

Kinds of freshwater habitats

- Rivers, streams
 - Flowing freshwater
 - Source: where it starts
 - Mouth: where it ends
- Lakes, ponds
- Wetlands

All freshwater ecosystems

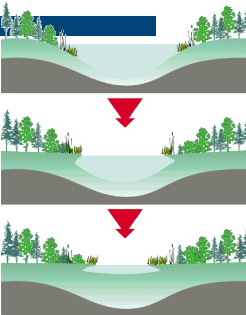
- Just a fraction of the Earth's water
 - .01% = one one-hundredth of one percent
- Occupy less than 1 percent of the Earth's surface

Rivers from start to finish

- Source = Headwaters
- Can be:
 - Snowmelt
 - Spring
 - Even a lake
- Water is colder, clearer, more highly oxygenated
- **Mouth:** where the river ends
 - Usually the ocean or another river, or lake
 - Near mouth, increased sediment limits light and plants, water is warmest
 - River widens and slows, getting warmer, siltier.
- **Middle** is most diverse, lots of plants

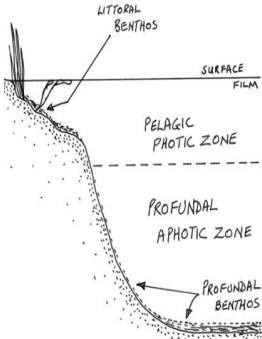
Lakes and ponds

- What's the difference?
 - Ponds typically smaller
 - May be seasonal (Ephemeral) —that is, dry up part of the year
 - Lakes exist hundreds or thousands of years
 - But, even lakes can fill in or dry up



Parts of a lake

- **Littoral zone:** near shore, not open water
 - Nutrient rich, lots of plant and animal life
 - Warm
- **Pelagic zone:** near surface, open water
 - Lots of light
 - Lots of plankton
- **Profundal zone:** deeper, little light
- **Benthic zone:** the bottom, little light, low



Blackberry

Native Blackberries


Ca Blackberry Rubus ursinus

- Hangs over the water
- Cools water
- Increases O₂
- Dense growth = foraging, nesting and hiding habitat for wildlife.
- Edible berries = important food source
- Spreading growth = binds soil for erosion control.



Blackberry

Invasive Species
Himalayan blackberry




- Covers the shore + Out competes low stature native vegetation
 - Shades out smaller, native species = reducing native plant and wildlife diversity
- HBB readily invades riparian areas, forest edges, oak woodlands, meadows, roadsides, clear-cuts and any other relatively open area,
- Limit movement of large animals

Water Temperature Affected by Native and Invasive Species

Native Blackberries	Invasive Species
<i>Ca Blackberry Rubus ursinus</i>	Himalayan blackberry


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- Covers the shore
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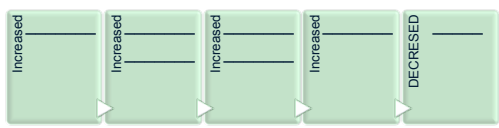
Summary of the difference between Invasive and Native Blackberry

Eutrophication = too much nutrients!

- If nutrients increase too much in a lake, pond, or ocean, excessive plant growth results
- Phosphorus
- Nitrogen
- NOT GOOD: why?
 - As plants decay, decomposing bacteria use oxygen dissolved in the lake to do their jobs.
 - Dissolved oxygen goes down
 - Fish and other critter suffocate



Eutrophication = too much nutrients!



Daily Debbie Downer

- March 22, marks the 20th anniversary of the first [World Water Day](#), a day established by the United Nations to focus attention on the importance of fresh water around the globe.
- Globally, fresh water is increasingly becoming an endangered resource.
- According to a U.S. State Department document released on World Water Day last year, the need for fresh water will exceed the supply by 40 percent by the year 2030.