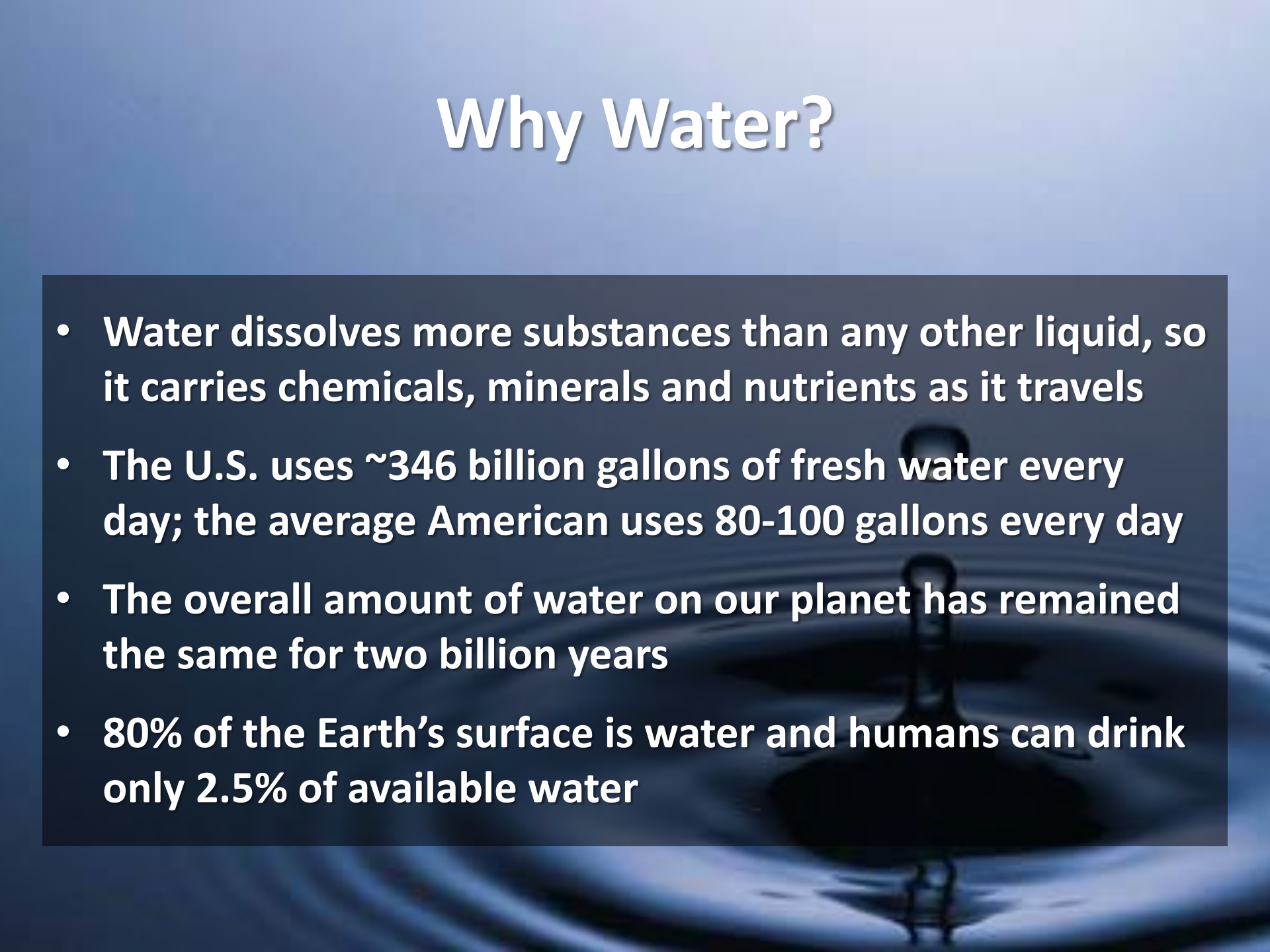


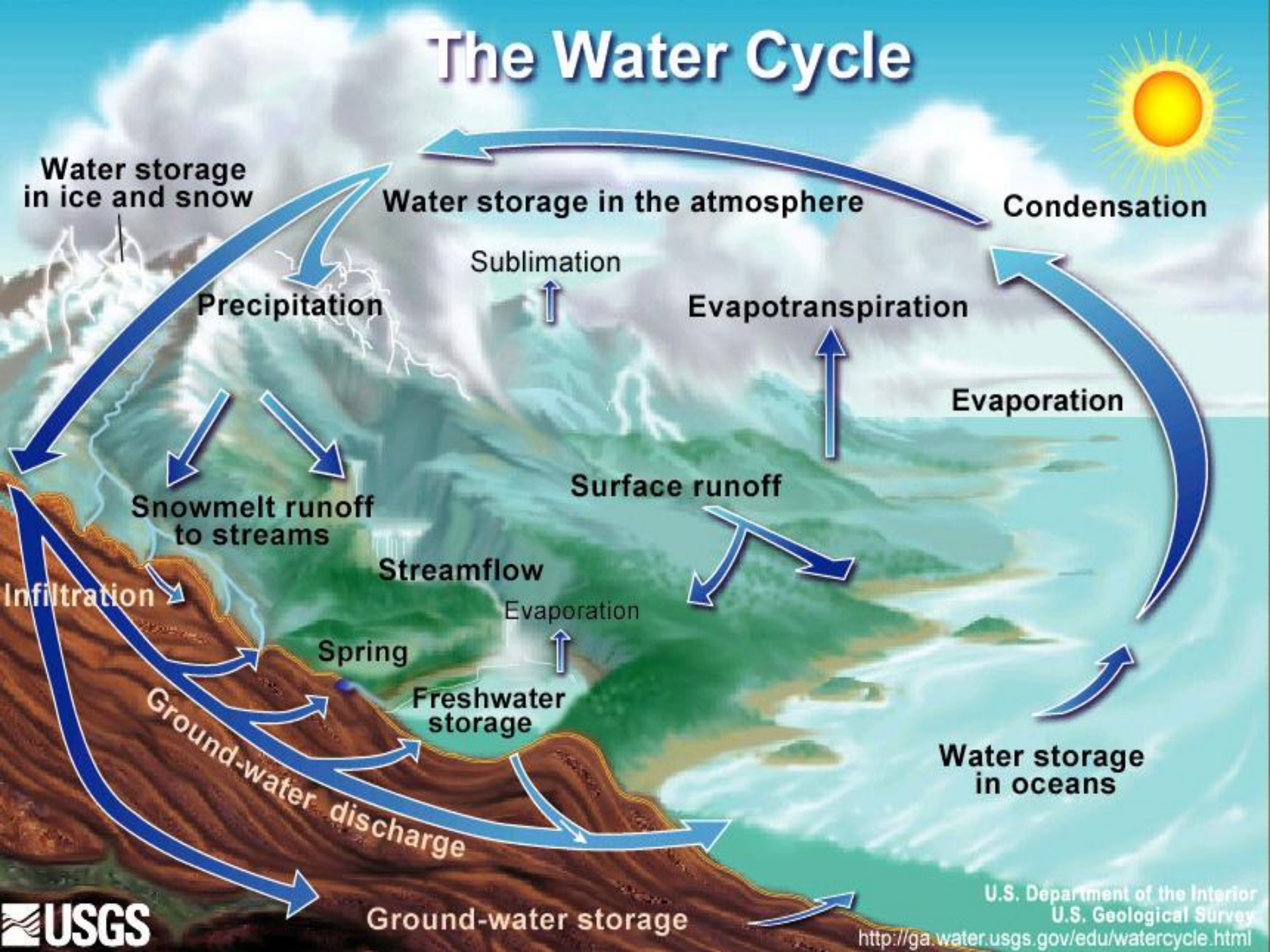
Introduction to Water Chemistry



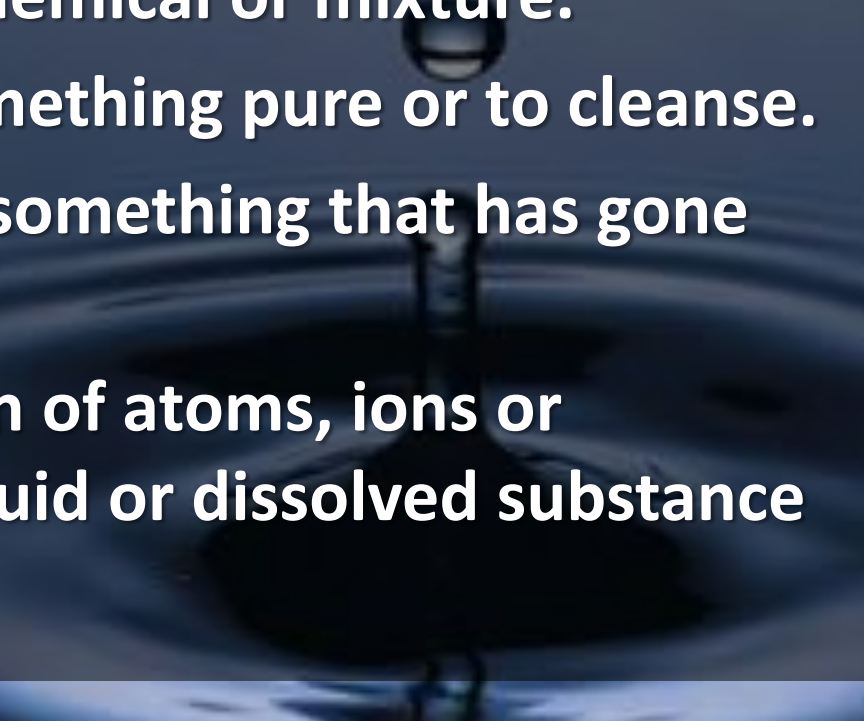
Why Water?

- **Water dissolves more substances than any other liquid, so it carries chemicals, minerals and nutrients as it travels**
 - **The U.S. uses ~346 billion gallons of fresh water every day; the average American uses 80-100 gallons every day**
 - **The overall amount of water on our planet has remained the same for two billion years**
 - **80% of the Earth's surface is water and humans can drink only 2.5% of available water**
- 

The Water Cycle



Water Quality Key Terms

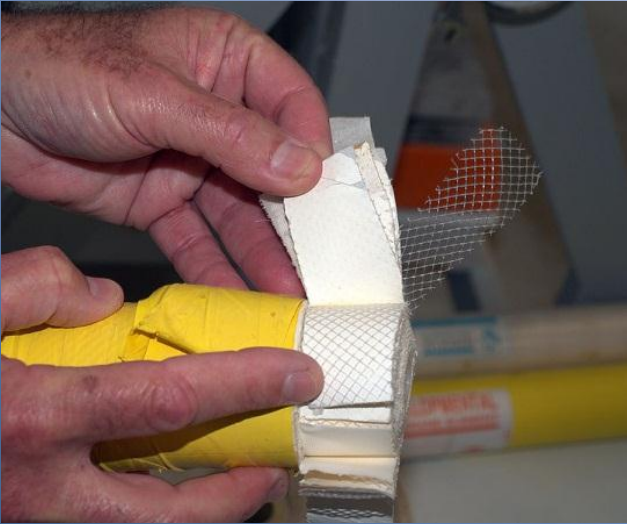
- **Contamination:** The presence of a minor component in another chemical or mixture.
 - **Purification:** To make something pure or to cleanse.
 - **Remediation:** To correct something that has gone bad or defective.
 - **Adsorption:** The adhesion of atoms, ions or molecules from a gas, liquid or dissolved substance to a surface.
- 

How do we purify water?

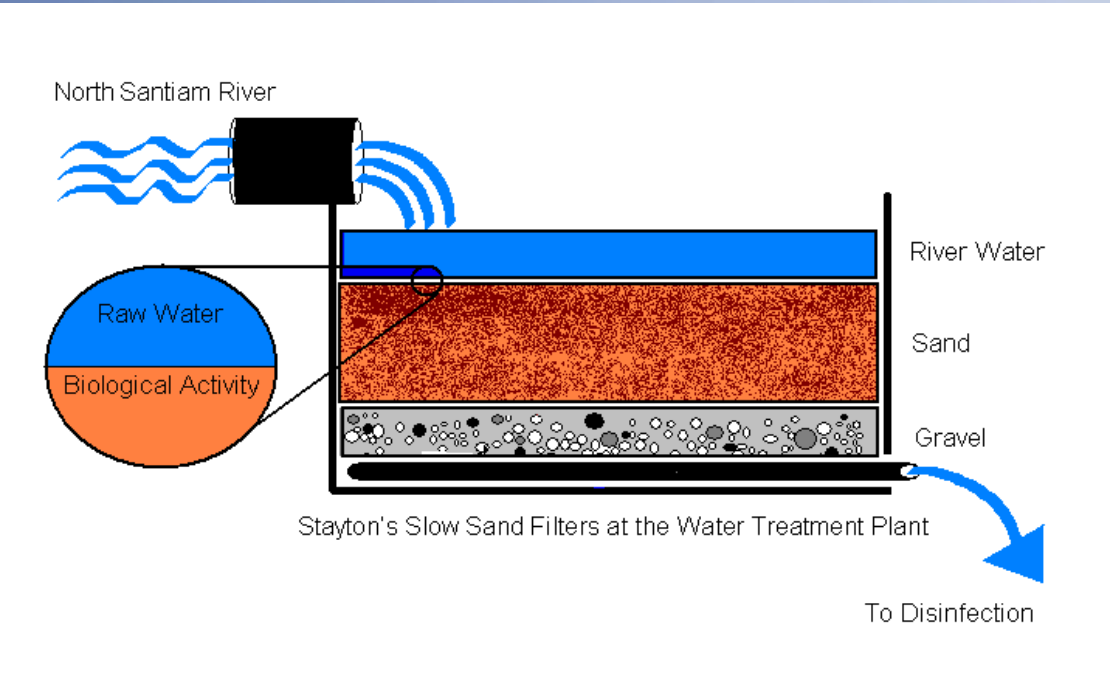
- **Larger-scale methods**
 - reverse osmosis
 - ultra-filtration
 - electro-deionization
- **Smaller-scale methods**
 - filters
 - boiling



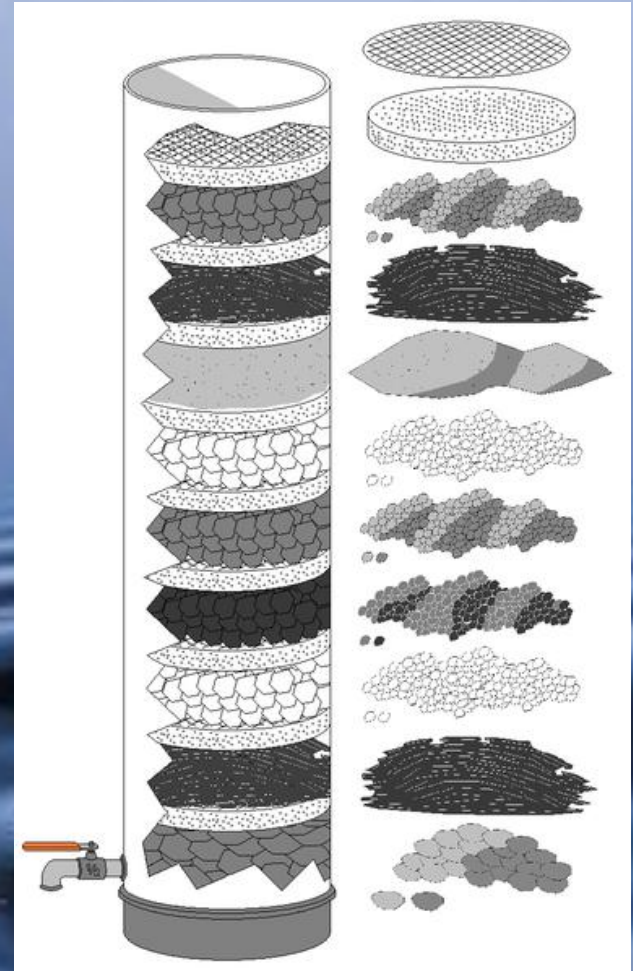
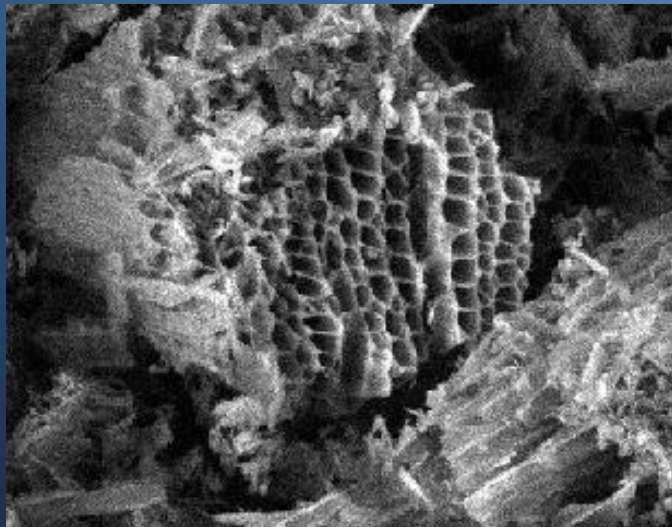
Reverse Osmosis



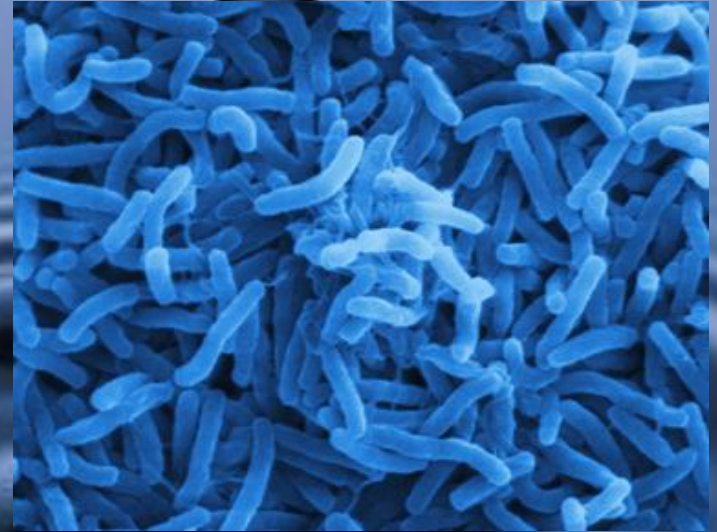
Filters



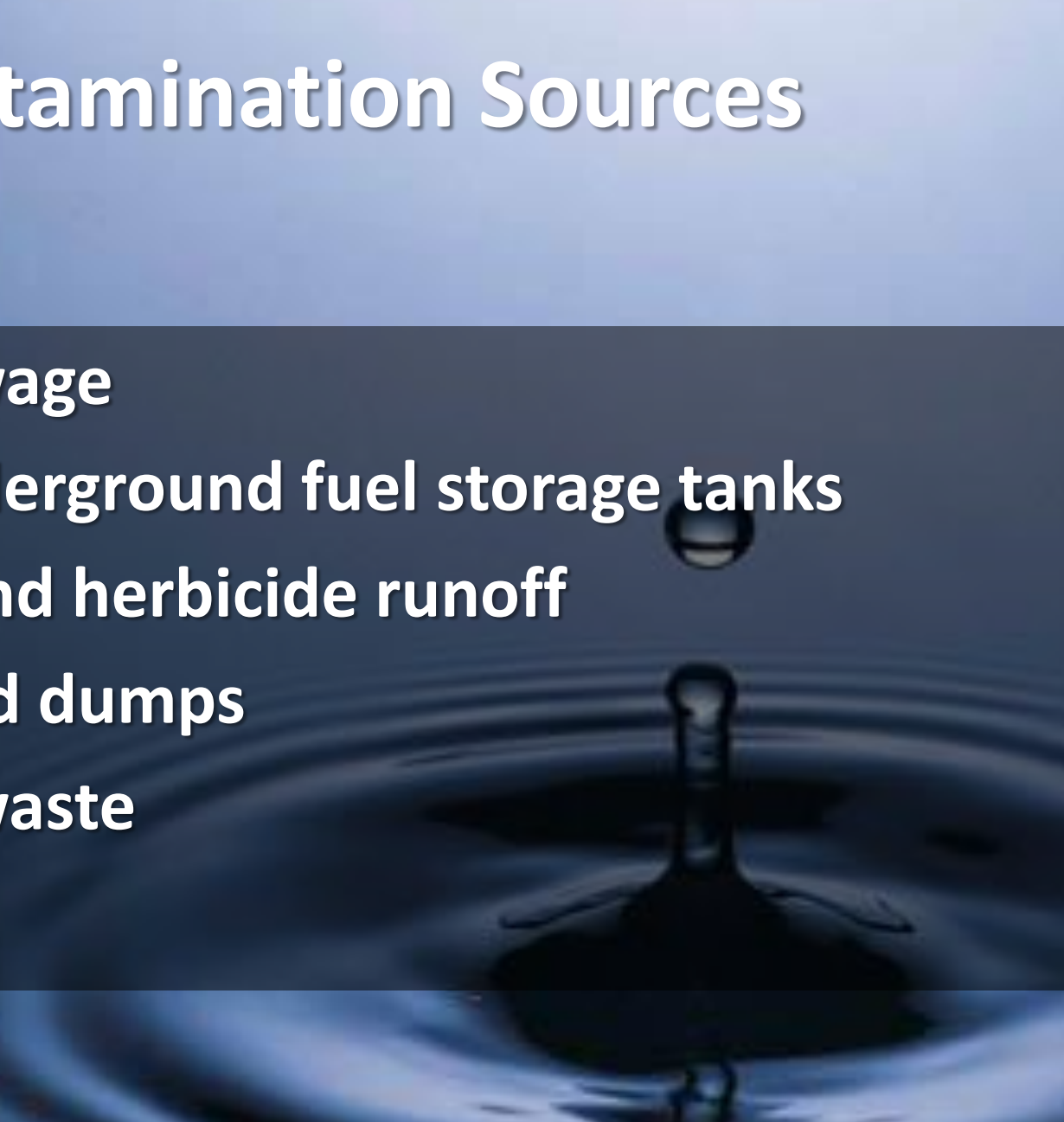
Activated Carbon



Boiling Water



Contamination Sources

- **leaking sewage**
 - **leaking underground fuel storage tanks**
 - **pesticide and herbicide runoff**
 - **landfills and dumps**
 - **industrial waste**
 - **and more...**
- 
- A close-up photograph of a single water droplet falling into a pool of water. The droplet is captured mid-fall, just above the surface, creating a small splash and concentric ripples that spread outwards. The background is a soft, out-of-focus blue, suggesting a clear sky or a clean water surface.

Sewage Spills



Underground Storage Tanks



Pesticides and Herbicides

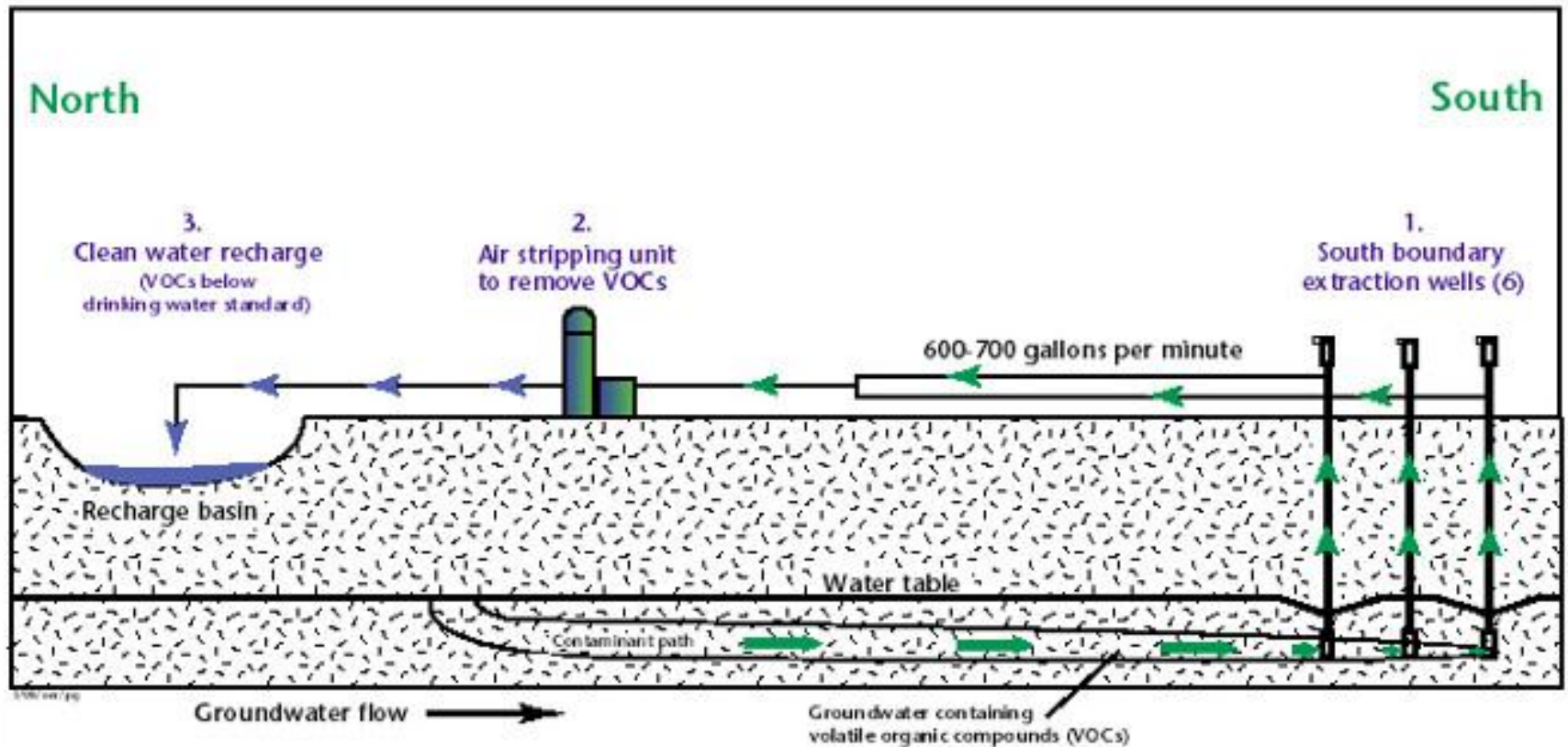


Industrial Waste Spills

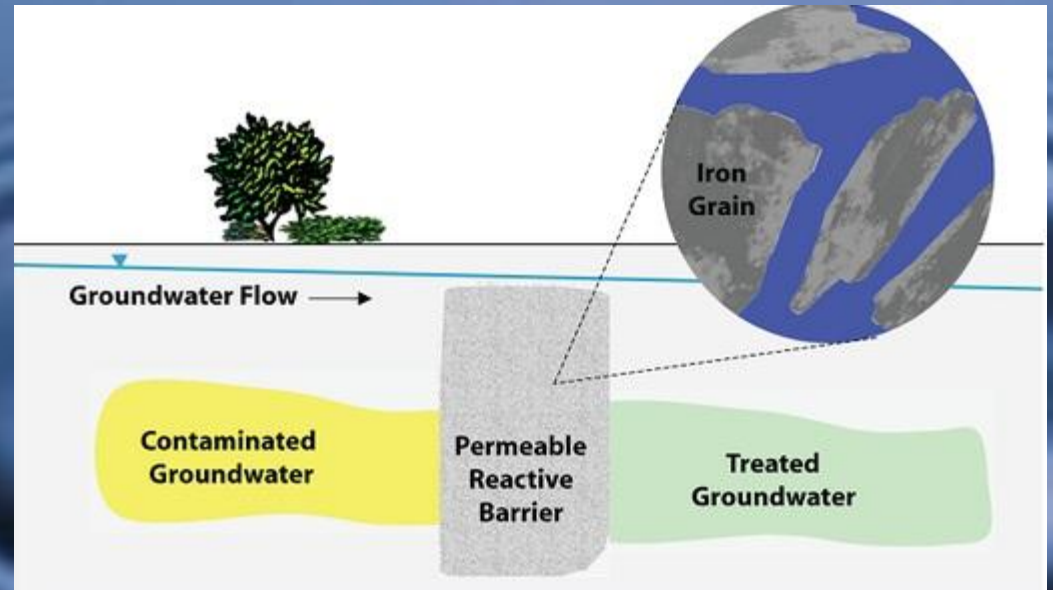


~ Remediation Methods ~

Pump-and-Treat



Permeable Reactive Barrier



Nanoparticle Injection

