Wetland Hydrology

1. Water sources
2. Where wetlands occur
3. Water budgets
4. Hydroperiods

1. Water Sources

- Where does the water come from?

1. Direct precipitation
2. Runoff from surrounding lands and streams, including snowmelt
3. Groundwater
4. Tide water (ocean)

2. Where do wetlands occur?

- Poorly drained sites

Vernal pools

A New England vernal pool; usually dry by mid-summer.

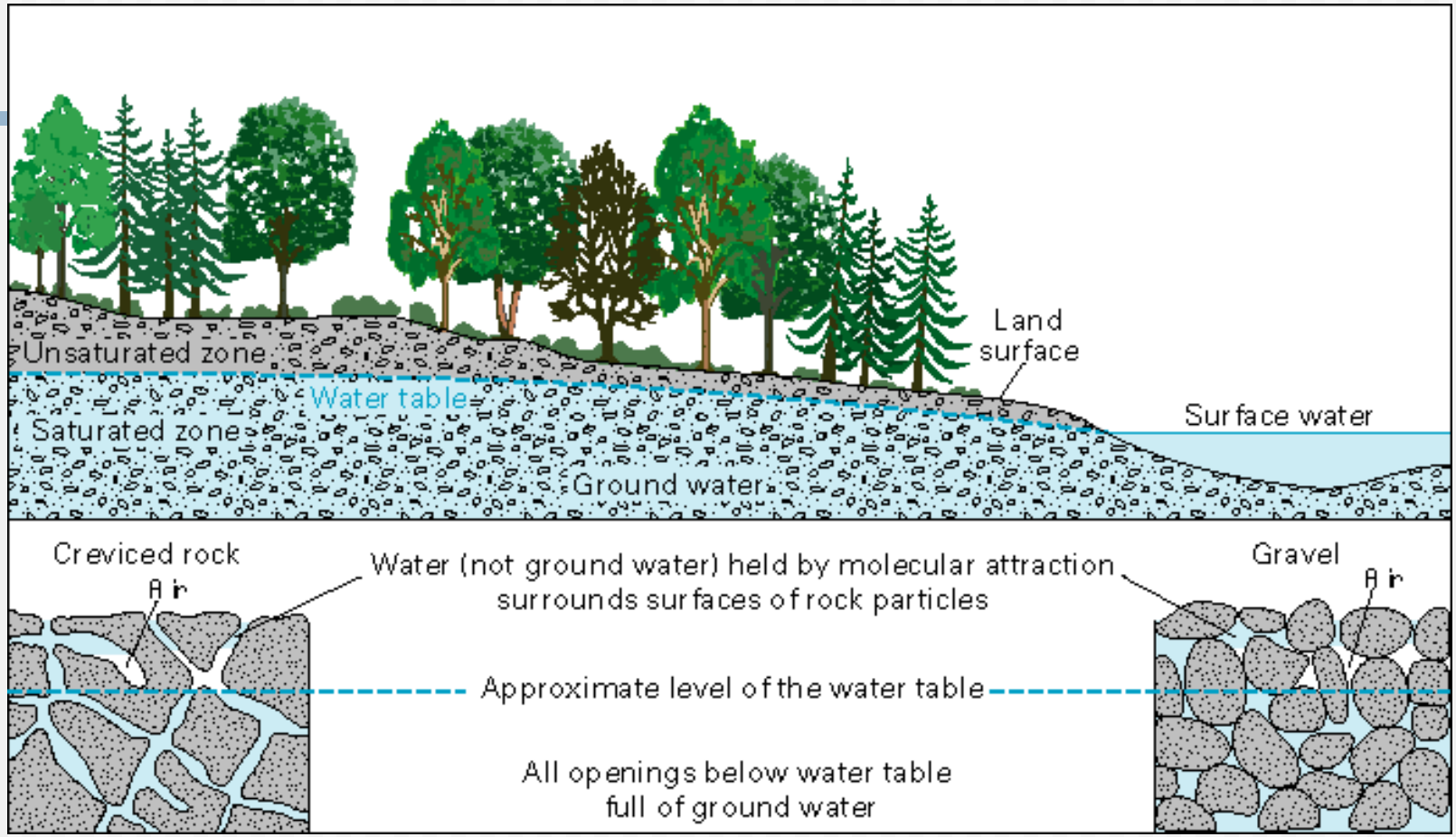


A pool that holds water for two continuous months in spring and summer in 3 out of 5 years: hydroperiod criteria. – Massachusetts state regulation for protection of isolated wetlands)Isolated Land Subject to Flooding).

2. Where do wetlands occur?

- Poorly drained sites
- Groundwater sites:
  - receive groundwater discharge
  - seeps, wet areas around springs

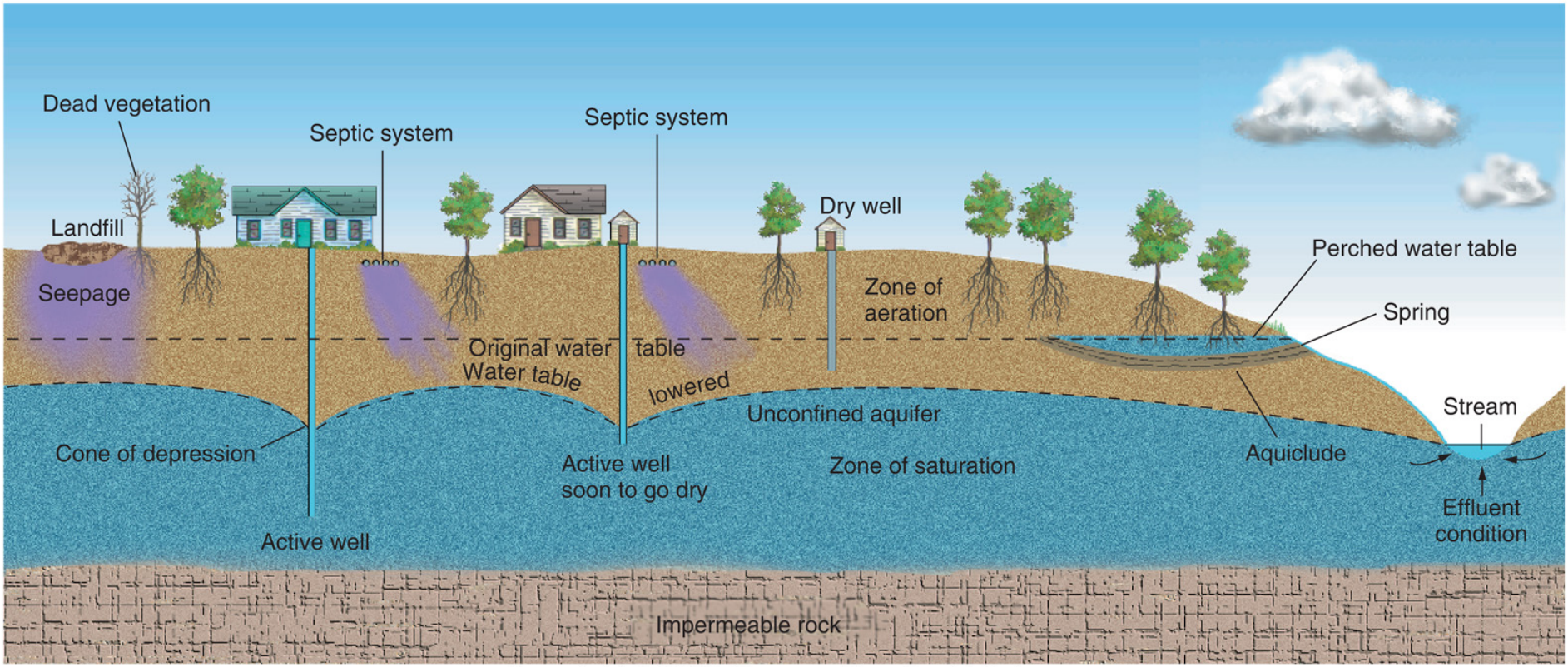
Groundwater (Unconfined aquifer)



Groundwater: water in saturated zone

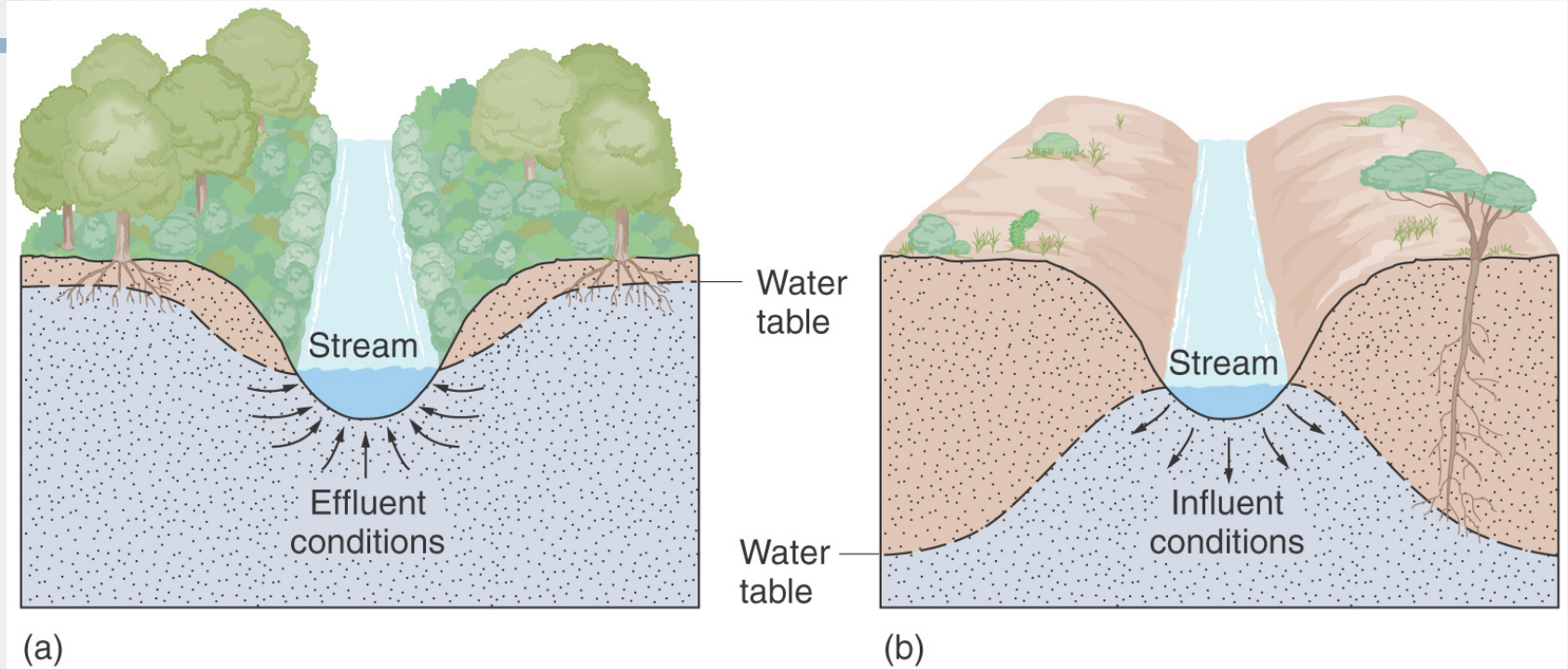
Aquifer: rock layer or deposit through which groundwater flows

Aquifers, Wells, and Springs



Wells, cones of depression, springs

Groundwater and Streamflow



2. Where do wetlands occur?

- Poorly drained sites
- Groundwater sites: receive groundwater discharge (seeps, wet areas around springs)
- Riparian sites: in and around edges of major water features (streams, lakes, estuaries).

Swamps

- Dominated by trees and shrubs
- Water level may change during year

Marshes

- Dominated by herbaceous vegetation.

- Tidal (above, with egrets)
- Non-tidal (Colorado)

Riparian wetlands

- Bankfull discharge
- Not just water

3. Water Budgets

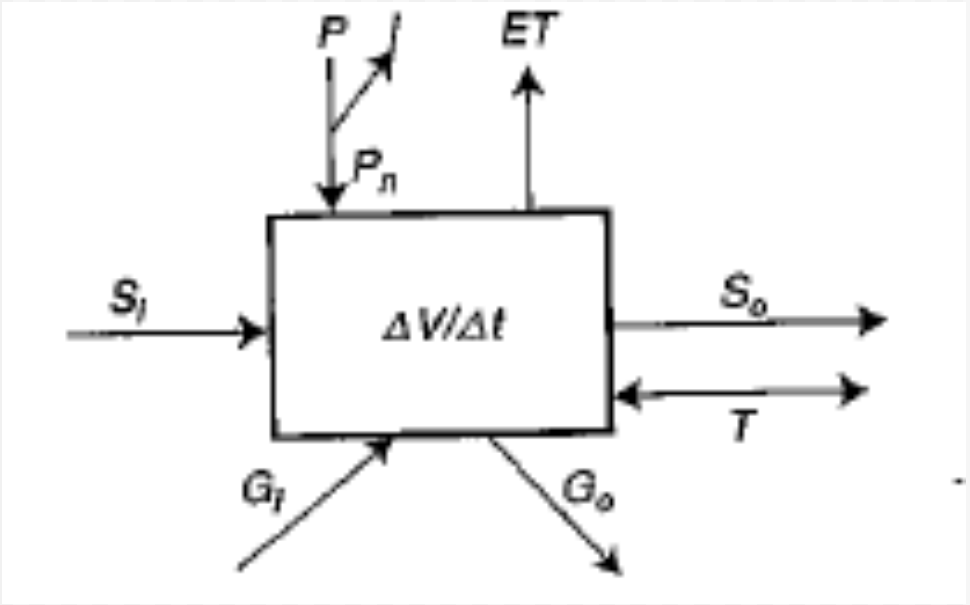
- Inputs
- Outputs
- Storage

- Hydrologic status is controlled by
  - In – Out
  - Shape of landscape (e.g., slope)
  - Soil, geology, and groundwater conditions

3. Water Budgets

- Consider
  - Vernal pool
  - Riparian wetland

Water Budget



Terms: P, ET, I, P_n, S_i, S_o, I, G_o, V, t

Net Precipitation

- Figure 4.8

- Interception,
- Throughfall
- Stemflow

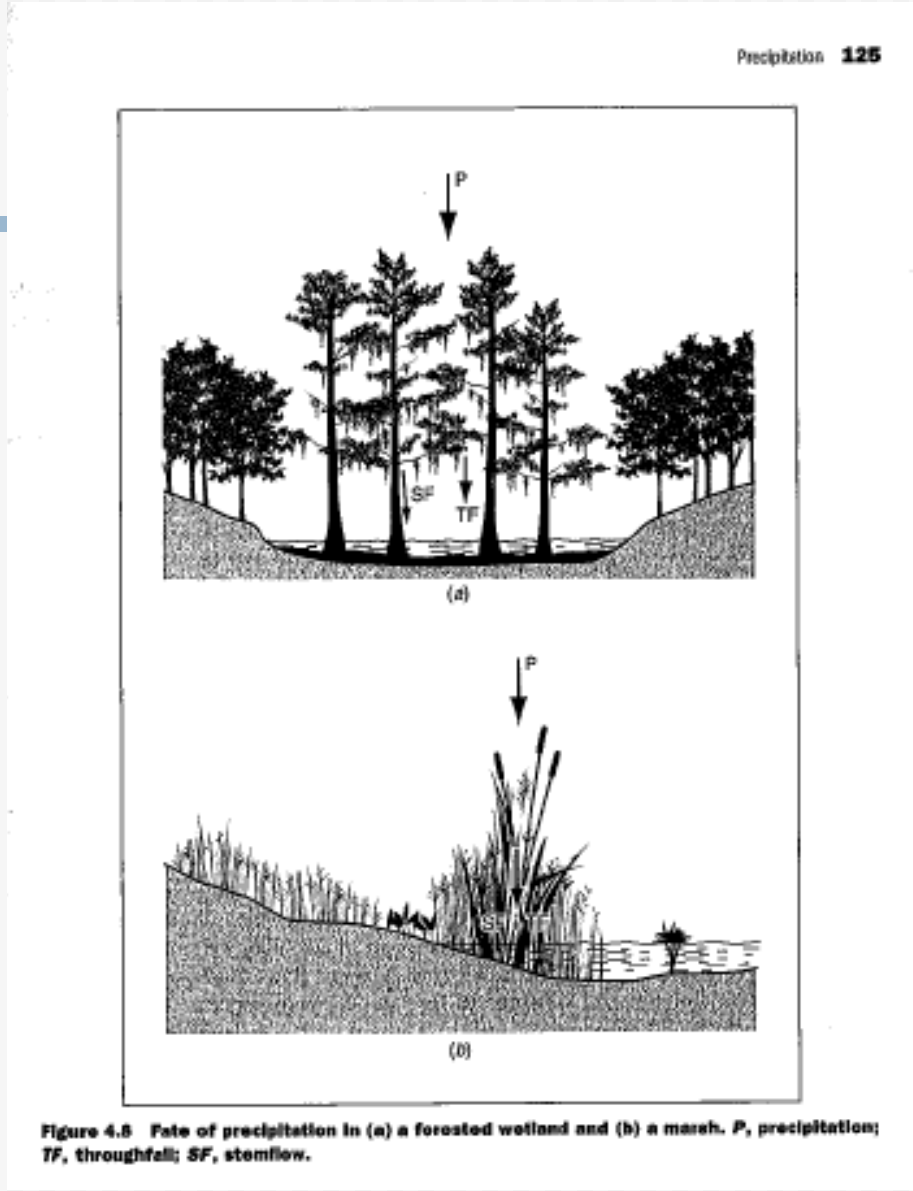
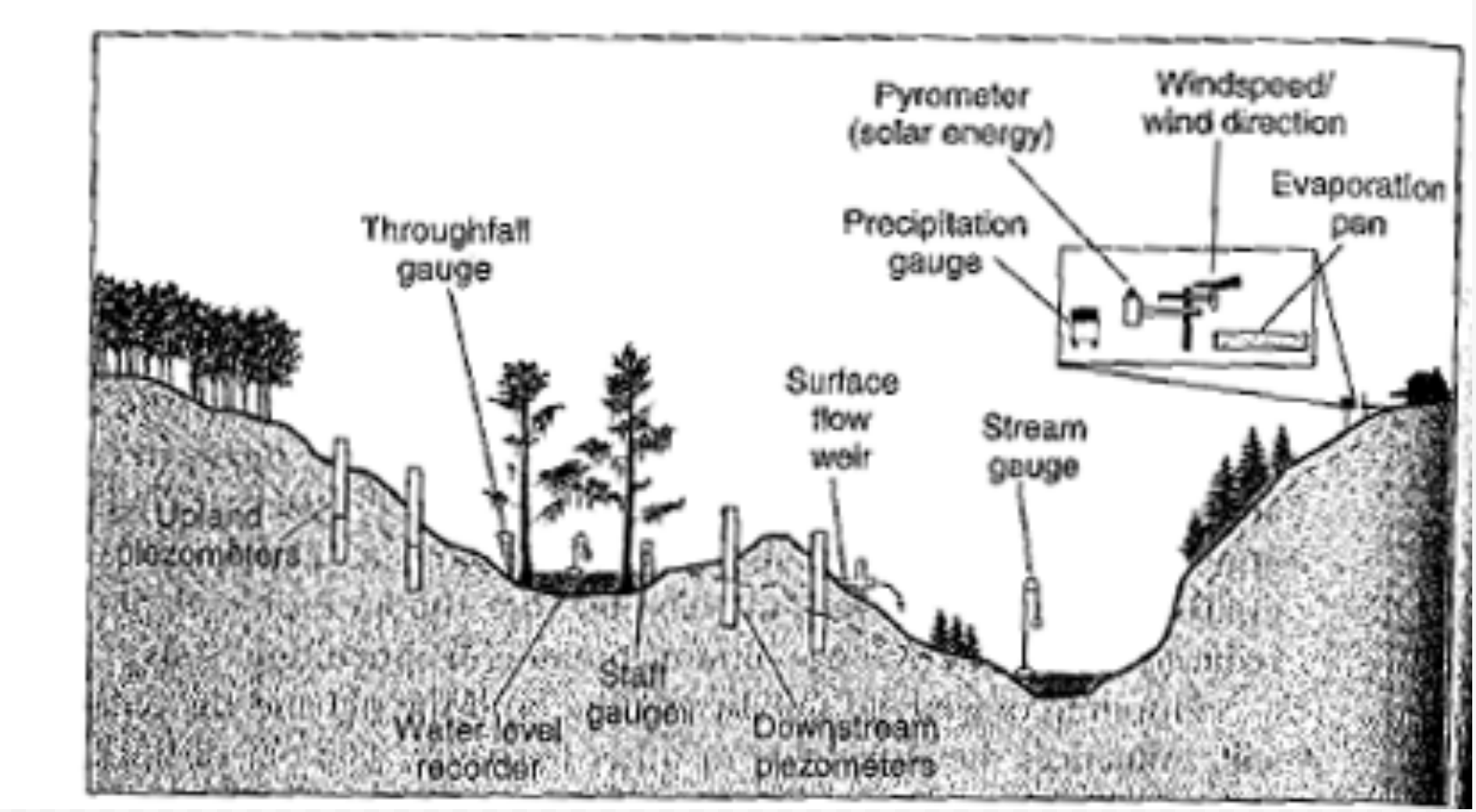


Figure 4.8 Fate of precipitation in (a) a forested wetland and (b) a marsh. *P*, precipitation; *TF*, throughfall; *SF*, stemflow.

Measuring components of water budget



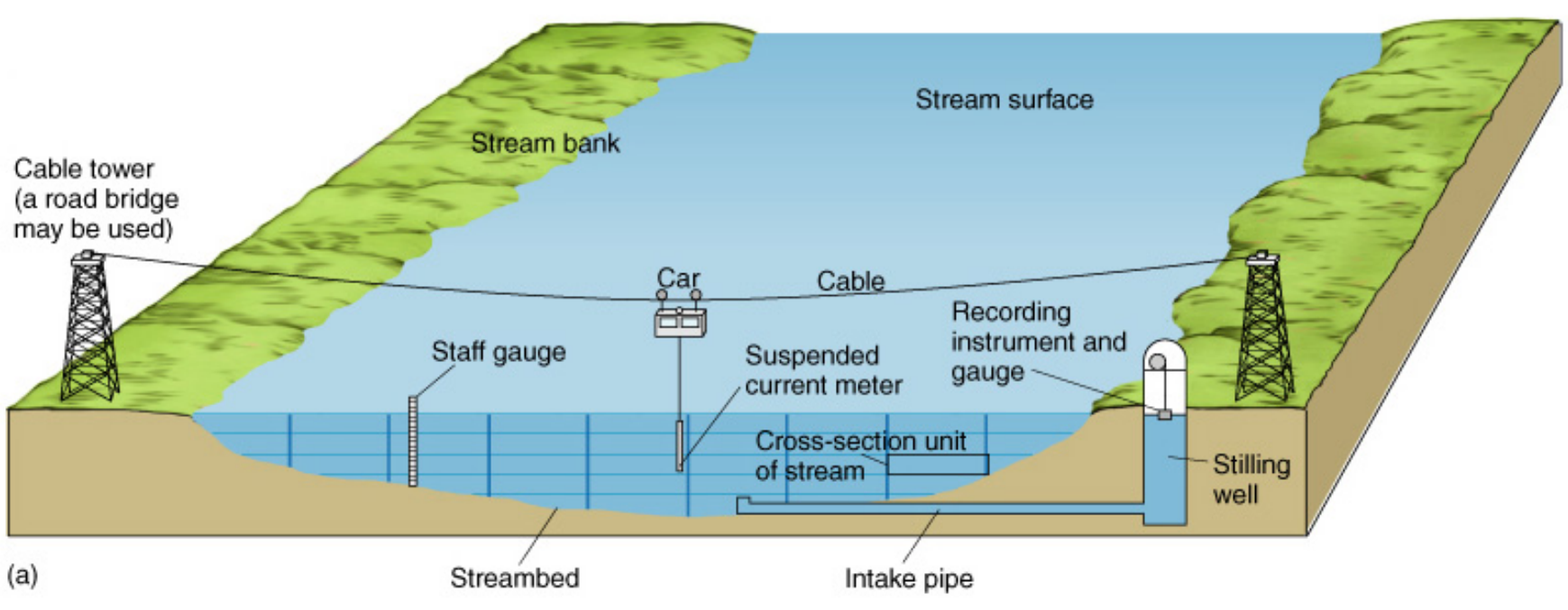
Channelized Streamflow

Discharge
(Q)

Q = AV
(A = wd)

Ft x ft x ft/sec =
ft^3/sec
cfs
m^3/s, cms

Discharge Measurement

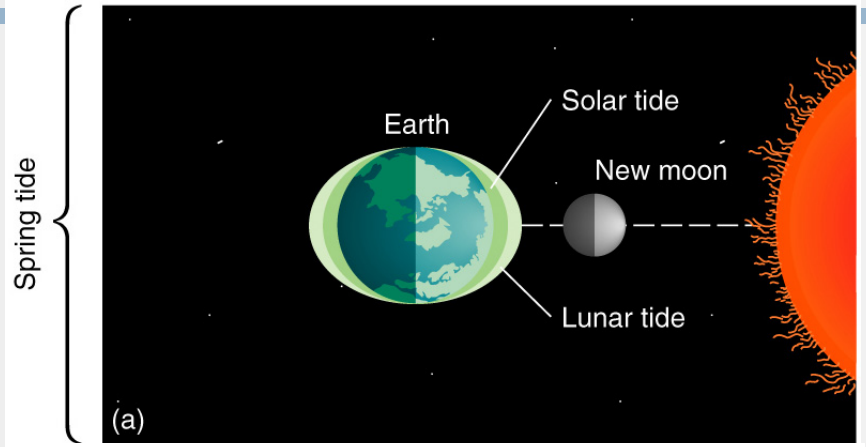


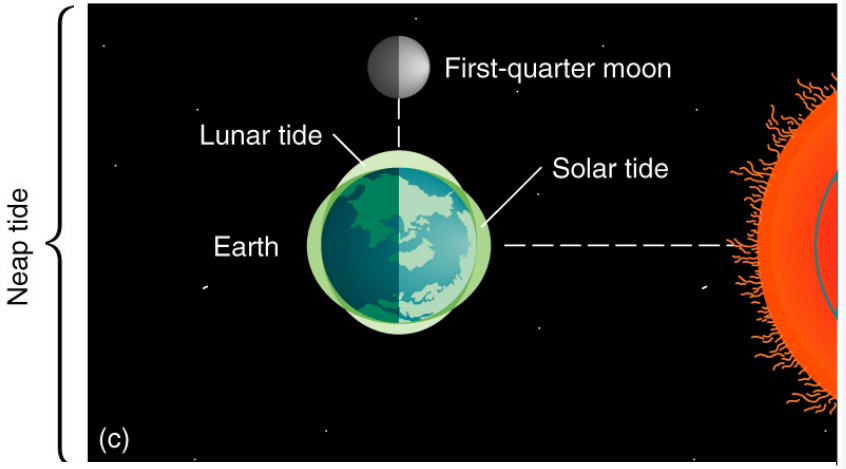
Q = AV

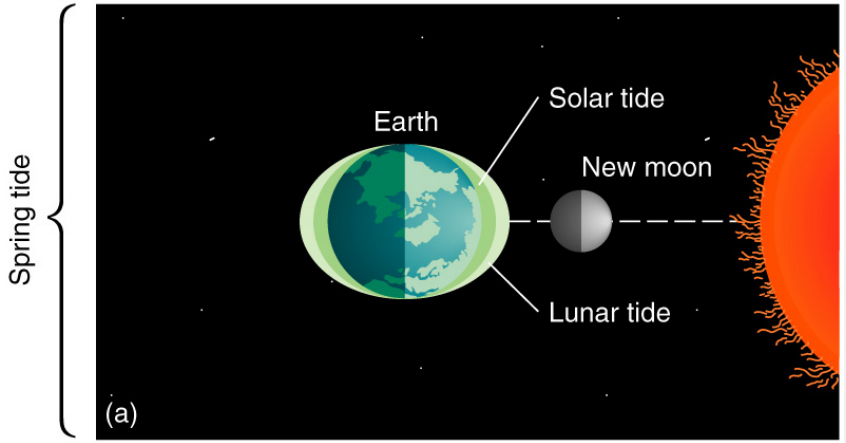
Need to measure: 1) cross-sectional area, 2) flow velocity

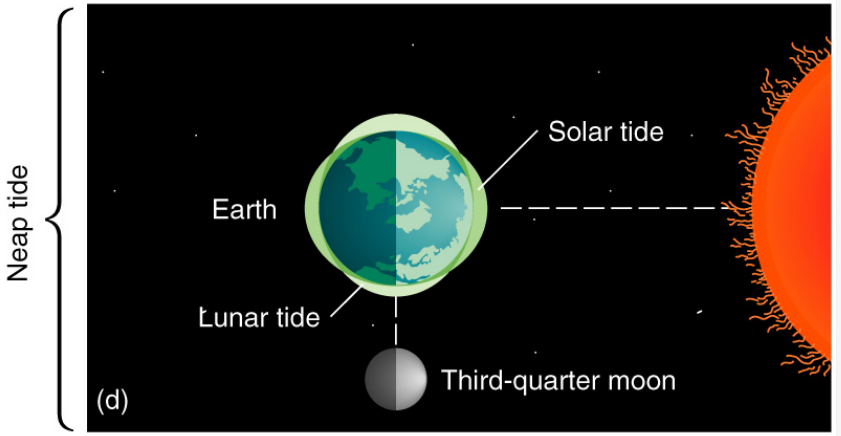
Measuring v

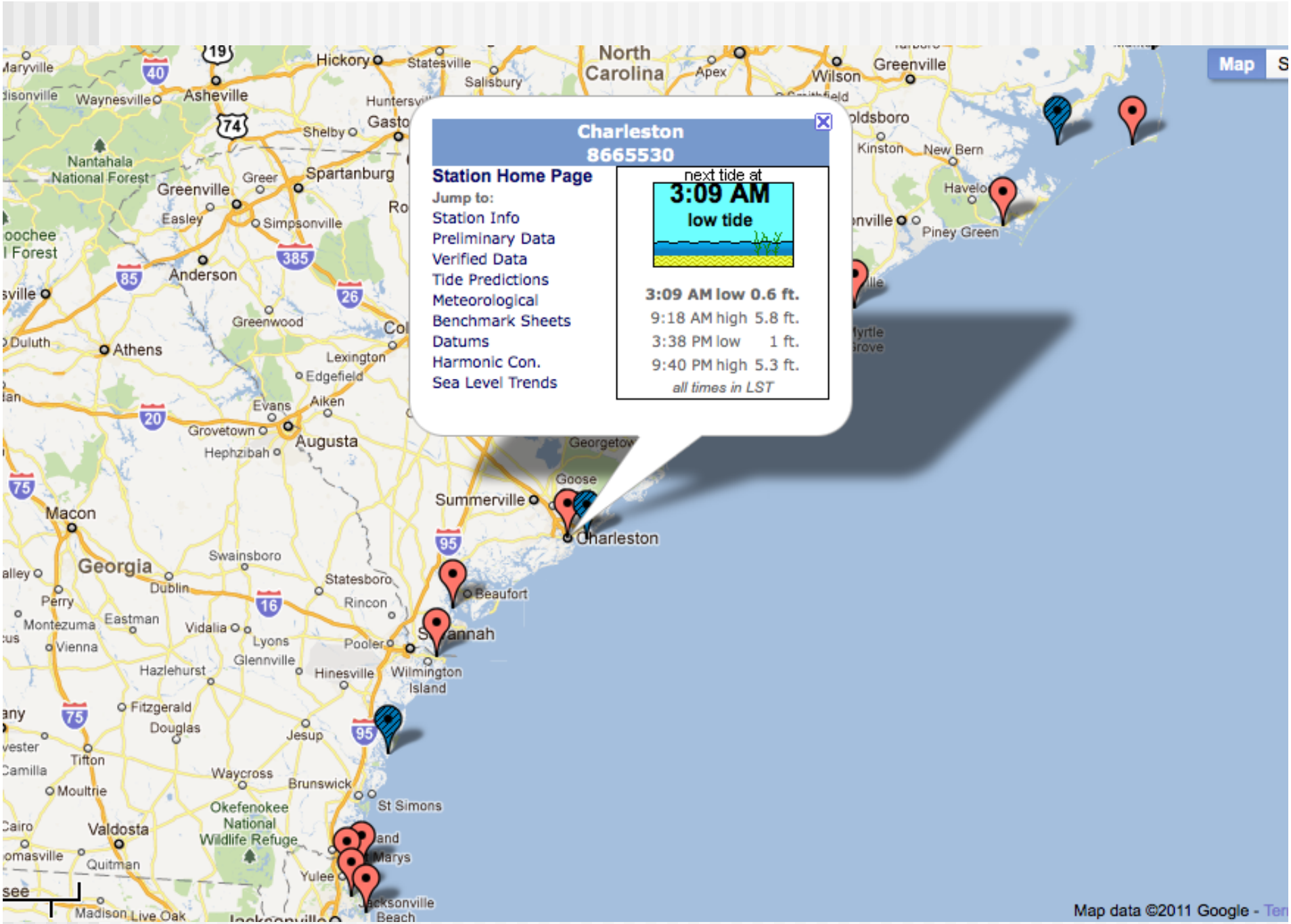
Tides


Spring tide
Earth
Solar tide
New moon
Lunar tide
(a)


Neap tide
First-quarter moon
Lunar tide
Solar tide
Earth
(c)


Spring tide
Earth
Solar tide
New moon
Lunar tide
(a)


Neap tide
Solar tide
Earth
Lunar tide
Third-quarter moon
(d)


Charleston
8665530
Station Home Page
Jump to:
Station Info
Preliminary Data
Verified Data
Tide Predictions
Meteorological
Benchmark Sheets
Datums
Harmonic Con.
Sea Level Trends
next tide at
3:09 AM
low tide
3:09 AM low 0.6 ft.
9:18 AM high 5.8 ft.
3:38 PM low 1 ft.
9:40 PM high 5.3 ft.
all times in LST
Map data ©2011 Google

Wetland Hydrology and Flood Control?

Do wetlands offer flood control benefits?

- Yes, in the sense that draining the wetland and building something in its place would reduce area of land in which floodwaters would be 'welcome.'
- Yes, as a buffer zone on coasts to absorb storm surges (e.g., Mississippi delta area wetlands)
- No, in the sense that little infiltration would take place in an already saturated place; the wetland would need to be extensive to provide a significant site for floodwater storage.

Bogs

This eastern mud salamander (*Pseudotriton montanus*) is resting on sphagnum moss. Sphagnum creates bogs by holding water and creating acidic conditions. Sphagnum itself may be up to 70 percent water. (EPA)