

# Proving the Concept: Field Test of Floating Treatment Wetland Technology's Ability to Treat Simulated Wastewater

## Project Location: Outdoor Test Ponds, Shepherd, Montana, USA

The following case study summarizes Floating Island International's (FII) first large-scale outdoor test of the capabilities of FII's patented floating treatment wetland (FTW) technology and its ability to clean water by significantly reducing nutrient levels. 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, one of three test ponds.

### Overview:

The need to reduce nutrient loading from wastewater is increasingly critical worldwide as the ecological damage to our rivers, lakes and coastal waters intensifies and corresponding economic costs continue to rise.

The Montana Board of Research and Commercialization Technology awarded a two-year \$300,000 grant to produce and test the FTW designed to remove nutrients and other contaminants from lakes, streams and wastewater lagoons. In 2007, the project evaluated the effectiveness of FTW treating full-strength simulated wastewater in three test ponds in a controlled outdoor environment. Pond 1 had no aeration or FTW (control pond); Pond 2 had aeration only; Pond 3 had aeration and an FTW.

### Results:

The FTW demonstrated rapid removal of ammonium, phosphate, organic carbon and suspended solids, compared to controls. Within a single FTW, the test achieved simultaneous aerobic and anoxic removal of ammonium, nitrate, phosphate and organic carbon. **Total Suspended Solid (TSS) removal in the FTW pond was 200% greater compared to the control pond. Ammonia removal was 43% greater.**

The FTWs removed phosphate via bacterial processes at approximately the same rate as suspended algae removed phosphate via plant growth. Water in the pond with FTW (turbidity of 26 NTUs<sup>1</sup>) was much clearer than algae-choked water in the pond without FTW (388 NTUs). This study demonstrated that FTW performance can be optimized by providing proper conditions for microbial processes.

<sup>1</sup>Nephelometric Turbidity Unit

**Conclusion:**

This study provides “proof of concept” that the concentrated wetland effect” of FTW technology is effective in removing excess nutrients and other contaminants. Its use results in visibly clearer water when compared to ponds without FTW. This case study also demonstrates the critical role microbes play in cleaning water because the test FTW was not planted with macrophytes.

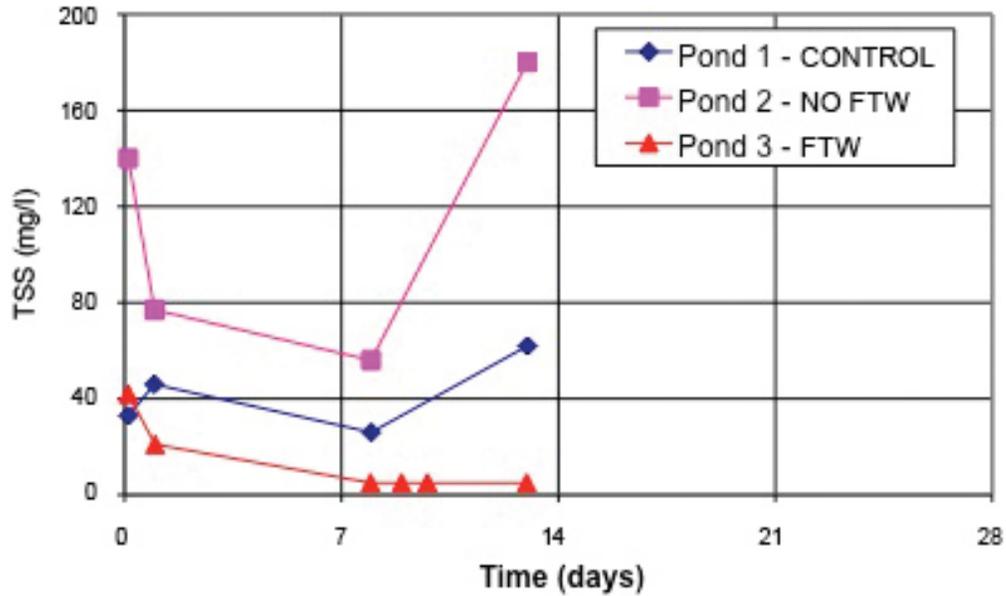
**Installation Data**

Location	Shepherd, Montana USA
Parameters Studied	Ammonia, phosphate, TOC, BOD, TSS, turbidity
System Type	Three lined ponds – 5000 gallons (19 m <sup>3</sup> each)
FTW Size	Area of 250 ft <sup>2</sup> (23 m <sup>2</sup> ); thickness of 8 inches (20 cm)
Water Source	Simulated municipal wastewater (pond water dosed with liquid fertilizer and organic carbon (molasses))
Test Date	July - October 2007
Flow Rate	Batch system with recycle
Water Body Depth	4 ft (1.2 m)
Water Body Area	455 ft <sup>2</sup> (42 m <sup>2</sup> )
Installed Cost	Prices depend on square footage and features, but typically begin at \$29/sq. ft.

**Results (September - October 2007)**

Parameters	FTW Removal Rate (mg/day/ft <sup>2</sup> )	Improvement Compared to Control Lagoon
Ammonia	759	43%
Total Phosphorus	106	0%
TSS	180	200%
BOD	547	11%

## Shepherd Test Ponds | TSS



## Shepherd Test Ponds | Ammonium

