BIOLOGICAL, CULTURAL, AND MECHANICAL CONTROLS FOR AQUATIC PLANTS

CITY OF SEBASTIAN — HOME OF PELICAN ISLAND

	Control Method	Vegetation Type	Asset Classification	Description	How to Implement	Currently in Use?
BIOLOGICAL	Pathogens	Limited	All	Some plant pathogens, such as bacteria, enzymes, or fungi, can stress aquatic plants – commercially available pathogens(bioherbicides) are under research evaluation	Usually combined with herbicides to provide more effective long-term control. Requires areas of still water and is often paired with direct aeration	No
CULTURAL	Always Mow with Sharp Blades	Emergent	Ditches	Dull mower blades cause uneven cutting and weaken the grass blades. Vegetation along sloping shorelines is crucial to shoreline stabilization and the prevention of sediment and nutrient laden runoff entering the waters.	Ensure that staff sharpens all mower blades on a consistent schedule and when necessary. The City and the contractor has the tools and trained staff to accomplish this.	Yes
	Minimizing Nutrient Inputs	All	All	Reducing the amount of Nitrogen and Phosphorus entering the conveyance system to the maximum extent practicable.	Ferilizer Ordinance, NPDES Compliance, erosion control ordinance and inspections, BMAP participation, stormwater park ponds, resident outreach.	Yes
	Native Shoreline Plantings	Emergent	Ponds, Canals	Native shoreline plantings will attract natural predators, prevent the establishment of invasive aquatics, filter water entering the waterbody, and support a healthy aquatic ecosystem.	As the budget allows or in working with local non-profit groups begin to introduce more plantings of florida freshwater shoreline natives to our accessible shorelines.	Yes
	Maintain Updated Chemical and Fertilizer Application Equipment	All	All	Maintaining updated chemical and fertilizer application equipment is necessary to adhere to the label requirements for applications to ensure equipment is calibrated. Updated motorized equipment cleans more efficiently, calibrates and hold calibration more accurately and deteriorated parts can be easily replaced.	Staff will stay up-to-date on the equipment and ensure that equipment is replaced as necessary to ensure the correct calibrations are applied per the label. Staff will also maintain servicing all parts necessary as recommended from the manufacturer.	Yes
	Direct Aeration	Algae	All	Bottom-up hypnolimnetic aeration provides oxygen for microorganisms to more efficiently break down muck and nutrients, effectively reducing algal growth. Also can prevent fish kills in small ponds. Aeration is especially helpful in water bodies with limited circulation	Would specifically be reccommended at structural choke points where muck accumulates and used in correlation with the addition of pathogens.	No
	Fountains	Algae	Ponds	Fountains help move the water from the pond's surface to the bottom. Aeration by the fountain oxygenates the water, keeping hydrogen sulfide gas from collecting at the bottom and ultimately, significantly reducing the amount of this gas in the pond. Effectively reduces algae, duckweed and watermeal.	Many ponds already have fountains installed. Future addition of fountains in other ponds is advisable where site conditions are favorable.	Yes
	Mow at Correct Height	All	Ditches	Mowing shoreline vegetation at the correct height will ensure that we promote healthy grass and maintain shoreline stabilization	Ensure that staff and contractors are not mowing the shoreline grasses so short that it poses a risk to the plant and root health	Yes
	Tool Sanitation	All	All	Pests can easily spread among sites on unsanitized equipment. Many aquatic pests multiply easily from small pieces of vegetation. Cleaning mowers, tractors, and equipment between areas minimizes pest transport.	Stormwater Staff and contractors must wash down and clean all equipment as frequently as possible, especially when leaving areas with pest problems.	Yes
MECHANICAL	Dredging/ Excavation	All	Canals, Ponds, Ditches	Plants and sediments are removed- increases water depth,restores storage capacity, and removes nutrient rich sediments. Ideal for highly impacted areas.	Heavy equipment requires broad access path to areas. This is not for natural areas as the turbidity is greatly incresed and nutrients are released into water column	Yes
	Manual Weed Pulling	Emergent	Structures	Where safe and applicable, manual weed eradication will involve staff manually pulling weeds.	Areas where it is safe and applicable can have manual weed eradication.	Yes
	Vacuum Removal	All	Structures	A vacuum truck is utilized by City staff to remove all accumulated sediments and vegetative debris from all catch basins	Staff cleans out these structures regularly and keeps record of how much debris is removed.	Yes
	Mechanical Removal	All, except duckweed, watermeal	Ponds, Canals, Some structures	Removal of vegetation by specially designed aquatic harvesters. Cut vegetation is removed and piled on shoreline for disposal. This process must be repeated throughout the growing season to maintain control. This process disturbs the sediments in the substrate and is non-selective, often removing fish and other fauna in the process. This method can be very costly.	Only about 50% of the City's canal system is accessible by this type of equipment and most of the shoreline is privately-owned with very limited access for piling and removing the cut vegetation. This method is reccommended when the location and cost are feasible,	Yes
	Skimmer Device	Duckweed, Watermeal, Azolla	Ponds	Large device that requires electricity and is easily movable between ponds. which is effective in removing small floating vegetation.	Water and material are pumped into an onshore filtration unit. Vegetation is piled onto shoreline by conveyor, then must be manually removed off site.	No