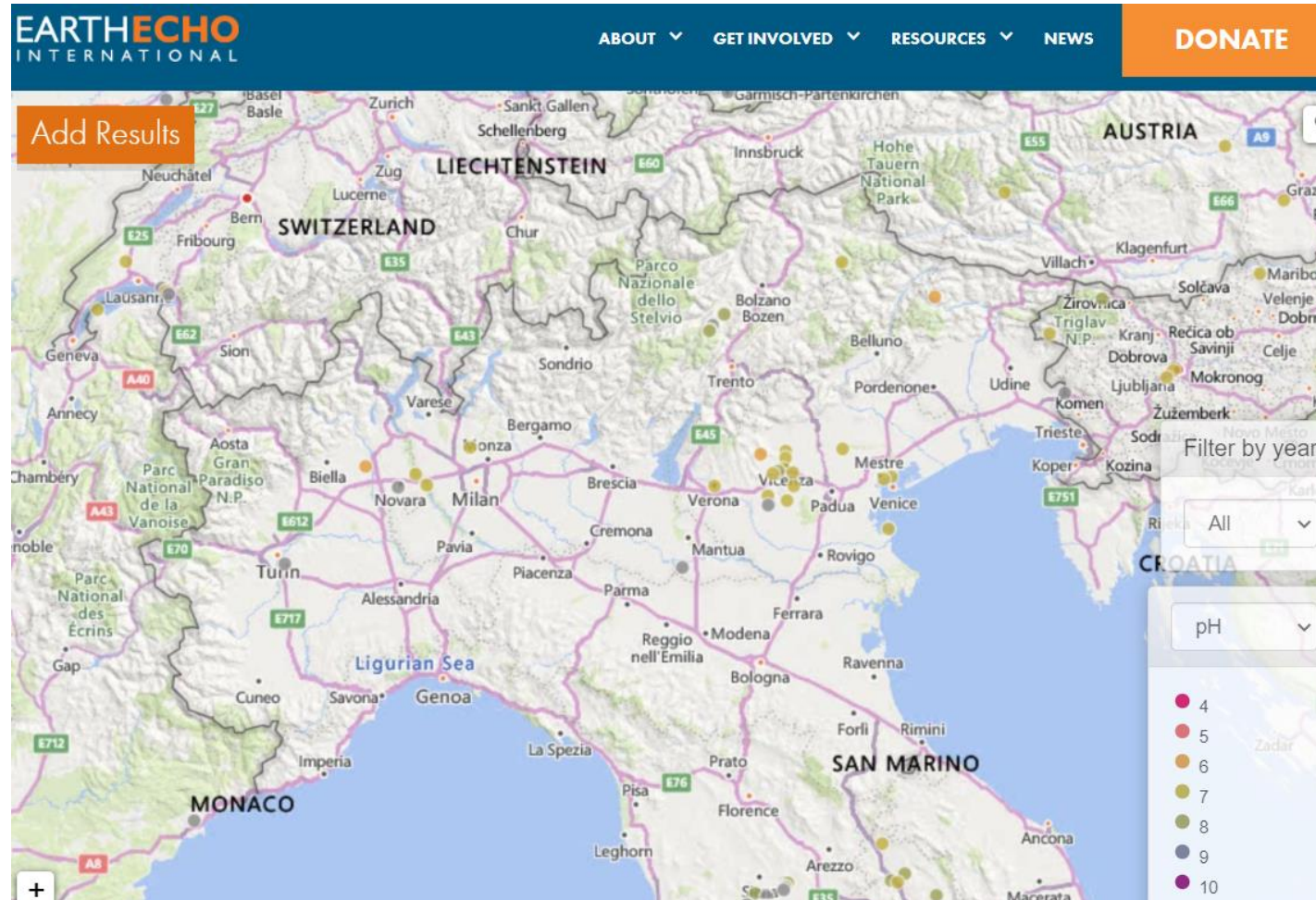


# Echo Earth Water Challenge : a citizen Science project about Water.



## Why is so important to monitor a river?

1. to characterize waters and identify changes or trends in water quality over time;
2. to identify specific existing or emerging water quality problems;
3. to gather information to design specific pollution prevention programs;
4. to respond to emergencies, such as spills and floods.

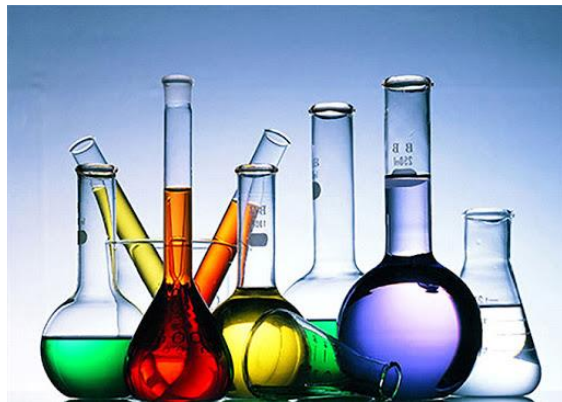


## How to determine Water Quality.

We can analyze water by different points of view:

### Chemical

- PH
- Dissolved Oxygen
- Nitrates
- Phosphates



### Physical

- Clarity
- Temperature
- Flow



### Biological

- Abundance of aquatic plants
- Abundance of aquatic animals



## Temperature

Temperature has a direct influence on the amount of dissolved oxygen in a river. Generally, warmer waters have lower dissolved oxygen levels than colder waters. Further, aquatic organisms' metabolic rates increase in warm water, consuming even more oxygen from the water. An organism's ability to fight disease, parasites, or pollution is compromised when available dissolved oxygen decreases.



More temperature → Less dissolved oxygen → Problems for living organism

## Dissolved Oxygen

Oxygen becomes dissolved in water in various ways, including tumbling over rocks (whitewater) or falls where water is agitated and atmospheric oxygen is forced into solution. Photosynthesis from aquatic plants also produces dissolved oxygen.

The amount of oxygen dissolved in water peaks in late afternoon when photosynthesis is also at its peak and is lowest just before dawn.

In general, higher dissolved oxygen levels indicate healthier water for aquatic organisms.



More plants → More dissolved oxygen → A good thing for living organism

## Clarity

Clarity refers to how clear water is, or how deep one can see into the water. Relative clarity is measured in centimeters of depth of visibility. Clarity decreases with the increase in levels of suspended solids such as plankton, silt, clay, sewage, organic matter, and industrial waste.

Water temperature increases as the clarity of a waterway decreases. When suspended solid levels increase so does the rate of absorption of the sun's rays.

The level of suspended solids increase → Clarity decrease → Temperature increase



## Flow

A river flows at various rates throughout a watershed and throughout the seasons. Flow tends to be higher in the springtime when storms and snowmelt add volume to rivers.

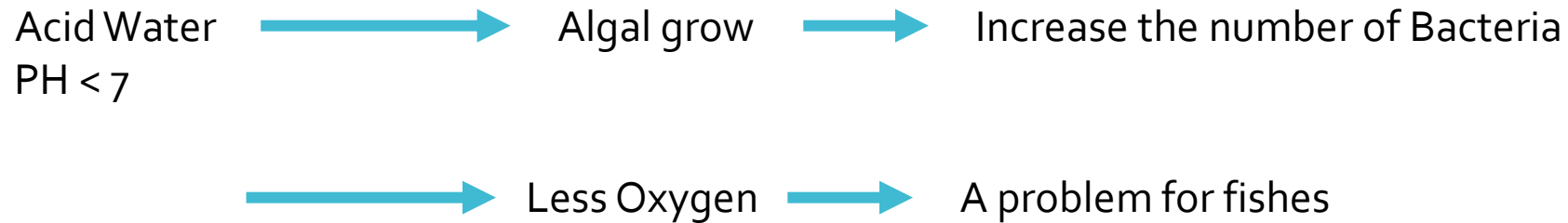
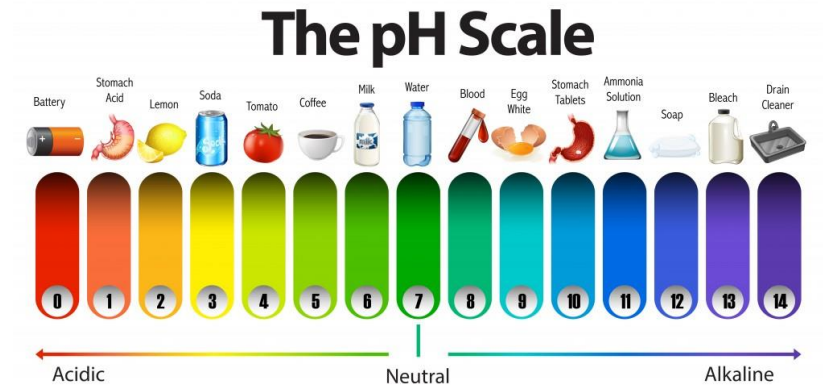
Clarity generally decrease as flow increases. High flow velocities keep solids suspended instead of letting them settle to the bottom.



Flow increase → More suspended solids → Clarity decrease

# PH

Indicates if the water is acid (less than 7) or a base (more than 7). Water with low pH increases the solubility of nutrients like phosphates and nitrates. This makes these nutrients more readily available to aquatic plants and algae, which can promote harmful overgrowth called "algal blooms." As these blooms die, bacteria numbers increase in response to the greater food supply. They, in turn, consume more dissolved oxygen from the water, often stressing or killing fish and aquatic macroinvertebrates.





## Erosion

What humans can do for reducing the erosion is to plant vegetation along the edge of waterways to serve as a buffer strip, capturing the sediments before they enter the water.

Plants slow the velocity of water as it runs off over the surface of the land. When runoff is slowed, erosion is decreased.

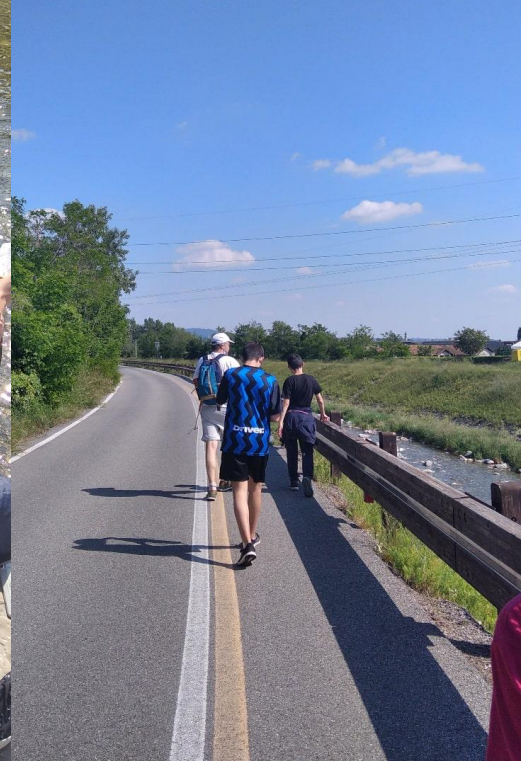
And this should be very important for the ecosystem because sediment and other dissolved substances also decrease light penetration, which inhibits aquatic plant photosynthesis.



More plants along the edge → Slow the water speed → Less erosion → Less sediments

Light penetration → More photosynthesis → More dissolved oxygen for all

# 31 th May: The Lambro River



7th June :  
Bova stream

