

Stream Flow



What is stream flow?

Stream flow, or **discharge**, is the amount of water that flows past a specific point in a stream over a specific period of time. The two components of stream flow– **velocity** (how fast the water is moving) and **volume** (the amount of water in the stream) combine to determine the energy of the water. Water energy greatly affects the shape of the stream as well as its biological and chemical characteristics.

Why do we care about stream flow?

Water quality

Stream velocity and flow affects **turbidity** and **dissolved oxygen (D.O.)** concentrations.

- High-velocity streams are more erosive and hold suspended sediments for a longer time, leading to greater turbidity (cloudier water).
- Turbulent, fast-moving streams are better aerated (have more bubbles) and therefore have higher concentrations of dissolved oxygen.
- Greater volume maintains cooler temperatures.

Aquatic life

Different stream flows create different habitats for aquatic organisms. Some organisms, such as the mayfly nymph, need highly oxygenated, swift flowing waters. Others, such as mosquito larvae, require still water. To protect the native species of a stream or river it is important to maintain natural stream flow levels. Many fish require both high and low water flow. The cutthroat trout, the only native trout in Wyoming, requires floods to fill backwaters for spawning and low flows for other life processes. Dams, which smooth-out the variance of flow, have helped other, non-native trout outcompete the native cutthroat.

Humans

Although regular flooding occurs in natural streams, they can be costly and dangerous events for humans. Each year in the United States, about 100 people lose their lives to floods. Hydrologists can predict the stream flow that will result from a storm of a specific size. They can then recommend if evacuation is necessary during a flood event and can recommend how far back from the river to build in the first place. Land use changes in the watershed change historic patterns of water flow and challenge our ability to predict the size and extent of major floods.

Water Storage

Most dams and reservoirs store water for industry, agriculture and cities. The amount and timing of stream flow determines how much water should be stored in the reservoirs. In Wyoming, peak stream flows occur in May and June, while the highest demands for water occur in July and August. Spring runoff is stored and then released to meet water demands throughout the year.

How do we interpret our results?

Stream flow data can help you interpret your other data:

- You may see higher concentrations of nutrients during low flows because high flows may dilute the concentrations.
- However, during high flows, the total amount of a chemical may actually increase (even though the concentration is lower) because there is more water with the chemical in it.
- Check for relationships between stream flow and dissolved oxygen. Low dissolved oxygen may coincide with low flows that leave the water still and stagnant. Dissolved oxygen concentrations during turbulent high flows will probably get bigger because there are more bubbles in the water that allow oxygen to more easily dissolve in the water.