

The North Relief Canal treatment system is proposed to be a 10 million gallon per day pollutant removal system that will clean water from IRFWCD's North Relief Canal, which discharges directly into the Indian River Lagoon. The system will remove nitrogen, phosphorus, and suspended solids from canal water generated by an approximate 12,600 acre watershed.

Methods to treat or control pollution from stormwater runoff have traditionally included land intensive passive systems such as retention/detention ponds and manmade or natural wetlands. The long-term maintenance costs of 'passive systems' can be huge because they accumulate rather than remove pollutants. Because collected nutrients are usually not removed until the system fails or nears failure, passive systems will become ineffective with time as their capability to absorb pollutants diminishes, and sometimes this occurs quite rapidly. Early failure and very costly remediation has been demonstrated at Orlando's Iron Bridge Wastewater Treatment Plant's Easterly Wetland Treatment System and at some Stormwater Treatment Areas in south Florida.

As raw land becomes scarcer and more valuable in Florida and decision makers become more aware of the huge cost to rehabilitate passive systems, efforts should focus on treatment technologies that are not land intensive and which remove rather than accumulate pollutants. Stormwater Division has examined adaptations of domestic and industrial wastewater treatment technology. These active systems often include electrical and mechanical components as well as biological components. Typically, they are much more efficient than passive systems and they constantly remove the polluted material they capture. PC Main Screening System is an example of a mechanical system adopted from the wastewater field. Indian River County's Egret Marsh and Osprey Marsh Stormwater Parks are examples of active systems that use algae to remove pollutants from stormwater and canal water, similar to the use of bacteria in a wastewater treatment plant. Active systems that use algae and other aquatic plants as part of the treatment process may be referred to as managed aquatic plant systems. Typically, managed aquatic plant systems tend to focus on a single plant type or species to remove pollutants, an approach that can make the performance of the biological component susceptible to seasonal variations and changes in water chemistry.

We have observed there is a diversity of aquatic plants that flourish in local IRFWCD canals, indicating that this community is efficient at up-taking nutrients and well-adapted to local water chemistries. The fact that a combination of species coexist implies that each is filling a unique ecological role in nutrient removal that is important to the ecosystem as a whole. The ongoing North Relief Canal pilot study is examining a pollutant removal system that uses modular aquatic plant treatment processes that will take advantage of the robustness of local diverse aquatic plant types to maintain high levels of nutrient removal under varying nutrient concentrations, seasonal and temperature fluctuations, and other parameters beyond our control. The pilot study is expected to be completed in early 2018 and design of the full-scale North Relief Canal system will begin shortly thereafter.