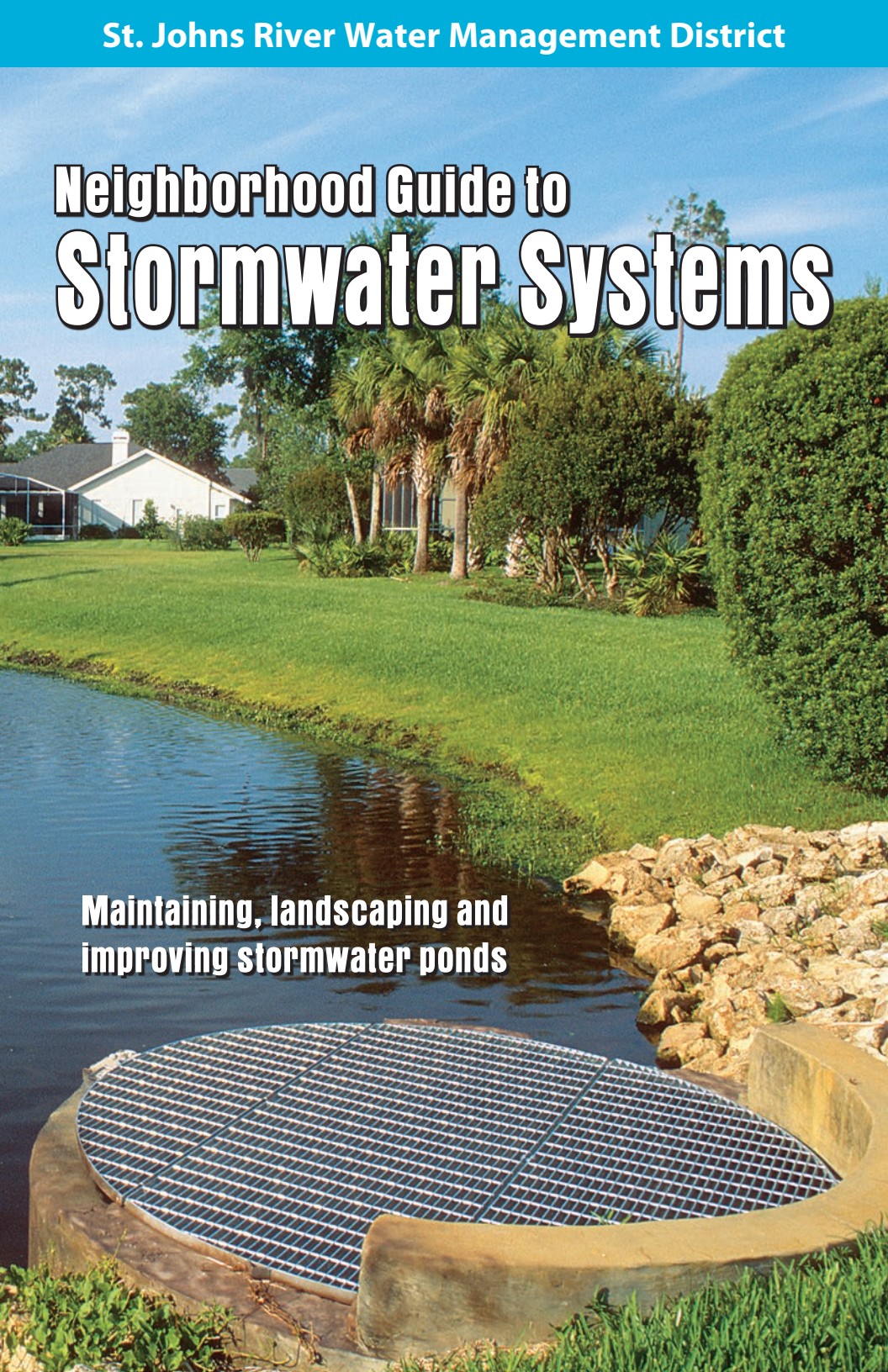
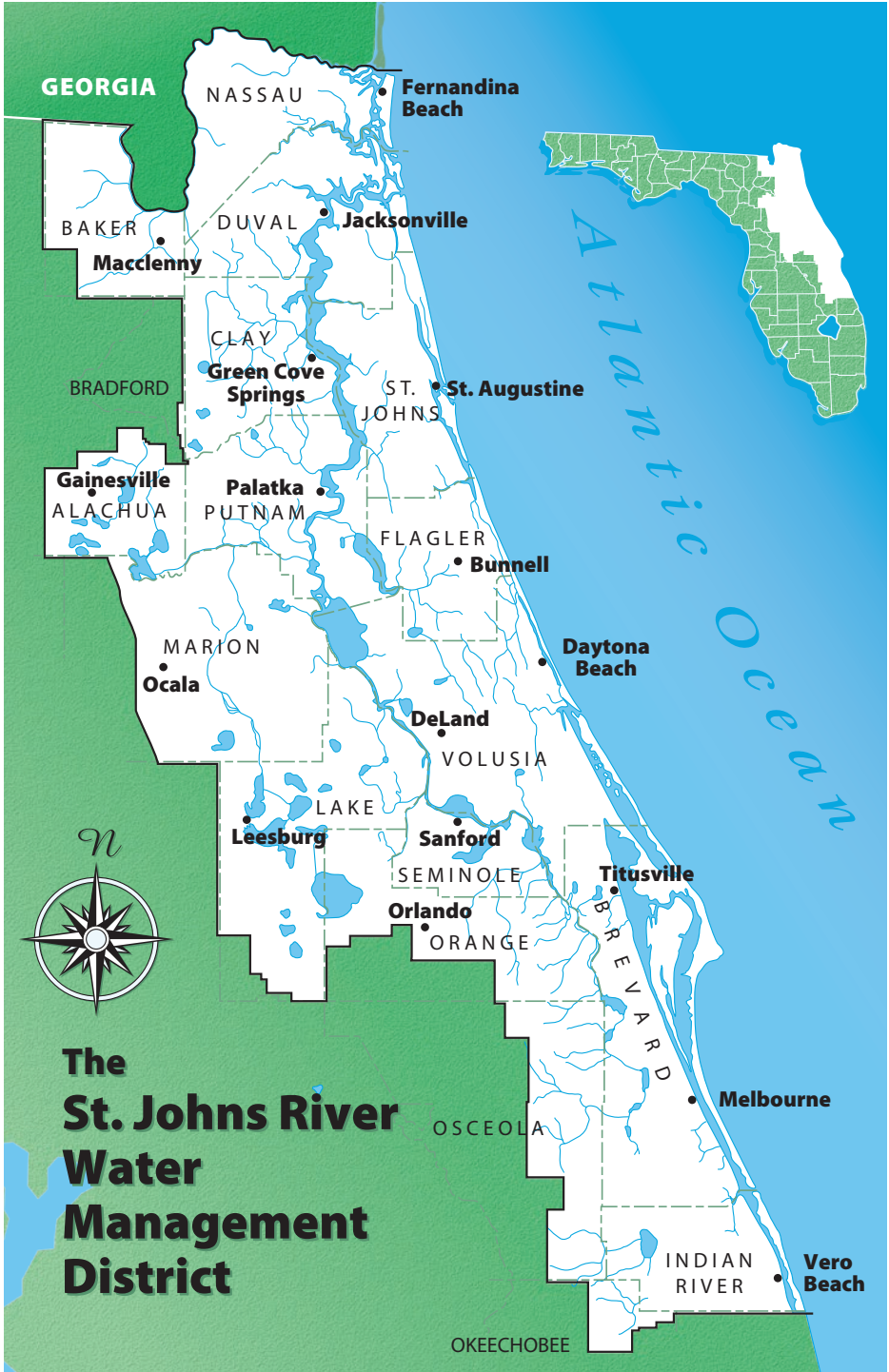


Neighborhood Guide to Stormwater Systems

**Maintaining, landscaping and
improving stormwater ponds**





GEORGIA

NASSAU

Fernandina Beach

BAKER

Macclenny

DUVAL

Jacksonville

CLAY

Green Cove Springs

ST. JOHNS

St. Augustine

BRADFORD

Gainesville

ALACHUA

Palatka

PUTNAM

FLAGLER

Bunnell

MARION

Ocala

DeLand

VOLUSIA

LAKE

Leesburg

Sanford

SEMINOLE

Orlando

ORANGE

Titusville

BREVARD

Melbourne

OSCEOLA

INDIAN RIVER

Vero Beach

OKEECHOBEE

Atlantic Ocean



The St. Johns River Water Management District

STORMWATER SYSTEMS

A stormwater system is a tool for managing the runoff from rainfall. In nature, this water flows from fields to streams to rivers and so on, but development has changed some of these natural flows. This has led to flooding concerns and to pollutants flowing into streams and rivers.

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
- How stormwater ponds can be aquascaped

Stormwater ponds hold excess rainwater and sometimes appear to be natural lakes.



STORMWATER SYSTEMS, A HISTORY

Stormwater systems are as old as Florida's natural landscape. 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 systems in two ways.

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 rules, development had led to destruction or filling of wetlands in some areas. 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 stormwater runoff, such as fertilizers, pesticides, motor oil and heavy metals that wash off lawns, sidewalks, roads and parking lots.

A man-made structure sits on the edge of this stormwater pond.





Stormwater swale

Consider these facts about storm water:

- Untreated stormwater runoff is considered the state’s leading source of water pollution.
- The uncontrolled growth of algae in some waterways is often the result of poorly managed and/or treated storm water.
- Storm water contributes approximately 80–95 percent of the heavy metals (lead, copper, cadmium) that enter Florida waters.
- The amount of nutrients (nitrogen and phosphorus — the same chemicals found in lawn fertilizer) in stormwater runoff is comparable to that in treated sewage.

In the early 1980s, 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 were designed to mimic natural processes so individuals may have stormwater systems on or near their property without realizing it. What appears to be a natural indentation in a yard behind a house may have been designed as a stormwater swale. What looks like a wild patch of shrubbery may be an important vegetative buffer around a pond.

Stormwater systems come in a variety of shapes, sizes and forms, but basically there are four types.

Stormwater 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 storm water 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

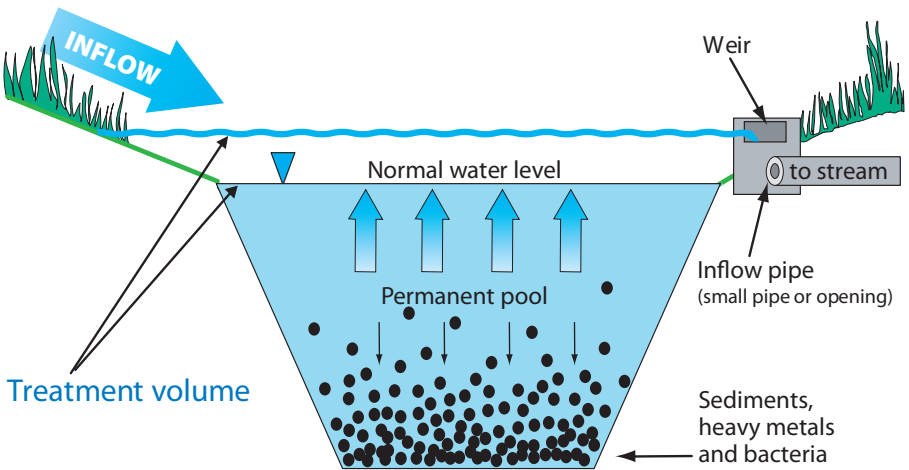
Wet detention systems (ponds) are the most recognizable stormwater systems. They are designed to allow material to settle and be absorbed. After a storm, water drains from a pond through a pipe in the “out flow” structure. Part of the pond — known as the permanent pool — is always below the level of 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, which may hold it until the basin is full and spills water into a stream.

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.



RESPONSIBILITY FOR STORMWATER SYSTEMS

In Florida, the responsibility for permitting stormwater systems rests with the water management districts and the Florida Department of Environmental Protection. 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 association.

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



A District engineer inspects a stormwater system in St. Johns County.

TAKE PART IN PREVENTING WATER POLLUTION

You may not have waterfront property, but the rain that runs off your roof, lawn and driveway can eventually end up in the nearest water body by flowing over land and into storm drains. Following are a few general guidelines for keeping a system functioning properly.

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 culverts 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.



Keep inflow/outflow structures clean and clear of debris.



Repair eroded slopes.

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, absorb nutrients and lower the water table.
- 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

- Avoid overuse of fertilizers, especially near the water's edge. Rain and lawn watering can wash excess fertilizer into water bodies, where excess nutrients cause algal blooms and undesirable weed growth.
- The amount of fertilizer to apply depends on a number of factors, such as grass species, soil type and permeability, and your location in Florida. Apply fertilizers sparingly, and follow directions, particularly in terms of the amount applied. Know exactly how much area (square feet) of your lawn the bag of fertilizer is intended to cover.
- Florida soil is naturally high in phosphorus, and therefore, a “No Phosphate” fertilizer is fine for most mature lawns. Apply a phosphate fertilizer only if lacking in the soil. For specifics to your area, contact the local County Cooperative Extension Service. Contact information is available online at sfyl.ifas.ufl.edu/map/index.shtml.



The use of shoreline vegetation can reduce erosion and trap pollutants in stormwater runoff before the runoff reaches water bodies.

- The best fertilizers for healthy landscapes and the environment are those that contain a high percentage of slow-release, water-insoluble forms of nitrogen. Water-insoluble products are not washed away like liquid or fast-release fertilizers. Slow-release products stay in the soil to supply nutrients to plants on a gradual basis, over a longer period of time. The product label will say organic, slow-release or controlled release, water-insoluble nitrogen, sulfur-coated, IBDU (15N-isobutylidene divrea), or resin-coated.
- Fertilize only during the growing season, which can vary depending on where you live in Florida. Allow a month between autumn application and the first freezing temperatures, which will make new growth less vulnerable to frost.
- Use pesticides, herbicides and fungicides only when needed, and apply them responsibly, following directions. Apply only on affected areas. Consider organic or nontoxic solutions.
- Use only aquatic herbicides in maintaining stormwater ponds. Land-based herbicides contain nutrients that are harmful to water bodies.

Things to avoid

- Avoid dumping oil, chemicals or yard trash into ponds, inlets or storm drains. Contact your local government's waste management department for a list of disposal facilities. Depositing lawn clippings in water bodies and storm drains can increase oxygen demand in the water, which can significantly harm fish populations. Use your lawn clippings for mulch or compost. Storm drains are direct conduits to your stormwater pond or natural waterway.
- Don't swim in the ponds or eat fish caught in them. Stormwater ponds are treatment systems that trap pollutants from the neighborhood watershed.
- Filling stormwater ponds, swales and retention systems can cause flooding. Stormwater systems are designed and constructed to an appropriate size. Any reduction in treatment volume will interfere with the pond's ability to hold stormwater runoff.
- Changing the elevation of large pieces of property can have drastic impacts on where storm water flows. Consult the stipulations of your neighborhood's permit before undertaking any construction.

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.

Just as you can landscape your yard, you can choose desirable, low-maintenance plants to aquascape your stormwater pond.

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 for most vegetation management programs.

The next few pages contain a list of the various types of plants often found in and around stormwater ponds and natural waterways.

Additional information is available on the Center for Aquatic and Invasive Plant's website at plants.ifas.ufl.edu.



Duck potato (*Sagittaria lancifolia*)



Many stormwater ponds are designed to resemble natural ponds.

PLANTS DESIRABLE FOR AQUASCAPING

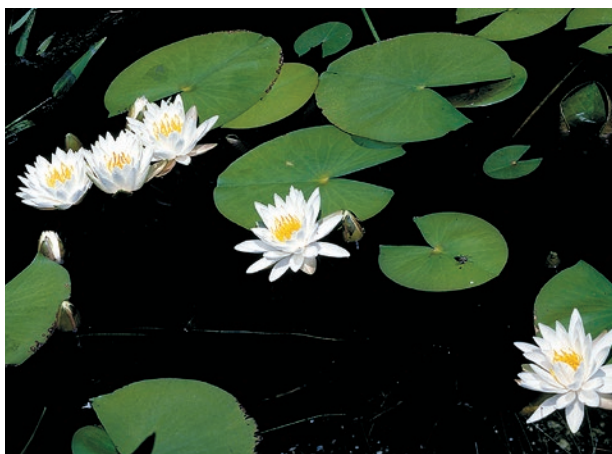
Aquascaping is landscaping in and around your pond. These plants are preferred for your “aquatic garden” as they grow slowly and require little maintenance.

- Arrowhead.....*Sagittaria latifolia*
- Blue flag iris.....*Iris hexagona*
- Softstem bulrush.....*Scirpus tabernaemontani*
- Duck potato.....*Sagittaria lancifolia*
- Giant bulrush.....*Scirpus californicus*
- Golden canna.....*Canna flaccida*
- Gulf Coast spikerush.....*Eleocharis cellulosa*
- Pickerelweed.....*Pontederia cordata*
- Pondweed.....*Sagittaria stagnorum*
- Soft rush.....*Juncus effusus*
- St. John’s wort.....*Hypericum perforatum*
- Tape or eelgrass.....*Vallisneria americana*
- American white water lily.....*Nymphaea odorata*





Pickerelweed
Pontederia cordata



American white
water lily
Nymphaea odorata



Soft rush
Juncus effusus

HIGH-MAINTENANCE AQUATIC PLANTS

There are native and non-native plants in the list below. They grow quickly and require a lot of attention.

- Bladderwort *Utricularia* sp.
- Cattail *Typha* sp.
- Coontail *Ceratophyllum demersum*
- Duckweed *Spirodela polyrhiza*
- Knotweed *Polygonum* sp.
- Mosquito fern *Azolla* sp.
- Paragrass *Urochloa mutica*
- Pennywort *Hydrocotyle* sp.
- Sedge *Cyperus* sp.
- Southern naiad *Najas guadalupensis*
- Spatterdock *Nuphar lutea*
- Spikerush *Eleocharis* sp.
- Torpedograss *Panicum repens*
- Water fern *Salvinia minima*
- Wild taro *Colocasia esculenta*
- Filamentous, macrophytic and planktonic algae



Wild taro
Colocasia esculenta



Duckweed
Spirodela polyrhiza



Torpedograss
Panicum repens



Cattail
Typha sp.

PROHIBITED AQUATIC PLANTS

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

- Alligator weed *Alternanthera philoxeroides*
- Eurasian water-milfoil *Myriophyllum spicatum*
- Hydrilla *Hydrilla verticillata*
- Waterhyacinth *Eichhornia crassipes*
- Waterlettuce *Pistia stratiotes*
- Water spinach *Ipomoea aquatica*



Waterhyacinth
Eichhornia crassipes



Waterlettuce
Pistia stratiotes

CONTACT INFORMATION

Your stormwater pond has been designed and constructed to meet specific criteria to ensure that it functions properly. For more information about stormwater treatment systems, call one of the St. Johns River Water Management District offices below or visit our website at www.sjrwmd.com/stormwatersystems.

Jacksonville Service Center 904-730-6270 for
Baker, Bradford, Clay, Duval, Nassau and St. Johns counties

Palatka Headquarters 386-329-4500 for
Alachua, Flagler, Marion and Putnam counties

Maitland Service Center 407-659-4800 for
Lake, Orange, Volusia and Seminole counties

Palm Bay Service Center 321-984-4940 for
Brevard, Indian River, Okeechobee and Osceola counties



For more information, contact:
St. Johns River Water Management District
4049 Reid Street • P.O. Box 1429
Palatka, FL 32178-1429
Phone: 386-329-4540

This booklet is free.

Visit us on the Internet at www.sjrwmd.com

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