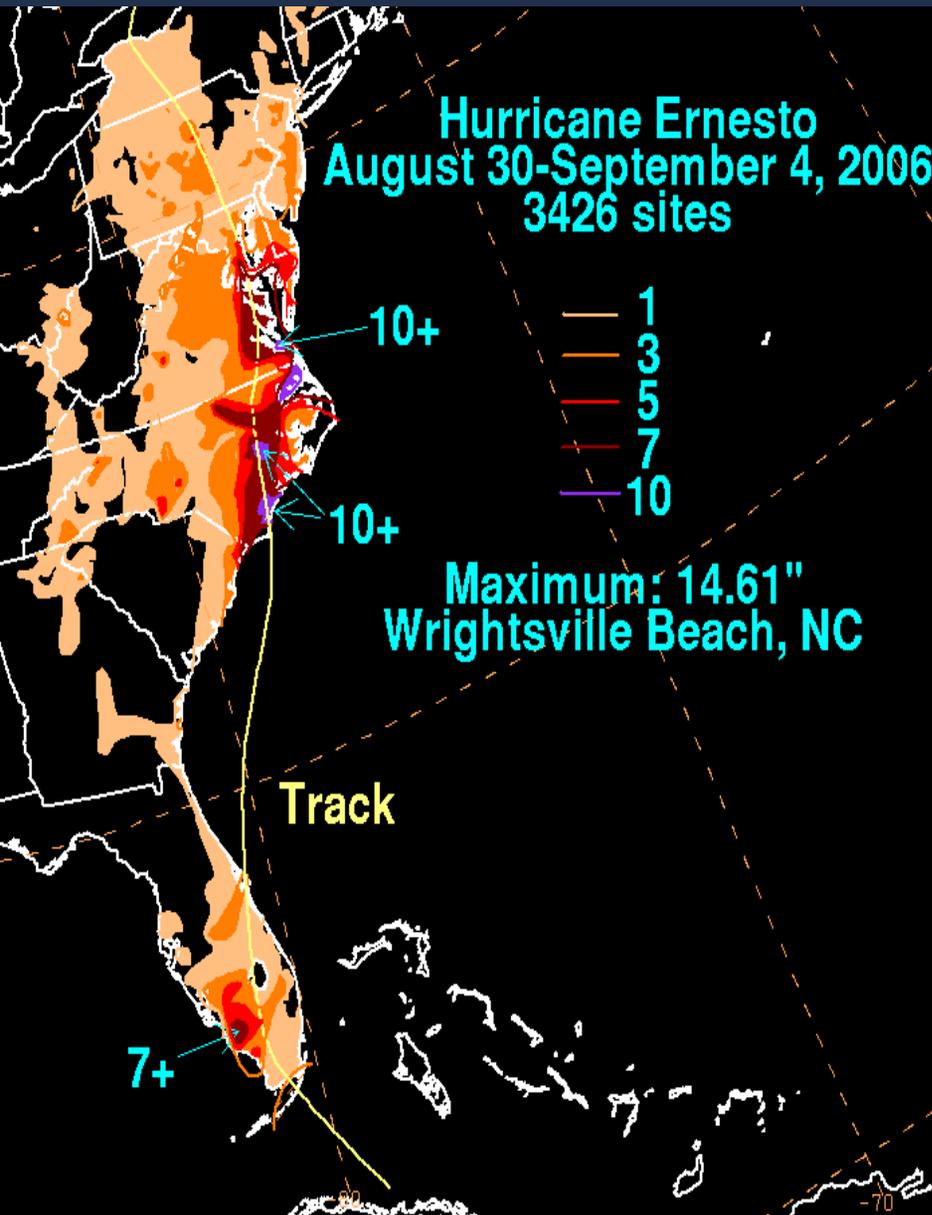


# **BIG CYPRESS BASIN**

## **Report on Tropical Storm Ernesto and Subsequent High Rainfall Event August-September 2006**



**October 27, 2006**



## TROPICAL STORM ERNESTO

- Moved thru SW FL on August 30<sup>th</sup>
- No damaging winds
- Rainfall exceeded prediction
- Residual moisture generated heavy rainfall for two weeks
- Saturated soil conditions caused runoff beyond the conveyance capacity of the drainage system
- Caused flooding in some residential yards and roads in NGGE

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rainfall 8/1/06 - 9/25/06

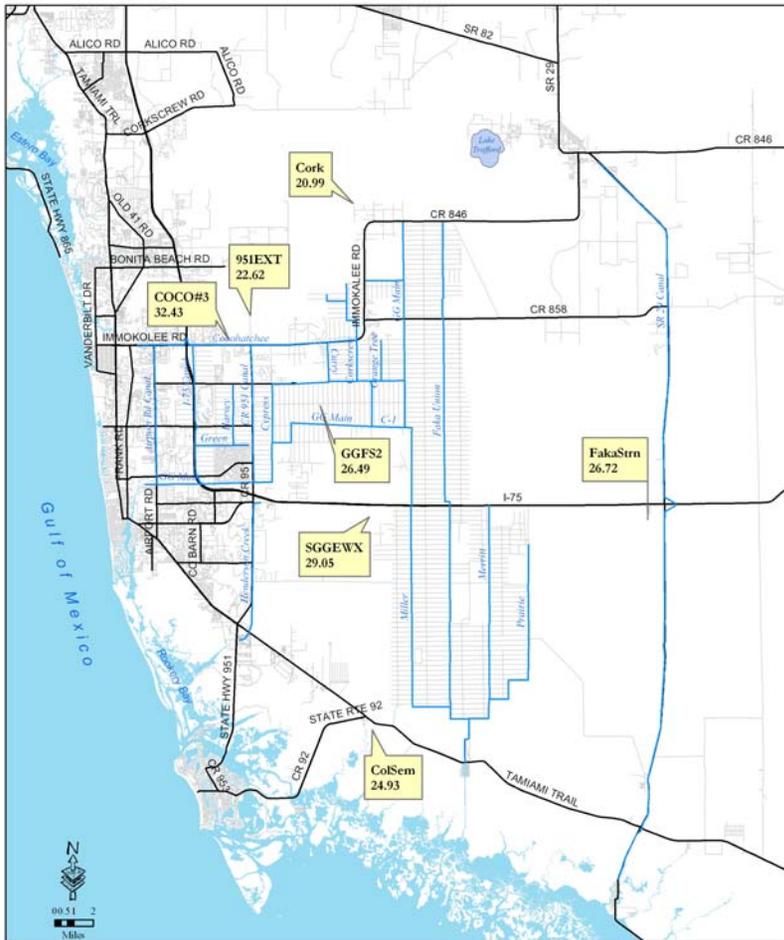


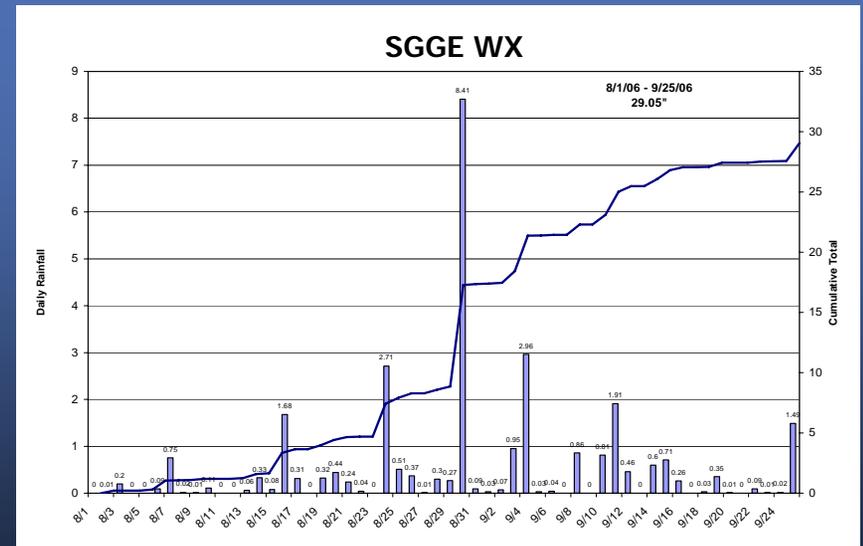
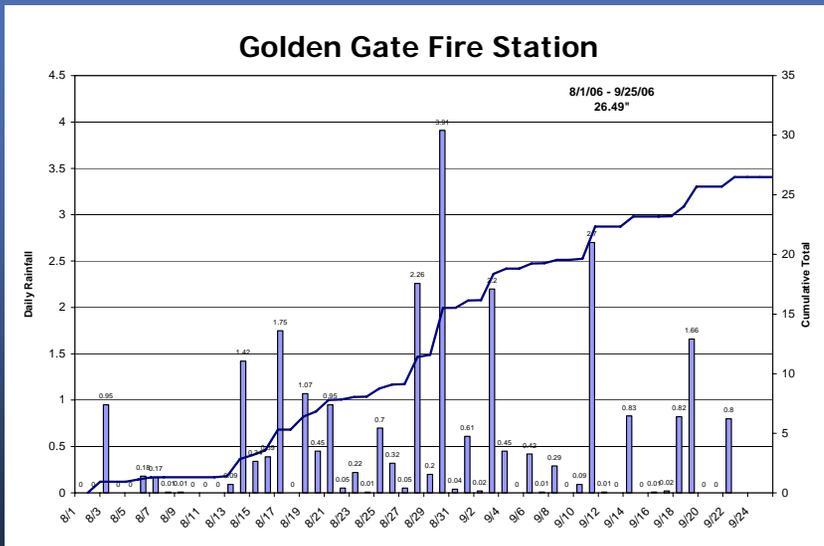
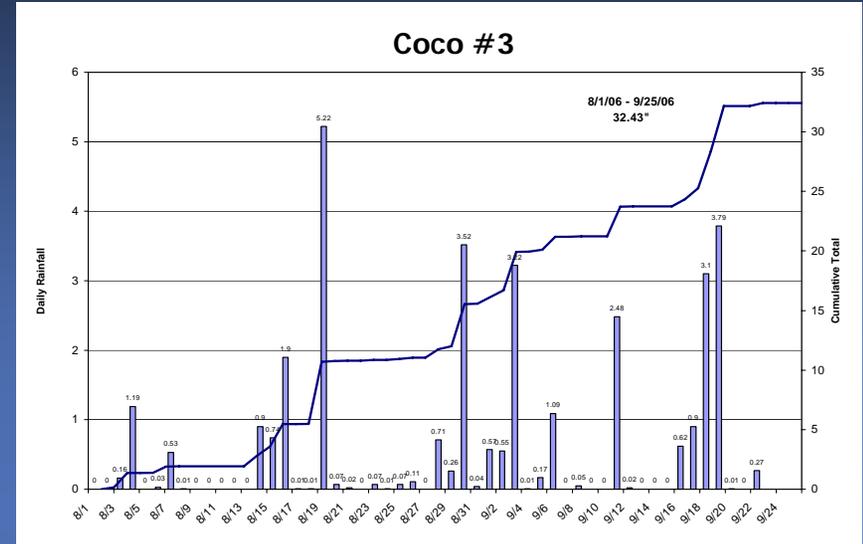
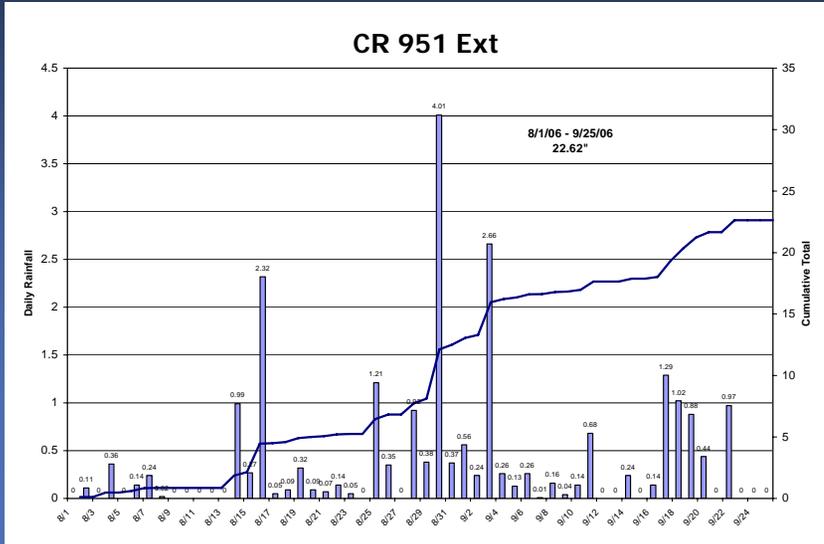
Figure 1. Rainfall Station Locations

## Rainfall Summary (inches) at Selected Rainfall Monitoring Stations

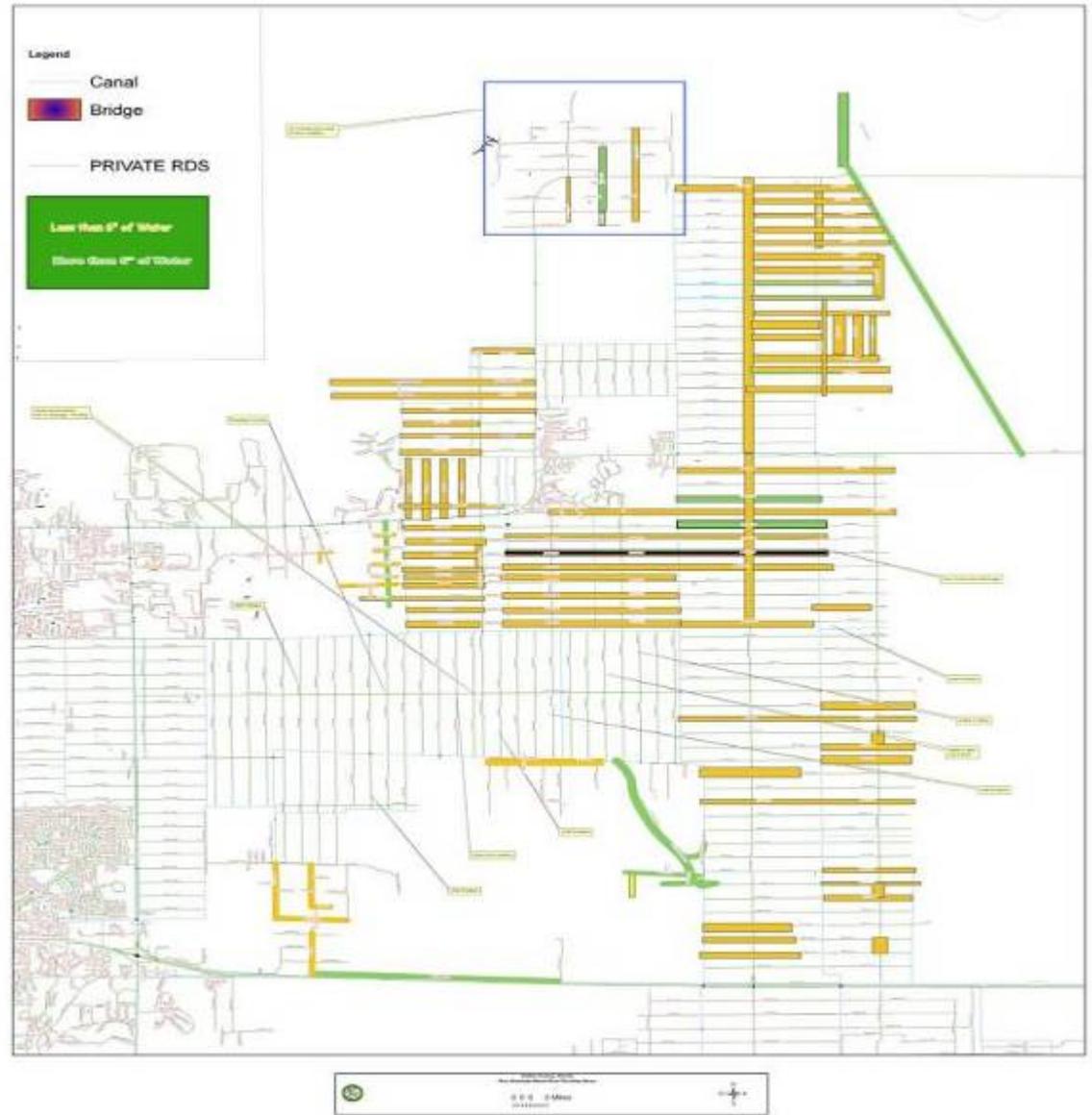
<u>Station</u>	<u>8/1-9/25</u>	<u>8/29-9/4</u>	<u>8/30</u>
CR 951 Ext	22.62	8.48	4.01
Coco #3	32.43	8.17	3.52
Golden Gate Fire Station #2	26.49	7.43	3.94
SGGE WX (52 <sup>nd</sup> Ave SE)	29.05	12.79	8.41
Corkscrew	20.99		
Fakahatchee N	26.72		
Col Seminole Park	24.93		

# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

## Daily and Cumulative Rainfall Totals at Selected Monitoring Stations for August & September 2006



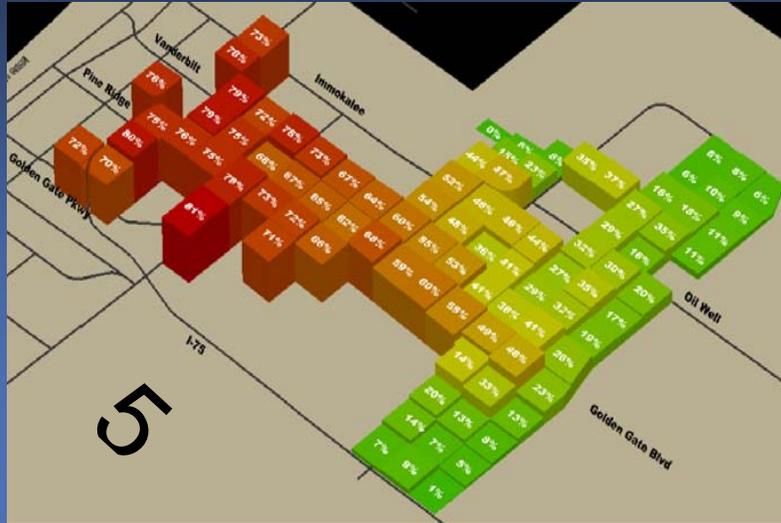
**Areas of  
localized and  
roadway  
flooding in  
western Collier  
County**



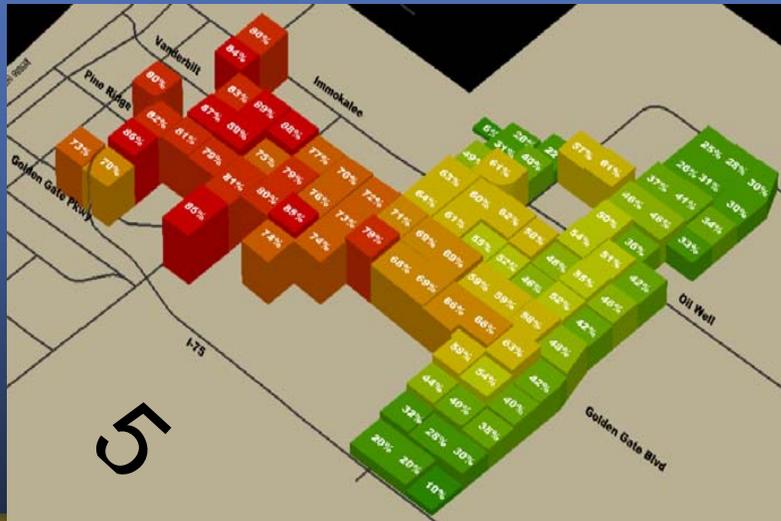
## Post ERNESTO

# Observations, Issues and Recommendations

### Development Percentages 2003



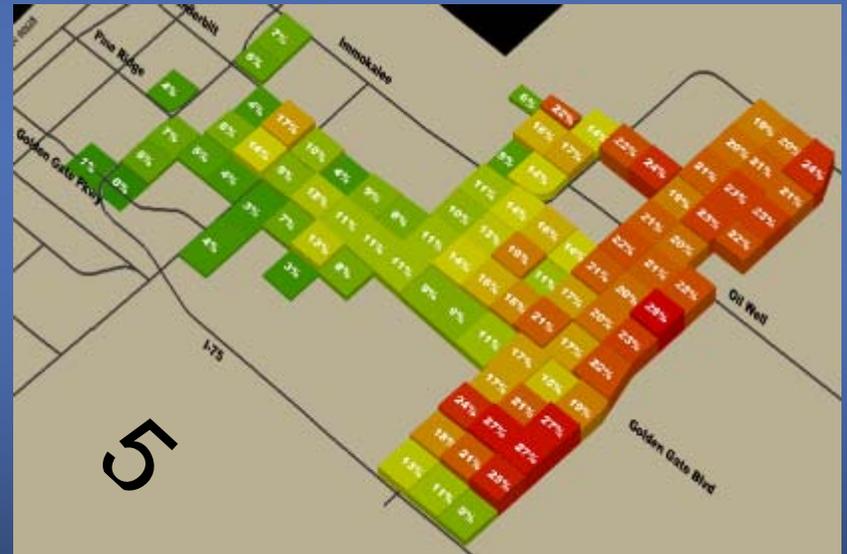
### Development Percentages 2005



## Issues: Eastward HO

## NGGE Single-Family Residences

### Development Percentages Increase



## Recommended Measures

### Comprehensive Watershed Management Plan:

- **Develop Watershed Management Plan (WMP) incorporating the BCB's western Collier WMP to include Secondary and Tertiary Systems**
- **Prioritize NGGE basin as the first WMP effort**
- **Objectives to include, but not limited to:**
  - **Improvement of conveyance in both the secondary and tertiary systems**
  - **Mitigate cumulative impacts of fill and impervious surfaces created by construction of not only Single-Family Residences, but also commercial property development and infrastructure within the watershed**
  - **Stem wall / piling constructed homes**
  - **On-site retention based on amount of fill and impervious surfaces**
  - **Neighborhood-based retention sites**
  - **Grade swales to convey flows**
  - **Properly place tertiary culverts – flow lines, inverts, size – maximize and equalize flows**
  - **Install cross culverts in restricted areas**
  - **Vegetate swales to reduce sedimentation**
  - **MSTU / stormwater utility fee**



## Issues: Planned Unit and Private Development Areas

### Issue Areas

- Twin Eagles
- Waterways
- Rock Road / Old Florida Golf Course
- Acre-maker Road / Crystal Lakes
- Massey Road
- Corkscrew Canal Area
- Frangipani Avenue Area

### Recommendations

- Examination of the removal of parts of Twin Eagles north berm and subsequent downstream effects
- Examination of water levels in proposed development areas
- Explain the importance of system maintenance and responsibilities to HOAs
- Assess the feasibility of MSTU for Rock Road area
- Explorer Acre-maker Rd relief using pump through Crystal Lakes development to CR 951 Canal
- Assess removal or properly size Cocohatchee culverts under the access road between Quarry and Bonita Bay East Golf Course.
- Place sand bags/sluice gates at wildlife crossing to prevent peak flows from flowing south
- Examine Massey Road drainage ditch

## Issues: Roads and Road Construction

### Issue Areas

- Immokalee Road
- Rock Road
- Randall Boulevard area
- Everglades Boulevard

### Solutions

- Install culverts to equalize flow levels and move water toward a pump station used for emergency purposes only
- Incorporate high elevations in road designs to prevent sections of road from becoming submerged
- Incorporate Action Plans and responses to potential storm events into road construction permits/plans

Partially Blocked Culvert Under Immokalee Road



## Issues: Water Control Structure Upgrades & Operation

### Structures

- Golden Gate Weirs #2, #3, #6, #7
- Miller Weir #1
- Faka Union Weir #2
- County secondary structures

### Recommendations

- Improvements to Golden Gate Weir #2 to provide additional of conveyance during storm events
- Relocate and upgrade of Golden Gate #3 for a diversion to Henderson Cr, restore historic flows
- Diversion of approx. 400 cfs to historic North Belle Meade watershed
- Retrofit of Golden Gate Canal Weir# 6 and #7
- Stormwater ASR wells with GG Canal flows
- Modification of steel gate supports on Miller Canal Weir #1 and Faka Union Canal Weir #2 structures
- Monitor wet season GW levels and adjust gate operation for unanticipated major storm events.
- Evaluate the efficiency of the secondary system of structures and implement modifications per WMPs
- Assure protection of natural resources, including the receiving bays, based on permit requirements

Golden Gate Weir #5 Submerged



## Issues: Vegetation Management

### Problem Plants

- Floating Hearts (*Nymphoides peltata*)
- Hydrilla (*Hydrilla verticillata*)
- Torpedo Grass (*Panicum repens*)
- East Indian hygrophila (*Hygrophila polysperma*)
- Other nuisance grasses

### Recommendations

- Hyacinth barriers used to force floating vegetation to the sides of the canal where it could then be mechanically removed and disposed
- Use the 'T-Bar' attachment for the Aquamogs to mechanically harvest high density weeds or problem areas
- Utilize a Tow Boat in the larger canals to drag vegetation up from the bottom of the canal, pushed downstream to a collection point and mechanically removed from the canal and disposed



## Issues: Gross Pollutants

### Issues

- Accumulate at water control structures and other permitted structures, such as docks, bridges and culverts, severely impeding flows
- Cause boating hazards in navigational waterways
- Have effect on public recreational areas, including swimming areas
- Damage environmental resources, such as seagrass beds and mangrove shorelines
- Impact ambient wildlife
- Create aesthetic impacts for residents and visitors

### Recommendations

- BCB and County staff to do a better job of trash removal in respective systems
- Contractors required to remove trash
- Add debris collectors to ends of swales in tertiary system
- Require debris grates at the ends of each driveway culvert
- Develop measures to address construction debris
- Work with non-governmental groups, like Keep Collier Beautiful, to support existing, underfunded 'clean-up' programs



## Public Education and Outreach

- **Convey system limitations to public**
- **Provide Technical Assistance property owners to improve and maintain their stormwater conveyance system**
- **Conduct public education programs like ‘Know the Flow’ in conjunction with County**
- **Manage an Interagency Phone Bank during the wet season to provide accurate information for public inquiries**
- **Continue work with Keep Collier Beautiful and Collier County’s Stormwater Department to promote the Adopt-A-Canal Program**
- **Actively participate in Keep Collier Beautiful ‘Litter Bugs Me’ campaign**

# Challenges:

Balancing Flood Control, Water Supply and the Environment!

