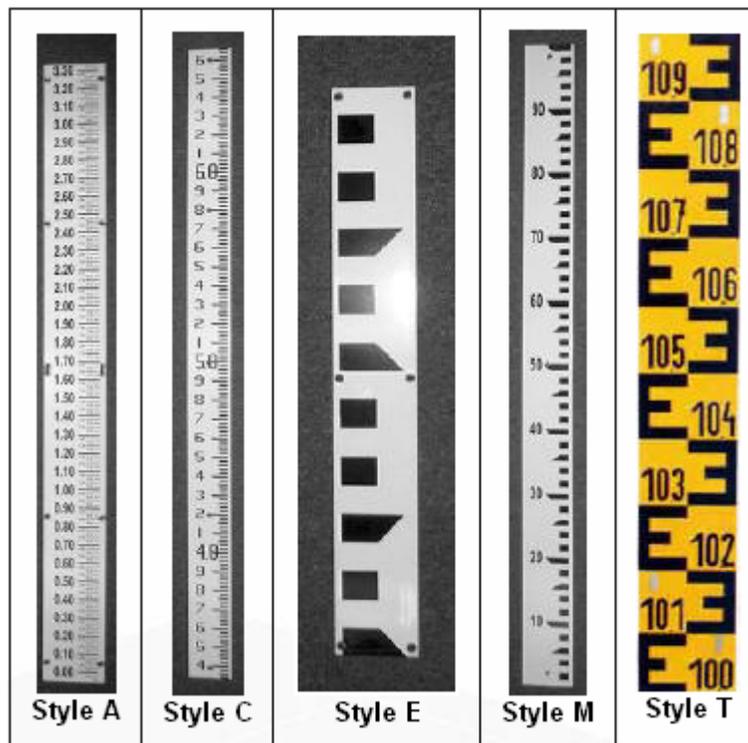


What is a staff gage?

A staff gage is a long ruler placed in a water body that is used to measure water surface elevation or just to determine the rise/fall of the water surface over time.

Setting up a staff gage:

1. Find a sturdy fence post or pipe to use as the post of the staff gage. It needs to be able to hold up against high water or wind, but also not be too heavy to carry and set it easily. A 2x8 wooden board works well. Bolt the board to the post.
2. Obtain numbers for the gage. Porcelain or metal numbers can be bought from a number of vendors. The staff gage can start at whatever number desired. The below photo shows some types of number plates that can be used for staff gages. If no number plates are available, a simple staff gage can be made using lath and a marker. Using a tape measure, draw the scale and numbers on the lath. This type of gage will only provide temporary service, but can be useful for backwater areas during a flood.



Attach the numbers to the staff gage board using screws or nails as available.

3. Choose a specific location for the staff gage. A good location is where the post will be in the water during lower water years and where it won't be overtopped during high water years. Avoid placing the staff gage in a location where the water pools or is very slow moving, because sediments will collect around the base of the staff gage and affect readings. If there is a permanent structure such as a dock or bridge near the desired staff gage location, the gage can be attached to that structure instead of using a fence post driven into the stream or lake bed. If it is desired to tie the staff gage into a given elevation marker, place the staff gage near the existing benchmark (place of established elevation) for ease of surveying.

4. The next step is setting the staff gage. Drive the fence post or pipe into the ground so that it will stay stable through high water or bad weather. If using a fence post driver, only fasten the board to the post using one bolt and let the board rest perpendicular to the post. This will allow the top part of the post to be used with the fence post driver. Once the post is set refasten the board onto the post.
5. If it is desired to tie the gage into an existing benchmark so it can be used to find the water surface elevation, follow the steps below:
 - a. Surveying equipment like a tripod, a leveling instrument, and a rod will be needed to survey the staff gage into the benchmark. Set up the tripod and attach the leveling instrument. Level the instrument using the three knobs under it.
 - b. Have a partner take the rod and place it on the benchmark, BM, location, then read the rod through the instrument. This is called your back sight reading, BS. The number read from the rod added to the known elevation of the benchmark is called the height of the instrument, HI. ($HI = BM + BS$).
 - c. If the benchmark is far enough away from the staff gage location that it cannot be seen from the level, move the rod to an intermediate point. Place the rod on a concrete corner or somewhere that can be marked and used as a reference in the future. Take a reading through the instrument and subtract that number from the height of the instrument previously calculated. This is called the foresight reading, FS. This will give a temporary benchmark elevation, TBM. ($TBM = HI - FS$). Now use this TBM as a new benchmark and repeat the process as many times as needed to reach the location of the staff gage. Before each iteration of these steps, the tripod will need to be moved and the instrument re-leveled (called 'breaking set').
 - d. Once the staff gage is reached, hold the rod against the gage with the bottom at the water surface to take a reading. The TBM calculated at this location will be the elevation of the water surface. Correlate that elevation to the number shown on the staff gage to tie your staff gage into the existing benchmark and be able to read the elevation from the staff gage.

When finished setting the staff gage, it will provide a quick and easy way to check changes in water level for anyone going past the gage.

