# LAKE OKEECHOBEE WATERSHED ADVANCED TREATMENT SYSTEMS (ATS) PROJECTS

## Taylor Creek Algal Turf Scrubber® Nutrient Recovery Facility

**Project Overview:**

This was a scaled-up demonstration of a proprietary water treatment technology that employs algae to remove pollutants from impaired waters. The process design for this facility was based upon the results obtained from a pilot investigation of a single ATS™ treatment system constructed and evaluated in the S-154 basin. The facility was designed to treat an average daily flow of approximately 15 million gallons of water rerouted from Taylor Creek, a tributary to Lake Okeechobee.

**Project Objectives:**

The objectives of the facility were to:

1. Reduce total phosphorus loads into Lake Okeechobee through the cultivation of periphytic algae.
2. Provide secondary enhancement of water quality associated with the targeted flows from Taylor Creek through increased dissolved oxygen levels.
3. Recover and recycle captured nutrients through the harvesting, processing and composting of harvested algae biomass.

**Project Description/Features:**

The facility had an effective treatment area of 3.6 acres. (Fig. 1). Water entered the TC-ATS via a pump station located on Taylor Creek. Inflow was discharged in pulsed flows equitably along the 521 ft width of the floway. Water then gravity flowed in a shallow laminar pattern down the 300-ft treatment floway. At the bottom of the floway, treated water was collected and routed to a centralized biomass recovery station. Outflow from the TC-ATS was returned to Taylor Creek via a gravity return line.

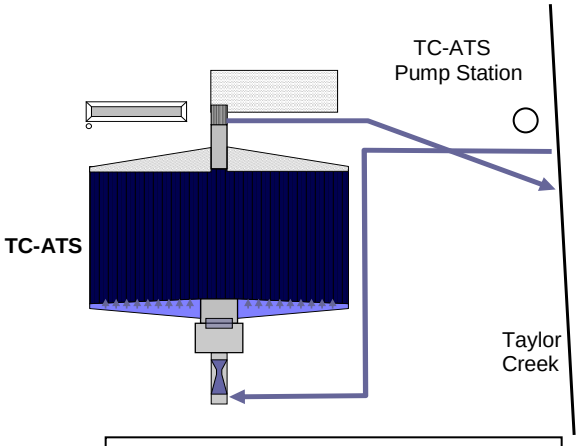
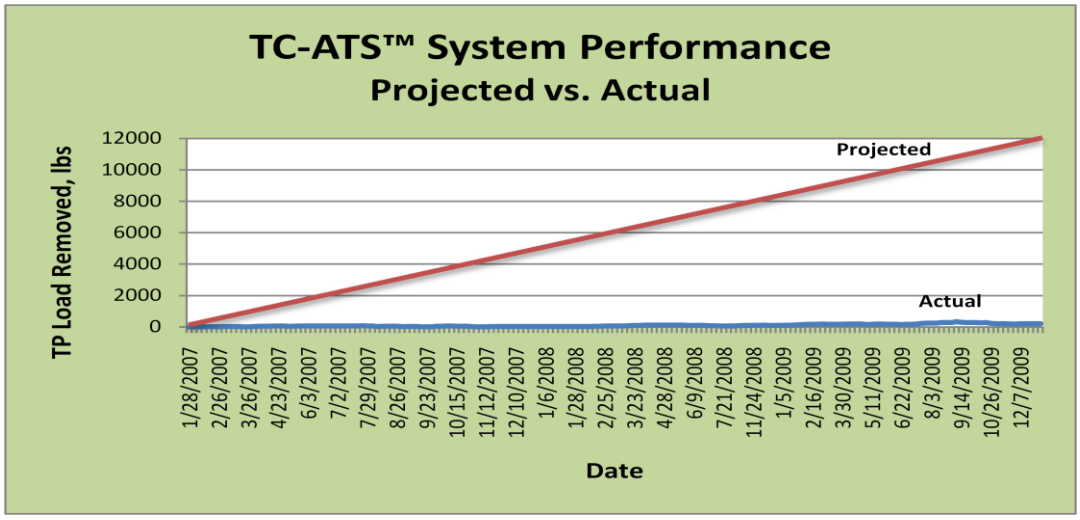



Figure 1. Illustration of TC-ATS

**Project Status**:

Operation of the facility began in late January 2007 and continued through January 2009. The facility was projected to remove 4,000 lbs of TP per year but water quality based total P removal for the entire period of operation was only about 220 lbs. Poor system performance was attributed to algal toxicity in the source water.




## Operation of an Algal Turf Scrubber® (ATS™) Mobile Pilot Unit and Design of a Full-Scale ATS™ System in the Everglades Agricultural Area

**Project Overview:**

This project was for the design, installation and operation of an Algal Turf Scrubber® (ATS™) mobile pilot unit (MPU) along the Stormwater Treatment Area -1 West (STA-1W) discharge canal to simulate the ATS™ treatment process specific to the water quality conditions associated with non-point source stormwater runoff from agricultural operations in the Everglades Agricultural Area (EAA). The results of the pilot investigation will be used to optimize the design of a full-scale ATS™ Nutrient Load Reduction Control Facility in the EAA.

**Project Objectives:**

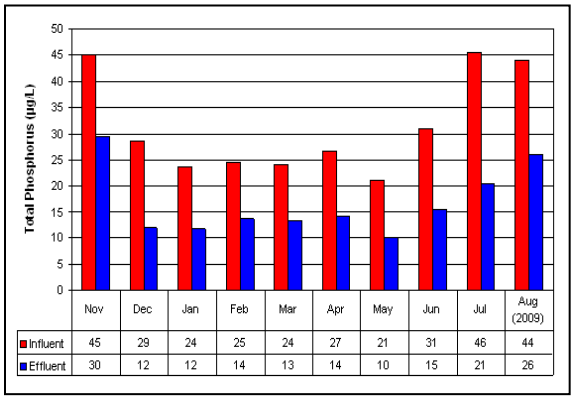
The goal of the project was to determine site specific ATS™ treatment performance based on water quality conditions of effluent from Stormwater Treatment Area (STA) 1W or STA-1W.

**Project Description/Features:**

The mobile pilot unit (MPU) consisted of an aluminum floway with support structure, self siphoning surger, 40 mil EPDM base and a geogrid matrix. The floway (1 ft wide and 1200 ft long) was installed at 0.5% slope. The MPU was operated at 20 gpm with and without microfiltration from August 2008 through August 2009.

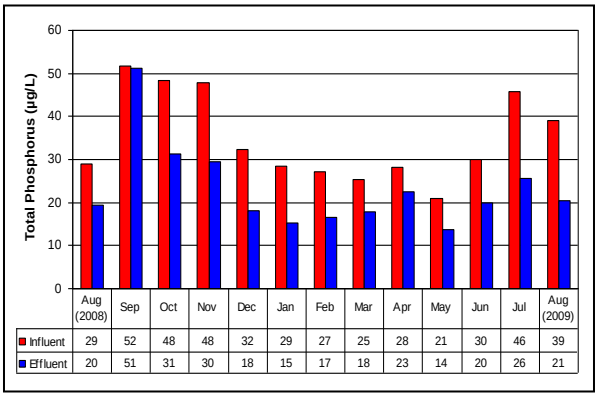
**Project Status:**

The 12-month pilot test was completed in August 2009. A TP concentration reduction of 33.3% was achieved without microfiltration. Mean influent and effluent TP concentrations were 35 and 24 µg/L, respectively.




| | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug (2009) |
|---|---|---|---|---|---|---|---|---|---|---|
| Influent | 45 | 29 | 24 | 25 | 24 | 27 | 21 | 31 | 46 | 44 |
| Effluent | 30 | 12 | 12 | 14 | 13 | 14 | 10 | 15 | 21 | 26 |

With Microfiltration




| | Aug (2008) | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug (2009) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Influent | 29 | 52 | 48 | 48 | 32 | 29 | 27 | 25 | 28 | 21 | 30 | 46 | 39 |
| Effluent | 20 | 51 | 31 | 30 | 18 | 15 | 17 | 18 | 23 | 14 | 20 | 26 | 21 |

Without Microfiltration

TP concentration reduction was higher at almost 50% with microfiltration. Mean influent and effluent TP concentrations were 31 and 15 µg/L, respectively. Microfiltration achieved an outflow TP concentration of 10 µg/L or less in 8% of the weekly samples.