



Neighborhood Guide to Stormwater Systems

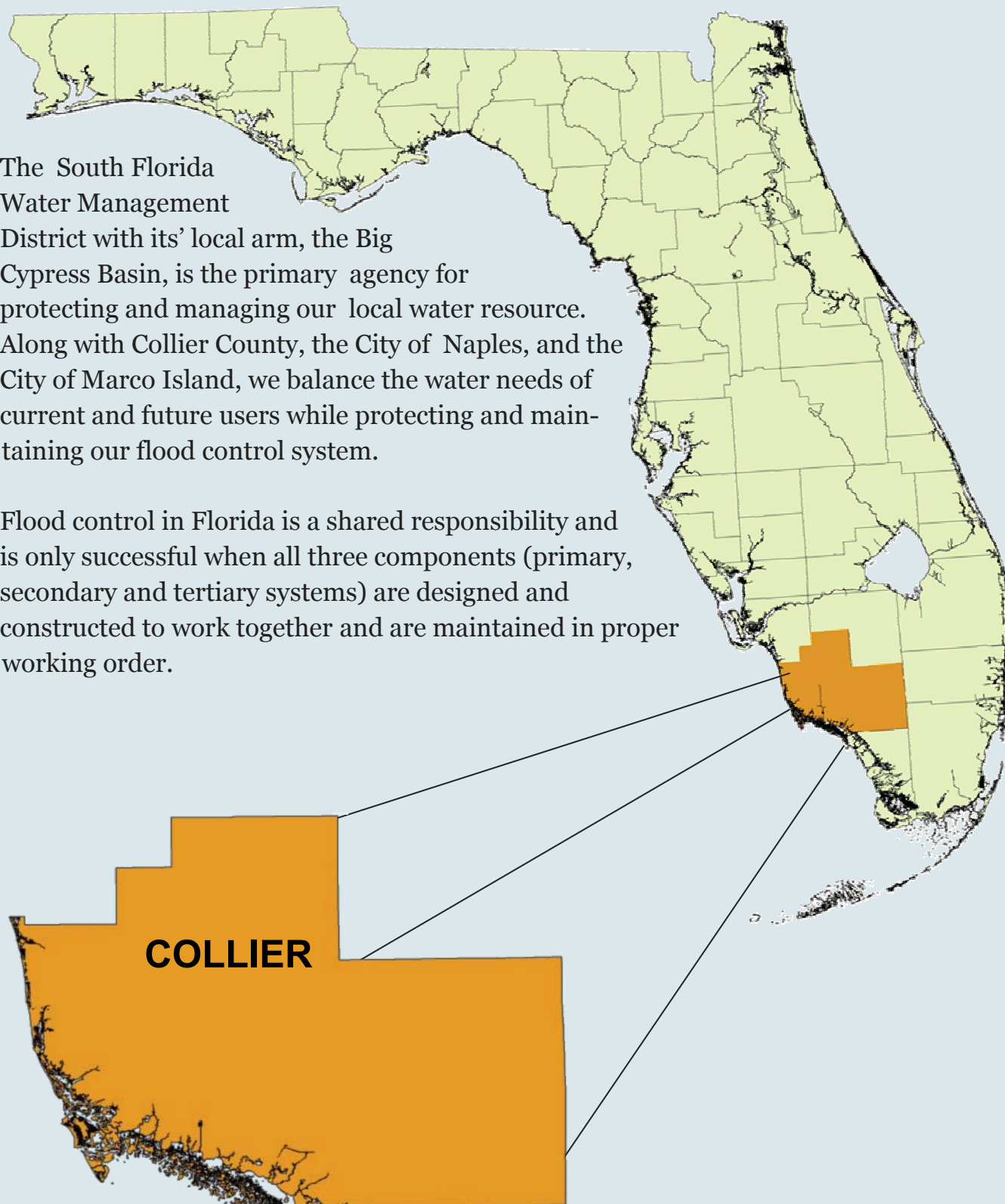
**Reducing neighborhood flooding
and improving water quality**



The regional network of canals and water control structures that criss-cross Collier County, along with hundreds of man-made lakes and smaller canals, serve a much greater purpose than merely providing scenic, water-front views. Without them, rainwater would simply gravitate toward the lowest areas and leave standing water for weeks.

The South Florida Water Management District with its' local arm, the Big Cypress Basin, is the primary agency for protecting and managing our local water resource. Along with Collier County, the City of Naples, and the City of Marco Island, we balance the water needs of current and future users while protecting and maintaining our flood control system.

Flood control in Florida is a shared responsibility and is only successful when all three components (primary, secondary and tertiary systems) are designed and constructed to work together and are maintained in proper working order.



STORMWATER SYSTEMS

Simply put, a stormwater system is a tool for managing the runoff from rainfall. When rainwater lands on rooftops, parking lots, streets, driveways and other impervious surfaces, the runoff (called stormwater runoff) flows into grates, swales or ditches located around your neighborhood. From here, stormwater may drain into a stormwater pond. A stormwater pond is specifically designed to help prevent flooding and remove pollutants from the water before it can drain into the ground water or into streams, canals, lakes, wetlands, estuaries or the Gulf of Mexico. Your stormwater pond might be located in your backyard, down the street, or on a nearby property.

Stormwater runoff may flow directly into the nearest water body without treatment. This runoff carries pollutants such as litter, motor oil, gasoline, fertilizers, pesticides, pet wastes, sediments and anything else that can float, dissolve or be swept away by moving water.

This Neighborhood Guide to Stormwater Systems provides the following information:

- A history of stormwater systems
- How stormwater systems work
- Who is responsible for stormwater systems
- How individuals can take part in preventing water pollution and flooding
- How stormwater ponds can be aquascaped



STORMWATER SYSTEMS – A HISTORY

Wetlands are Florida's original stormwater management systems and once covered more than half the state. Long ago, before the land was developed, Florida was an area with many wetlands, also known as swamps or marshes. Not only are wetlands important ecological systems because they provide habitat for unique and important organisms, they also serve as stormwater control system in two ways.



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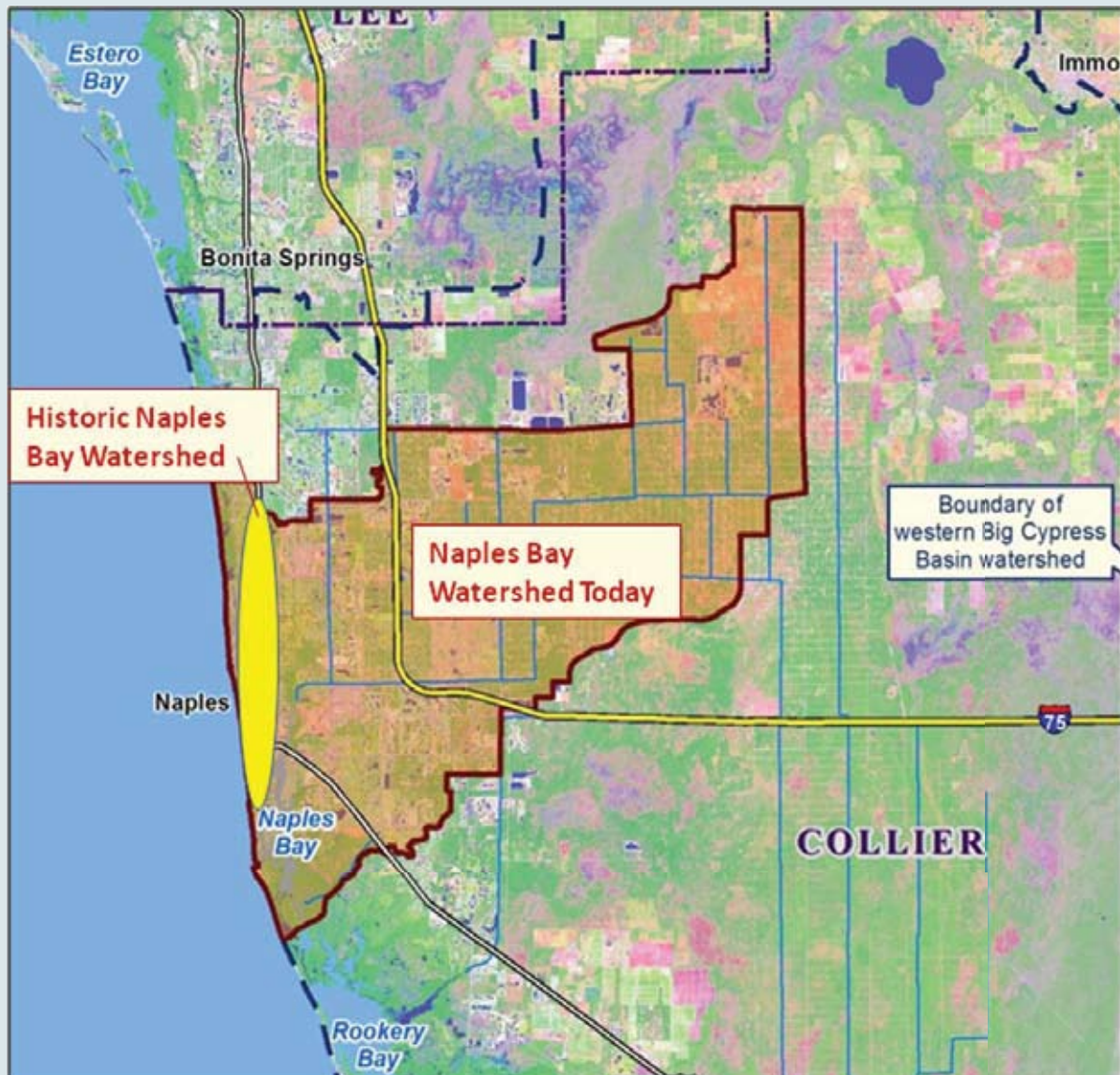
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Naples Bay

First, wetlands help control flooding by slowing down storm surges and absorbing rain water before it reaches water bodies. Wetlands also help filter out nutrients and sediments collected by storm water as it runs over the earth's surface before the nutrients and sediments reach fragile waterways.

Prior to enactment of stormwater management rules, poorly planned development led to destruction or filling of many of our wetlands. Those actions increased the danger of potential flooding as storm water had no natural outlet without wetlands. Also, development has led to increased pollutants in Naples Bay and Moorings Bay from septic systems, fertilizers, pesticides, motor oil and heavy metals that wash off lawns, sidewalks, roads and parking lots.





Consider these facts about the impact of storm water on our water resources:

- Untreated stormwater runoff is considered the state's leading source of water pollution.
- The amount of stormwater draining to Naples Bay increased from an area of 12 square miles to 127 square miles due to drainage canals.
- Storm water contributes approximately 80-95 percent of the heavy metals (lead, copper, cadmium) that enters our waters.
- The uncontrolled growth of algae in some waterways is often the result of poorly managed and/or untreated storm water.

In the early 1970s, the Florida Legislature passed laws requiring treatment of storm water, and neighborhood stormwater systems were established to mimic the natural role of wetlands. Restoration projects have demonstrated over the years that, with proper treatment, the detrimental effects of stormwater pollution can be reversed.

HOW STORMWATER SYSTEMS WORK

Stormwater systems are designed to mimic natural processes so individuals may have them on or near their property without realizing it. What appears to be a natural indentation in a yard behind a house may have been designated as a stormwater swale. What looks like a wild patch of shrubbery may be an important vegetation buffer around a pond. Stormwater systems come in a variety of shapes, sizes and forms, but basically there are four types.

Retention basin

Retention basins are designed to store runoff for about 72 hours to allow water to seep through soil into the shallow groundwater aquifer. A basin can be man-made or it can be a natural, flat depression. Grass stabilizes basin slopes and filters sediments. Retention systems are closed systems, constructed so that stormwater does not reach natural water bodies.



Stormwater swale

Swales are either man-made or natural areas shaped to allow water to be quickly absorbed into the ground or to allow the water to flow to other waterways. As in a shallow ditch, a swale promotes water absorption through soils. Swales hold water during and immediately after a storm, but are typically dry at other times. They are open systems and allow water to flow into water bodies.



Dry detention

Dry detention systems are normally dry and are designed to collect and temporarily hold storm water before a gradual release of the storm water.

Wet detention

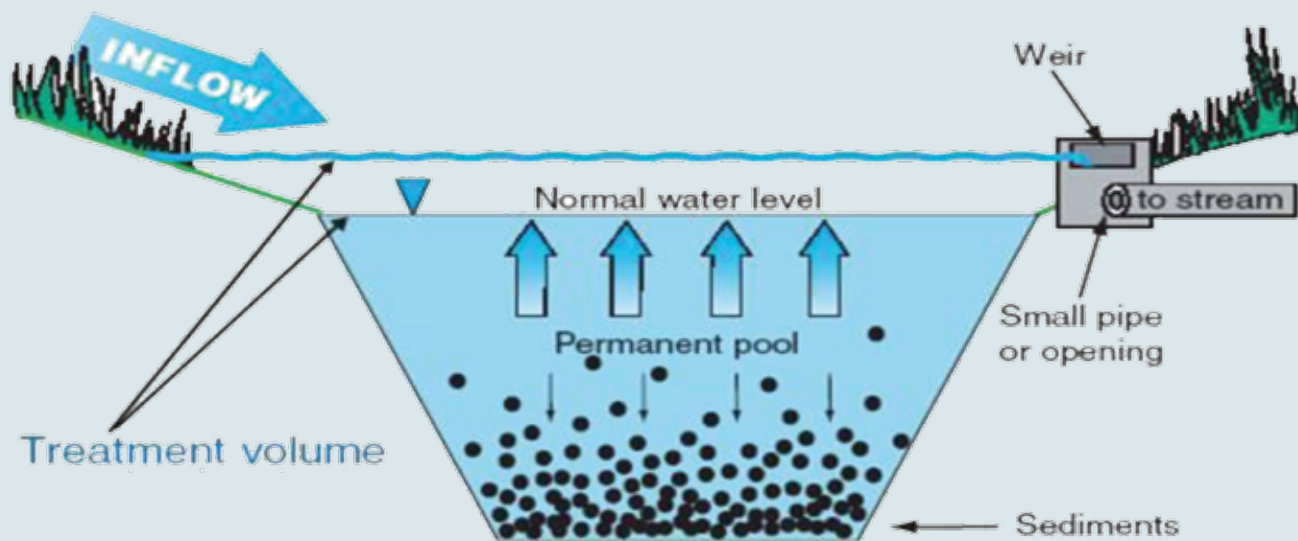
Wet detention systems (ponds) are the most recognizable stormwater systems. They are designed to allow material to settle and be absorbed. After a storm, water drains from a pond through a pipe in the “out flow” structure. Part of the pond—known as the permanent pool—is always below the level of the drain structure. Sometimes aquatic vegetation is planted around the pond’s perimeter to help filter sediment in stormwater runoff.



The next time it rains, take note of the direction water drains in your neighborhood. Often it will initially flow off the road and lawns and into a swale or storm drain. The water then may flow into a detention basin, or pond, which may hold it until the basin is full and then spills water into our local canals and then to the Gulf.

The illustration below shows an example of a wet detention pond and how it works. Notice the normal water level. When storm water flows into the pond through a pipe or channel, called an inflow, the water level rises in the pond.

As the water rises, sediment and pollutants—such as bacteria and heavy metals—picked up on the way to the pond sink to the bottom. The outflow structure usually has a small pipe or opening that sits just above the normal water level. When the water level reaches the outflow structure, the treated water will begin flowing out of the pipe. Not all systems work exactly in this way, but this is a standard design for wet detention ponds.

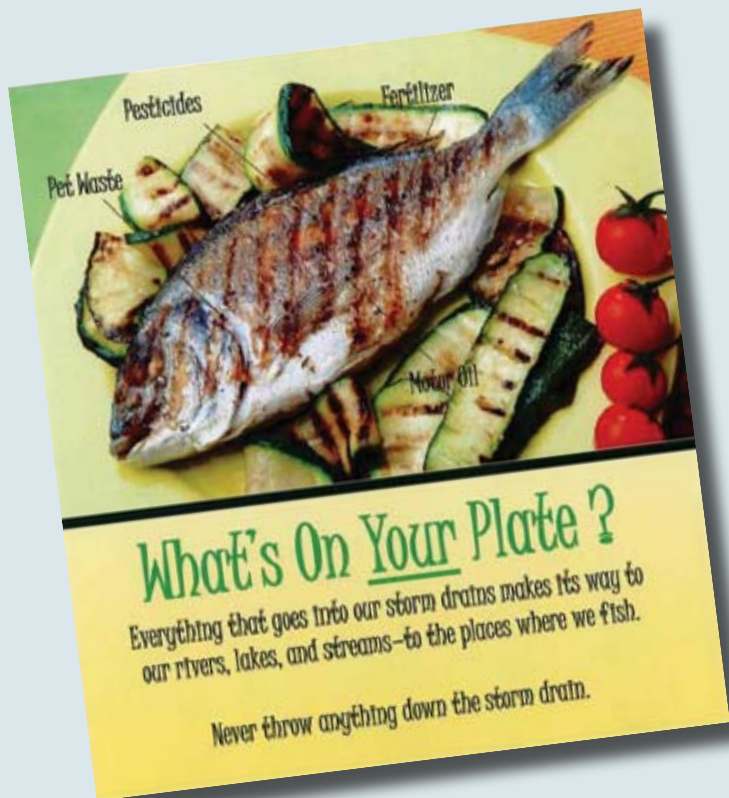


TAKE PART IN PREVENTING WATER POLLUTION

You can help conserve and improve the quality of water that enters the stormwater ponds and promote a healthy environment within your community. Even if you do not have waterfront property, the rain that runs off your roof, lawn and driveway eventually will end up in our area canals and bays.

Contaminants such as oil, grease, metals, and pesticides tend to build up on surfaces in urban areas. The contaminants come from sources such as pavement deterioration, tire and brake pad wear, vehicle emissions and spills. They may also come from yard and garden care, and pet feces. In older systems, stormwater runoff picks up these substances and transports them **DIRECTLY** to our lakes, canals, bays and the Gulf. Whatever enters a storm sewer systems is discharged **UNTREATED** into the water bodies we use for swimming and fishing.

Naples Bay is considered to be badly polluted with copper by both the state of Florida and the United States Environmental Protection Agency. The likely culprit is the copper from the copper sulfate that has been applied to local stormwater ponds in an effort to treat and control algae. On top of that, the sulfate component of copper sulfate has been identified as the agent that causes mercury in the environment to form methyl mercury, which then creates a pathway for mercury to enter the food chain. The mercury ends up in the fish we eat, often at levels considered to be a health hazard to some people.



RESPONSIBILITY FOR STORMWATER SYSTEMS

In Florida, the general responsibility for permitting stormwater systems rests with the water management districts. Single family residential stormwater permits in rural areas, like Golden Gate Estates are handled by FDEP. After developers complete construction of permitted systems in residential areas, the permit and the legal responsibility for maintaining these systems are typically passed on to a homeowners or condominium owners association.

It is then the sole responsibility of the association to operate and maintain the stormwater system to keep it functioning properly. This responsibility applies to every homeowner in the neighborhood, whether or not they live adjacent to a detention or retention basin.



Nutrients are the main problem with most ponds. The main reason for any algae or aquatic plant problem is there are too many available nutrients in the water for the plants to grow and thrive. Grass clippings, leaves, runoff from fertilized lawns and farm fields or pastures, animal waste (from geese, ducks, fish, etc.), and organic matter in the pond (dead aquatic plants) are some of the most common sources of nutrients in ponds. All of these supply an enormous amount of nitrogen and phosphorous that aquatic plants and algae need to survive and thrive. The key to algae and aquatic plant control is reducing the amount of nutrients entering and existing in the pond.



It may seem trivial, but over time, grass clippings and sediment blown into storm inlets and into the pond will degrade the pond health and esthetics, and contribute to eventual larger maintenance costs for the pond. Florida Friendly Landscape principles will make a pond much easier and less costly to maintain. “Project Greenscape” - certified landscape maintenance companies are trained in Florida Friendly Landscape principles and recognize the connection between the landscape and pond water quality.

Basic maintenance

- Keep inflow/outflow structures clean and clear of debris.
- Keep grass clippings and other debris out of stormwater drainage systems to prevent clogging.
- Remove nuisance and excess vegetation from stormwater ponds.
- Repair eroded slopes.
- Remove trash and yard waste from gutters and around storm drains.
- Report clogged culvers or slow moving water in ditches to your local government.
- Do not fill stormwater ponds, swales or retention systems with dirt or other debris, as this will reduce the capacity of the stormwater pond. Any reduction in treatment volume will interfere with the pond's ability to hold storm water.



Plant wisely

- If your stormwater system is intended to be a wet system, plant trees around the perimeter of the pond. Trees help shade the area and absorb nutrients.
- Use plants to create a buffer zone of five feet or more between your yard and any water bodies. Shoreline vegetation can reduce erosion and trap pollutants in stormwater runoff before the runoff reaches water bodies



Fertilize Carefully

The City of Naples and Collier County have fertilizer ordinances. It is important to make sure you and your lawn care provider are familiar with these codes. Ordinance details are available at their websites.

- Avoid overuse of fertilizers, especially near the water's edge
- No fertilizer applications during any identified storm "Watch" or "Warning" or when soils are saturated
- No fertilizer within 10 feet of water bodies or wetlands (3 feet with deflector shield or drop spreader)
- Application rates per label and Rule 5E-1.003(2) F.A.C.
- No fertilizer may be left on impervious (asphalt or concrete) surfaces
- No fertilizer may be swept or blown into ditches, stormwater drains, or wetlands
- No grass clippings may be swept or blown into ditches, stormwater drains, wetlands, or roads

Build Rain Gardens

Rain gardens are a fun and inexpensive way to improve water quality and enhance the beauty of your yard. They are placed between stormwater runoff sources (roofs or driveways) and runoff destinations (storm drains, streets and ditches or canals).

A rain garden is a shallow depression in the ground that captures runoff from your driveway or roof and allows it to soak into the ground. Plants and soil work together to absorb and filter pollutants and return cleaner water through the ground to nearby waterways. While an individual rain garden may seem like a small thing, collectively they produce substantial neighborhood and community environmental benefits.



Floating Plant Islands

For years, the algae problem in our local lakes (stormwater ponds) has been treated by applying chemicals to kill these plants, and the chemical of choice is usually copper sulfate. Unfortunately, Naples Bay is considered to be badly polluted with copper by both the state of Florida and the United States Environmental Protection Agency. The likely culprit is the copper from the copper sulfate that has been applied to these ponds. On top of that, when the algae dies after being treated with copper sulfate, it sinks to the bottom of the pond and begins to decompose. The dead algae rob the pond of more oxygen and provide more food for a new crop of algae.

So what can you do to treat your algae problem? Cut off the algae's food supply, lower the temperature of the water, and get more oxygen in the pond. How?

Plant some native wetland plants along the shoreline of your pond and build floating plant islands in the water. These plants will intercept the nutrients the algae use for food by taking it up themselves. These islands are constructed of a plastic material that has holes so that roots of the plants can absorb the nutrients from the water. Their growth is phenomenal, and they must be harvested at least once a year. Harvesting takes more algae food out of the system. The plants can be mulched or even planted along the shoreline to do more work while small young plants are replanted on the islands.



Another successful algae control method to try is the placement of aerators – not fountains – in the lake. Bubbling aerators are put on the bottom of the lake. Air is pumped from the shoreline to the aerator, creating water circulation in the pond. When the water circulates, it adds oxygen and lowers the temperature. With both plantings and an aerator, you've treated all of the conditions favorable to an algae bloom and improved the health of your lake.



Pond before floating plant islands and aeration



Pond after floating plant islands and aeration

AQUASCAPING YOUR STORMWATER POND

Aquascaping is the term used to describe the planting of desirable aquatic and wetland plants. Certain plants help take up nutrients, act as a filter to sediments in stormwater runoff, control the growth of nuisance vegetation and help make the pond aesthetically pleasing. Aquascaped ponds and lakes have fewer problems than those without aquascaping. Desirable vegetation will filter polluted runoff, trap sediments, control the growth of nuisance vegetation and help make the pond visually pleasing.

Just as you can landscape your yard, you can choose desirable, low-maintenance plants to aquascape your stormwater pond. Use plants to create a buffer zone of five feet or more between your yard and any water bodies. Shoreline vegetation can reduce erosion and trap pollutants in stormwater runoff before it reaches water bodies. Plant trees around the perimeter of the pond. Trees help shade the area, which can help lower water temperature and help prevent algae blooms.

Not all plants are good for aquascaping, and the removal of prohibited or unwanted plants can be difficult. Homeowners are advised to contact a reputable pond management company or nursery for most vegetation management programs.



PLANTS DESIRABLE FOR AQUASCAPING

The following is a list of plants that have been successful in this area. There are many more native plants to choose from and it is important to note that all plants success depends of soil type, water levels and other environmental factors. Be sure to consult with an expert when aquascaping your pond or lake

American bulrush.....	<i>Schoenoplectus americanus</i>
Alligatorflag.....	<i>Thalia geniculata</i>
Dixie iris.....	<i>Iris hexogona</i>
Duck potato.....	<i>Sagittaria Sp.</i>
Fakahatchee grass.....	<i>Tripsacum dactyloides</i>
Golden canna.....	<i>Canna flaccid</i>
Gulf coast spikerush.....	<i>Eleocharis cellulose</i>
Knotted spikerush.....	<i>Eleocharis cellulose</i>
Pickerelweed.....	<i>Pontederia cordata</i>
Pink muhlygrass.....	<i>Muhlenbergia capillaries</i>
Sand cordgrass.....	<i>Spartina bakeri</i>
Saltgrass.....	<i>Distichlis spicata</i>
Seashore dropseed.....	<i>Sporobolus virginicus</i>
Seashore paspalum.....	<i>Paspalum vaginatum</i>
Water hyssop.....	<i>Bacopa monnieri</i>



Pickerelweed
Pontederia cordata



Duck Potato
Sagittario Sp.

American bulrush
Schoenoplectus americanus



Dixie iris
Iris hexogona

Golden canna
Canna flaccida



Pink muhlygrass
Muhlenbergia capillaris

PROHIBITED AQUATIC PLANTS

Prohibited aquatic plants are aggressive weeds that are restricted by state or federal laws. These invasive plants may not be possessed, transported, cultivated or imported without a special permit.

Alligator weed.....	Alternanthera philoxeroides
Cattails.....	Typha sp.
Euransian water-milfoil.....	Myriophyllum spicatum
Hydrilla	Hydrilla verticillata
Water hyacinth	Eichhornia crassipes
Water lettuce.....	Pistia stratiotes
Water spinach.....	Ipomoea aquatic



Water lettuce
Pistia stratiotes



Water hyacinth
Eichhornia crassipes

CONTACT INFORMATION

Your stormwater pond has been designed and constructed to meet specific criteria to ensure that it functions properly. If you have questions about your stormwater pond or have any questions about information in this guide, call one of the office below.

Big Cypress Basin, SFWMD

2660 N. Horseshoe Drive
Naples, FL 34110
239-263-7615
www.sfwmd.gov/bcb



Collier County

Growth Management Division
Stormwater and Environmental Planning
2800 N. Horseshoe Drive
Naples, FL 34110
239-252-2400
www.colliergov.net



City of Naples Streets and Stormwater Department

295 Riverside Circle
Naples, FL 34102
239-213-5016
www.naplesgov.net



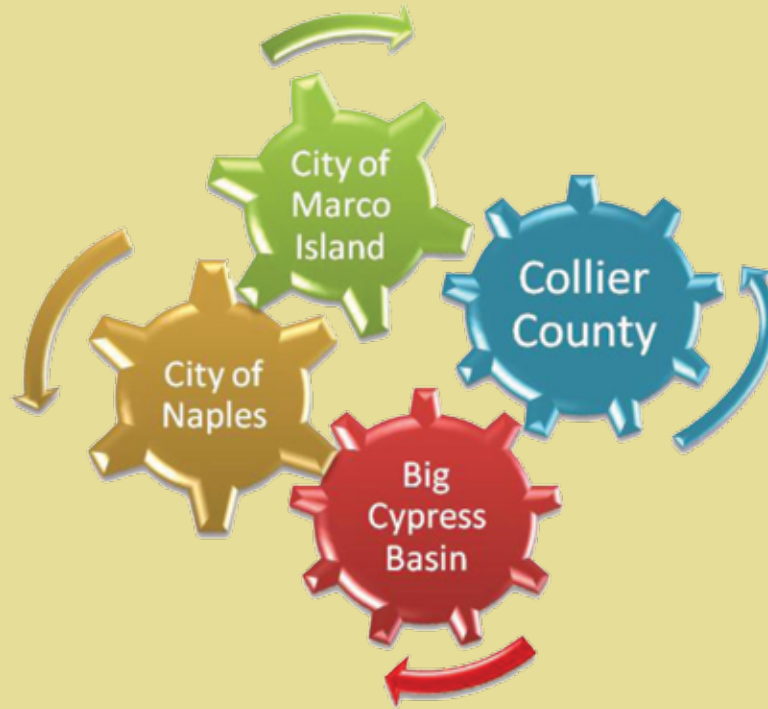
City of Marco Island Public Works

50 Bald Eagle Drive
Marco Island, FL 34145
239-389-5000
www.cityofmarcoisland.com



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It's Worth Saving

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