

Floating Treatment Wetlands Remove Nutrient Loads from Eutrophied Lake

Project Location: Yingri Lake, Jinan, China

The following case study demonstrates the capabilities of Floating Island International's (FII) patented floating treatment wetland (FTW) technology and its ability to purify water by reducing nutrient concentrations. Constructed of post-consumer polymer fibers and vegetated with native plants, FTWs mimic the ability of natural wetlands to clean water by bringing a "concentrated wetland effect" to any water body – in this case, an urban lake with high concentrations of COD, nitrogen and phosphorus.

Overview

The purpose of this floating island application was to prevent summer algae blooms by reducing the nutrient load in an urban lake. Reductions in nutrient levels were anticipated to increase the overall health of the lake by decreasing algae growth, increasing dissolved oxygen levels and decreasing odors. The location is Yingri Lake at Quancheng Park in Jinan, a city of seven million people in North China near the east coast.

Installation Data

Location	Yingri Lake, Jinan, China
Parameters Studied	Chemical oxygen demand (COD), biochemical oxygen demand (BOD), total nitrogen, total phosphorus, dissolved oxygen (DO)
Environment	Lake in public park
FTW Size	Total area for five islands of 7000 ft ² (660 m ²); total thickness of 10 inches (25 cm)
Installation Date	4-19-10
Flow Rate	Non-circulating
Water Body Depth	Average of 4 ft (1.2 m)
Water Body Area	108,000 ft ² or 2.5 acres (10,000 m ²)
% Coverage	6.6% of lake covered by FTW
Species Planted	Iris, yellow flower iris, day lily, Greek Jacob's ladder, holly trees, ligustrum vicaryi, hosta sieboldiana, canna; some of these terrestrial plants were later replaced with aquatic plants
Funding Agency	Gardening Bureau of Jinan City

Operational Data

Average O&M Costs (Labor, Materials)	1 hour/week; no materials
Training Required to Operate	1-day training seminar
Anticipated Lifespan	At least 10 years

Results

Parameter	Before FTW Installation (July 2009)	After FTW Installation (July 2010)	Reduction
COD (mg/L)	63	30	52%
BOD (mg/L)	20	11	45%
Total nitrogen (mg/L)	11	3.9	65%
Total phosphorus (mg/L)	0.93	0.10	89%
DO (mg/L)	12.1	6.0	50%

Yingri Lake has typically experienced a severe algae bloom every spring; however, no algae bloom was seen in 2010 after the FTW installation in April.

Conclusions

- Large reductions in COD, BOD, total nitrogen and total phosphorus were measured within three months after FTW installation, which met the project objectives.
- The islands are aesthetically pleasing.
- It is unclear why dissolved oxygen concentrations decreased; however, the primary related goal of reducing algae blooms appears to have been achieved.



FTW in Yingri Lake



Another view of one of the Yingri Lake FTWs