

CONSUMPTIVE WATER USE—A CRITICAL COMPONENT OF GEORGIA’S COMPREHENSIVE STATEWIDE WATER MANAGEMENT PLAN

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REFERENCE: *Proceedings of the 2007 Georgia Water Resources Conference*, held March 27–29, 2007, at The University of Georgia, Athens, Georgia..

Abstract. Water planning and management are most effective when accurate information is used to effect good water-policy decisions. Knowing how much water is withdrawn from available water resources, how much of the water is consumed, and how much is no longer available for use are necessary for effective resource management. To provide this important information, the Georgia Water-Use Program (GWUP), a cooperative project between the U.S. Geological Survey (USGS) and the Georgia Environmental Protection Division (Ga-EPD), collects, compiles, and disseminates water-use information on the major water users in the State.

As of December 2006, it appears likely that the draft version of the first comprehensive statewide water plan—to be produced by the Environmental Protection Division by July 2007—will include a policy framework that will embrace a water management that gives far greater consideration to consumptive water use. It also

appears that use of a “consumptive-use” approach to water management is not likely to be fully implemented until such time as regional water resource management plans are developed to conform to the policy framework expected to be included in the initial State plan.

The USGS defines consumptive water use as that part of water withdrawn that is not immediately available for reuse: water that is evaporated, transpired, incorporated into a product or a crop, consumed by humans or animals, or otherwise removed from the immediate environment. The USGS water-use data model for aggregated data examines the withdrawal, use, and disposition (returned or consumptively used) in a defined area, such as a county or a basin (Fig 1). Interbasin transfer of water also is considered in the USGS water-use data model, but only for major water sales from one public supplier to another. USGS consumptive use generally is reported in the county or basin of the withdrawal.

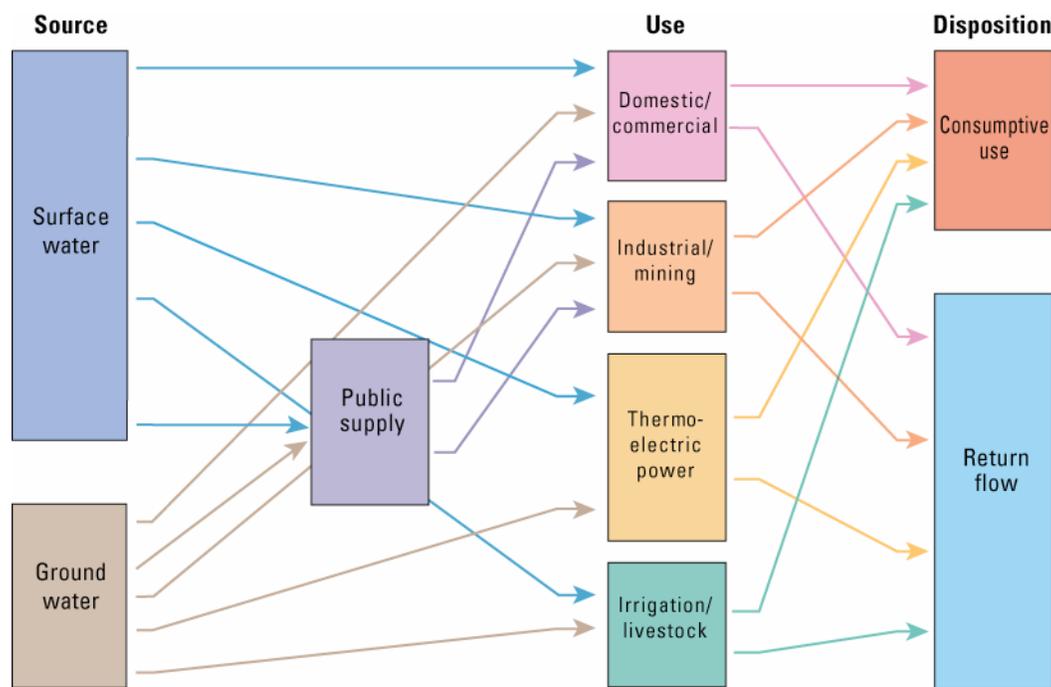


Figure 1. Schematic diagram showing source, use, and disposition of water in a typical closed system.

In one alternative approach to consumptive use in a river basin, consumptive use can represent the difference between all water withdrawn from a river segment and all water returned to the river (return flow) in a given water-use timeframe. Consumptive use in this approach is the net effect on a basin of surface-water withdrawals and return flows to surface water in that basin. Factors such as interbasin transfers, ground water returned to streams, and septic-system usage are implicit in the “net effect” calculation. This is contrasted to the USGS consumptive use, in which consumptive use is the amount of a given set of withdrawals (for a user, a basin, or a county, for instance) that is not immediately available for reuse in any location, not just in the basin of the withdrawal. The USGS approach also may not show the effect on the basin in which a withdrawal occurred unless interbasin transfers also are quantified.

Consumptive use in the “net effect” sense of the term can be computed using withdrawal data compiled by the GWUP and using reported discharge data derived from the National Pollution Discharge Elimination System (NPDES) permit information (accessed December 18, 2006, at <http://cfpub.epa.gov/npdes/>), or by using this same information directly from GaEPD files and databases. In Georgia, water withdrawal and NPDES data are stored in a variety of file locations with different reporting requirements, and no centralized database yet exists for dissemination and analysis.

If the State does not develop the means by which to determine actual consumptive water uses prior to commencement of the regional water planning process, then other means must be employed to arrive at consumptive-use figures.

Consumptive-use computations by the USGS usage of the term require the same withdrawal and discharge data, but compiled by user instead of by basin. Then information on whether each user purchased or sold water also is needed in order to determine the part of the user’s withdrawal that was consumptively used. Because data on these purchases and sales for each user often are not readily available, the GWUP developed an estimation method to determine consumptive water use in the State using coefficients for various types of water uses. Consumptive use varies by user. For example, as developed by the GWUP estimation method, the consumptive use coefficient for the pulp and paper industry is estimated to be 7 percent, whereas for the textile industries 13 percent is applied. Although the coefficient is less, more water is actually consumed by pulp and paper industries than the textiles industries because of the larger amounts of water being withdrawn for production.

Although estimates derived using coefficients can provide insight into consumptive water use, like any estimate, the results are not as valuable as actual data. In addition, the consumptive use calculations for the “net effect” approach, or some hybrid of the net effect and the coefficient approach, would require the use of actual withdrawals and discharges. As quantification of available water resources becomes increasingly critical into the future, it will be important to provide for timely and accurate data on water withdrawal, return flows, and consumptive use. The GWUP is beginning to implement a new database—the Site-Specific Water Use Data System (SWUDS)—which would provide a full water tracking system for Georgia. A centralized database providing for timely entry and analysis of water withdrawal and return-flow data would help provide a framework for sound water-management decisions.