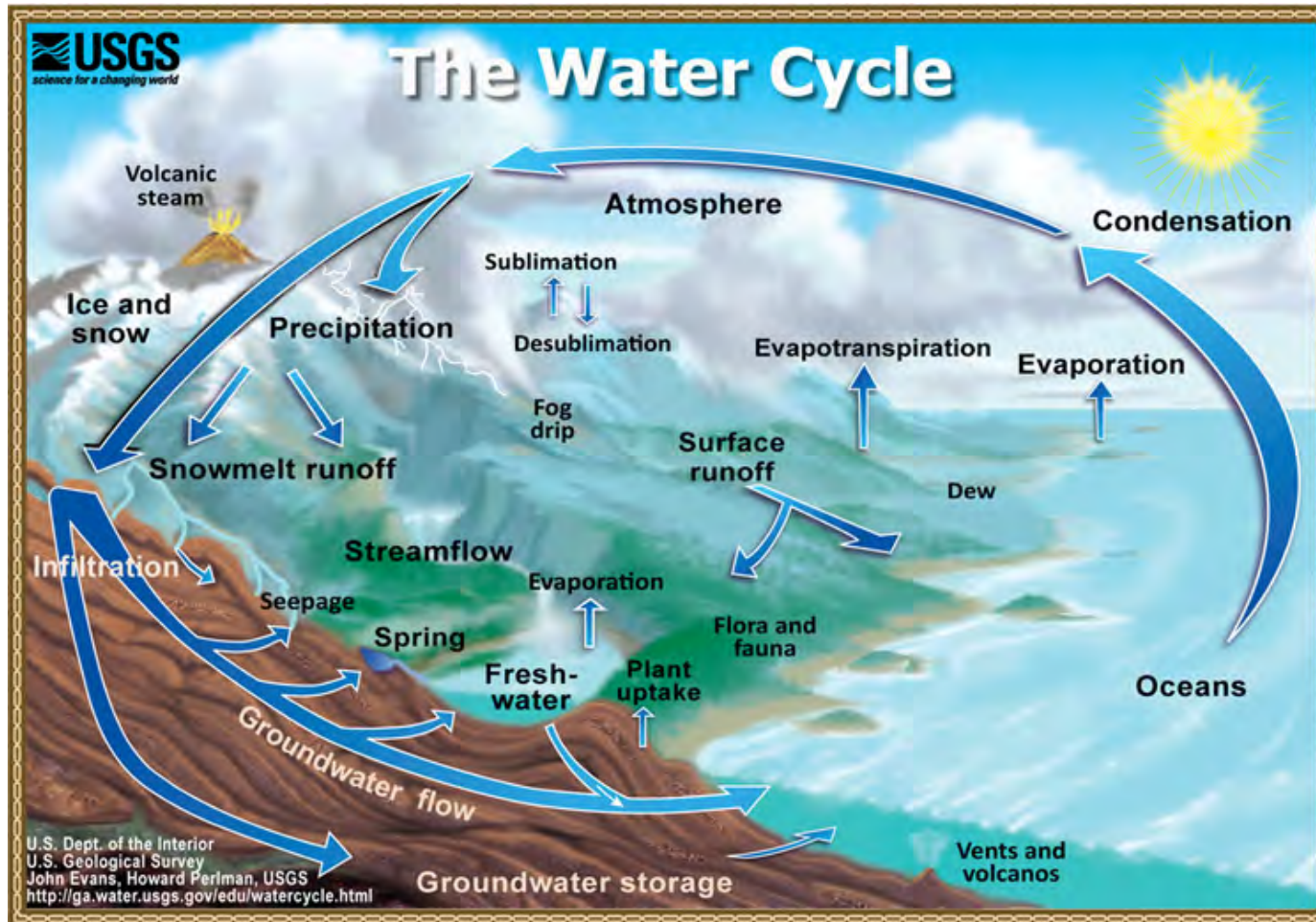


# **Streamflow & Surface Runoff:**

Excerpt from Marla Schwartz

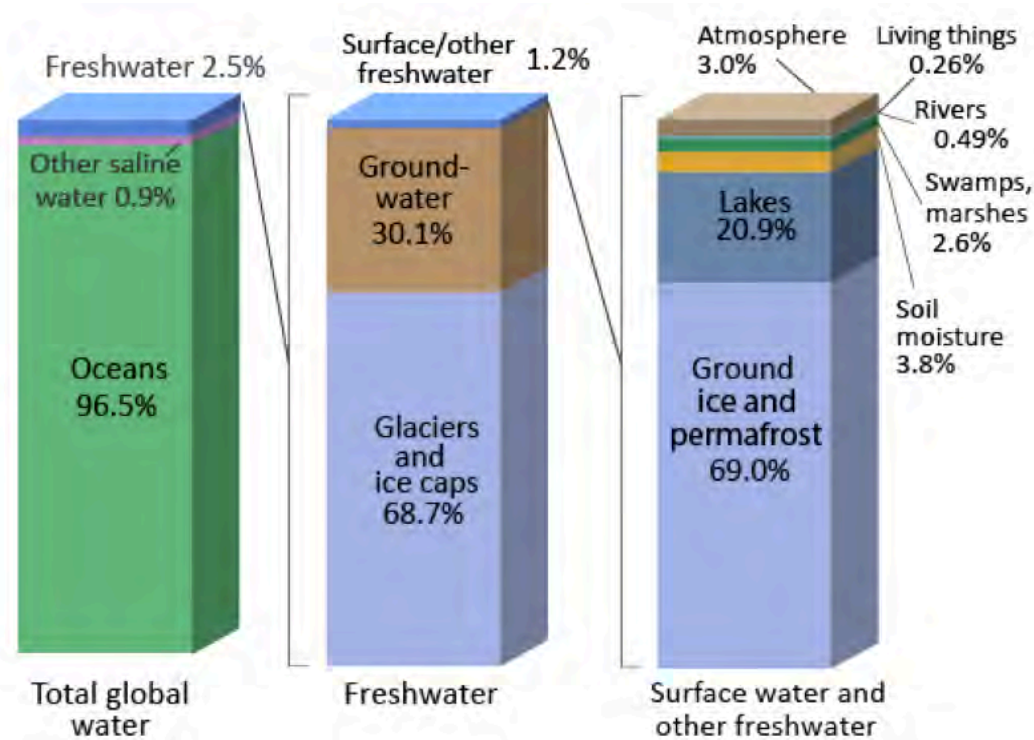
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# 1. The Basics



- Surface runoff: precipitation that falls on saturated or impervious ground and flows downhill over land
- Streamflow: the amount of surface water flowing downhill through creeks, streams, and rivers toward the oceans

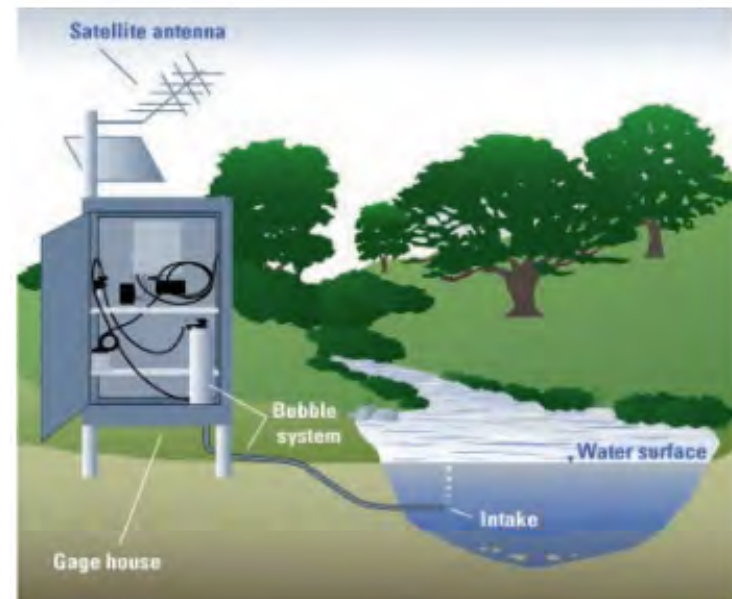
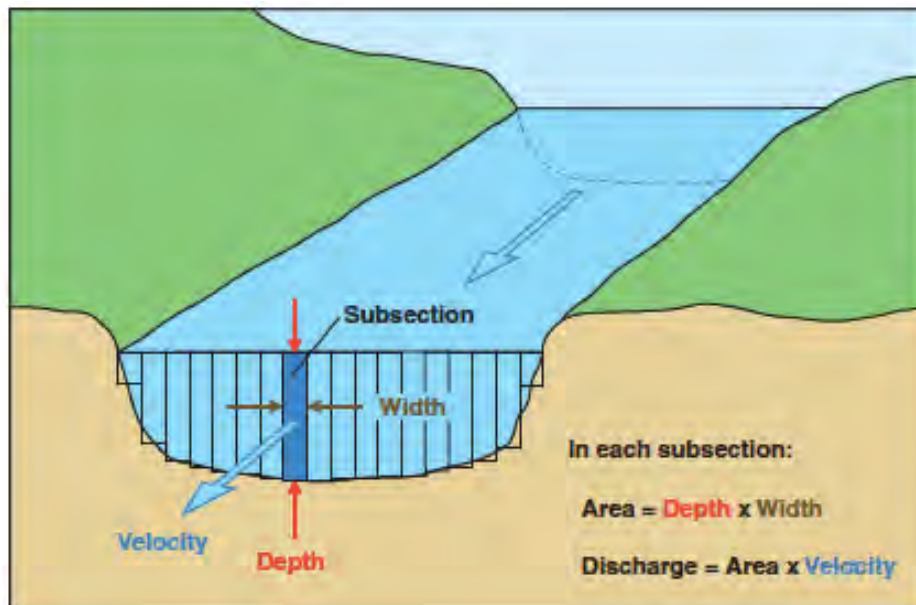
# Motivation



- Water supply
  - Where is Earth's water?
  - Rivers & lakes that supply surface water for human uses constitute about .007% of Earth's total water.
- Flood prediction and forecasting

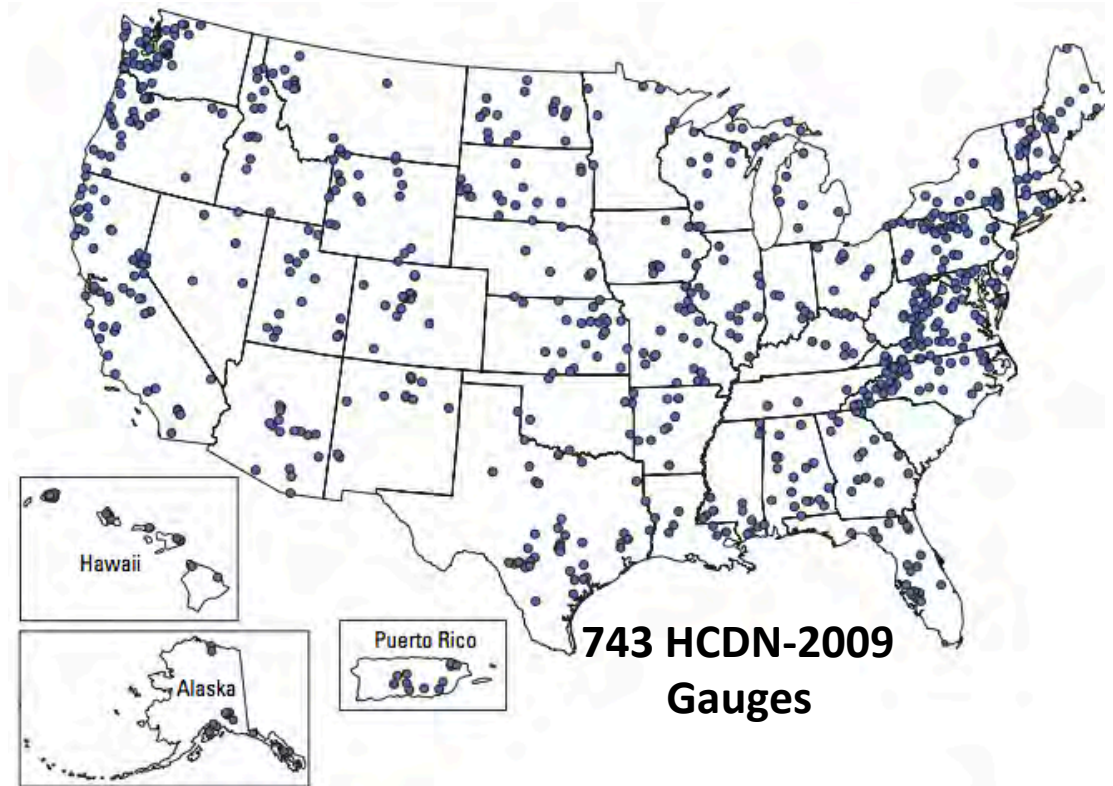
# Streamflow Measurements

- Streamflow is measured at gauging stations
- Streamflow is unique among water cycle components in that it both spatially and temporally integrates surplus runoff and waters upstream within a catchment basin
- Measurements are made by determining the discharge in each subsection of a channel cross section and summing the subsection discharges to obtain a total streamflow discharge.



# My Favorite Streamflow Data Set: USGS HCDN

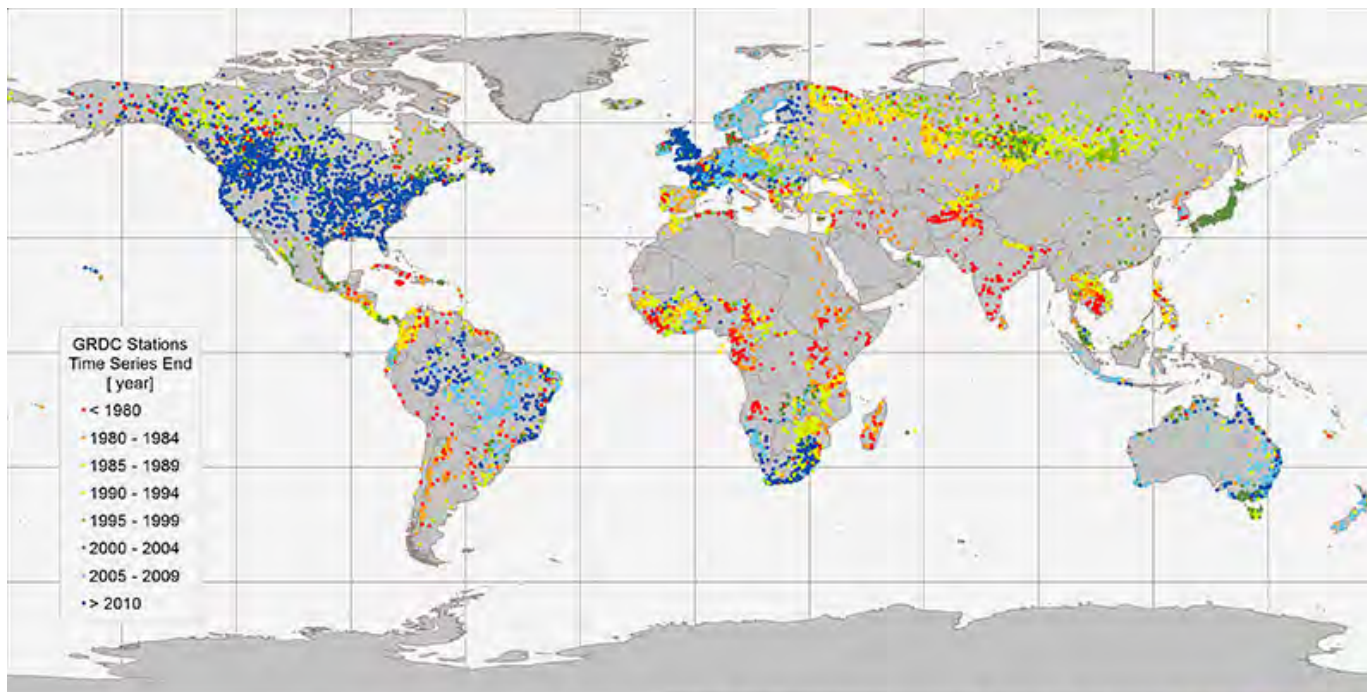
- United States Geological Survey's Hydro-Climatic Data Network
- Gauges are identified as having:
  1. Natural streamflows least affected by direct human activities
  2. Accurate measurement records
  3. At least 20 water years of suitable streamflow data



- **Original HCDN:** 1,659 streamflow gauges, data spans 1874-1988. (Slack and Landwehr, 1992)
- **Updated HCDN-2009:** 743 streamflow gauges with at least 20 years of complete and continuous streamflow record through 2009 (Lins, 2009)
- Real time data available at <http://waterdata.usgs.gov/usa/nwis/rt>

# My 2<sup>nd</sup> Favorite Streamflow Data Set: GRDC

- Global Runoff Data Center: [www.bafg.de/GRDC](http://www.bafg.de/GRDC)
- Database of historical daily or monthly river discharge from nearly 9000 gauges worldwide in 157 countries
- GRDC features ~350000 years worth of monthly and daily values
- Average station time-series length of 40 years



8923 stations with monthly discharge data, incl. data derived from daily data (Status: 06 November 2013)

Koblenz: Global Runoff Data Centre, 2013.



# GRDC GTN-R

- Global Terrestrial Network for River Discharge
- 380 gauges
- Specialized subset of GRDC stations: gauges along continental coastlines
- Determines the freshwater flux into the world oceans

