82.3180	-0.91425	.	0.27473	-0.40982	-0.33803
18	MODEL1	PARMS	SQR_OYST	9.6374	80.1225	-1.08373	0.14281	0.11184	.	-0.42516
19	MODEL1	PARMS	SQR_OYST	9.6406	82.2444	-1.08190	0.26383	.	-0.19452	-0.37798
20	MODEL1	PARMS	SQR_OYST	9.7283	76.8271	-1.09816	0.18082	0.28305	-0.57665	.
21	MODEL1	PARMS	SQR_OYST	9.6043	80.2857	-1.02330	0.13376	0.22979	-0.40426	-0.32047

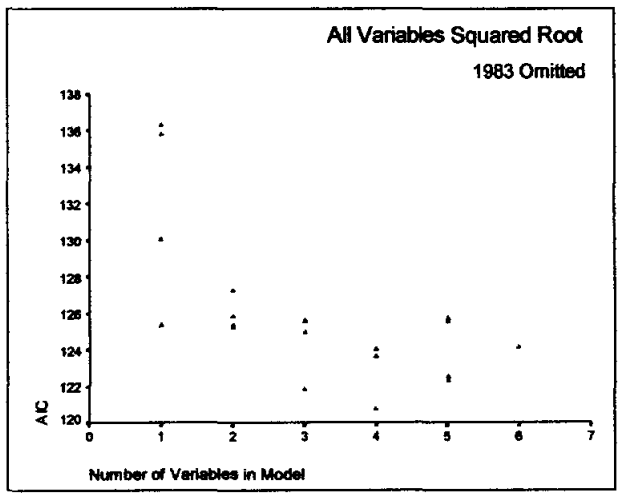
OBS	SQR_QND	SQR_OYST	_IN_	_P_	_EDF_	_MSE_	_RSQ_	_ADJRSQ_	_CP_	_AIC_	_SBC_
1	.	-1	1	2	22	98.250	0.38808	0.36027	3.4326	112.012	114.368
2	.	-1	1	2	22	119.252	0.25728	0.22352	8.4415	116.661	119.017
3	.	-1	1	2	22	133.565	0.16813	0.13032	11.8553	119.382	121.738
4	-0.36588	-1	1	2	22	143.987	0.10322	0.06245	14.3410	121.185	123.541
5	.	-1	2	3	21	92.348	0.45098	0.39870	3.0238	111.409	114.943
6	.	-1	2	3	21	96.987	0.42340	0.36849	4.0800	112.585	116.119
7	.	-1	2	3	21	99.624	0.40772	0.35132	4.6804	113.229	116.763
8	.	-1	2	3	21	100.150	0.40460	0.34789	4.8000	113.355	116.889
9	0.33531	-1	3	4	20	89.251	0.49466	0.41886	3.3514	111.419	116.131
10	.	-1	3	4	20	90.387	0.48823	0.41146	3.5976	111.723	116.435
11	.	-1	3	4	20	92.514	0.47618	0.39761	4.0588	112.281	116.993
12	.	-1	3	4	20	96.396	0.45421	0.37234	4.9004	113.267	117.980
13	0.33546	-1	4	5	19	89.257	0.51989	0.41882	4.3850	112.190	118.080
14	0.44288	-1	4	5	19	89.772	0.51712	0.41546	4.4911	112.328	118.218
15	.	-1	4	5	19	91.660	0.50697	0.40317	4.8800	112.827	118.718
16	0.19944	-1	4	5	19	91.725	0.50662	0.40275	4.8934	112.844	118.735
17	0.33321	-1	5	6	18	88.290	0.55009	0.42512	5.2285	112.631	119.699
18	0.40339	-1	5	6	18	92.880	0.52670	0.39523	6.1242	113.847	120.915
19	0.45978	-1	5	6	18	92.942	0.52639	0.39483	6.1363	113.863	120.931
20	0.29489	-1	5	6	18	94.639	0.51774	0.38378	6.4675	114.297	121.366
21	0.39687	-1	6	7	17	92.243	0.55606	0.39938	7.0000	114.310	122.556











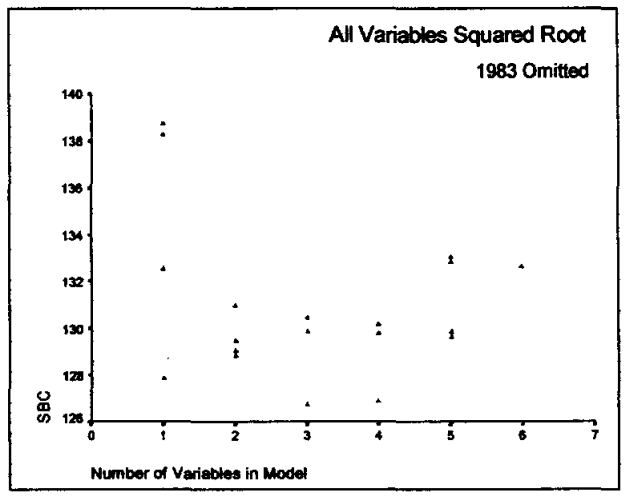


Fig. 6. Examining Subsets of All Variables Squared Root Data: 1983 Omitted.