Rainfall in Florida

- 1 inch is equivalent to 1.04 cubic miles of water (about 65,800 sq. mi.)
- 53 inches is equivalent to 55 cubic miles of water or 185 million acre-feet.
- 18 million people, using 190 gal/person/day, 1.1 cubic miles or 3.6 million acre-ft.

Rainfall in Florida

Average annual rainfall is ~53 inches per year. In general rainfall varies by both:
- Location
- Season (summer 70% of total)
- Average E/ET is about 39 inches annually.
**Good Water-Bearing Formation (Aquifer)**

- **high permeability** (ease with which water can flow through a soil profile)
- **high drainable porosity** (large amounts of water can be removed from the water-bearing formation)

**Aquifers**

- Consolidated (rock with groundwater in the cracks or caverns)
- Unconsolidated (sand and gravel or loose soil material with the pore space saturated with water)

**Aquifers**

- confined (aquifer is isolated from the atmosphere by an impermeable layer)
- unconfined (aquifer is bounded only on the bottom by impermeable strata and is often referred to as water table aquifers)

**Confined versus Unconfined**

**Potentiometric Level and Surface**

The elevation to which water rises in a well that taps a confined aquifer is called the **potentiometric (piezometric) level** and represents the hydrostatic pressure at that point in the aquifer. An imaginary surface representing the confined pressure throughout all or part of a confined aquifer is called the **potentiometric (piezometric) surface**.

**Piezometric Level**

When no water is pumped, the water table level in an unconfined aquifer and the piezometric level in a confined aquifer are called static water levels.
Potentiometric Surface

Gaining and Losing Streams

Well Classification
- gravity wells
- free flowing artesian wells,
- combination of artesian and gravity (pumped artesian wells)

Artesian Well Requirements
1) Lower Elevation
2) Inclined Strata
3) Recharge Capacity
4) Recharge Area
5) Confined Aquifer

Aquifers in Florida

Surficial Aquifers
**Surficial Aquifers**

Surficial aquifer system is a main source of water for much of Florida especially, for south Florida, since there are extensive areas of shallow aquifers in the state.

**Intermediate Aquifer**

In Southwest Florida, exists confined aquifers between surficial and the Floridan aquifers. Made mostly permeable sand, shell and limestone, the intermediate aquifer is primarily used for agriculture.

**Floridan Aquifer**

The Floridan is one of the world’s most productive aquifers. It supplies much of North Florida’s water needs and is the source of many of the springs located throughout the state.

**Saltwater Intrusion**


North Florida has several major streams and rivers. Twelve rivers have an average flow above 1000 cfs. In the south, most of the drainage occurs through a system of canals which connect Lake Okeechobee with both coasts. There are also more than 200 springs in Florida.

Florida’s Surface Water

1. Escambia River
2. Choctawhatchee River
3. Apalachicola River
4. Suwannee River
5. Withlacoochee River
6. Hillsborough River
7. Peace River
8. Caloosahatchee River
9. Miami Canal
10. Hillsborough Canal
11. West Palm Beach Canal
12. St. Lucie Canal
13. Kissimmee River
14. St. Johns River

Water Law

- Doctrine of Appropriation
  - Western States – First Come, First Serve Approach
- Doctrine of Riparian Use
  - Eastern States – English “Access and Reasonableness of Use” System
- Florida Water Law
  - “Regulated” Riparian Doctrine
Florida’s Water Management Districts

Each district is controlled by a governing board of nine district residents appointed by the governor for four years. The boards have authority over:

- consumptive use permitting,
- artificial aquifer recharge,
- management and storage of surface waters,
- use of district works or land,
- and the construction and repair of water wells.

Watershed

- A watershed or basin is a catchment area that discharges to a single point.
- Large river basins or watersheds are typically composed of several watersheds.