

# A Holistic Assessment of Lake and Wetland Restoration Best Management Practices in Florida



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## INTRODUCTION

Best Management Practices are utilized in Lake and Wetland Restoration activities to ensure that the water quality standards, particularly those pursuant to Chapter 62-302 of the Florida Administrative Code (F.A.C.) are not violated during or after aquatic restoration activities. A multitude of BMPs exist to ensure these activities to meet water quality standards beyond any authorized mixing zone established in accordance with Rule 62-4.244, F.A.C. These water quality standards being addressed are primarily turbidity (<29 Nephelometric Turbidity Units (NTU)), but other standards affected may include: herbicides, nutrients, oils and greases, dissolved oxygen, and the biological integrity of the water body.

## OBJECTIVES

To identify applicable and effective BMPs for restoration activities in Lakes and Wetlands during and post construction to ensure that water quality standards are not violated.

## GENERAL CONTROL METHODS

It is important to properly plan with the most effective design, construction techniques, and BMPs to avoid water quality standard violations

**Scheduling:** For most aquatic restoration projects, rainy seasons should be avoided and the major restoration operations should take place during the dry months. This will minimize the sediment runoff and erosion of the project area caused by precipitation.

**Wildlife Disturbance:** It is important to minimize the disturbance of habitat and lifecycle of the animals that live in these aquatic habitats. Migratory bird nesting season occurs from April 1st to August 31<sup>st</sup>, and south Florida's wading bird season is around April-May. BMPs for construction conditions may be implemented for manatee, marine turtle, migratory bird protection, and other wildlife conditions during construction activities

**Equipment Selection:** Lighter weight equipment that exerts minimal ground pressure should be used to reduce the potential of erosion if possible. Equipment that contain the following will assist: wide or high flotation tires (34-72 in wide), dual tires, central tire inflation systems, bogie axle systems, lightweight equipment and tracked machines



Barge-Mounted Excavators with a rake attachment are used to remove the bulk of the aquatic plant material



The removal of aquatic plants may be disposed of by creating large islands where the organic material may decompose over time



Silt curtains are out on site and ready to be deployed if turbidity levels get too high

## LAKE RESTORATION

### Sediment Manipulation BMPs

Sediment manipulation primarily deals with dredging projects, which will resuspend the bottom sediments, contaminating the water with higher levels of suspended sediments which may contain other contaminants contained therein violating quality standards.

Restoration BMPs including both operational controls and devices aid in reducing turbidity levels in and around the dredging work site. These include:

#### Mechanical Dredge Operational Controls

- Increase Cycle Time
- Eliminate multiple bites
- Eliminate bottom stockpiling

#### Hydraulic Dredge Operational Controls

- Reduce cutterhead rotation speed
- Reduce swing speed
- Eliminate bank undercutting

#### Hopper Dredges and Barges Operational Controls

- Eliminate or reduce hopper overflow
- lower hopper fill level

#### Specialty Equipment

- Pneuma pump
- Closed or environmental bucket
- Large capacity dredges

#### Dredging BMPs

- Silt Curtains
- Gunderbooms

**BMPs for the disposal site** of the dredged material must also be applied, These may include:

- Chemical treatment with polymers or alum
- Discharging methods
- Clarification ponds
- Turbidity curtains and/or berms

#### Aquatic Plant Removal MPs

Excessive growth of aquatic plants is commonly the result of excessive nutrient input to a lake, stream, or wetland increasing the rate of eutrophication. There are multiple methods and technologies for aquatic plant removal using various biological, chemical, and physical solutions.

#### Removal Operation BMPs

- Silt Curtains
- Gunderbooms

#### Island Construction BMPs

- Hydraulic Mulch
- Hydroseeding
- Soil Binders
- Straw Mulch
- Geotextile and Mats

## WETLAND RESTORATION

### Wetland Restoration BMPs

Wetlands are very sensitive to changes in water quality BMPs are necessary to prevent disturbance or run off during restoration activities. BMPs for water quality control during wetland restoration may involve altering the flow, velocity, duration, or other characteristic by means of a structural control. These controls are used to maintain water quality in the construction site and to reduce the quantity or velocity of water entering the wetland.

#### Structural Controls BMPs

- Infiltration basins
- Infiltration trenches
- Sand filters
- Level Spreaders (may be associated with gabions)
- French Drains
- Grassed swales
- Open Spaces
- Extended detention dry basins
- Wet ponds

#### Vegetative BMPs

- Vegetated Filter Strips
- Vegetated Natural Buffers
- Contour Terraces

These BMPs applied are specific to the project being conducted in the wetlands. Use of chemical treatments must be monitored and water quality standards for many of them exist in Chapter 62-302 of the F.A.C. Regulatory standards for other water quality parameters including pH, alkalinity, biological integrity, BOD, oils and greases must also be met.



Constructed wetland Units in the T.M. Goodwin Waterfowl Management Area, Fellsmere FL.



Constructed Marsh of the Broadmoar Marsh Unit in Fellsmere FL.

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