

6. River Basin Planning Tool

6.1 General Description

The RBPT is designed to support water resources planning by assessing the limitations of consumptive water use relative to supply and minimum instream flow requirements. More specifically, the planning tool simulates and analyzes the response of river basins under various hydrologic, water use, environmental, water infrastructure, and water management scenarios. Application of the RBPT provides quantitative information related to the following aspects of water management and water allocation:

- Reliability of present and future water supply subject to predefined minimum instream flow requirements
- Reliability of minimum instream flows subject to present and future water demands
- Tradeoff analysis of supply and demand management alternatives

The RBPT and associated reports were developed by the Georgia Water Resources Institute (GWRI) at the Georgia Institute of Technology with sponsorship from the Georgia Department of Natural Resources, Environmental Protection Division (Georgia EPD contract no. 761-70091).

6.2 Modeling Approach

Stepwise procedures for an assessment of surface water availability using the RBPT typically are as follows:

- Define basin and sub-basin boundaries for the assessment; boundaries are defined based on drainage area, reservoirs, water and wastewater utility service areas, political and economic boundaries, and other practical planning considerations.
- Develop assessment data and model; data include water withdrawals and returns by type, reach locations and monthly or daily amounts, water transfers in and out of sub-basins, and reservoir storage within sub-basins.
- Specify flow regime (minimum flow) requirements at each sub-basin, based on natural hydrologic criteria (e.g., unimpaired monthly 7Q10 flows), reservoir operating rules or operational history, or other instream flow measures.
- Perform gap and reliability analyses for consumptive uses and required flow regimes; requires the determination of current consumptive use (total withdrawals less returns), desired water supply reliability, and desired instream flow protection reliability.
- Evaluate management alternatives to reduce gaps, including conservation measures, storage additions, interbasin transfers, and reduced reliability of water uses and/or instream flow protections.

The RBPT has undergone several modifications and improvements since its original release in June 2008, and as a result its capabilities for analysis of complex systems have subsequently grown. Additional

Synopsis of Surface Water Availability Assessment

improvements are under consideration, driven by the requirements of the current resource assessment work. Because the RBPT is not intended for reservoir system operational analyses, several of the recent and potential pending modifications are designed to improve the interaction between the RBPT and external operational models including HEC-5, HEC-ResSim, and ACF-DSS (also developed by GWRI). Other identified areas of possible enhancement include analysis of distributed and pumped-storage reservoirs (multiple reservoirs variously located upstream of planning nodes, on main rivers or tributary streams), and additional water supply storage accounting options.