ESTIMATING MONTHLY WATER WITHDRAWALS, RETURN FLOW AND CONSUMPTIVE USE

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Abstract Water-resource planners and scientists use water-withdrawal, return-flow, and consumptive-use data to understand the effects of humans' use of water on the hydrologic system, but the limited availability of water-use data correspondingly limits our ability to understand the effects of water use on water resources in real time. Among the many state agencies nationwide that are responsible for compiling water-use data, agency programs differ substantially regarding what data are collected, how data are organized, how often the data are collected, and when data are made available to the public. This poster will present water-use information and estimation methods from recent reports published for the U.S. Geological Survey's National Assessment of Water Availability and Use Program to assist modelers, water managers, and scientists with interest in estimating monthly water withdrawals, return flows, and consumptive use. Following are a few of the main points in the content of the poster:

Monthly data are of great value for understanding the effect of human activity in areas where potential water shortages or degraded water quality may stress aquatic life. These periods tend to be in the summer and early fall, when water temperatures are at maximum and streamflows and groundwater levels are at minimum. Summer months and early fall (June, July, August, and September) are also when water withdrawals for most water-use categories are at their highest.

In terms of maximum accuracy and minimal uncertainty, use of available withdrawal, return-flow, and consumptive-use data reported by facilities and data estimated from similar facilities is preferable over estimates based on data for a particular water-use category or groups of water-use categories.

If reported monthly data are not available, monthly withdrawals can be computed by multiplying annual withdrawal by the monthly percentage of annual withdrawals [computed from either mean or median monthly withdrawals that are typical of the water-use category].

If annual withdrawal data are not available, water withdrawals may be estimated by using median daily withdrawal rates based on water-use categories, groups, or SIC codes and multiplying the median water withdrawal rate by 365 days to get an estimated annual withdrawal.

Because many states do not compile return-flow and consumptive-use data, return flow and consumptive use are often computed with consumptive-use coefficients. Consumptive-use estimates can be computed by multiplying the monthly withdrawal by an annual, seasonal, or monthly consumptive-use coefficient. Return flow is then computed as the total withdrawal minus the consumptive use.