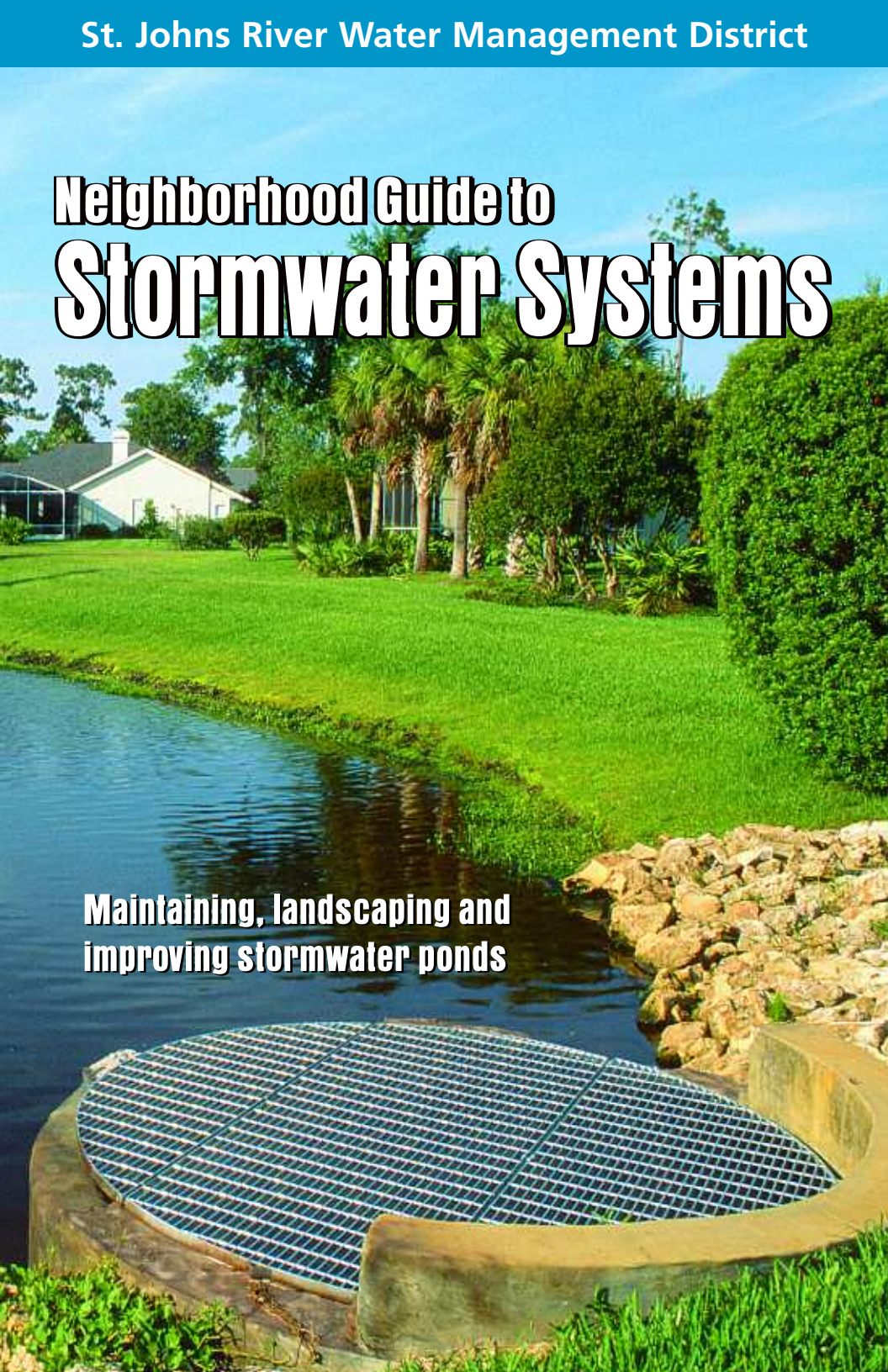


Neighborhood Guide to Stormwater Systems

**Maintaining, landscaping and
improving stormwater ponds**



GEORGIA



**The
St. Johns River
Water
Management
District**

Stormwater Systems

Simply put, 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 human development has stifled some of these natural flows. This has led to concerns of flooding and to human-induced pollutants flowing into streams and rivers.

The Neighborhood Guide to Stormwater Systems was created to provide 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 to aquascape a stormwater pond



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 numerous 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 they reach fragile waterways.

Development by humans has led to the destruction, filling in and paving over of wetlands. This has increased the danger of flooding, as storm water has no natural outlet. 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.





Stormwater swale

Unfortunately,

- Untreated stormwater runoff is now considered the state's leading source of water pollution.
- The uncontrolled growth of algae in waterways is often the result of poorly managed 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.

Fortunately, in the early 1980s, the Florida Legislature recognized the pollution potential of stormwater runoff and passed laws requiring treatment of storm water. Neighborhood stormwater systems were established to mimic the natural role of wetlands. Furthermore, restoration projects have demonstrated that with proper treatment the detrimental effects of stormwater pollution can be reversed.

How Stormwater Systems Work

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

Stormwater retention basin

A retention basin is 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 generally dry. They are open systems, flowing into other water bodies.

Dry detention

Dry detention systems are normally dry and hold stormwater runoff long enough for it to be slowly released into an adjacent water body. In dry ponds, sediment has little time to settle before water is released to another holding area.

Wet detention

Wet detention systems (ponds) are the most recognizable stormwater system. They are designed to allow material to settle and be absorbed. After a storm, water slowly drains from the 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 plants are planted around the pond’s perimeter to help filter sediment in stormwater runoff.

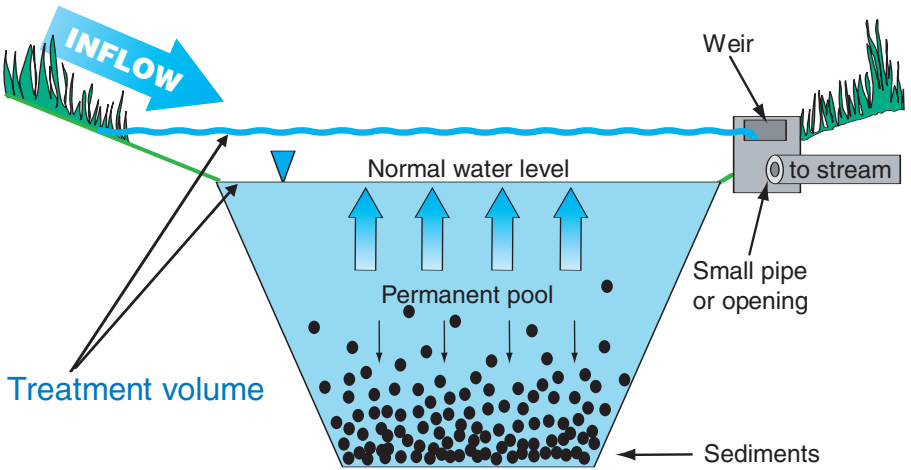
Because these systems were designed to mimic natural processes, individuals may have stormwater systems on or near their property without realizing it. What appears to be a natural indentation in the back yard may have been designed as a stormwater swale. What looks like a wild patch of shrubbery may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

The next time it rains, take note of the course of water near your house. 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 natural 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. 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 homeowners association, not the developers or the water management district, which is responsible for the upkeep and maintenance of the system. The homeowners association is responsible for labor and financially for keeping the system functional (see following sections). This responsibility applies to every homeowner in the neighborhood, whether or not they live adjacent to a detention or retention basin, as everyone's storm water flows into the basin.

Copies of your homeowners association's operation and maintenance permit, plans and maintenance guidelines were provided at the time of the transfer to your association's representative. For more specific information about your pond, you may call your water management district's permitting staff.



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

- Clear or clean inflow/outflow structures.
- Remove nuisance and excess vegetation.
- Repair eroded slopes.
- Clean up trash and yard waste in your yard and gutters and around storm drains.



Clear or clean inflow/outflow structures.



Remove nuisance and excess vegetation.



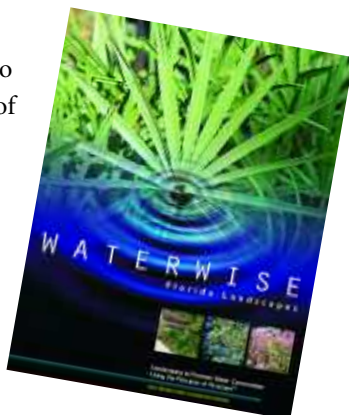
Repair eroded slopes.



Clean up trash and yard waste in your yard and gutters and around storm drains.

Plant wisely

- Apply waterwise landscaping principles to your landscape. By knowing what types of plants grow in what types of soils and their water needs, you can dramatically reduce the amount of water used for irrigation, chemicals used for pest control, and fertilizers used for growth. Information on waterwise landscaping can be obtained from your water management district.
- Plant trees. If your stormwater system is wet, 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.



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

Fertilize carefully

- Unwise or excessive use of chemicals can harm people, pets, beneficial organisms and the environment. Use nontoxic alternatives whenever possible and pull weeds by hand.
- Avoid overuse of fertilizers, especially near the water's edge. Rain and lawn watering can wash excess fertilizer into ponds and water bodies, where excess nutrients cause algal blooms (green pond scum) and undesirable weed growth. The University of Florida's Institute of Food and Agricultural Sciences recommends using a complete, slow-release fertilizer in March and September. This can result in less mowing, less thatch buildup, less watering, fewer nutrients washing into ponds and waterways, and fewer insect and disease problems.
- Use pond water to irrigate your lawn. It not only saves drinking water supplies, but also recycles nutrients so that you can fertilize less frequently. You save on both your water and your fertilizer bills.
- Use only aquatic herbicides in maintaining stormwater ponds. Land-based herbicides contain nutrients that are harmful to water bodies.

Things to avoid

- 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.
- Stormwater ponds are treatment systems that trap pollutants from the neighborhood watershed. Don't swim in the ponds or eat fish caught in them.
- 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. Filling stormwater ponds, swales and retention systems can cause flooding and endanger waterways.
- 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 any construction.
- Storm drains are direct conduits to your stormwater pond or natural waterway. Avoid dumping waste 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.

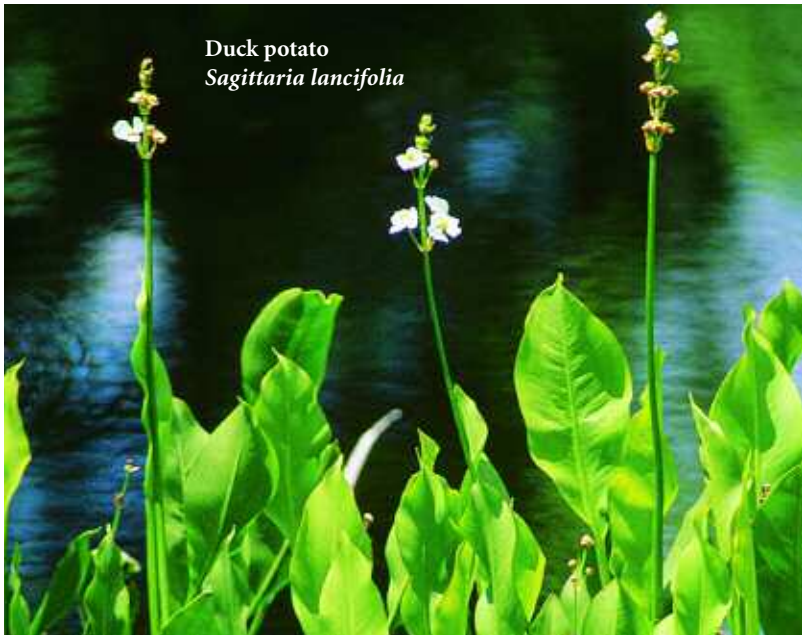
Aquascaping Your Stormwater Pond

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. Pond vegetation can range from grass right down to the pond's edge to no plants to an aquascaped 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 brief overview of the various types of plants often found in stormwater ponds and natural waterways.





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





Pickerelweed
Pontederia cordata



American white
water lily
Nymphaea odorata



Soft rush
Juncus effusus

High-Maintenance Aquatic Plants

These plants may or may not be native, but they grow quickly and require a lot of attention.

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



Wild taro
Colocasia esculenta



Duckweed
Spirodela polyrhiza



Torpedograss
Panicum repens



Cattail
Typha sp.

Prohibited Aquatic Plants

Prohibited 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 your closest St. Johns River Water Management District office or visit our Web site at www.sjrwmd.com.

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

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

Altamonte Springs Service Center (407) 659-4800 for
Lake, Marion, Orange, Volusia and Seminole counties

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

An education program has been developed to provide neighborhood groups with information about proper landscape and pond maintenance practices that will save them money and help ensure protection of Florida's natural waterways. This watershed and ponds education program is available through the District's Watershed Action Volunteer (WAV) program. For more information, contact the WAV coordinator at (386) 329-4345.

As an introduction to the education program, videos on watersheds and stormwater systems can be ordered from the District by calling (800) RALLY-22.

A complete listing of available publications and videos is located at www.sjrwmd.com, "publications" button.



St. Johns River

Water Management District

For more information, please contact:
St. Johns River Water Management District
Office of Communications and Governmental Affairs
4049 Reid Street • P.O. Box 1429
Palatka, FL 32178-1429
Phone (386) 329-4540

This free publication was produced by the
St. Johns River Water Management District to inform
the public about stormwater systems within the District.

Visit us on the Internet at www.sjrwmd.com.

December 2003