Aquifers

Today's agenda

- Finish water budgets
- Streams and stream discharge
- Aquifer systems and terminology
- Aquifer properties
- Unconfined, confined, and artesian aquifers

Types of streams

Temporal

1. Year-Round (Perennial)
2. Seasonal (Intermittent) Stream
3. Rain-Dependent (Ephemeral)

a) Gaining and baseflow
b) Losing

Stream Order

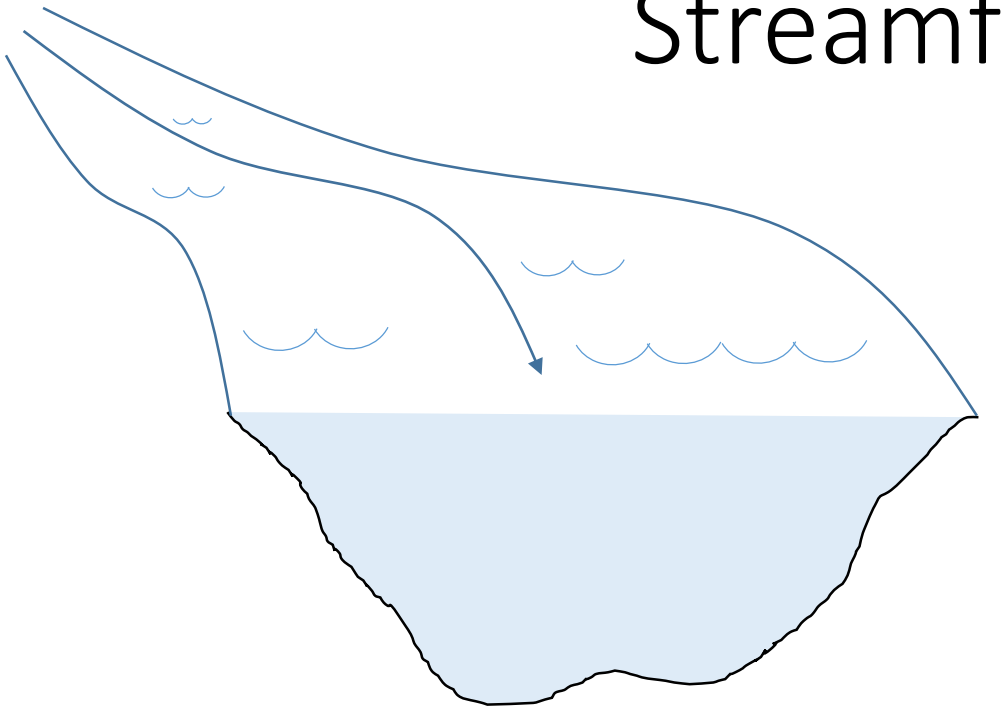
Rules:

1+1=2

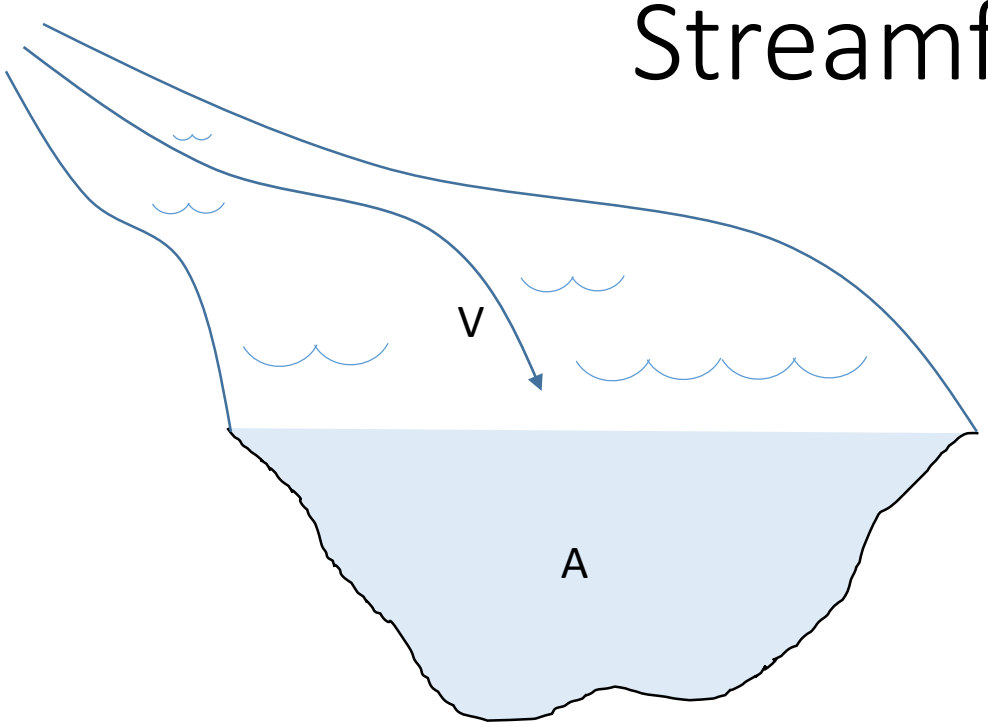
2+2=3

2+3=3

Streamflow

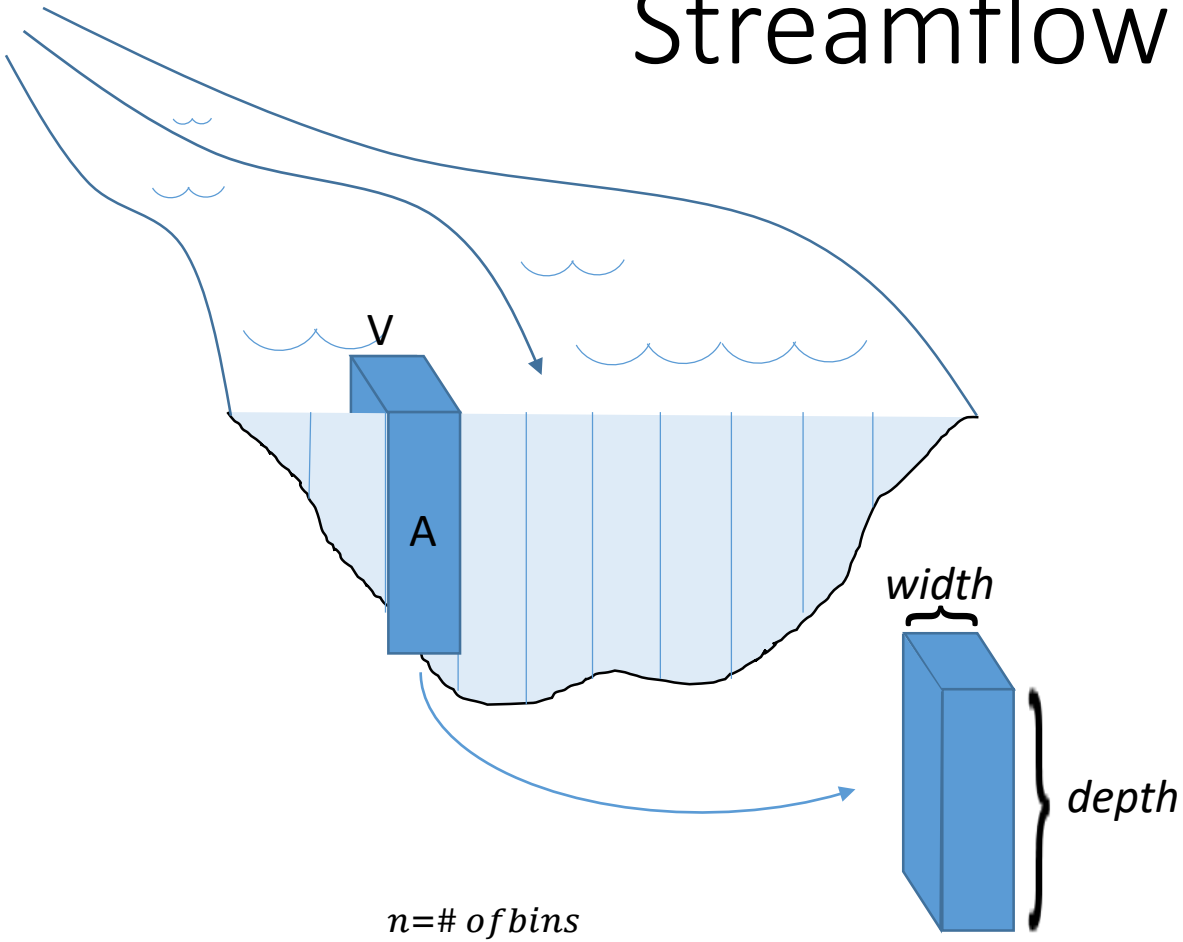


Streamflow



Velocity (V) * Cross sectional area (A) = Q (L^3/t)

Streamflow



$$Q\ (L^3/t) = \sum_{n=1}^{n=\#\ of\ bins} V * A$$

Streamflow

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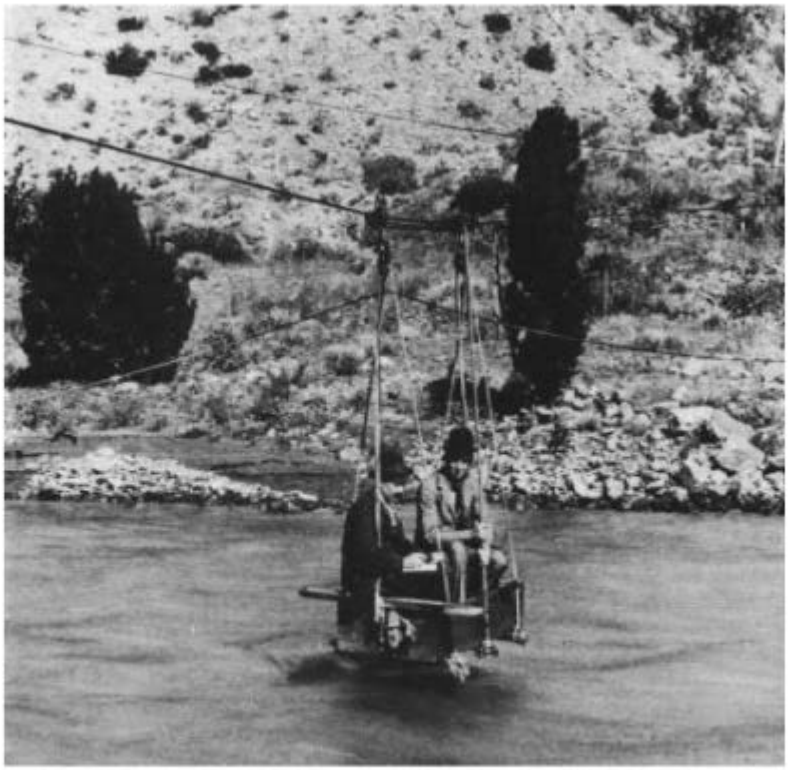
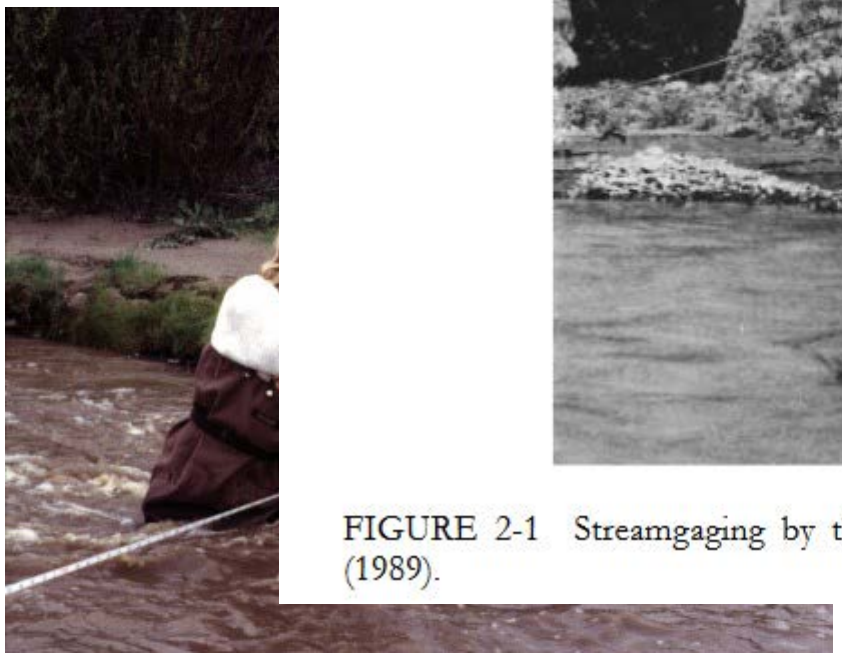
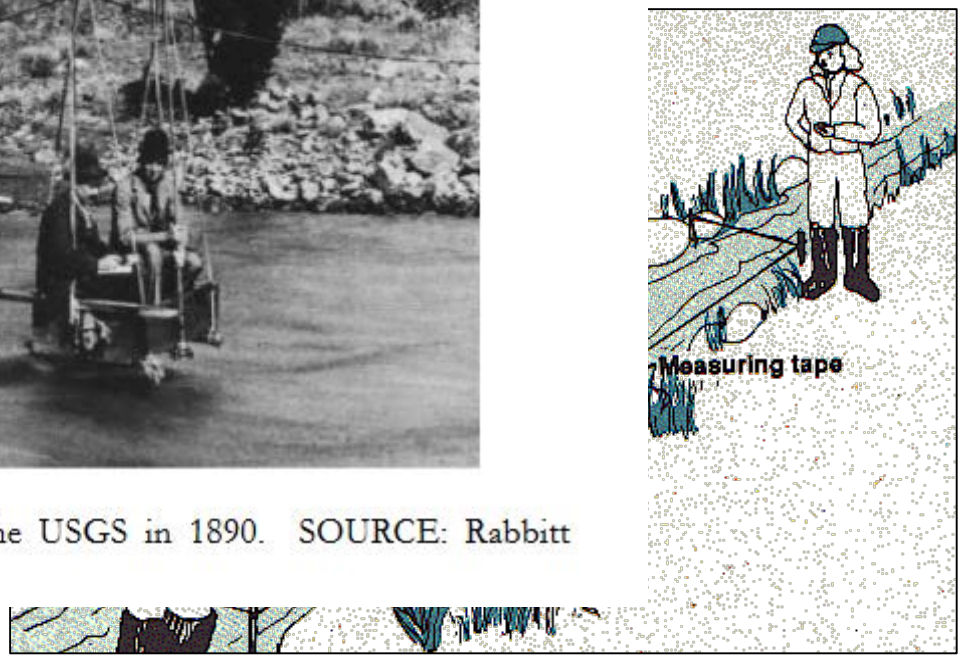


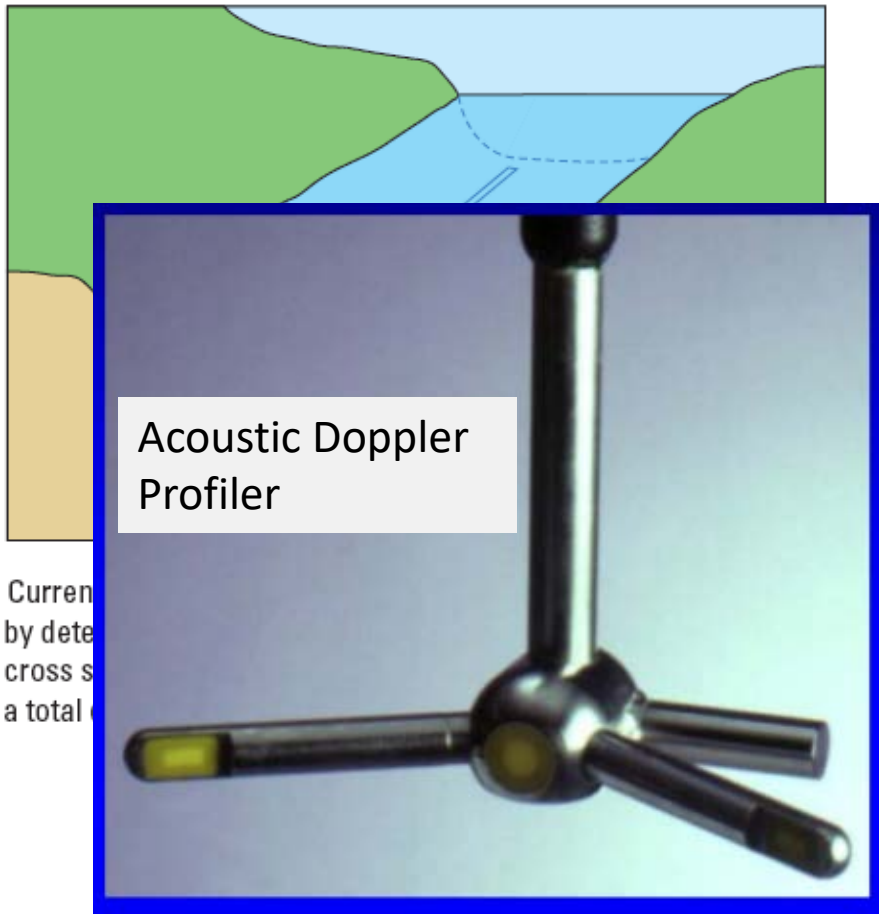
FIGURE 2-1 Streamgaging by the USGS in 1890. SOURCE: Rabbitt (1989).





http://www.sciencecourseware.org/

Streamflow



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(Photograph courtesy of Michael Nolan, U.S. Geological Survey)

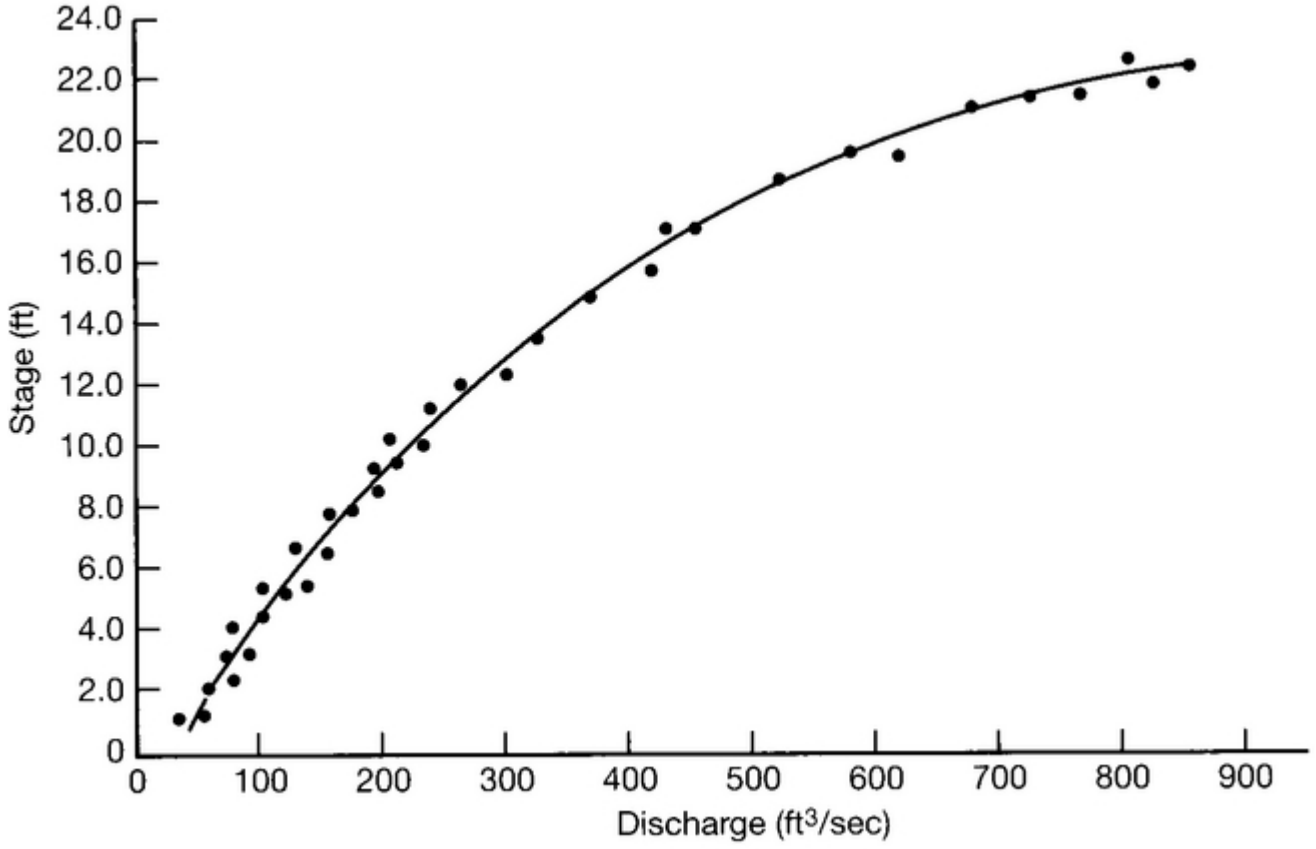
The current-meter method uses equipment such as (*A*) the Price AA current meter; (*B*) the Price AA current meter attached to a wading rod; and (*C*) the Price AA meter suspended above a heavy weight.

(Photograph courtesy of Michael Nolan, U.S. Geological Survey)

To measure velocity beneath ice, a mechanical current meter with a polymer rotor is attached to an ice rod and submerged through a hole drilled in the ice.

https://water.usgs.gov/edu/streamflow2.html

Stream Rating Curve



USGS Gages

- 19,740 total sites
- Lots of parameters
  - Water Level/flow (stage height, Q, tide stage, etc.)
  - Water Quality (Chemistry, turbidity, EC)
  - Meteorology (Precip, Temp, Solar radiation, wind)
  - Physical Properties (e.g. ET, wave period/height, etc.)

- https://waterdata.usgs.gov/nwis/rt