

Understanding the Basics

The regional network of canals and water control structures that crisscrosses central and southern Florida, along with the thousands of man-made lakes and smaller canals that dot the landscape, 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. Working in concert with city, county and local drainage district systems, which must coordinate with developer/property-owner managed facilities, the South Florida Water Management District is responsible for safely conveying excess waters into regional storage areas or out to the ocean.

In the case of extreme situations, including hurricanes, even well-maintained, fully-functioning drainage systems are no guarantee against serious flooding in our sub-tropical climate. Routine up-keep and repair of facilities will, however, help the water drain away more quickly.

Drainage and flood control in south Florida

Unlike many other states where one entity is usually responsible for providing local and regional drainage for the community, Florida is more complex. Some areas have no formal drainage systems and are prone to routine flooding; others may be covered by several organizations or governments providing varying levels of service. Depending on conditions, water may have to be routed through a

number of interconnected, though independent, conveyance systems – each of which must be properly maintained and functioning – in order to provide flood protection for central and south Florida neighborhoods.

A failure or blockage in one part of the system can adversely affect others. Proper drainage can be compared to a chain of dominoes: one out-of-sync piece can slow or stop the chain. The SFWMD and local drainage districts spend millions of dollars each year to maintain these vital water conveyance systems; community facilities must be maintained by homeowner associations.

A shared responsibility

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

However, even the best-maintained and functioning drainage systems cannot totally prevent flooding. In fact, flooding will always occur during heavy, prolonged downpours and hurricanes, just as droughts occur during prolonged dry spells. To help temper our subtropical climatic extremes, the SFWMD continually works with federal, state and local governments, developers, homeowner associations, and others to improve conditions and correct problems where possible. Measures include educating homeowner associations about the need to properly maintain drainage facilities; working with secondary drainage districts to improve any shortcomings observed in routine and emergency situations; assisting developers, cities and counties in developing solutions to local drainage concerns;

acquiring more land for regional water storage; and working with the federal government in its "restudy" of the regional flood control public works project.

What can YOU do to help?

- Homeowner association officials – familiarize yourself with your particular drainage system and how it fits into the overall south Florida drainage picture. Specifically, learn how the system is designed to work, what all current permits entail, what level of protection is expected or provided, and how to properly maintain the facilities under your responsibility. (see "How to Inspect and Maintain Neighborhood Drainage Systems")
- Residents and business owners – learn more about the capabilities and limitations of drainage in south Florida. For example, inconvenient standing water in streets and yards is not considered unusual, but rather a critical component of your neighborhood drainage facilities. Many people do not understand how their community drainage system works, what – if any – local or secondary drainage district serves them, and how water management in general, operates in south Florida.
- Report the location and condition of any clogged or damaged facilities to the proper authority (homeowner association, city, county or local drainage district, or the South Florida Water Management District) in ADVANCE of and DURING the summer rainy season. Make a note of important telephone numbers and keep them handy.
- Do not treat your drainage system like a garbage disposal. Keep ditches, swales, drainage grates and retention lakes clear of debris, trash and other discarded material.
- Support the required funding for proposed flood control solutions. Long-term fixes require long-term financial commitments.

Contacts for the primary drainage system

MAIN OFFICE
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
 3301 Gun Club Road
 West Palm Beach, Florida 33406
 MAILING ADDRESS:
 P.O. Box 24680
 West Palm Beach, FL 33416-4080
 561-686-8800 or 800-432-2045

SERVICE CENTERS

ORLANDO
 1707 Orlando Center Parkway
 Suite 200
 Orlando, Florida 32809
 407-858-4100 or 800-250-4250

OSKEECHOBEE
 205 North Parrott Avenue, Suite 201
 Okeechobee, FL 34972
 863-462-5260 or 800-250-4200

MARTIN/ST. LUCIE
 780 S.E. Indian Street
 Stuart, FL 34997
 772-223-2600 or 800-250-4100

PALM BEACH
 3301 Gun Club Road
 West Palm Beach, FL 33406
 561-682-6784 or 800-432-2045

LOWER WEST COAST
 2301 McGregor Boulevard
 Fort Myers, FL 33901
 238-338-2929 or 800-248-1201

BROWARD
 8211 West Broward Blvd, PH3
 Plantation, Florida 33324
 954-713-3200 or 877-350-3897

MIAMI-DADE
 2123 SW 3rd Ave.
 Miami, Florida 33129
 305-377-7274 or 800-250-4300

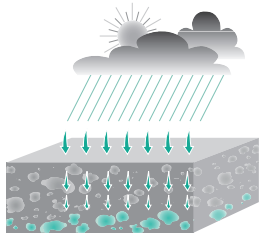
FLORIDA KEYS
 10 High Point Road, Suite A
 Plantation Key, FL 33070
 305-853-3219 or 800-464-5067

BIG CYPRESS BASIN
 2640 Golden Gate Parkway
 Suite 205
 Naples, FL 34105
 239-263-7615

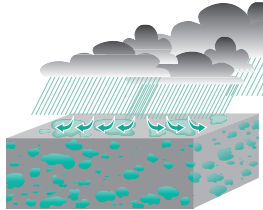
What Can Hamper Water Flow?

The rate at which drainage occurs can be affected by many factors and can vary from situation to situation:

- Existing ground and surface water levels.** If it has been dry for a while, most rainwater is quickly absorbed into the ground – or runs into lakes, canals or ponds – and, generally, poses no concern. If, however, recent rains have kept water levels high, there is more likelihood of surface water "ponding" or standing water in streets and yards. It is not unusual for the water to remain in the community for several days when ground and surface water storage levels are high.



If it has been dry for a while, most rainwater is quickly absorbed into the ground – similar to a thirsty sponge. If, however, recent rains have kept the ground saturated like a wet sponge, there is more likelihood of surface water "ponding" or standing water in streets and yards.



- Distribution of rainfall.** If rainfall is very localized, then more capacity is available in the secondary and primary canals to accept and move water away from the affected neighborhoods. On the other hand, if rainfall is widely distributed across the region, secondary and primary system canals reach carrying capacity faster and community water levels recede more slowly.
- Florida is basically low and flat, and offers little natural drainage relief.** Roadway and parking lot drainage systems are typically only designed to handle rainfall of 2 – 6 inches – not extreme situations in which we receive from 10 – 20 inches over a short period of time. During and after heavy rain, standing water in streets, yards and low-lying areas for extended periods of time is expected and normal.
- Some areas lack effective drainage systems** or have older systems that were in place before permitting criteria was developed, resulting in more frequent and more severe flooding.
- Smaller community drainage systems often are not maintained properly,** aggravating the potential for neighborhood flooding. Maintenance problems include grass, debris and other flow blockages, and/or facilities in need of repair.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
 3301 Gun Club Road
 P.O. Box 24680
 West Palm Beach, FL 33416-4080

Know who to call

Neighborhood:

Local Drainage District/County or City:



South Florida Water Management District
 3301 Gun Club Road • West Palm Beach, Florida 33406
 561-686-8800 • FL WATS 1-800-432-2045 • www.sfwmd.gov
 MAILING ADDRESS: P.O. Box 24680 • West Palm Beach, FL 33416-4080

Know the Flow! Flood protection is a shared responsibility

Preventive Maintenance Guidelines for Home- and Property-owner Association Officials

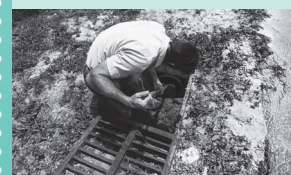
How to Inspect and Maintain Neighborhood Drainage Systems

Just like our northern neighbors inspect and check-out their furnaces and heating systems in advance of cold weather, we should always review our drainage facilities in advance of the rainy season.

As a critical link in south Florida's interconnected "chain" of water flow, you should become familiar with the drainage system for stormwater runoff in your subdivision. Specifically, you should be aware of the location, condition and operation of all on-site facilities that your association is responsible for maintaining. It is also a good idea to develop a list of important contact persons/phone numbers representing interconnecting or associated drainage systems BEFORE an emergency situation arises and keep it handy.



(Top) A stormwater inlet pipe located in a grassed swale is hidden from view due to overgrown vegetation, dirt and leaves. (Center) Proper maintenance should include periodic inspections and removal of excess material and sediment that might block water flow. (Bottom) A clear opening ensures that excess stormwater will properly flow through the drainage system as designed.



(Top) It is important to check underneath drainage grates for the accumulation of sediment, trash or debris. Pipe openings should be completely visible and free of any obstructions. (Center) It is always easier and less costly to remove any trash or build-up at this point – BEFORE it is carried further into the underground piping system. (Bottom) The removal of excess sediment will allow the structure to operate at its peak efficiency. Remember to properly dispose of the excess material and securely replace the drainage grates.

Your development may have been issued a surface water management (SWM) permit, authorizing construction and operation of a water management, or drainage, system serving your subdivision. You are encouraged to contact the city, county, local drainage district or the South Florida Water Management District in order to acquaint yourself with the particulars of all current permits.

You may want to consider engaging the services of a private contractor (surveyor, engineer, construction company, lake maintenance, etc.) or property management company to conduct the necessary inspections and/or repairs. Familiarity with permit requirements would be helpful. At a minimum, these inspections should include the following:

- Stormwater inlets, pipes & culverts:** The grates should be unobstructed and the bottom, inside the inlet, should be clean. Check for any accumulation of sediment, trash such as garbage bags, or debris in the culverts connecting these inlets. Flushing out with a high pressure hose may clean some sediments. Any noted blockage (due to a possible obstruction, or broken pipe, etc.) should prompt further investigation. Crushed or corroded culverts should be replaced with new ones of the same size.
 - Swales and grassed water storage areas:** These provide for conveyance and/or above-ground (or surface) storage of stormwater. With age, these areas usually fill in with vegetation and sediment. Your swales may need to be regraded and/or revegetated. It is a good idea to compare the existing slope and dimensions of the swale with the permitted design plans prior to the removal of excess sediment or regrading. Areas which show erosion should be stabilized with appropriate material such as sod, planting rock, sand bags, or other synthetic geotextile material.
- Regular mowing of grass swales is essential. These areas also improve water quality by catching sediment and assimilating nutrients, and recharge the underground water table. Remove any undesirable exotic vegetation. Culverts underneath driveways should be checked for blockage, and, if necessary, flushed with a high pressure hose. After a storm, swales may remain wet for an extended period of time. This is normal and the water will recede gradually.

- Ditches or canals:** Fill material, yard waste, clippings and vegetation, sediment, trash, appliances, garbage bags, shopping carts, tires, cars, etc. should be completely removed. Also check to make sure there are no dead trees or any type of obstructions which could block the drainage flow way. Maintenance cleaning/excavation must be limited to the same depth, width and side slope as approved in the current permit. Making a ditch deeper or wider may trigger a need for a permit modification. Provisions must also be made to prevent any downstream silting or turbidity. (Contact the SFWMD Field Engineering staff if you are unsure or need clarification.) Be sure to dispose of all removed material properly so it won't affect any other water storage or conveyance system, environmental area, or another owner's property.
- Lake system:** Dead vegetation, trash and debris should be cleaned from the shoreline, and the lawn-grasses should be mowed, unless it is a wetland preserve area. Side slope erosion or washouts on the lake banks should be repaired and revegetated with water-tolerant plants or grasses. Pipe (culvert) connections between the lakes need to be clear and open (ends not crushed, etc.).
- Outfall structure (also called the discharge control structure or weir):** It should be routinely inspected to determine if any obstructions are present or repairs are needed. Trash or vegetation impeding water flow through the structure should be removed. The structure should have a "baffle" or trash collector to prevent flow blockage and also hold back any floating oils from moving downstream. Elevations and dimensions should be verified annually with all current permit information. Periodic inspections should then be regularly conducted to make sure these structures maintain the proper water levels and the ability to discharge.
- Earthen embankments (dikes and berms):** Check for proper elevation, width and stabilization. Worn down berms – especially if used by all-terrain vehicles or equestrian traffic – and rainfall-created washouts should be immediately repaired, compacted and revegetated.

Please Note: Proposed improvements or changes that go beyond the intent or specifics of your permit(s) frequently require review and authorization by the South Florida Water Management District or others before proceeding. **If in Doubt – Ask First!**

Your neighborhood drainage system is not a garbage disposal – don't treat it like one. Encourage residents to take responsibility and to not dump chemicals, fertilizer, paint, oil, etc. in inlets or pipes. Discourage sweeping of lawn clippings and dirt into street drains and disposing of lawn clippings and other debris (wood, concrete blocks, Christmas trees, etc.) directly into retention lakes. Keep drainage facilities clear of vegetation, trash, improperly and illegally discarded appliances, shopping carts, tires, cars, garbage bags, etc.

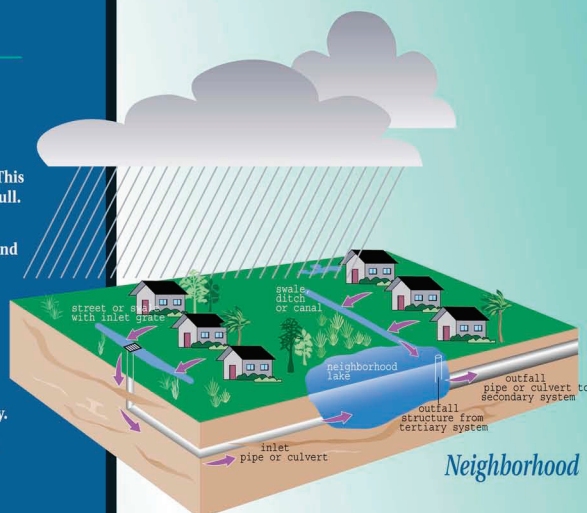




Neighborhood TERTIARY DRAINAGE SYSTEM

What path does storm water typically follow from your neighborhood to its final destination? Here's an example:

- Five inches of rain falls in 24 hours over an inland community. This rain follows a wet period, so ground water levels are already full.
- According to most approved drainage designs, some water is temporarily stored in public recreational areas, yard swales and streets.
- The excess "surface water" slowly drains to community lakes/on-site ponds via street and yard drainage grates or culverts and/or via swales, ditches or canals.
- Water then drains from the community or "tertiary" system through underground pipes to the "secondary" system, usually operated by a special taxing district or the county/city.
- Maintenance and upkeep of community drainage facilities is typically the responsibility of homeowner associations.



Neighborhood

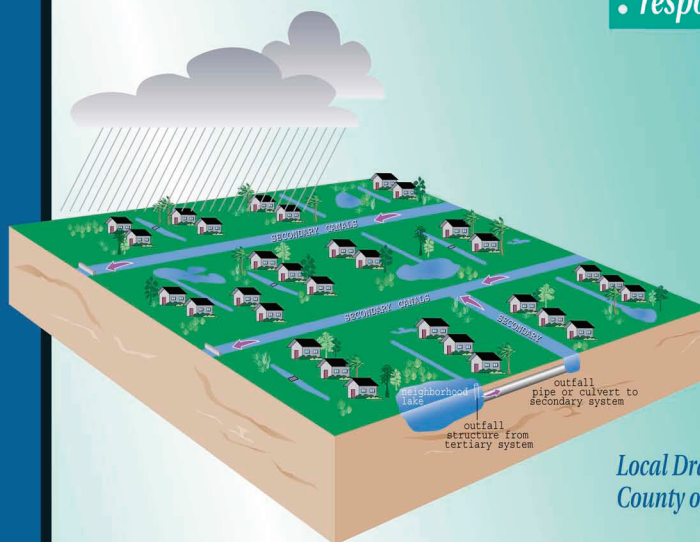
Know the Flow!

Flood protection is a shared responsibility

Local Drainage District/County or City SECONDARY DRAINAGE SYSTEM

- Usually a network of canals, structures, pumping stations and storage areas, secondary drainage systems can cover several hundred square miles and serve a number of communities.
- Responsibility typically includes the design, construction, maintenance and operation of water control facilities for controlling drainage and reclaiming lands within a given area.
- Based on available carrying capacity, these canals discharge water into the "primary" flood control system — either South Florida Water Management District canals, or natural rivers and other waterways which ultimately flow to the coast.
- Drainage problems, blockages or flow restrictions should be immediately reported to the responsible drainage district, county or city.

* If you live in an area serviced by a local drainage or water control district, it is noted as a separate item on your county property tax bill.

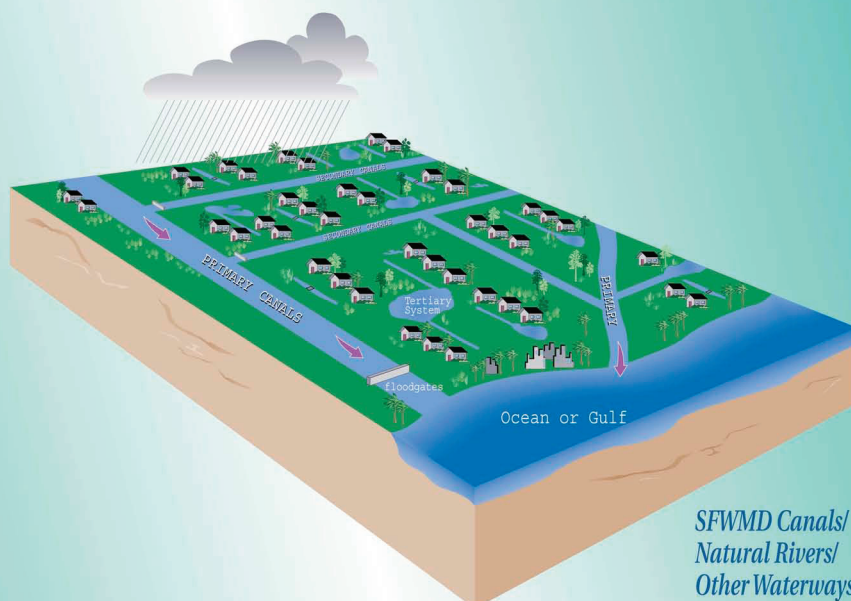


Local Drainage District/
County or City

SFWMD Canals/Natural Rivers/ Other Waterways PRIMARY DRAINAGE SYSTEM

- The South Florida Water Management District operates and maintains a federal public works project along with other regional flood control facilities.
- Weather conditions and water levels are monitored around the clock. Floodgates are opened and water levels are lowered in anticipation of heavy rains to accommodate direct rainfall and inflows from the secondary systems.
- During and after heavy rains, excess water is routed through all available primary waterways to regional storage areas or to coastal discharge points to relieve flooding as quickly and safely as possible.
- A year-round maintenance program assures peak performance of SFWMD facilities under emergency conditions.
- In those areas not serviced by the federal project, the primary drainage outlets are natural rivers and other waterways.

* As a multi-purpose agency, a portion of the property taxes you pay to SFWMD is for regional flood protection. Look for "Freddy the Friendly Alligator" on SFWMD canal signs.



SFWMD Canals/
Natural Rivers/
Other Waterways

NOTE: This graphic represents "typical" stormwater flow in central and south Florida. The path from your particular neighborhood may involve less or more drainage system connections than depicted here. It's up to YOU to "know the flow!"