

Uses of Streamflow Information

Streamflow information provided by the U.S. Geological Survey is used in many ways and often the information from any give streamgage is used for not just one of the following but for many of the following purposes:

◆ **Water Supply Management**

Streamflow information is required to determine how much water is available in different locations so the citizens can make informed decisions about growth and to help assure there is an adequate water supply even during periods of drought. Today, the effects of climate change on the water available could become an issue in certain regions of the nation, and accurate long-term streamflow information is required to determine what if any impacts.

◆ **Legal Settlements – i.e., water rights, interstate agreements and court decrees**

Because of growing populations, contaminated supplies, and potentially changing supplies, the amount of water crossing political boundaries has come under much more scrutiny in recent years.

◆ **Engineering design**

Streamflow information is used for many of our nation's infrastructure designs- i.e., dams and reservoirs, water treatment plants, and roads, bridges, and culverts. It is important to have accurate information because to over design is very costly, but to under design can be even more costly.

◆ **Operations**

Most of the nation's reservoirs, rely on streamflow information to know how much water to release and when to release it, whether for flood control or for aquatic habitat. Hydropower plants, water transport systems, ecosystem managers and recreational rafters also rely on streamflow information to regulate the amount and timing of releases.

◆ **Assessing Impacts – Water Diversions, Changing Land Management & Climate Change**

Major changes in land use can have significant effects on streamflow, as can even more obvious changes in water use. In the near future it will be the effects of climate change on the amount and timing of streamflow that will get the most attention.

◆ **Flood Planning, Management & Warning Systems**

Streamflow information is used by the National Weather Service (NWS) in making flood forecasts. The streamflow information is used to check flood model results and to help calibrate the models. The Federal Emergency Management Agency (FEMA) uses streamflow information in map flood prone areas to help protect citizens from building or developing in areas that have a high probability of being flooded.

◆ **Streamflow Forecasting**

To help water management agencies do a more efficient job, more are relying on computer models to forecast the amount of water that will be available for different time periods (week, months, seasons). Streamflow information is used to help calibrate the models and to provide verification checks.

◆ **Water Quality Monitoring**

Streamflow is a key water quality monitoring parameter that is measured. Streamflow measurements help monitors assess general water quality conditions and trends, the movement of contaminants and

information is required to determine the load, or amount, of a contaminant that is moving past a given point - Total Maximum Daily Loads (TMDLs)

❖ Ecosystem & Recreational Management

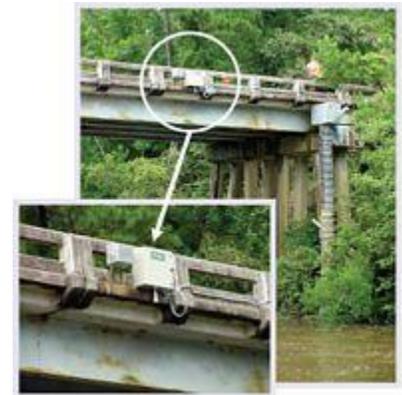
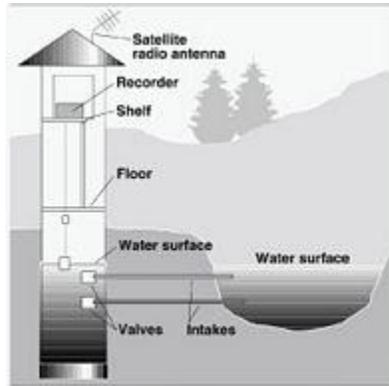
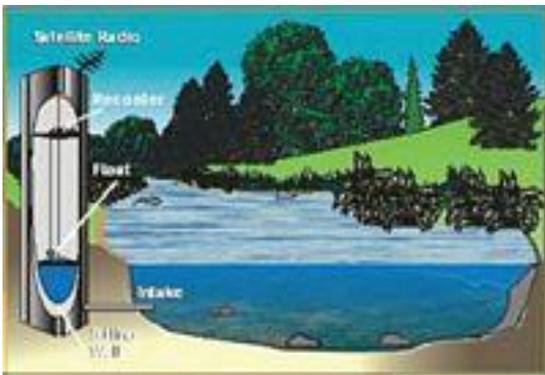
Streamflow information is required to determine the amount and timing of streamflow to assess habitats and to develop stream flow requirements. In addition, many boaters, swimmers, and fishermen use streamflow information to decide if the streamflow is appropriate for them to visit their favorite locations.

How does a USGS Streamgage work?

Most USGS streamgages operate by measuring the elevation of the water in the river or stream and then converting the water elevation (called 'stage') to a streamflow ('discharge') by using a curve that relates the elevation to a set of actual discharge measurements. This is done because currently the technology is not available to measure the flow of the water accurately enough directly.

The USGS standard is to measure river stage to 0.01 inches. This is accomplished by the use of floats inside a stilling well, by the use of pressure transducers that measure how much pressure is required to push a gas bubble through a tube (related to the depth of water), or with radar.

At most USGS stream gages, the stage is measured every 15 minutes and the data is stored in an electronic data recorder, most often powered by solar energy. At set intervals, usually between every 1 to 4 hours, the data is transmitted to the USGS using satellite, phone, or radio. At the USGS offices, the curves relating stage to streamflow are applied to determine estimates of the streamflow and both the stage and streamflow data are then displayed on the USGS webpages.



USGS Mapper Website: <http://maps.waterdata.usgs.gov/mapper/index.html>

You and your students can get access to water-resources data collected at over 1.5 million sites in the 50 States and selected other areas. Data are organized by:

- **Current conditions**—sites with real-time or recent surface-water, groundwater, or water-quality data.
- **Site information**—descriptive site information for all sites with links to all available water data for individual sites.
- **Groundwater**—water levels in wells.
- **Water quality**—chemical and physical data for streams, lakes, wells, and other sites.
- **Water use**—water-use information.