Appendix 6.2

Streamflow Assessments

TWDB and technical representatives from several planning groups developed a methodology to estimate the effects that surface water management strategies recommended in the 2006 Regional Water Plans might have on future streamflow. Each planning group selected points on the rivers within their region for this analysis to be conducted. In total, 156 points were chosen. TWDB, with input from the planning groups’ consultants, then developed models indicative of both current streamflow conditions and projected future conditions based on implementing water management strategies within the entire basin. For a variety of reasons, detailed verification by planning group consultants was limited, and the results presented should be treated with this qualifier.

Background and Methodology

After the 2002 State Water Plan was published, some stakeholders requested that analyses be conducted to determine the impact that recommended water management strategies would have on streamflow. In response, TWDB agreed to use the Texas Commission on Environmental Quality’s water availability models to quantitatively determine the likely streamflow alteration resulting from new water management strategies presented in the 2006 Regional Water Plans. A methodology was developed, revised based on suggestions and comments from planning groups, and finalized in May 2004. The model chosen was the Texas Commission on Environmental Quality water availability model run 8. Run 8 uses modified diversion amounts (maximum use for last 10 years), year 2000 area-capacity parameters for major reservoirs, and assumed return flows. It also includes term water rights and provides the most realistic assessment of current streamflow conditions. Run 8 was then modified to include projected increased demand from existing water rights, expected change to return flows, projected new strategies to come online before 2060, and estimated year 2060 storage capacities for major reservoirs. The combination of these two models gives a realistic assessment of current and future streamflow resulting from implementation of the 2006 Regional Water Plans and this state water plan.

Results

With input from planning groups, three to five water availability model control points were chosen within each river basin of each planning area. Control points are geographic points within the model of the basin where calculations are performed. Typically, any reservoir, water right diversion point, river confluence, or streamgage station is a model control point. Flow statistics can be derived from any control points. A total of 156 control points were chosen across the entire state for the assessments.

The following pages present maps and statistics from selected control points across the state. The median flow and 10th percentile flow are shown for both the current and future monthly streamflow. For some control points, the flow appears to increase slightly as a result of more water being imported to the basin and eventually being treated and returned to the river. The increased flow may also result from releases from new reservoirs to diversion points downstream during periods of dry weather. For other control points, the effect of proposed reservoirs clearly reduces streamflow. No generalized statement can be made on the impact water management strategies have had on streamflow for the entire state.
Figure A.6.2. Water Availability model control points for streamflow assessments.
Red River Basin Streamflow Assessment for Selected Control Points

Wichita River near Charlie (Q10000): Median Flow

- Current Condition
- Future Condition

Red River at Index (Y10000): Median Flow

- Current Condition
- Future Condition

Wichita River near Charlie (Q10000): 10th Percentile Flow

- Current Condition
- Future Condition

Red River at Index (Y10000): 10th Percentile Flow

- Current Condition
- Future Condition
Sulphur River Basin Streamflow Assessment for Selected Control Points

Sulphur River west of US 250 (E175): Median Flow

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Sulphur River below Wright Patman (F10): Median Flow

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Sulphur River west of US 250 (E175): 10th Percentile Flow

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Sulphur River below Wright Patman (F10): 10th Percentile Flow

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Appendix 6.2
Cypress River Basin Streamflow Assessment for Selected Control Points

Cypress River below Lake-O-The-Pines (B10000): Median Flow

Cypress River below confluence with Big Cypress (F10130): Median Flow

Cypress River below Lake-O-The-Pines (B10000): 10th Percentile Flow

Cypress River below Confluence with Big Cypress (F10130): 10th Percentile Flow
Sabine River Basin Streamflow Assessment for Selected Control Points

Sabine River near Burkeville (SRBU): Median Flow

Sabine River near Ruliff (SRRL): Median Flow

Sabine River near Burkeville (SRBU): 10th Percentile Flow

Sabine River near Ruliff (SRRL): 10th Percentile Flow
Neches River Basin Streamflow Assessment for Selected Control Points

Angelina River near Alto (ANAL): Median Flow

Neches River at Evadale (NEEV): Median Flow

Angelina River near Alto (ANAL): 10th Percentile Flow

Neches River at Evadale (NEEV): 10th Percentile Flow
Trinity River Basin Streamflow Assessment for Selected Control Points

Trinity River near Oakwood (8TROA): Median Flow

Trinity River below CWA Canal Diversion Point (B4261B): Median Flow

Trinity River near Oakwood (8TROA): 10th Percentile Flow

Trinity River below CWA Canal Diversion Point (B4261B): 10th Percentile Flow
San Jacinto River Basin Streamflow Assessment for Selected Control Points

San Jacinto River at Lake Houston (A4964A): Median Flow

San Jacinto River below Confluence with Buffalo Bayou (SRGB): Median Flow

San Jacinto River at Lake Houston (A4964A): 10th Percentile Flow

San Jacinto River below Confluence with Buffalo Bayou (SRGB): 10th Percentile Flow
Brazos River Basin Streamflow Assessment for Selected Control Points

Brazos River near South Bend (BRSB23): Median Flow

Brazos River Downstream of Dow Downstream Diversion Point (CON238): Median Flow

Brazos River near South Bend (BRSB23): 10th Percentile Flow

Brazos River Downstream of Dow Downstream Diversion Point (CON238): 10th Percentile Flow

Appendix 6.2
Colorado River Basin Streamflow Assessment for Selected Control Points

Colorado River at Austin (I10000): Median Flow

Colorado near Bay City (K10000): Median Flow

Colorado River at Austin (I10000): 10th Percentile Flow

Colorado near Bay City (K10000): 10th Percentile Flow
Lavaca River Basin Streamflow Assessment for Selected Control Points

Navidad River (DV501): Median Flow

Lavaca Bay (GS100): Median Flow

Navidad River (DV501): 10th Percentile Flow

Lavaca Bay (GS100): 10th Percentile Flow

Appendix 6.2
Guadalupe River Basin Streamflow Assessment for Selected Control Points

Guadalupe River at New Braunfels (CP04): Median Flow

Guadalupe Estuary Inflows (CPEST): Median Flow

Guadalupe River at New Braunfels (CP04): 10th Percentile Flow

Guadalupe Estuary Inflows (CPEST): 10th Percentile Flow
Nueces River Basin Streamflow Assessment for Selected Control Points

Nueces River near Three Rivers (CP29): Median Flow

Nueces River at Nueces Bay (CPBAY): Median Flow

Nueces River near Three Rivers (CP29): 10th Percentile Flow

Nueces River at Nueces Bay (CPBAY): 10th Percentile Flow
Rio Grande River Basin Streamflow Assessment for Selected Control Points

Rio Grande at Gage below Falcon Dam (DT1000): Median Flow

Rio Grande at Gage below Brownsville (ET0104): Median Flow

Rio Grande at Gage below Falcon Dam (DT1000): 10th Percentile Flow

Rio Grande at Gage below Brownsville (ET0104): 10th Percentile Flow