SludgeHammer®

nature called. we answered.

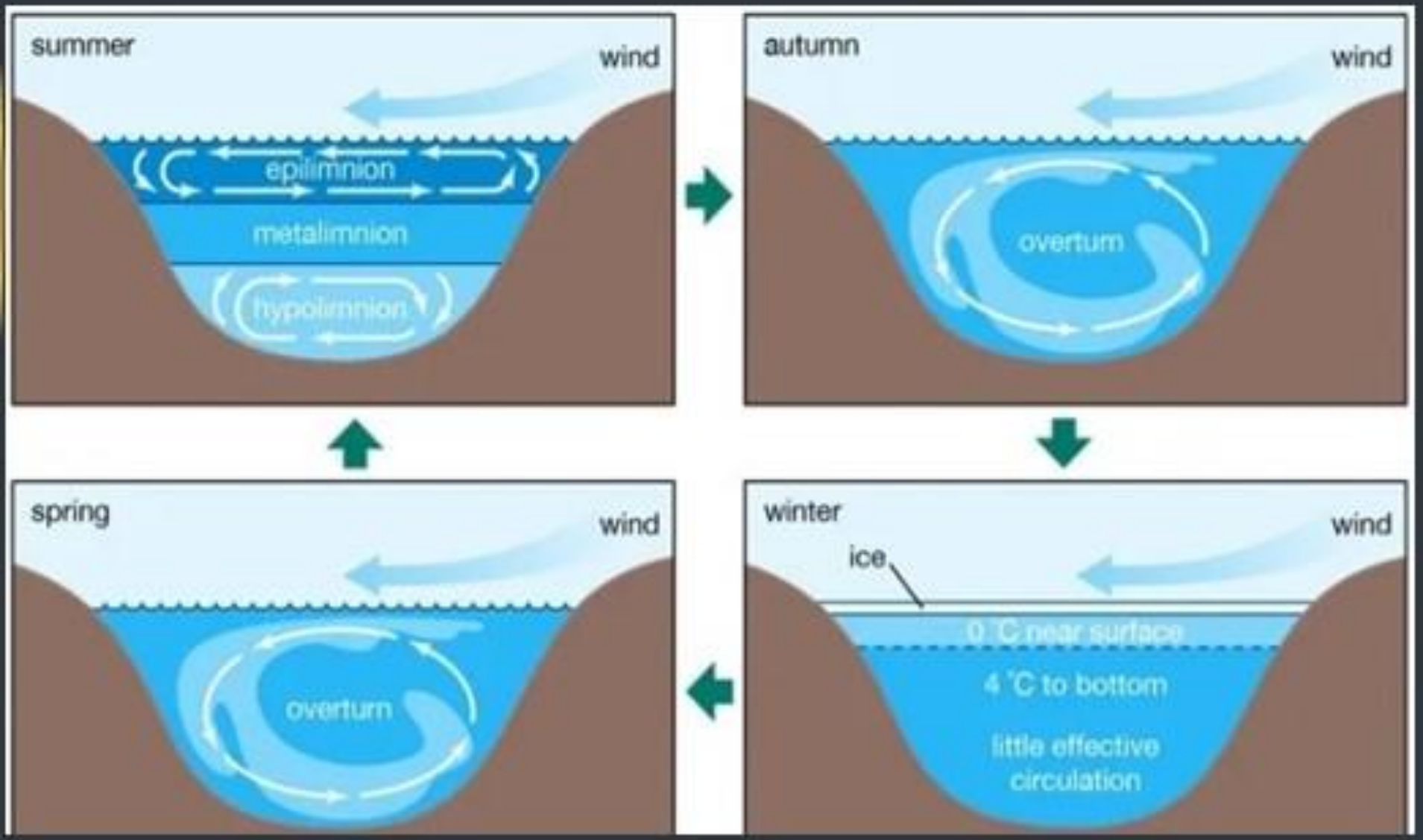
Empowering Nature in Wastewater Treatment Systems

We love our lakes - So how do we protect them?

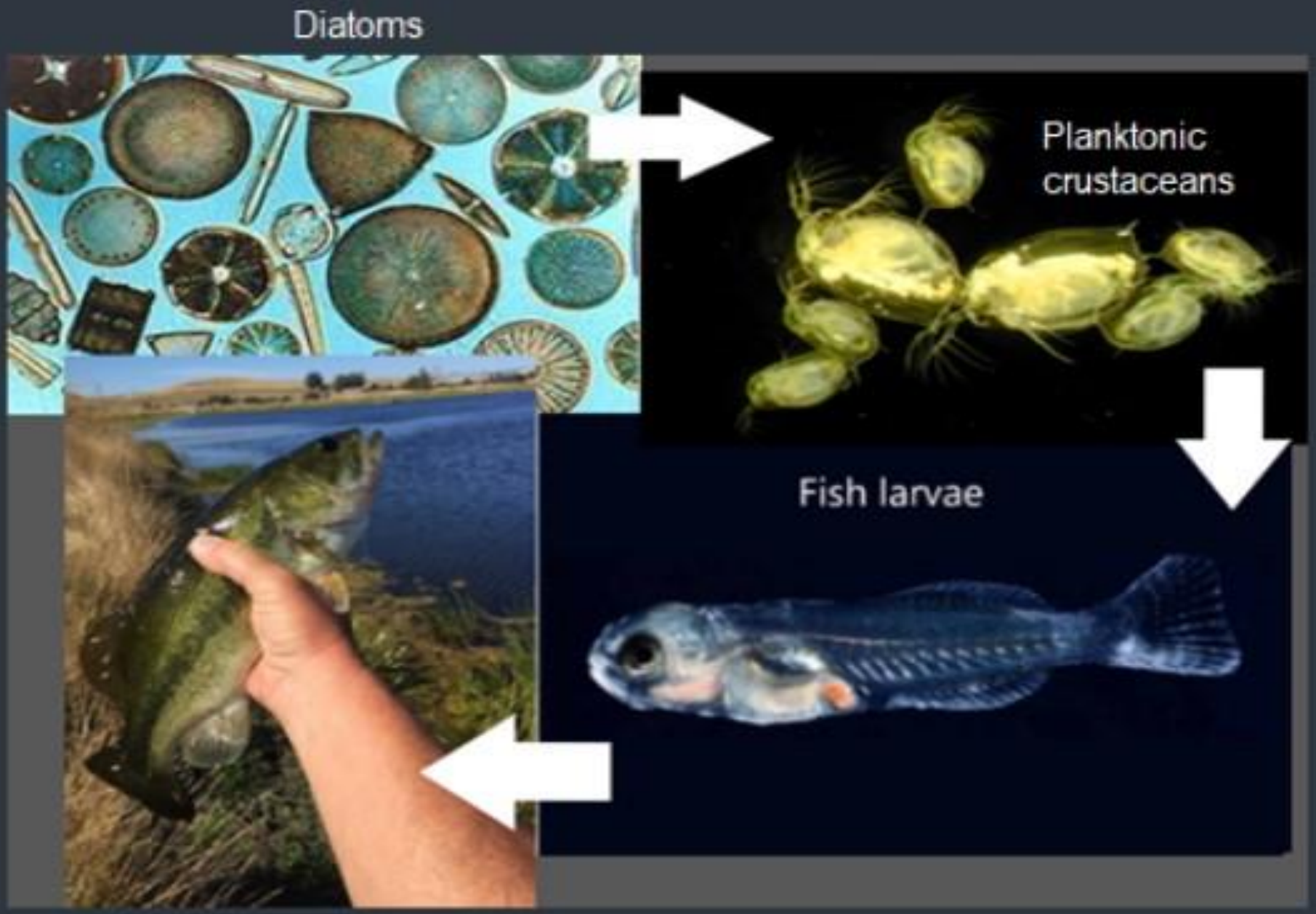
How do you keep a lake like this from becoming

A lake like this!

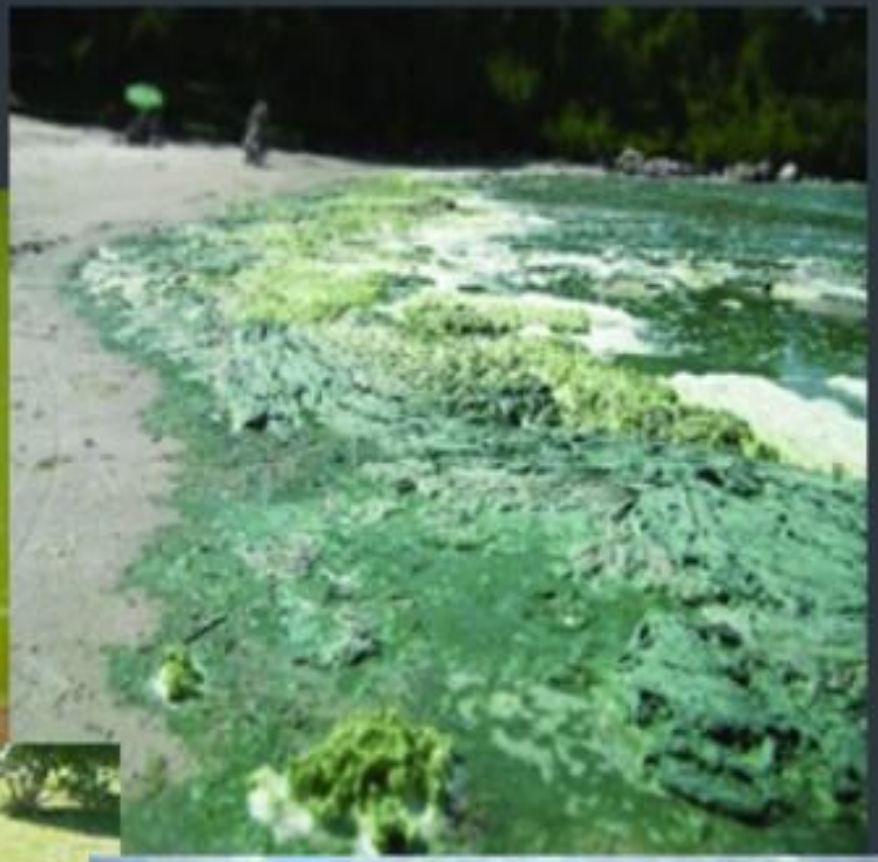
Annual Lake Weather Cycle



Spring Diatom Increase and Aquatic Food Cycle



Out of Control Algae



Bacterial Bioremediation

Dr. Wickham Develops the SludgeHammer Blend Bacteria and displays successful soil remediations at the Marine Corps Base Camp Pendleton, Oakland Naval Supply Depot, Chevron Oil and PEMEX.

Active Fermentation in Manure Lagoon

Sources of Wastewater Bacteria

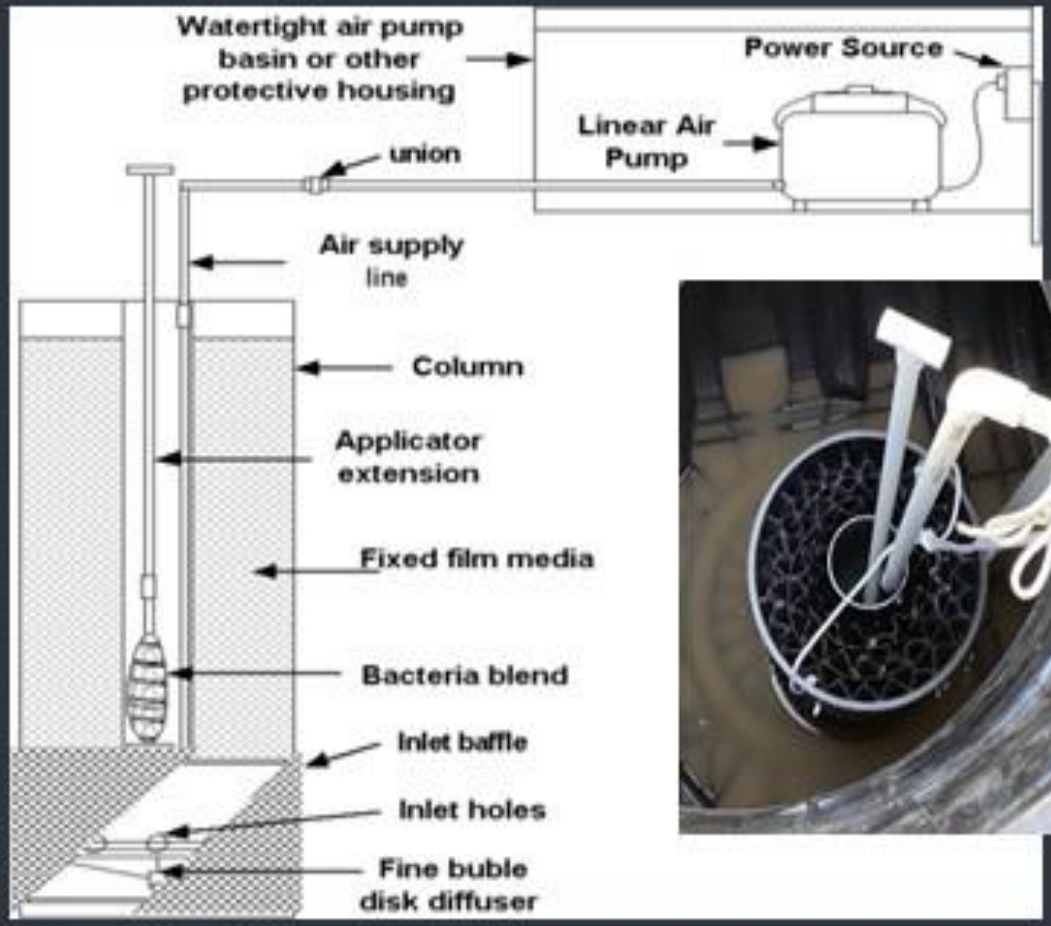
Weaknesses of Strict Aerobes

1. Random sourcing
2. Appetite constrained by host dependency
3. Require O_2 – Cannot survive in anaerobic leach field.
4. Cannot ferment
5. Cannot denitrify

Soil Bacteria

- Survive in anaerobic conditions
- When anaerobic they ferment sugars such as muco-polysaccharides
- Denitrifiers when anaerobic
- Operate at low temperatures
- Spore formers are "R" selected
- Produce very small level of biomass
- Robust enough to recover quickly

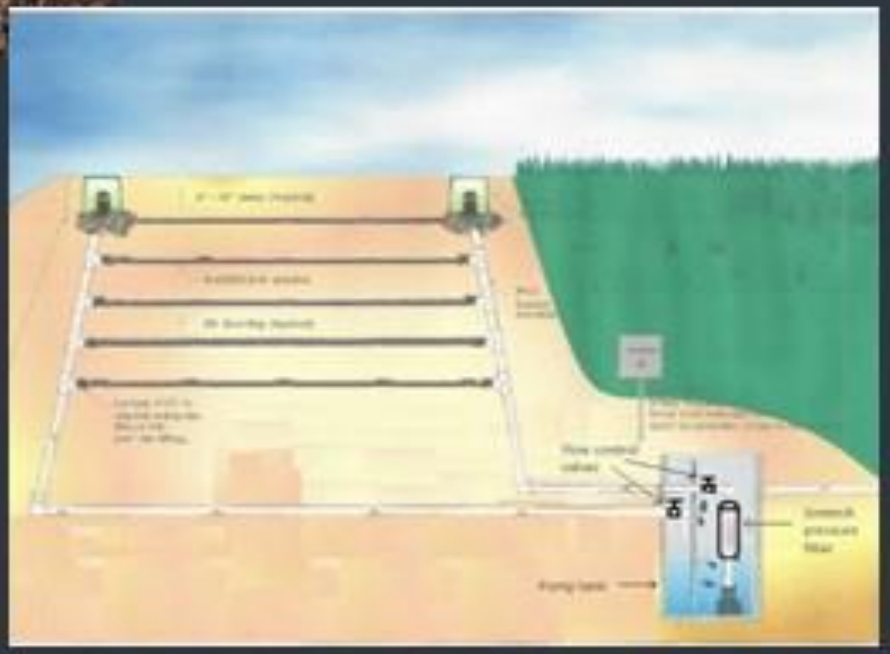
The ABG is an aeration device that provides a specific refuge where facultative soil bacteria can be grown inside the tank.



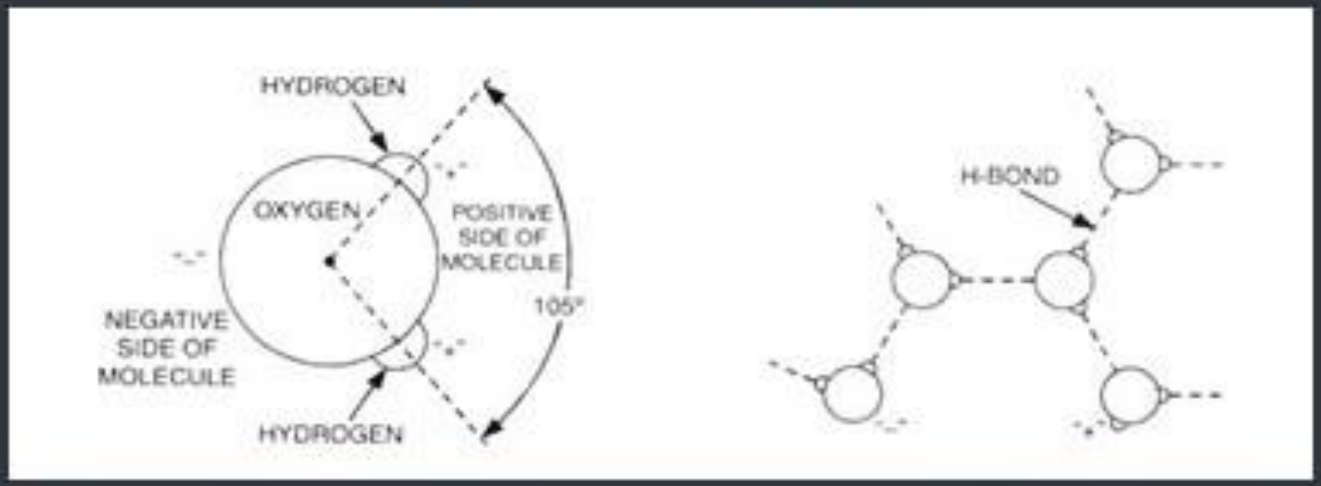
GeoFlow Subsurface Drip Irrigation

Nitrogen and Phosphate
Directly taken up by
Vegetative Growth

Enriched organic
environment of discharge
point increases nutrient
absorption and biological
treatment even in winter.



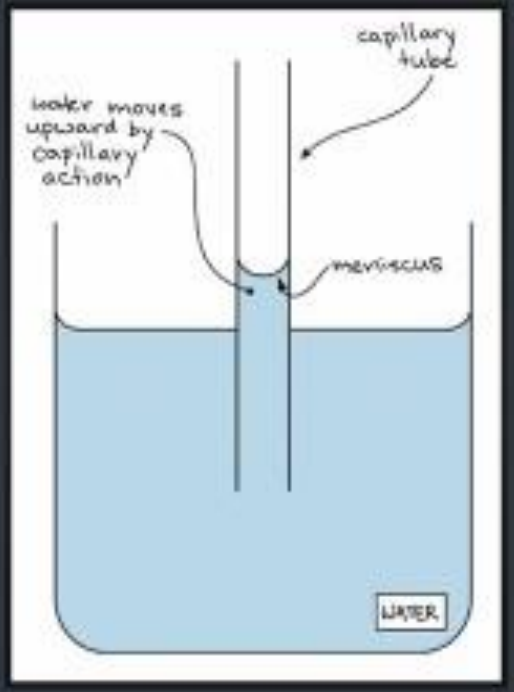
Why is water so unique?



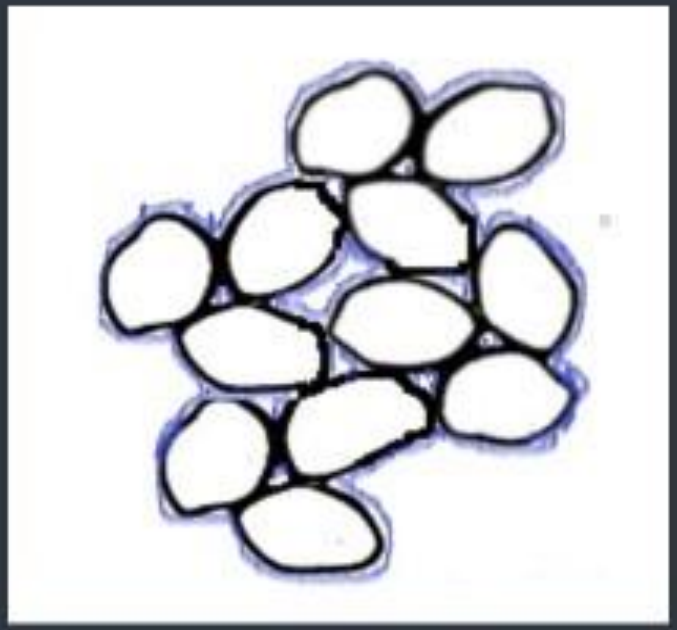
Viscosity and Surface Tension

Walking on water!

Capillary action and soil



Liquid microlayer around soil particles



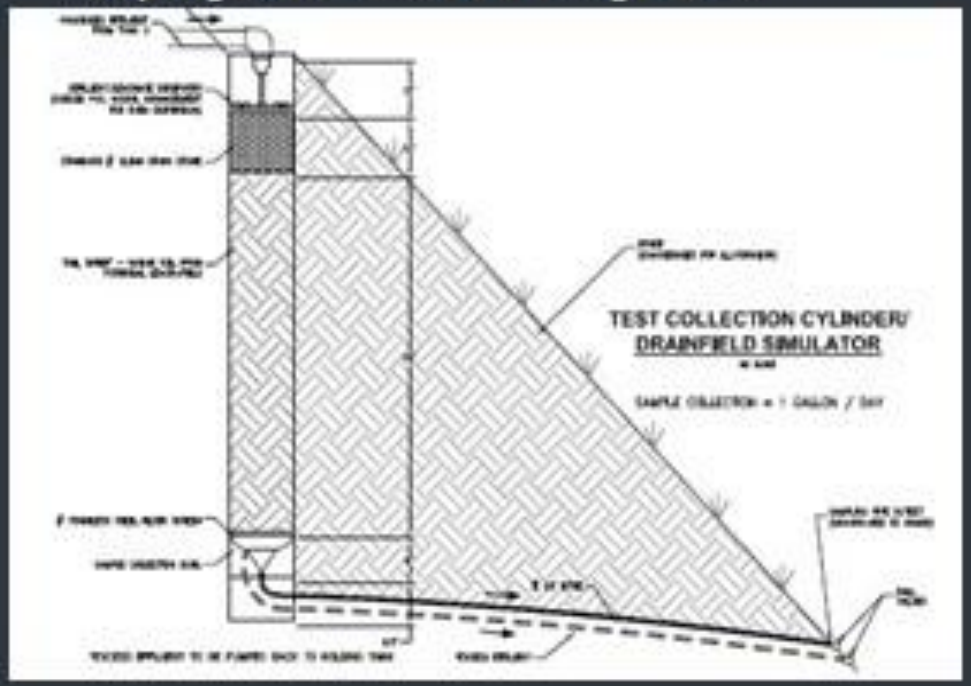
Capillary action can pull water all the way up a 200 foot tree!

Nutrient control is the key with phosphate being the most important. Aeration may be the best way to keep it in the soil and out of the Groundwater

Lysimeter Soil Samples at Depth
Total Phosphorus readings as mg/l

	Site 3 Conventional Septic/leachfield			Site 1 Single SludgeHammer in septic tank/leachfield			Site 2 SludgeHammer with subsurface drip		
	Depth			Depth			Depth		
Date	6"	12"	24"	6"	12"	24"	6"	12"	24"
Baseline 11/12	1.19	1.59	0.5	0.15	0.14	0.12	0.13	0.14	0.47
12/13/2004	1.95	NS	1.63	0	0	0	0	0	NS
1/5/2005	2.96	3.23	1.89	0.12	0	0	NS	NS	0
1/10/2005	NS	3.78	1.58	0.06	0	0	NS	NS	0
1/26/2005	5.12	NS	2.81	0.09	0	0.11	NS	NS	NS
2/8/2005	6.7	NS	3.56	0.06	0	0	NS	NS	0
2/14/2005	6.97	7.06	4.5	0.09	0.05	0.07	NS	NS	0.57
2/21/2005	7.96	8.06	5.22	0.08	0	0	0.08	0	0
2/28/2005	7.05	8.51	5.28	0.27	0.07	0.32	0.09	0.25	0.08
3/7/2005	6.28	NS	4.29	0.09	0.06	0	0.09	0	0.05
avg	5.62	6.13	3.42	0.10	0.02	0.16	0.07	0.06	0.10

Septage treatment through soil



			BOD	TSS	NH3	NO2	NO3	TKN	TN	Phosp.
Raw Septage			2423	4280.3	125.60	0.04	1.3	232.30	233.60	19.2
Average SludgeHammer			80.57	438.73	4.81	3.35	18.37	18.21	39.29	6.28
Average Soil Treatment			16	14.46	7.56	0	4.75	10.68	15.83	0.83

No:	Analysis	Concentration	LOD	Units
SAMPLE ID: PUMP TANK				
1	BOD 5-DAY SM5210-B-2016	<7	7	mg/L (PPM)
1	NITROGEN, AMMONIA - SM4500-NH3-G-2011	ND	0.20	mg/L (PPM)
1	NITROGEN, KJELDAHL EPA SM4500-NH3-G	1.8	1.0	mg/L (PPM)
1	NITROGEN, NITRATE - EPA 353.2	10.8	0.50	mg/L (PPM)
1	NITROGEN, NITRITE - EPA 353.2	0.42	0.05	mg/L (PPM)
1	PHOSPHORUS-TOTAL EPA 365.1	4.33	0.25	mg/L (PPM)
1	RESIDUE, NON-FILTERABLE(TSS)/SM2540D	7	1	mg/L (PPM)
SAMPLE ID: SOIL SAMPLER				
2	NITROGEN, AMMONIA - SM4500-NH3-G-2011	8.59	0.20	mg/L (PPM)
2	NITROGEN, NITRATE - EPA 353.2	1.63	0.50	mg/L (PPM)
2	NITROGEN, NITRITE - EPA 353.2	0.06	0.05	mg/L (PPM)
2	PHOSPHORUS-TOTAL EPA 365.1	ND	0.25	mg/L (PPM)

DigIt Excavation converts pump-and-Haul tanks to Drip at Lake Cora

Tiny yard next to private lake near Traverse City

Trees can now be part of your disposal system.

The Visconti property on Mullet Lake already had a beautiful landscape mound. Treated effluent now provides nutrients and irrigation.

What about Lakes that already have blooms?

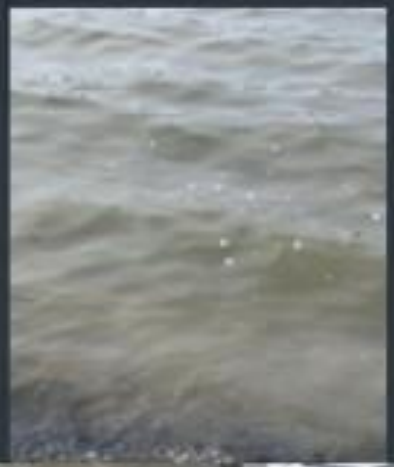
Pond Unit added to Pea Soup lake

Solar powered pond treatment unit

Pond water without algae

Phosphate Adsorption Media

Silver Lake Biochar Installation



June 10 – Installation with Secchi disc at 32"

August 11 – Secchi reading at 48" and visible clearing throughout the lake.

The comments and opinions made in this presentation are those of the presenter and not of NOWRA or the Mega-Conference sponsors.

Visit www.sludgehammer.net for more information

(Beauty from a septic tank!! SludgeHammer's own wastewater garden below.)