

## **Appendix G – Socioeconomic Analysis of Region C Water Supply Alternative from Toledo Bend Reservoir**

### **Introduction**

In order to test the overall validity of the methodology described in Appendix C of this report, the Project Team conducted a socioeconomic impact analysis of the Toledo Bend Interbasin Transfer Project (“TBIBT”). The TBIBT was included in the 2007 State Water Plan as a recommended water management strategy for Tarrant Regional Water District (“TRWD”) and North Texas Municipal Water District (“NTMWD”), and an alternative water management strategy for Dallas Water Utilities (“DWU”). The TBIBT provides for the transfer of up to 600,000 acre feet of water, divided equally between TRWD, NTMWD, and DWU, and 100,000 acre feet to the upper basin of the Sabine River Authority (“SRA”).<sup>1</sup> This water supply alternative was chosen as the initial project to be studied herein due to recent activities involving the potential use of Toledo Bend Reservoir water and the fact that the vast majority of the required data is readily available and can be objectively applied.

An interbasin water transfer involves the taking of water from one state defined river basin and transporting that water to another state defined river basin. For this water supply alternative, the TBIBT would transfer water from the Sabine River Basin’s Toledo Bend Reservoir, giving this basin the classification of the “Basin of Origin.”

The analysis discussed below provides for the estimated benefits of the TBIBT with and without DWU participation. The Project Team chose to conduct both scenarios based on a recent Schaumburg and Polk, Inc., Freeze & Nichols, Inc., and Alan Plummer Associates, Inc. (“Polk, Nichols and Plummer”) draft update to construction costs for the TBIBT.<sup>2</sup> In that report, the estimated construction costs are provided for the same two scenarios.

### **Underlying Assumptions Concerning the Basin of Origin**

With respect to the TBIBT project, the Project Team premised the analysis on the following key assumptions:<sup>3</sup>

- As stated in Appendix C, each water supply alternative is assumed to commence construction, if required, or delivery as of January 1, 2009;
- It is assumed that the TBIBT will take seven (7) years from January 1, 2009 to be constructed, allowing 2016 to be the first year of benefits related to the physical transfer of water;
- Increased water supply for SRA will provide opportunity to have more households, and therefore more commerce, in Harrison, Rusk and Hunt Counties;<sup>4</sup>

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<sup>1</sup> Alternatively, the TBIBT has been evaluated without DWU participation for delivery of a total of 500,000 acre feet per year.

<sup>2</sup> Schaumburg and Polk, Inc., Freeze & Nichols, Inc., Alan Plummer Associates, Inc. “East Texas Region, Special Study No. 1: Inter-Regional Coordination of the Toledo Bend Project.” Prepared for the East Texas Regional Water Planning Group. March, 2009 Draft.

<sup>3</sup> A more detailed discussion of the general assumptions related to IMPLAN is included in Appendix C

<sup>4</sup> It is assumed that if the 100,000 acre feet of water is not made available to SRA via the TBIBT, these counties may not achieve population growth as projected in the TWDB population growth statistics. These counties were chosen

- SRA will begin receiving maintenance fees as of January 1, 2009, thus providing an additional economic influx of monies into the Basin of Origin;
- SRA will begin receiving Interbasin Transfer Fees in 2016 based on the amount of water being transferred, thus providing an additional economic influx of monies into the Basin of Origin; and
- Payments for easements for the pipeline will provide one time benefits to the counties where the pipeline is projected to be built.<sup>5</sup>

### **Beginning Date of the Project**

The start date of January 1, 2009 provides for a number of benefits with respect to the analysis. As discussed in Appendix C, the latest IMPLAN data is based on calendar year 2007. These inputs can easily be inflated through 2008 to provide for reasonably accurate initial data. Additionally, by using January 1, 2009, SRA's actual 2008 investment and operating expenses can be used to determine the maintenance and interbasin transfer fees assumed to be paid to SRA by the other water supply participants. Finally, this analysis can be easily reproduced utilizing a new start date where such date is chosen based on the latest available actual data.

### **Construction Completion Date of Seven Years**

The analysis of the TBIBT project assumes that the project will begin transferring water within seven (7) years of January 1, 2009. This timeframe has been used not only to allow for construction time, but also to allow for pre-construction activities including, but not limited to, design and easement acquisition. Therefore, the economic benefits for the Basin of Origin due to increases in commerce are assumed to begin in 2016. However, as will be discussed in greater detail below, the calculated benefits are constrained by either projected population growth and/or projected annual water deliveries to the Receiving Basin.

## **IMPACTS TO THE BASIN OF ORIGIN**

### **Increased Commerce due to Increased Water Supply to Basin of Origin**

It is the understanding of the Project Team that the Sabine River Basin will not only be the Basin of Origin from which water will be taken, but will also be able to transport up to 100,000 acre feet per year via the TBIBT pipeline to the upper portions of the river basin. Based on the Polk, Nichols and Plummer study, SRA would take TBIBT water from that portion of the pipeline that is constructed close to the Longview area and Lake Tawakoni, both areas which are considered within the upper Sabine River Basin.<sup>6</sup> Information included in the 1999 Sabine Watershed Management Plan<sup>7</sup> and previous studies of the TBIBT<sup>8</sup> state that the greatest likelihood of

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as they have been noted in prior studies and/or in the 2006 regional plans as having potential water shortages during the review period.

<sup>5</sup> While the Project Team recognizes that economic benefit will be realized from the construction of the pipeline, construction wages and salaries are not included in this analysis as there are no certainties that the construction will include local workers as opposed to workers imported from urban areas. This produces a more conservative estimate of the anticipated economic impacts.

<sup>6</sup> Schaumburg and Polk, Inc., Freeze & Nichols, Inc., Alan Plummer Associates, Inc. "East Texas Region, Special Study No. 1: Inter-Regional Coordination of the Toledo Bend Project." Prepared for the East Texas Regional Water Planning Group. March, 2009 Draft, page 2-2.

<sup>7</sup> Comprehensive Sabine Watershed Management Plan (1999).

potential increase in commerce driven by demands related to new residents would be in Harrison, Rusk, and Wood counties. However, the Project Team has replaced Wood County data with Hunt County data in the analysis as the 2006 Region D plan showed significant growth in Hunt County, with actual and anticipated shortages during the planning period. Given the currently planned locations from which SRA will take TBIBT transported water, Harrison, Rusk, and Hunt counties appear to be the likely beneficiaries of the increase in water supply.

As of the writing of this report, the TWDB approved population projections through 2060 for Harrison, Rusk, and Hunt counties have not been altered from the 2007 State Water Plan. Therefore, the analysis incorporates these ten year projections and computes an effective annual change based on each identified ten-year period.<sup>9</sup> The underlying assumption with respect to population growth is that such changes would not occur if these counties are in a water shortage or need situation. Conversely, inclusion of increased water supply cannot be assumed to provide more residents than the current projected population increase. Therefore, the Project Team has limited the potential economic benefits due to new residents to the lesser of the additional population included in the TWDB projections or the additional households that could be supported by the TBIBT water supply.<sup>10</sup>

With the assumption that the TBIBT will begin supplying water in 2016, and the assumption that the three counties will grow as projected given the additional water availability, the economic benefits for SRA are assumed to begin in 2016. The computation of these benefits begins with the following major components:

- Average household income for each county as reported by IMPLAN for 2007;
- Computation of disposable income in each county based on an IMPLAN analysis of \$1,000,000 of total spending;
- Computation of locally spent income in each county using the results of the \$1,000,000 shown to be spent locally; and
- Computation of a county specific multiplier effect using the results of the \$1,000,000 of total spending.

The reported 2007 average income per household is multiplied by the percentage of disposable income in order to restrict the spending to income not used to pay taxes or put into savings by households. The locally spent percentage is applied to the disposable income in order to remove household income that is spent in areas outside of the county. Within the IMPLAN data, each county has a varying amount of income that is reportedly spent not only outside of the county (domestic trade), but also outside of the country (foreign trade). As shown on Table 1, Harrison, Rusk, and Hunt counties have less than 40% of household income spent locally.<sup>11</sup>

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<sup>8</sup> Stowe, Jack. "Socioeconomic Analysis of Selected Interbasin Transfers in Texas." Prepared by R.W. Beck, Inc. for the Texas Water Development Board. October, 2007.

<sup>9</sup> For example, Harrison County is projected to increase its population from 2010 to 2020 by 7.97%. On an effective basis, this equates to an annual increase of 0.77%.

<sup>10</sup> The per household water demand used to compute the additional households that could be supported is based on the TWDB population and demand statistics for each of the ten year periods beginning with 2010. The number of households is based on the IMPLAN 2007 county specific data.

<sup>11</sup> This result appears reasonable given that more urban areas show a higher percentage of income spent locally.

The final IMPLAN factor used in the analysis is the multiplier effect for each of the locally spent dollars. As observed from the IMPLAN multipliers for Harrison, Rusk and Hunt counties, and as shown in Table 1, the higher the percentage of locally spent income, the greater the multiplier effect. Therefore, any increase in the number of residents in Harrison County will have a greater economic benefit than increases in Rusk and/or Hunt counties. Also noted is that the economic benefits will not necessarily increase or decrease with the level of average income per household, but rather is more heavily influenced by how much of the income is spent within the region. This is particularly important when reviewing impacts in urban areas where there is a larger variety of locally available goods and services.<sup>12</sup>

**Table 1: IMPLAN Data for Beneficiaries in Basin of Origin**

	2007 Average Income	Income Spending		Multiplier effect (ME)
		Disposable	Locally spent	
<b>Harrison County</b>				
Per Household Income (disposable, locally spent)	\$ 86,499	77.6%	38.4%	1.30
<b>Rusk County</b>				
Per Household Income (disposable, locally spent)	\$ 79,130	76.7%	35.9%	1.22
<b>Hunt County</b>				
Per Household Income (disposable, locally spent)	\$ 80,758	75.5%	38.0%	1.24

Because the IMPLAN data is based on the 2007 calendar year, the resulting locally spent income as adjusted for the multiplier must be inflated each year. In order to be conservative, the Project Team used a constant annual inflation factor of 3.84%.<sup>13</sup> Although many economists are currently predicting that inflation will be significantly greater than recent historical measurement, the use of the most recent annual change of 3.84% as a constant throughout the period of analysis is due to the Project Team's assumption that household income may not necessarily keep pace with potentially higher inflation resulting from nation-wide economic circumstances.

Once the adjusted annual locally spent income is computed, this amount is multiplied by the increase in households assumed to occur as a result of the increased new water supply, (capped at current population projections as discussed above). This computation is conducted each year from 2016 to 2060.

The resulting total annual increases are then discounted to 2008 dollars using a discount factor of 8% (shown on Schedule 3). This factor was chosen based on the 30-year average of interest rates

<sup>12</sup> Due to this result, urban areas will necessarily have greater economic impacts from changes in population than rural areas, regardless of the actual population change.

<sup>13</sup> This is the actual percentage increase in the CPI index from 2007 to 2008.

on the 30-year Treasury bill. By employing a 30-year average, the Project Team has taken into account the possibility that there will be a downward impact on the value of the dollar resulting from current nationwide economic conditions. In addition, using a higher discount factor reduces the value of the economic benefits, providing for more conservative findings. Table 2 provides a comparison of the present value impact for each additional resident from 2016 to 2060.

**Table 2: Comparison of Economic Impact of Each Additional Resident**

	<b>Trended Locally Spent Income - Present Value \$</b>
<b>Harrison County Per Household</b>	\$ 546,575
<b>Rusk County Per Household</b>	\$ 435,590
<b>Hunt County Per Household</b>	\$ 470,300

**Impact of Additional Monies for Economic Development**

It is the understanding of the Project Team that SRA will receive both maintenance fees and interbasin transfer fees for delivery of water by the TBIBT.<sup>14</sup> As there is currently no executed agreement, the Project Team has used the general parameters of the draft 2004 agreement, with modifications reflecting comments received on the draft agreement. As final agreement is reached, the terms and conditions of said agreement will need to be incorporated into any final analysis for the TBIBT. With respect to the Maintenance Fee, the computational parameters are as follows:

- The maintenance fee is based on the annual actual SRA 2008 expenditures for Account V, half of the actual annual expenditures for Account VI, inflated annually through 2060 and the actual annual debt service related to SRA’s debt to the TWDB (retired in 2034);
- The inflation factors fluctuate based on a review of inflation factors from 1977 through 2008;<sup>15</sup>
- The total annual operating costs are divided by the current permit for water of 750,000 acre feet per year; and
- The resulting cost per acre foot is multiplied times the amount to be taken by the other parties, including SRA’s portion (700,000 acre feet with DWU and 500,000 acre feet without DWU).<sup>16</sup>

<sup>14</sup> Based on a Draft Memorandum of Understanding, December, and associated comments through February 2005.

<sup>15</sup> For SRA operating costs, the Project Team included significantly higher inflation in the short term in order to take into account the possibility of increased inflation on expenditures due to current economic conditions. As stated above, these varying factors were not used to inflate annual income

<sup>16</sup> It is assumed that the Receiving Basin will pay the maintenance fees for any water taken by SRA

The Interbasin Transfer Fee is computed as follows:

- The Interbasin Transfer Fee is computed on the utility basis with a 7.5% rate of return on the net value of the Toledo Bend Reservoir and related assets;
- The return and depreciation expenses will be charged based on the amount of water taken, up to the maximum of 700,000 acre feet;
- Water will be taken from TBIBT beginning in 2016;
- Any water transfer will include a 12% lost and unaccounted for amount to reflect distribution system loss to end-use customers; and
- The resulting maintenance fees and Interbasin Transfer Fees, as totaled annually, are discounted at 8% for the period 2009 through 2060.<sup>17</sup>

For purposes of measuring potential economic benefits to the Basin of Origin, the Project Team assumes that the additional payments for operating costs and return on assets will provide additional dollars for economic development in the entire SRA basin. Therefore, by following the underlying assumption that there is a multiplier effect of every additional dollar spent within an area, the analysis includes the IMPLAN multipliers for each of the counties in the SRA Basin. In estimating the impact of economic development, the total annual maintenance and interbasin transfer fees are allocated among each of the counties in the SRA basin. As many of the counties are only partially located within the SRA Basin, the analysis allocates dollars only to the extent that households in the county are located in the SRA Basin. The Water Conservation and Drought Contingency Plan, published by the Sabine River Authority, was used to develop the allocation by county.<sup>18</sup> Such allocation ensures that the analysis does not over or under estimate the impact in any single county given that the multipliers vary.<sup>19</sup> Once the inside basin households per county are identified, the percentage of total basin households by county is then determined. These percentages are then used to allocate the annually computed maintenance and interbasin transfer fees.

The results of the allocated maintenance and interbasin transfer fees by county are adjusted each year for the IMPLAN provided multiplier effect specific to that county. This is shown on Schedule 2.<sup>20</sup> As with the other potential economic benefits computed, these results are discounted at 8% annually. Schedule 3 shows the present value of both the economic benefits of increased household commerce and the present value of the economic impact of additional monies received from maintenance and interbasin transfer fees.

### **Economic Impact of Easement Payments**

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<sup>17</sup> The discount factor for 2008-2009 is 4.83%; the 2008 30 year T-Bill interest rate. However, all other years are discounted at the 30 average for the 30 year T-Bill interest rate. The actual 2008 30 year T-bill rate is used to discount the 2009 dollars as the rate is known and measurable.

<sup>18</sup> Sabine River Authority of Texas, "Water Conservation and Drought Contingency Plan," revised December, 1999, March 2002, and March 2005, Tables 9 and 11.

<sup>19</sup> Using the IMPLAN county data, the multiplier effects of locally spent dollars vary in large part due to differences in household income and the availability of local goods and services. As shown on Schedule 2, the multiplier for Collin County is significantly higher than Rains County, but when allocated, only .7% of Collin County households are included in the Sabine River Basin, with 100% of Rains County households are included.

<sup>20</sup> The maintenance fees begin in 2009 with the interbasin transfer fees beginning in 2016, with the transfer of water.

In the updated TBIBT project costs identified in the Polk, Nichols and Plummer Study, payments are estimated for both urban and rural easements for project development.<sup>21</sup> Although the exact pipeline corridor and alignment is not included in the draft report, the influx of easement dollars into certain counties was estimated based on a mapping measurement of pipeline anticipated to be located within those counties. As this is considered to be a one-time payment, the analysis includes the amounts in only one year, computing only the percentage of locally spent income and no multiplier effect. As shown on Schedule 3, the impact is only included for 2010 in the lower basin and 2011 in the upper basin, assuming that the easement acquisitions will begin at the Toledo Bend Reservoir and continue along the pipeline planned location.

Given the above analysis, the tables below present the present value of the Project Team’s estimated socioeconomic impact of the Toledo Bend Reservoir water supply alternative on the basin of origin. Table 3 presents this analysis assuming the participation of DWU, while Table 4 presents this analysis without the participation of DWU.

**Table 3: Comparison of Total Economic Benefits to the Basin of Origin with DWU Participation (Scenario I)**

	<b>Trended Economic Benefits Present Value \$</b>
<b>Commerce from New Households</b>	
Harrison	\$ 2,300,000,000
Rusk	752,000,000
Hunt	\$ 5,672,000,000
<b>Economic Development</b>	
Upper Basin	\$ 95,000,000
Lower Basin	\$ 27,000,000
<b>Total Economic Benefits to Basin of Origin</b>	<b>\$ 8,846,000,000</b>

<sup>21</sup> Schaumburg and Polk, Inc., Freeze & Nichols, Inc., Alan Plummer Associates, Inc. “East Texas Region, Special Study No. 1: Inter-Regional Coordination of the Toledo Bend Project.” Prepared for the East Texas Regional Water Planning Group. March, 2009 Draft, Appendix B, Opinion of Probable Construction Costs With DWU Participation.

**Table 4: Comparison of Total Economic Benefits to the Basin of Origin without DWU Participation (Scenario II)**

	<b>Trended Economic Benefits Present Value \$</b>
<b>Commerce from New Households</b>	
Harrison	\$ 2,300,000,000
Rusk	752,000,000
Hunt	\$ 5,672,000,000
<b>Economic Development</b>	
Upper Basin	\$ 75,000,000
Lower Basin	\$ 21,000,000
<b>Total Economic Benefits to Basin of Origin</b>	<b>\$ 8,820,000,000</b>

Following this narrative, detailed schedules are included which illustrate the analysis conducted.