

The Estuary at Grand Harbor and Oak Harbor

Introduction

This visual appeal of Grand Harbor and Oak Harbor is enhanced by the estuary, a 237 acre, protected wetlands consisting mostly of mangrove trees. Many of the holes on the River Golf Course and the Oak Harbor Golf Course benefit from the serenity and beauty of the mangrove trees, many homes in our community have a view of the beautiful estuary, residents enjoy the wildlife the estuary supports. These wetlands are covered by a conservation easement.

Part of the wetlands existed prior to the creation of Grand Harbor and Oak Harbor and part was created by the developer to replace protected wetlands which were made into part of the golf courses. The original wetlands and the newly created wetlands were designed to function as a natural ecosystem while eliminating mosquito habitats and breeding areas. The design provides breeding area for fish and habitat for crustaceans. It eliminated depressions and impoundment areas which acted as breeding areas for mosquitos.

Mangrove trees provide protection from wind and flooding to nearby homes. Florida statutes allow limited trimming of mangrove trees; however, a permit is required, the amount and frequency of trimming is strictly controlled, and licensed mangrove trimmers must be used. Fines are steep for violations.

Tidal Flushing

The design of the estuary relies on tidal flushing to eliminate stagnant areas of water. It relies on channels within the mangroves to provide water movement. The maximum depth of the channels is minus 4 feet at the outlets and minus 2 feet within the eastern portions of the estuary. The water in the estuary is brackish (partly salty) but it also receives water from the storm water retention lakes within Grand Harbor and Oak Harbor. Small dams regulate the flow of storm water to the estuary and keep the brackish water from getting into the fresh water lakes.

Roadways and portions of the golf courses are within the estuary. To permit water flow there are culverts in many places under these roadways to connect the estuary on either side of the road and there are bridges over estuarine water channels within the golf course.

Flushing channels connect waterways within the estuary to the Indian River. Bridges in the fairway of the 14th hole of the River Course go over two of these channels and a bridge at the tee boxes on the 15th hole of the River Course goes over another channel. A fourth flushing channel is at the east end of Oak Harbor, just north of the Gifford Dock; it is not visible from Grand Harbor or Oak Harbor. It is visible from the Gifford Dock or by boat from the Indian River.

Adequate tidal flushing relies on the flushing channels, internal estuarine waterways, and culverts to be maintained by periodically removing decayed vegetation, excess growth, and accumulated silt.

Invasive Species

When Grand Harbor was started in 1986 the existing wetlands had numerous invasive plants which the county required to be removed. Invasive plants include the Brazilian Pepper Tree, the nice looking small tree with bright red berries. Florida Statutes and the Grand Harbor Conservation Easement require continued removal of invasive species in the estuary

History of Estuary

Grand Harbor is an 885 acre development. Before it existed the area consisted of a citrus orchard, water impoundment areas for mosquito control, abandoned agricultural land, marine grass beds, mangrove swamps (estuary), freshwater swamps, impounded fresh water, fresh water ditches, and a deep water basin. As a condition of developing Grand Harbor, much of the land with mangroves needed to be returned to a more natural state and be kept in this condition via a conservation easement. Soil contaminated with agricultural chemicals was cleaned or removed, invasive plants (primarily Brazilian pepper trees), waterways were created to provide tidal flushing within the mangroves to create wildlife habitat and control mosquitos, fill dirt was added to provide an area to build houses and the golf courses, and the mangroves were connected to the Grand Harbor lakes to provide storm water control and the final means of cleaning storm water prior to it entering the Indian River. Some of the area devoted to the golf course originally was a mangrove swamp so the developer created new areas with mangrove trees to replace that lost to the golf course.

The conservation easement is 237 acres and is under the jurisdiction of the Florida Department of Environmental Protection, the Saints John Water District, and the Army Corps of Engineers. The Florida DEP administers the easement. What happens in the mangroves and surrounding upland areas is controlled by various federal, state, and county laws/statutes/regulations.

The estuary in Grand Harbor was designed with tidal flushing to provide mosquito control, a new, untested method. The county required a backup method for mosquito control if tidal flushing did not work. Engineers and scientists debated what channel depths were needed to ensure adequate flow within the estuary, too deep being as bad as too shallow. County statutes required Grand Harbor to establish financial reserves to be established to maintain the waterways within the estuary by periodically dredging them, removing mangroves blocking water flow, and keeping culverts open. At least once, one estuary outlet at the River 14 fairway was dredged after silt closed it. This outlet and others currently are blocked with silt. Some of the waterways no longer are at the designed depth resulting in poor water flow and nearly stagnant water which causes a strong sulphur smell such as found at the east end of Saint Davids.

On January 6, 1987 Grand Harbor and Indian River County reached an agreement to “...provide for sufficient assessment to fund annual maintenance activities as may be reasonably anticipated, and to fund reserves for such extraordinary maintenance as may be reasonably anticipated.” No reserves have been funded. Maintenance of waterways and removal of invasive species does not meet county and state requirements.

Water Flow

The following aerial photo shows the water flow within the estuary and the connections with the Indian River. Flow is in both directions in every waterway and each connection with the Indian River because the flow is driven primarily by the tides which cause the water level in the Indian River to fluctuate. Water from the ponds within Grand Harbor also drains to the Indian River through the estuary.



