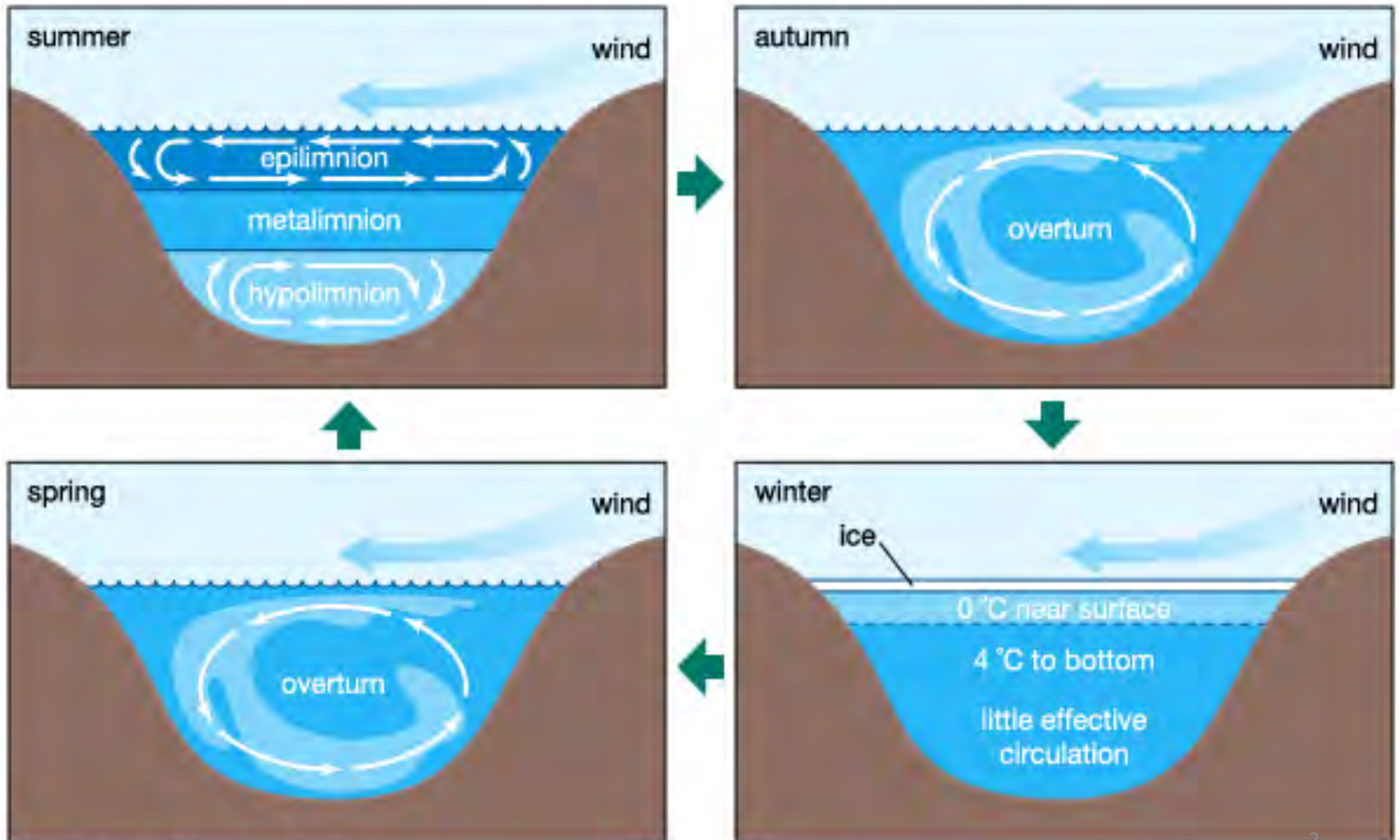


Will Aeration Control Algae?

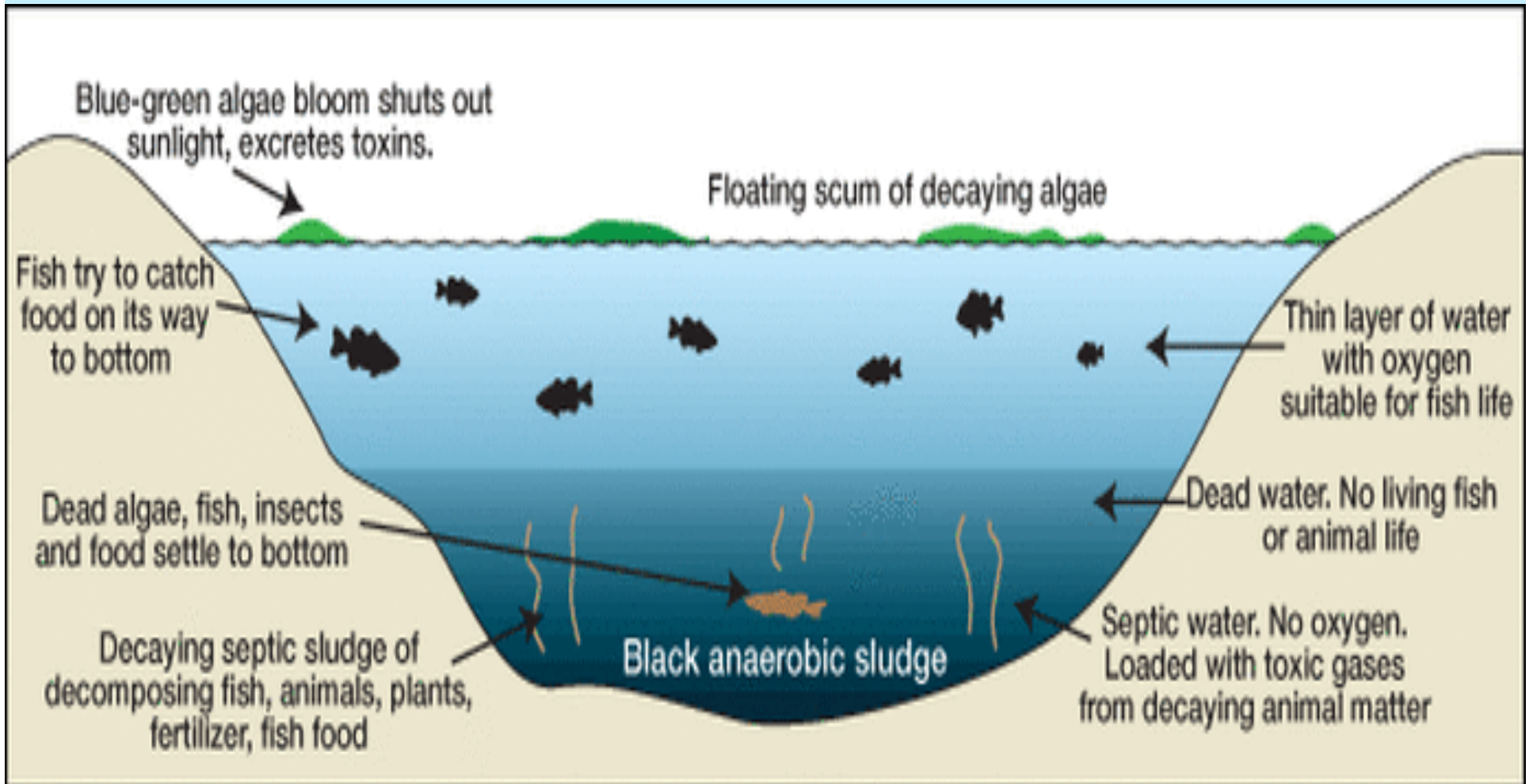
Sandy Kubillus



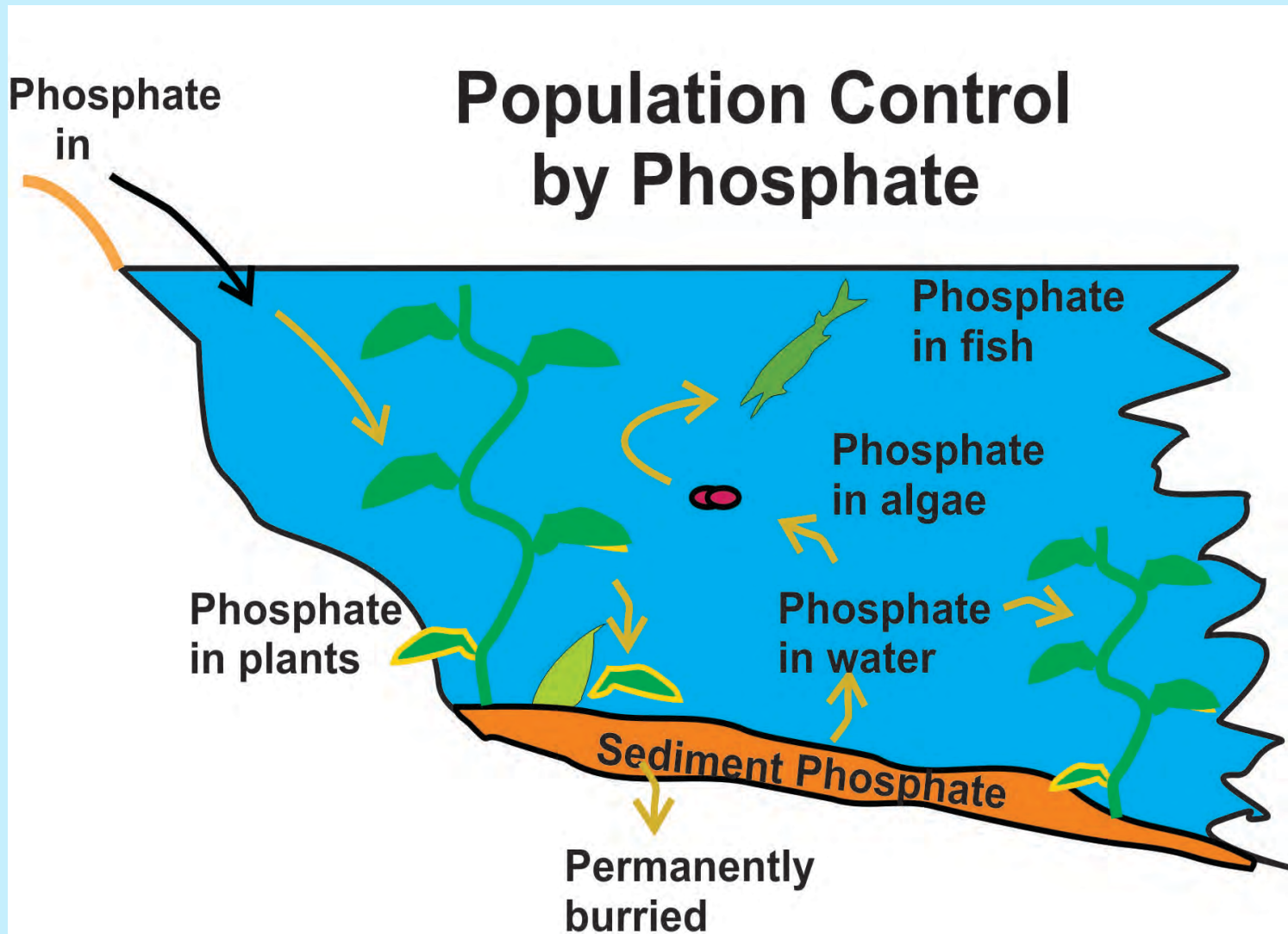
Lake Stratification



Summer Stratification in Nutrient-Rich Lakes



Phosphorus in Sediment can cause Algae Blooms or Plant Growth



Does Aeration Control Algae?

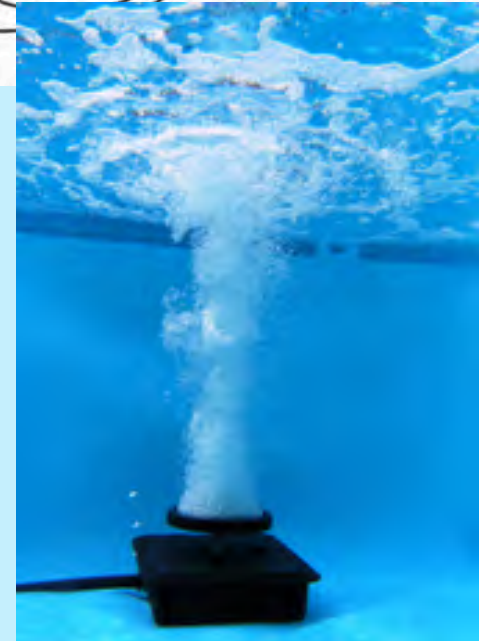
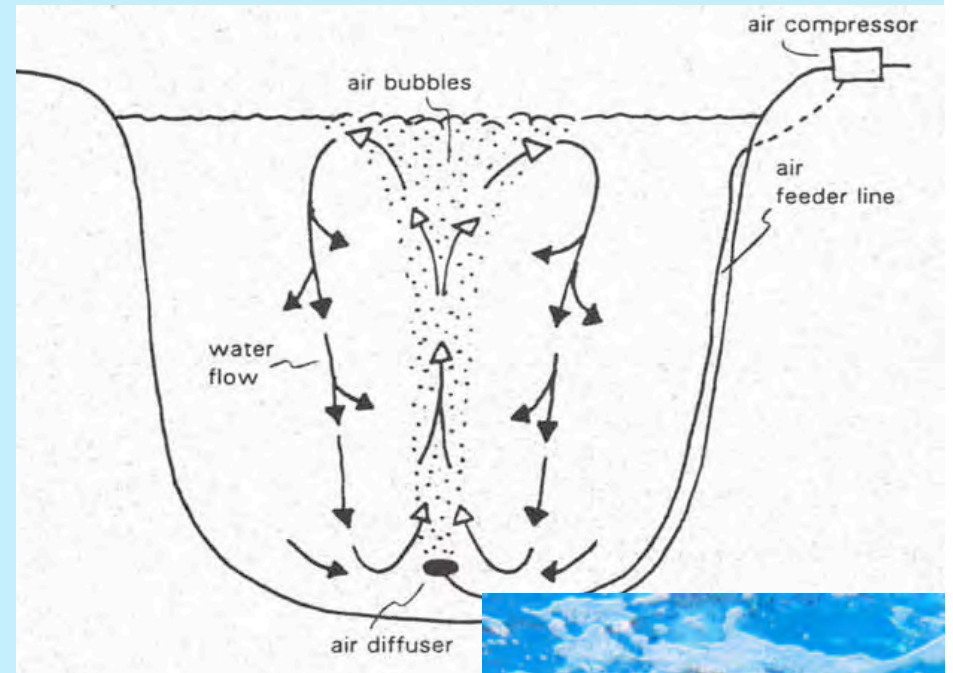
...Sometimes

- Provides a healthier ecosystem for fish.
- Often recommended for lake problems.
 - May take years to see results.
 - Mixing of the water will depend on the type of aeration used.
 - May depend on phosphorus inputs.
- Systems can be costly – purchasing, maintenance, and electricity.

Types of Aeration

Diffusers / Bubblers

- Has an air line and an air stone at the bottom of the lake or pond.
- De-stratifies the water – so oxygen rich environment occurs at the bottom.
- More efficient with water 6' or deeper.



Diffuser with filamentous algae



Diffuser with Wolffia



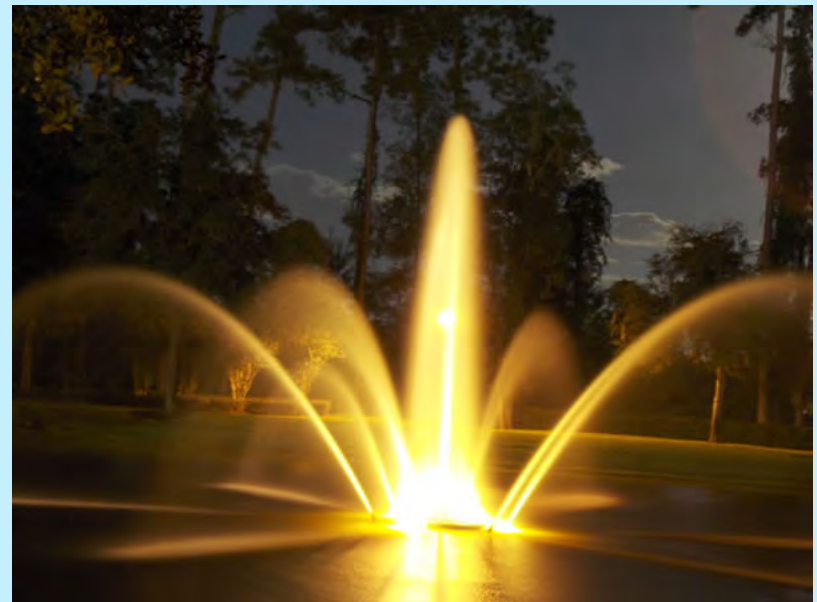
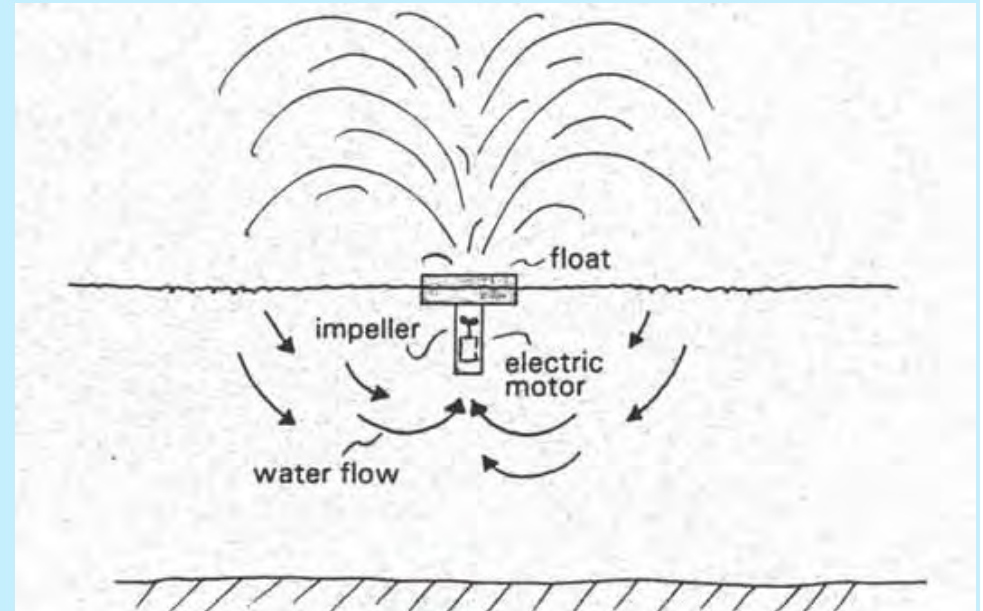
A photograph of a pond with a diffuser system. The diffuser is a vertical pipe extending from the shore into the water, with a horizontal section at the bottom. The water surface is covered with a dense layer of brown, dried aquatic plants. In the background, there is a red barn and a house with a white fence. The text "Diffuser with aquatic plants" is overlaid in white on the image.

Diffuser with aquatic plants

Types of Aeration

Fountains

- Decorative
- Circulates water near the surface.
- Does not aerate the bottom of the lake.
- Can work in shallow areas.





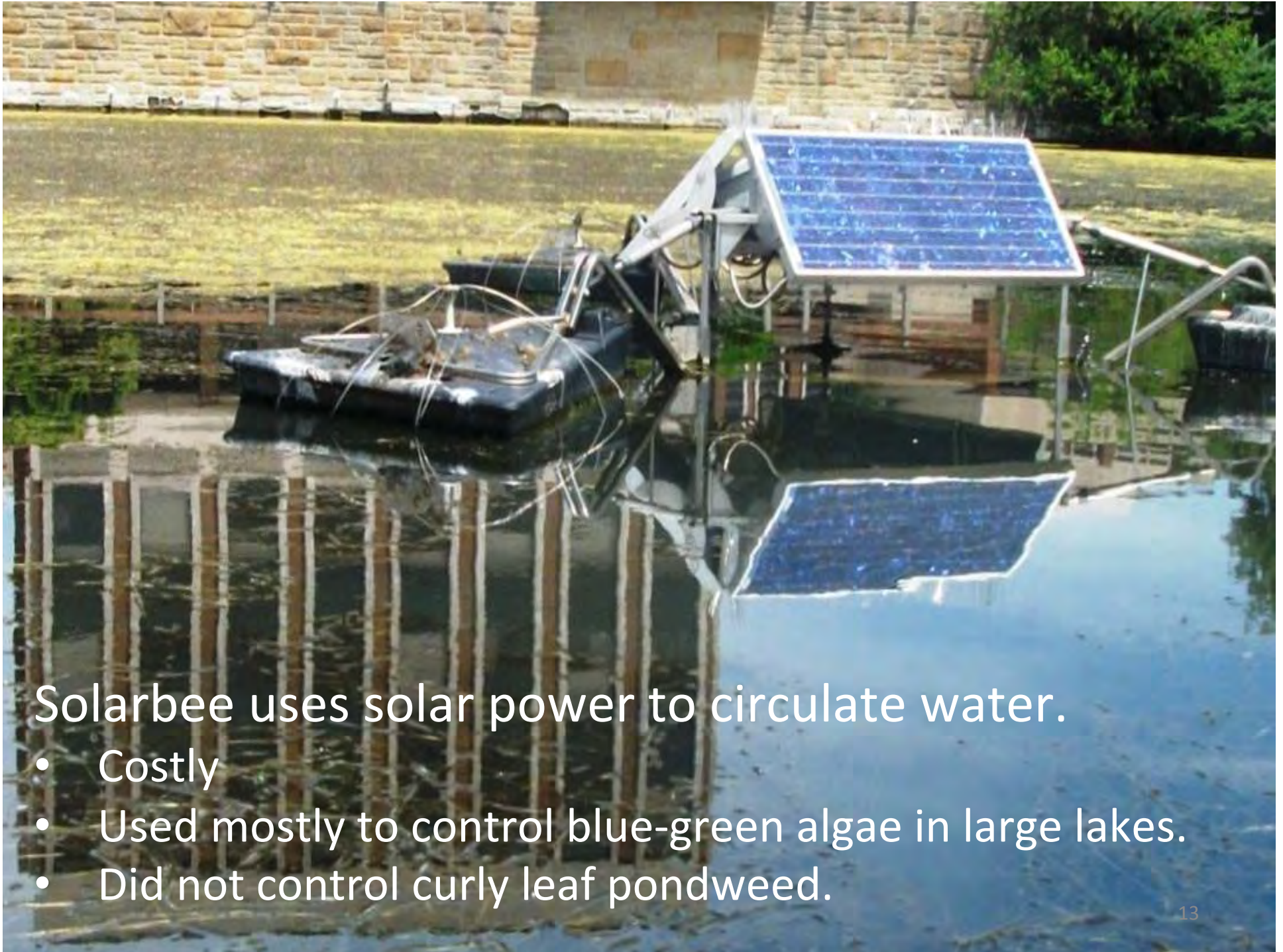
Fountain with filamentous algae

Types of Aeration

Circulators

- Moves water away from an area.
- Circulates water around boat docks, beaches, or small coves.
- Reduces algae growth or bacteria in swimming areas.





Solarbee uses solar power to circulate water.

- Costly
- Used mostly to control blue-green algae in large lakes.
- Did not control curly leaf pondweed.

Problems with Aeration

- Not functioning
 - Clogging
 - Fishing line tangles.
 - Muskrats chewing on wires or air lines.
- Not controlling algae
 - Under aeration
 - Phosphorus level too high.



Case Study – Turnberry Lakes

Residential subdivision with 4 lakes & 2 golf courses.

- Lake 1 is a 48 acre shallow lake (4.2' avg.) dominated by filamentous algae.
 - Had grass carp until a fish kill occurred in 2009.
 - Total P = 0.111 mg/l in 2009
- Lake 2 is a 20 acre deep lake (10.6' avg.) dominated by blue-green algae.
 - Total P = 0.126 mg/l in 2009.



Turnberry Lake Options

ILM developed a lake management plan with an estimated 5-year cost projection:

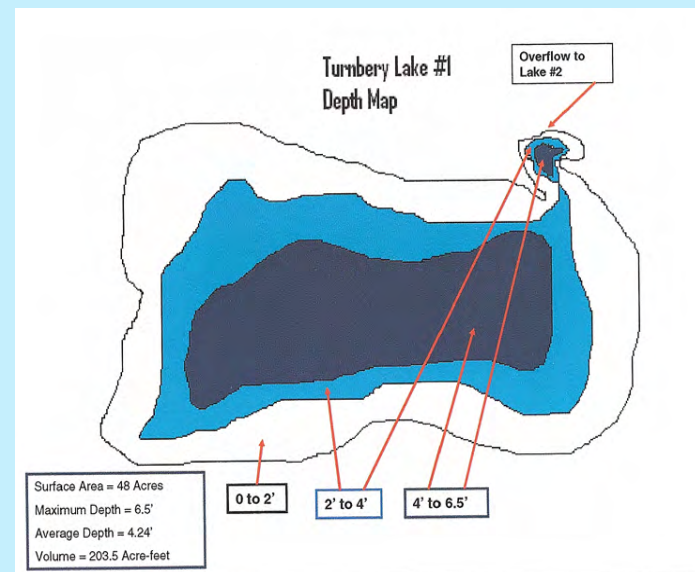
- Chemical control of algae (no assurance of success) - for 78 acres (4 lakes) - \$450,000
- Dredging - \$4,000,000
- Application of aluminum w/aeration - \$600,000
- Algae harvesting & chemical control - \$800,000
- Multi-source aeration w/enzymes & bacteria (w/chemical algae control) - \$478,000

All options exceeded their budget

An Alternative Solution

For Lake 1 – the most challenging lake

- ILM proposed a multiple source diffuser system for Lake 1 requiring 160 diffusers.
 - Cost (2009) for all 4 lakes to purchase the system \$327,777
 - Plus enzymes & bacteria ~ \$150,000
- Leased system (Lake Savers, LLC) only used 24 diffusers. Multiple horse-power single air source aeration system.
 - Investment for 1st year was only \$45,075
 - Included installation, 1 year leasing, and bacteria & enzymes.



Seven years later

- Turnberry Lakes purchased the aeration system and was very happy with the outcome.
- Due to nutrient-rich inflows, they still need to use algaecides.
 - Annual algaecide budget is \$30,000.
 - Some algae and weeds occur, but only during hot dry periods.



Conclusions

Aeration creates a more balanced ecology by allowing aerobic bacteria to decompose organic material, which should reduce algae growth.

- Did aeration & bacteria and enzymes reduce algae or absence of grass carp?
- How are total costs for aeration, B&E, electrical compared to harvesting and disposal followed by re-introduction of native plants?
- Can these results be duplicated in different lakes?

Conclusions

- Use an experienced vendor who you can work with and trust.
- At Turnberry, leasing the system was an important option that allowed the community to see the results.
- Sometimes unexpected results happen.

Questions?

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