City of Naples
Natural Resources Division

Management ● Science ● Restoration ● Outreach
Altered Watershed

Historic watershed = 10 sq. mi.

Current watershed = 120 sq. mi.

(SFWMD SWIM Plan 2007)
Estuaries need freshwater, but.....
Water Quality

Degraded and impaired for:

- Copper
- Bacteria
- Nutrients

*Transported by stormwater pipes, canals, upland runoff
Aesthetically enhances shoreline
Attracts wildlife
Uptakes nutrients
Can reduce algal growth
Minimizes shoreline erosion
Sources of Nutrients

- Fertilizer runoff
- Pet waste (bacteria)
- Septic tanks
- Soaps & detergents
- Reclaimed water
- Groundwater
- Freshwater inflows
Stormwater Ponds

- 50-70 years old
- 28 lakes (most private)
- Provide fill for houses
- Majority receive some amount of stormwater from the City’s collection system
- Little to no maintenance
- Expensive to dredge
- Monitor discharges
Why have stormwater ponds?

• Required for new developments
• Built to intercept pollutant-laden runoff
• Treat runoff and clean water
• Flood control
• Aesthetics
• More focus on maintaining a “healthy balance” (littoral shelves, plantings, aerators)
Everything is interconnected!
Moorings Bay
Still within the watershed
Pond Interaction with Groundwater

Wet Detention System

GROUND SURFACE

Wet Season Water Table

AVAILABLE CAPACITY

25-Year Storm Elevation

MUCK, DEBRIS & SEDIMENT

Discharge To Receiving Water Body

WET DETENTION LAKE

Groundwater
Educate Residents

- **Purpose of stormwater ponds**
  - Collect stormwater runoff, water quality treatment. More emphasis on a “healthy pond” with plantings, aerators, littoral shelves. You will have algae!

- **Stormwater is the #1 pollutant of our waterways**
  (Florida Department of Environmental Protection)

- **How to foster healthy lakes and ponds**
Highlights of the Naples Fertilizer Ordinance

• Certification decal on lawn and landscape maintenance company’s vehicles

• Buffer zones (10’) around ponds and restrictions of TN and TP application

• For commercial or institutional applicators

• At least one professional certified in Green Industries Best Management Practices must be present at each location
Reclaimed Water Use

City of Naples reuse water nutrient concentrations

TP = 0.76 mg/L
TN = 1.4 mg/L

Example: Assuming 1 inch of irrigation per week on a 1,000 ft² lawn, provides 0.38 lb/yr/1000 ft² of TN

Can reduce fertilizer use
Copper sulfate
Harmful effects of Copper include:

- Toxic to fish and invertebrates
- Mass of dying vegetation results in crash of dissolved oxygen, creates more problems
- Accumulates over time in ponds and drains into our natural waterways
Copper Concentrations
What happens on the uplands effects the health of our waterways, the habitats within them, and the flora and fauna that depend on good water quality.
Seagrass Beds

"The Rainforest of the Estuary"
Mangroves

- Base of Food Chain
- Nursery and Breeding Grounds
- Dissipate Wave Energy/Erosion
- Filter Out Pollution
City Initiatives

Promote healthy lakes and retain as much stormwater as possible on uplands
Initial cost: Mat+plants $1,950 for 250 ft$^2$ (15’ x 15’),
Maintenance: $500 (250 ft$^2$), $2,100 (600 ft$^2$)
North Lake

Before

After
Before

After
1) Elevations shown herein are relative to the North American Vertical Datum of 1988 (NAVD 88).


3) The Contractor shall construct the following:
   a) Install Poker and Reburst Connectors - Sheet C220
   b) Remove Poker Connectors - Sheet C230
   c) Remove Poker Connectors and Small Organ Mix to Designated Estate Location - shown above
   d) Remove Bike System and Construct Lateral System - shown above and C230
   e) Construct Public Outfall multimeter - Sheet C230
Pre-Restoration
Littoral Plantings
Post Restoration
Pedestrian Pathway
Baffle Box
Trash Collector

Inlet filter basket
Post Restoration
Block stormwater flow from pump station

Current route for stormwater

Reroute flows to the south and east through a filter marsh
Freedom Park--Gordon River Water Quality Park
Build a rain garden

Landscape area using flowering Florida friendly vegetation

Capture stormwater running off roofs, sidewalks, and driveways.
Rain Gardens

- Retain and treat runoff
- Butterfly habitat
- Recharge groundwater
- Aesthetically pleasing
- Native plants
Where can you build a rain garden?

Rain gardens can work almost anywhere.
How do you build a rain garden?
City Rain garden