Technical Bulletin 115

Lake and Pond Aeration Techniques

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BULLETIN BRIEF

Lake ponds can suffer degradation of water quality as they mature. This loss of quality arises from low dissolved oxygen concentrations, excessive algae concentrations, odor, or other nuisance conditions and requires remedial work.

Environmental Dynamics International (EDI) has many years of experience engineering and supplying aeration systems that effectively address such quality concerns.

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TECHNICAL BULLETIN 115 – LAKE AND POND AERATION TECHNIQUES

Aeration can help reverse the loss of water quality in small lakes and ponds suffering from aging (also known as eutrophication).

Aeration in these systems is used to:

- Limit the growth and concentration of algae.
- Increase dissolved oxygen (D.O.) levels to support fish habitation and reduce or eliminate odors and gases escaping from the benthal (sludge) deposits.
- Minimize stratification within the body of water.

EDI can offer suggestions on rehabilitating lakes and ponds experiencing these kinds of problems. Properly designing aeration systems to mitigate such issues requires reviewing the basin geometry, depth of the basin, and the quantity and types of organic material being introduced.

However, if the pond is experiencing the imposition of major organic loads, an aeration strategy on its own may be inadequate, requiring a more rigorous approach and design of a specialized waste treatment facility to eliminate waste loads to the water body.

For deep lakes or ponds, thermal stratification is common. Stratification can cause serious problems with water quality, notably:

- Dead zones, where below the unmixed hypolimnion (thermocline) zone, dissolved oxygen levels frequently diminish to zero.
- Treatment challenges and taste and odor problems, caused by the build-up of undesirable chemicals, such as manganese, hydrogen sulfide, and iron.
- Fish kills and nuisance conditions, resulting from the natural turnover of water induced by temperature changes in the spring and fall.

Proper application of aeration mixing techniques in stratified lakes or reservoirs can eliminate most of the difficulties and nuisance conditions outlined above.

Introducing a modest amount of air at carefully engineered and designed locations deep within a basin can open a hole through the hypolimnion layer. This action creates a vent for hydraulic or air lift pumping that causes the entire water body to be oxygenated and mixed, resulting in improved and uniform quality throughout. Diffused aeration systems that apply EDI advanced-technology diffusers are ideal for accomplishing this objective.

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