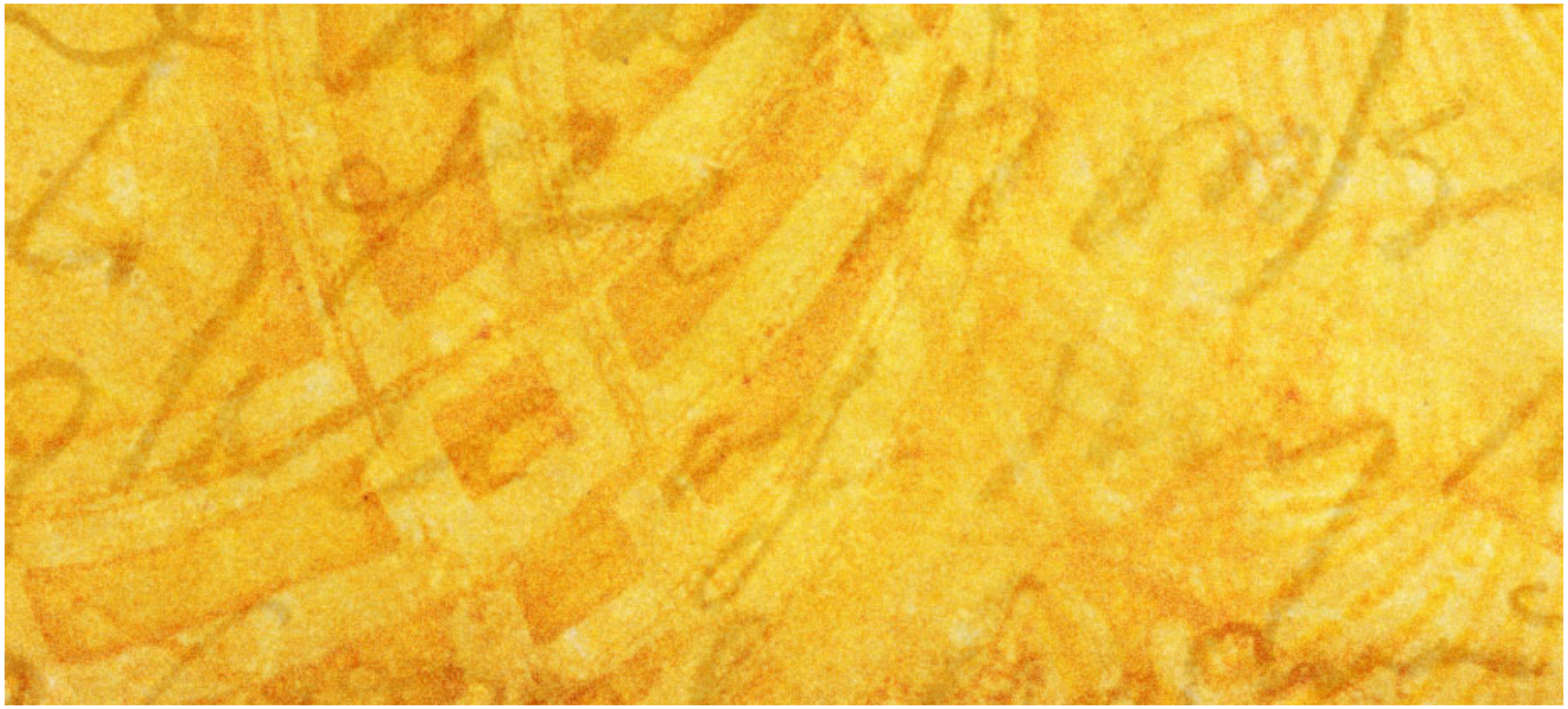
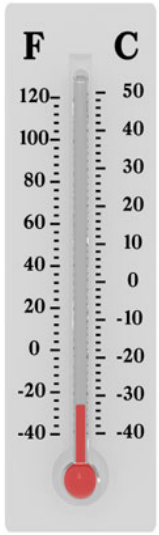
EQ- What do Basic Water Chemistry tests tell us about water quality?

An Overview



Why is Water Temperature Important?



- Water temperature limits where aquatic organisms can live
- Aquatic organisms become the temperature of the water they're in
- Extremes can kill organisms

2. How do plants affect water temperature?

- Plant cover (shade) is key to cooler streams and more oxygen (water is 7-12 degrees F lower in shaded areas)
- Pools offer deeper, cooler, more oxygenated water

What is Thermal Pollution?

- Human activities that warm the natural temperature of water cause thermal pollution
- Dams and, water used to cool industry are problems
- Is a problem since aquatic organisms are temperature dependent

What are the ranges of Water Temperature?

- Warm Range (**More than 68 degrees F**): carp, catfish, bluegill, crappie and plant life, dragonfly
- Middle Range (**55-68 degrees F**): brown trout, rainbow trout, some plant life, caddisfly
- Low Range (**cold; less than 55 degrees** F): Brook trout, **salmon**, stonefly, mayfly

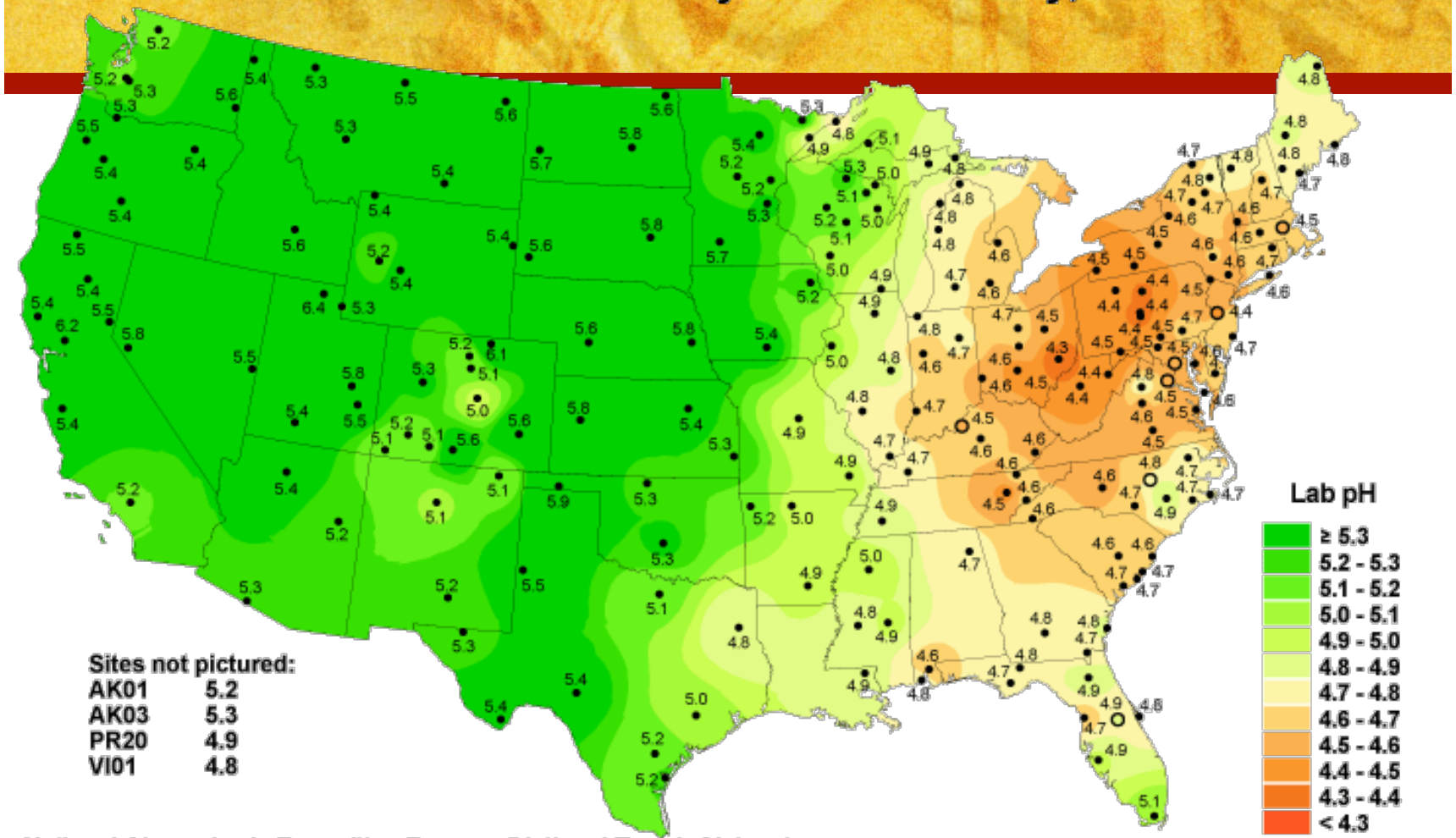
What is pH?

- Power of Hydrogen
- Levels tell whether a solution is acidic or alkaline/basic
- Is a logarithmic (exponential) scale

How does the range of pH affect aquatic life?

- **Range is 1(most acidic)-14 (most basic)**
- **7 is neutral**
- If water gets out of an organism's range, it will die
- **Ideal range** for most life is **6.5-8.0**

Hydrogen ion concentration as pH from measurements made at the Central Analytical Laboratory, 2006



National Atmospheric Deposition Program/National Trends Network
http://nadp.sws.uiuc.edu

What Influences pH?

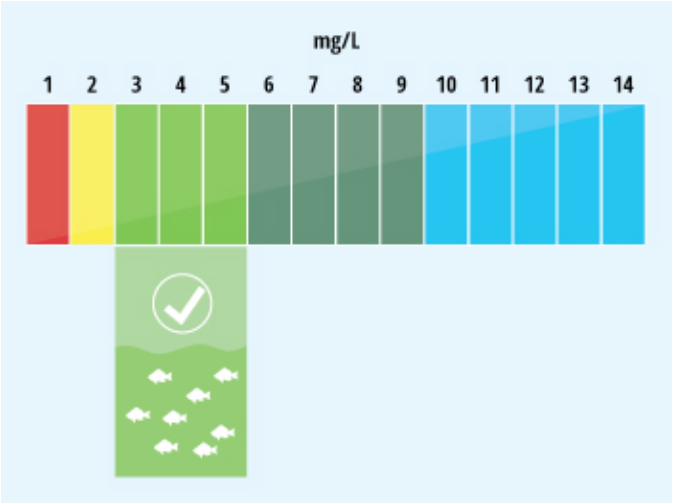
- Pollution (from automobiles and industry (coal)) can result in acid rain and make water and soil acidic
- Increased acidity has caused pH to exceed lethal levels in many lakes and streams

What is Dissolved Oxygen?

- Is the amount of oxygen found in water and is measured in milligrams per liter (or ppm)
- Fish and macros require different amounts of oxygen

Dissolved Oxygen: Ranges

- DO levels must *consistently be 5 mg/L or greater* for fish to live and grow well
- Stress, disease and death can occur when DO levels drop below 5 mg/L for any given time
- Some fish species can live in persistent low oxygen (carp, for example) but Salmon CANNOT when DO drops below 5mg/L



Factors Affecting DO Levels

- **Temperature**: the colder the water, the more oxygen it can hold
- **Water Agitation**: Riffles oxygenates water
- **Plant life**: plant decomposition reduces DO levels
- **Turbidity/Suspended solids**: reduces oxygen from streams as water temp increases.

What is Turbidity?

- It is a measure how cloudy the water is
- Clear water has low turbidity
- Suspended solid material from land —like rocks and soil—make water cloudy
- Human activity increases turbidity

2. What Causes Turbidity?

- Erosion increases rates of turbidity
- Runoff from road building, construction, logging, and farming increases turbidity
- Storm events increase turbidity

3. Problems from Increased Turbidity

- Turbidity increases water temperature AND reduces DO levels because more heat is absorbed in water (due to the particles in the water)
- Increased turbidity limits plant life especially in oceans (cuts down on sunlight and therefore photosynthesis)

Measuring Turbidity

- Measured in NTUs (Nephelometric Turbidity Units)
- Turbidity readings range widely depending on in-stream habitat and riparian conditions
- In streams west of the Cascades, ranges may be:
  - **High / Poor**: Over 50 ntu (often after winter storms)
  - **Moderate**: 26-50 ntu
  - **Low / Best**: Under 25 ntu (drinking water is zero)

Today's Lab Info