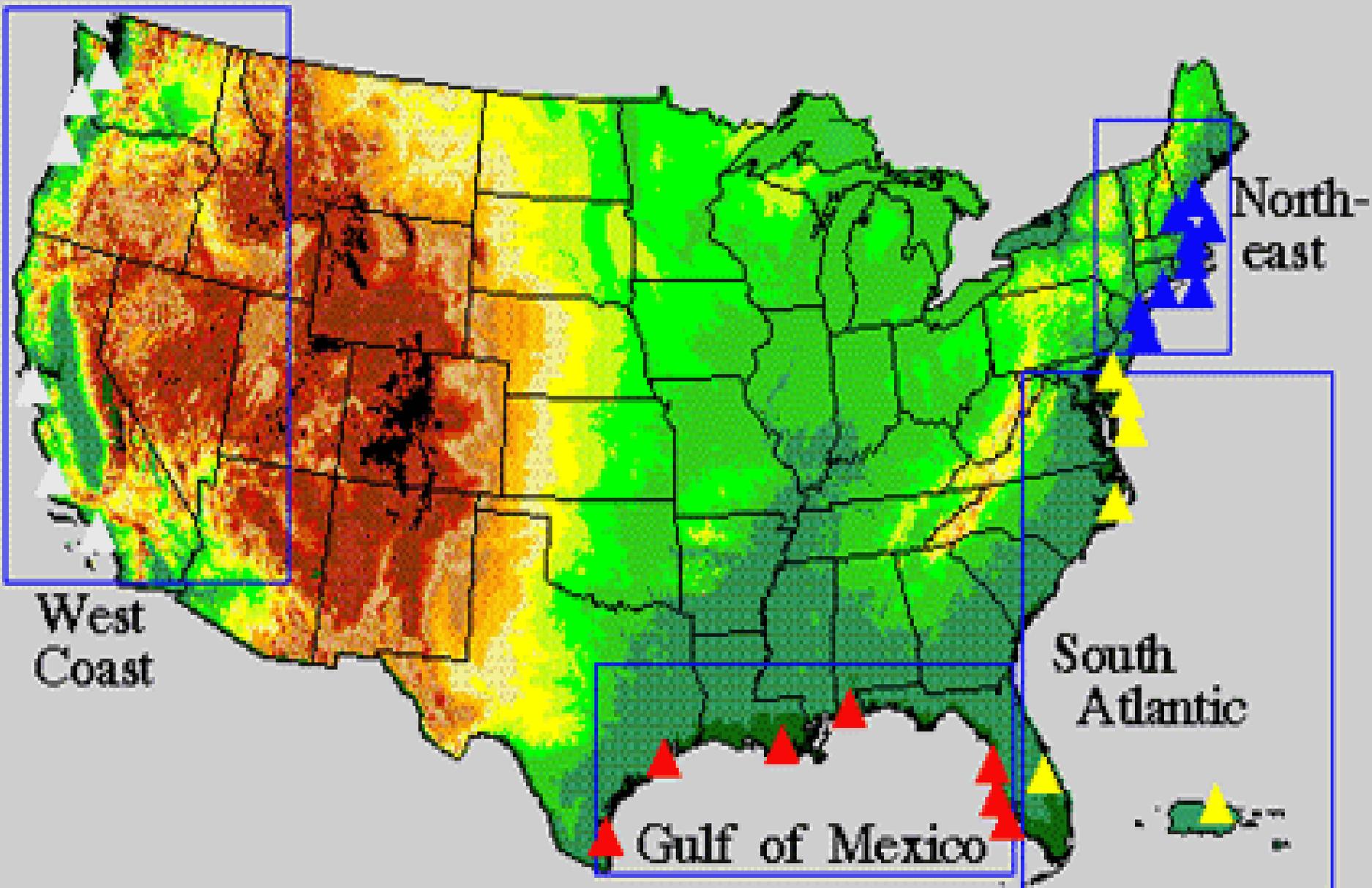


# Coastal Charlotte Harbor Monitoring Network

by Catherine A. Corbett  
Charlotte Harbor National Estuary Program



# National Estuary Programs



# What is the National Estuary Program?

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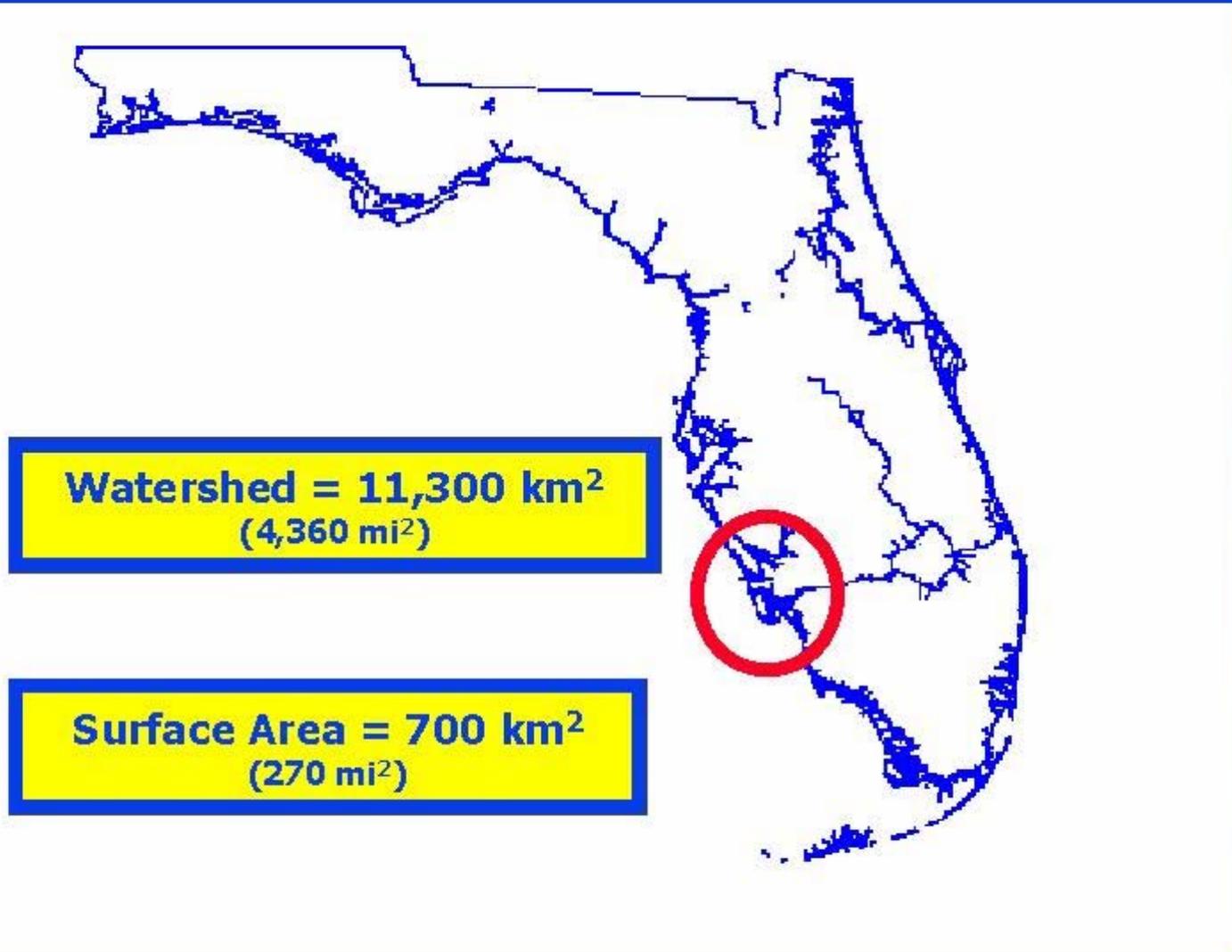
- EPA supported program
- 28 in the United States
- 4 in Florida: Tampa Bay, Sarasota Bay, Indian River Lagoon and Charlotte Harbor
- A unique planning process based on collaborative decision-making and consensus
- A process that encourages stakeholders to participate in the development and implementation of a *Comprehensive Conservation and Management Plan (CCMP)*

# Charlotte Harbor NEP Partners

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- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- NOAA-National Marine Fisheries Service
- U.S. Army Corps of Engineers
- U.S.D.A.-Natural Resources Conservation Service
- Southwest and South Florida Water Management Districts
- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission
- Sarasota, Manatee, Charlotte, Lee, Polk, Hardee and DeSoto Counties
- Southwest and Central Florida Regional Planning Councils and
- Others

# Charlotte Harbor, Florida

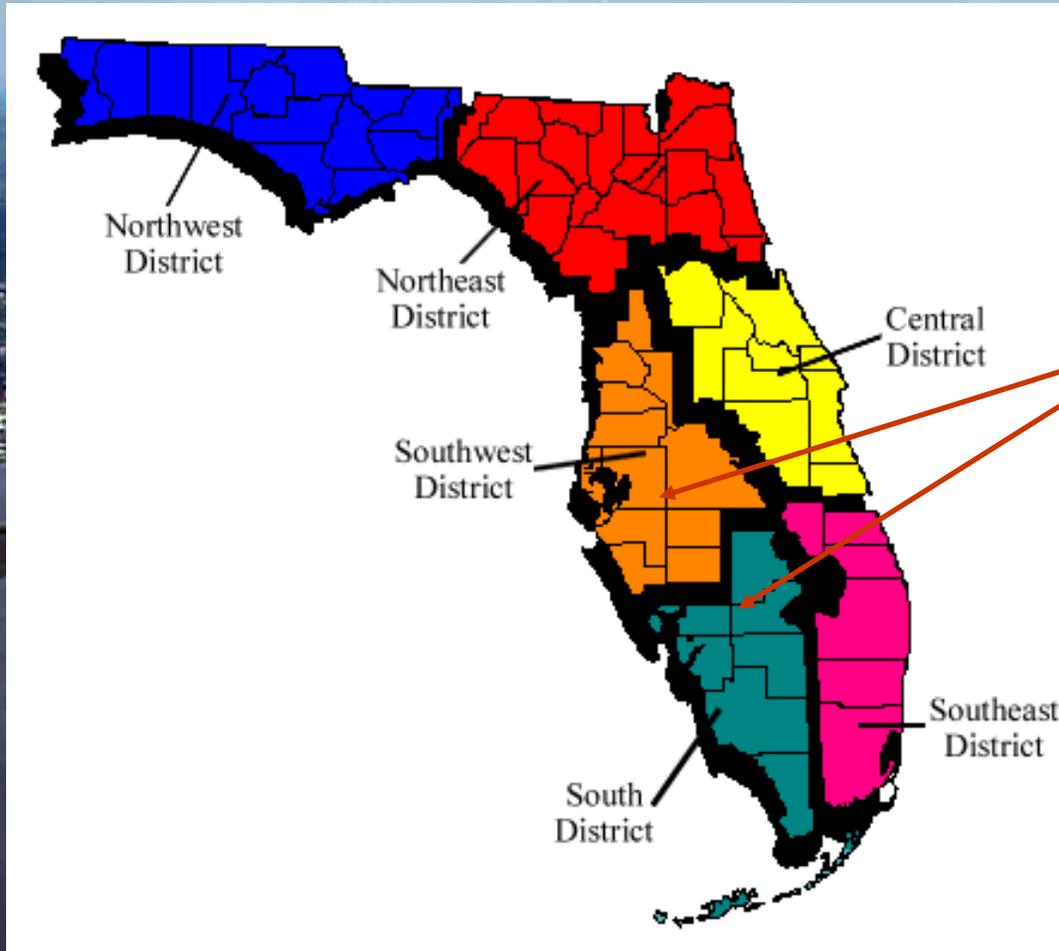


# Charlotte Harbor Watershed

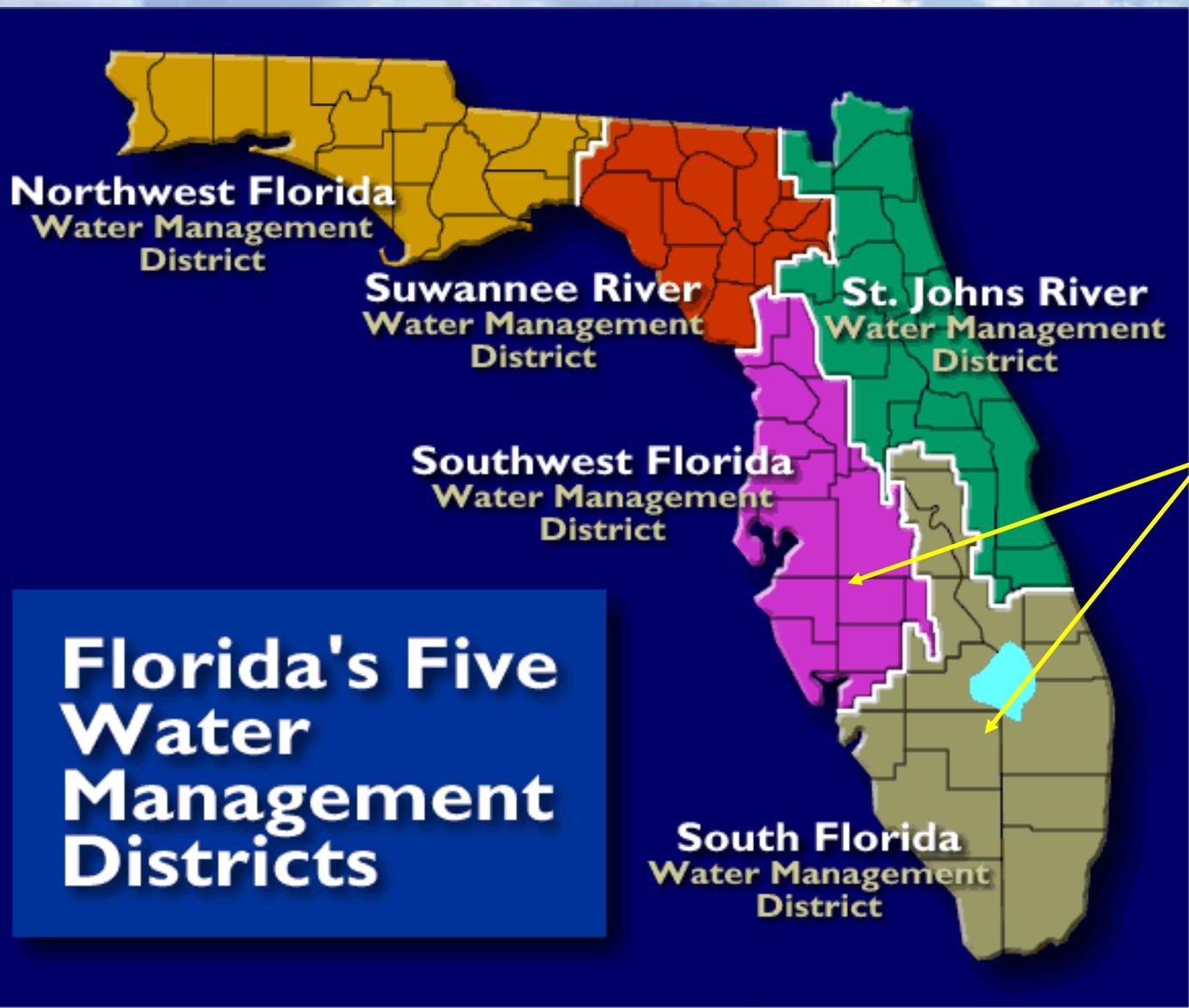


- Eight distinct sub-basins, from Coastal Venice to Estero Bay
- Peace, Myakka & tidal Caloosahatchee rivers
- Covers all or part of 7 counties

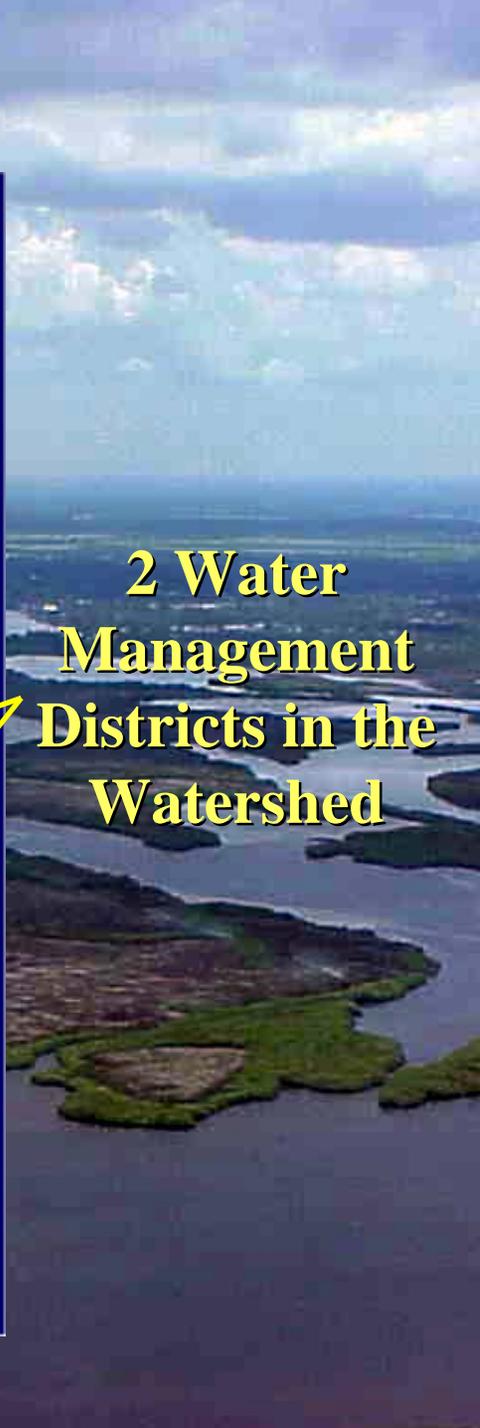
# Florida Department of Environmental Protection



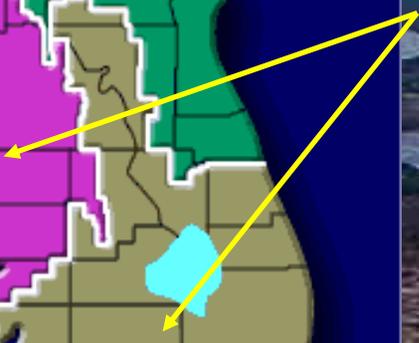
**2 Districts in  
the  
watershed**



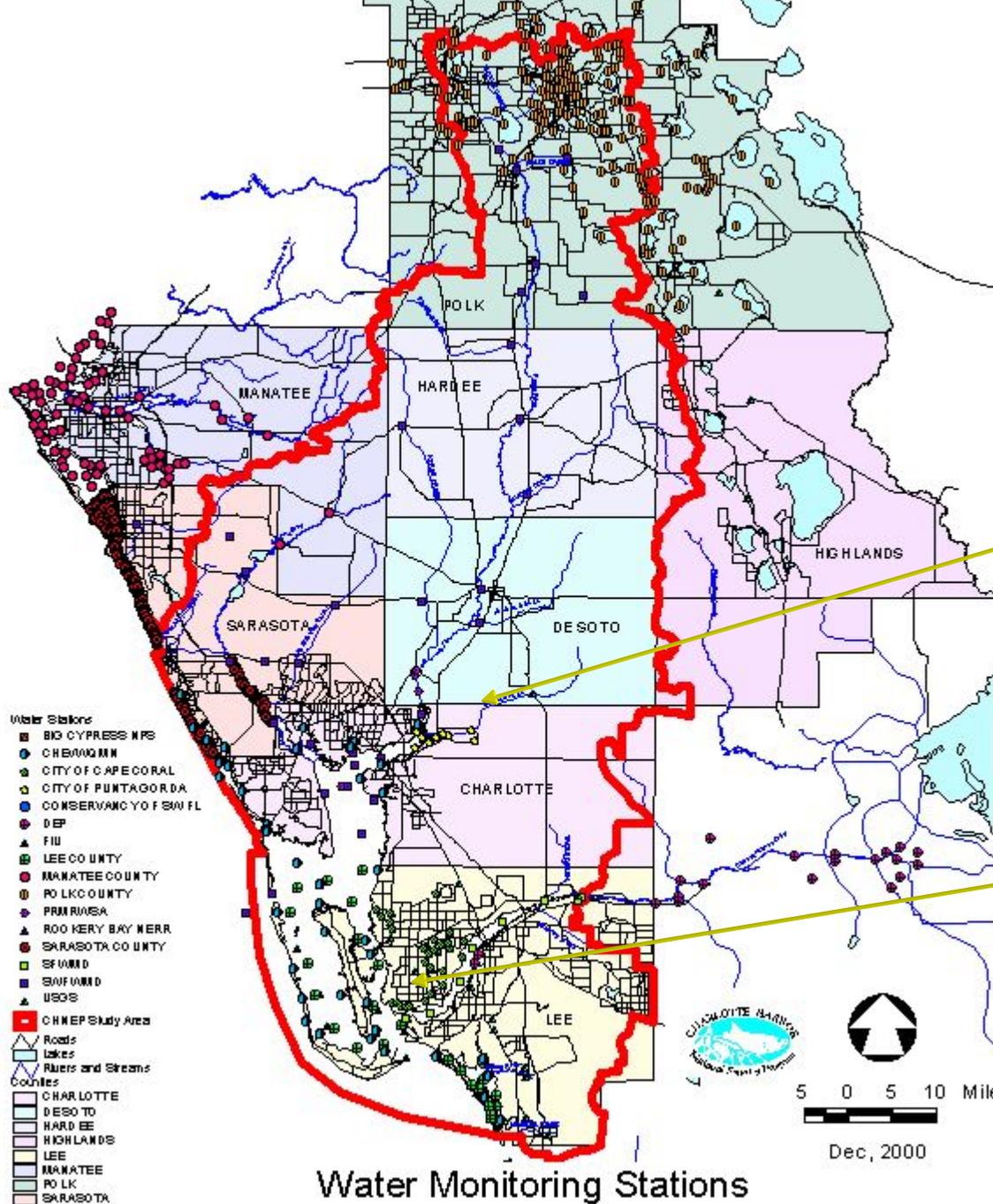
**Florida's Five Water Management Districts**



**2 Water Management Districts in the Watershed**



# Current Surface Water Quality Monitoring Sites



Water Monitoring Stations

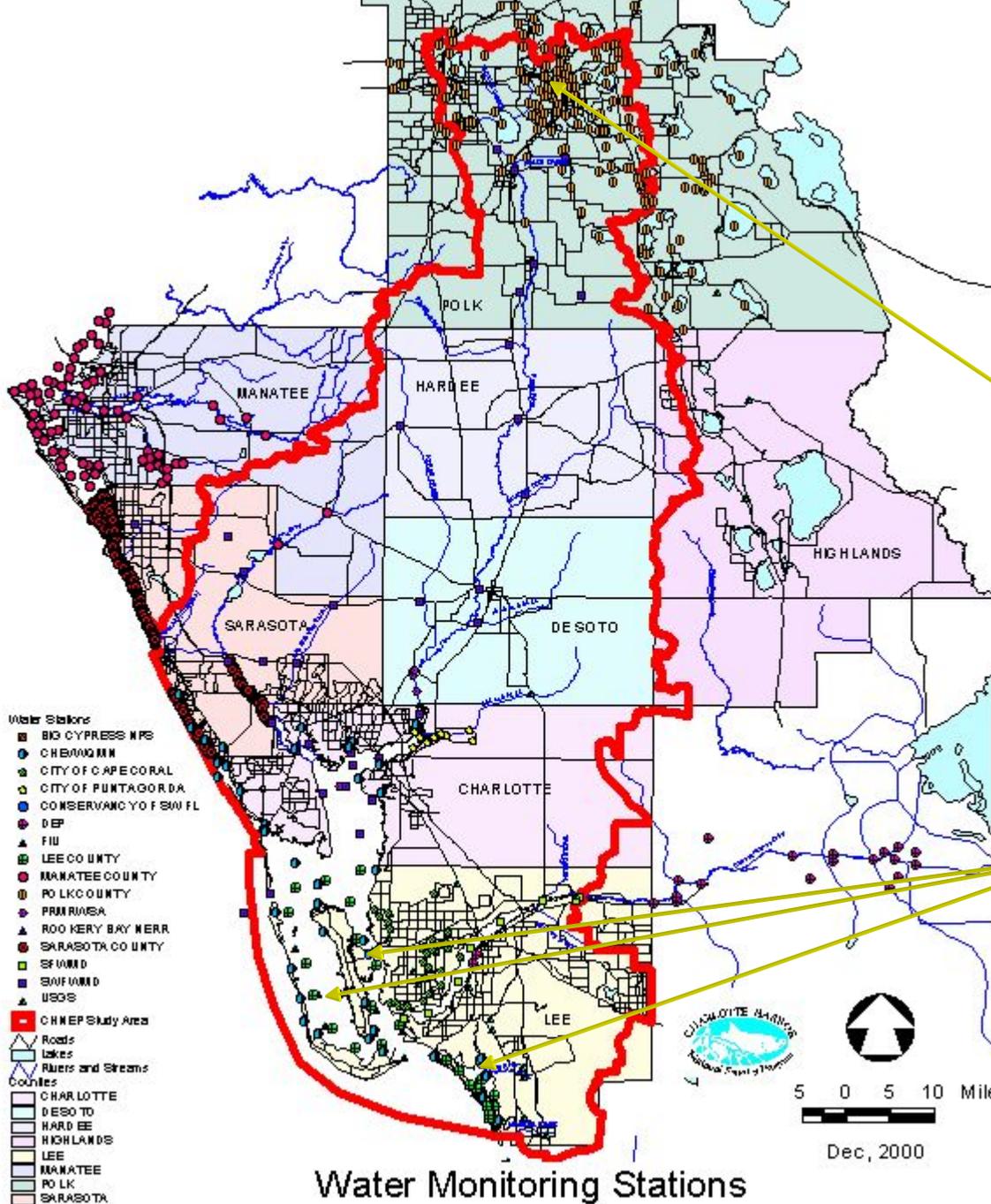
**City of Punta Gorda**

- 9 fixed sites sampled monthly

**City of Cape Coral**

- 33 fixed sites sampled on a monthly basis

# Current Surface Water Quality Monitoring Sites



Polk County

27-33 fixed stations per year in Peace River basin quarterly

Lee County

14 sites monthly in Pine Island Sound and Matlacha; 14 sites monthly in Estero Bay

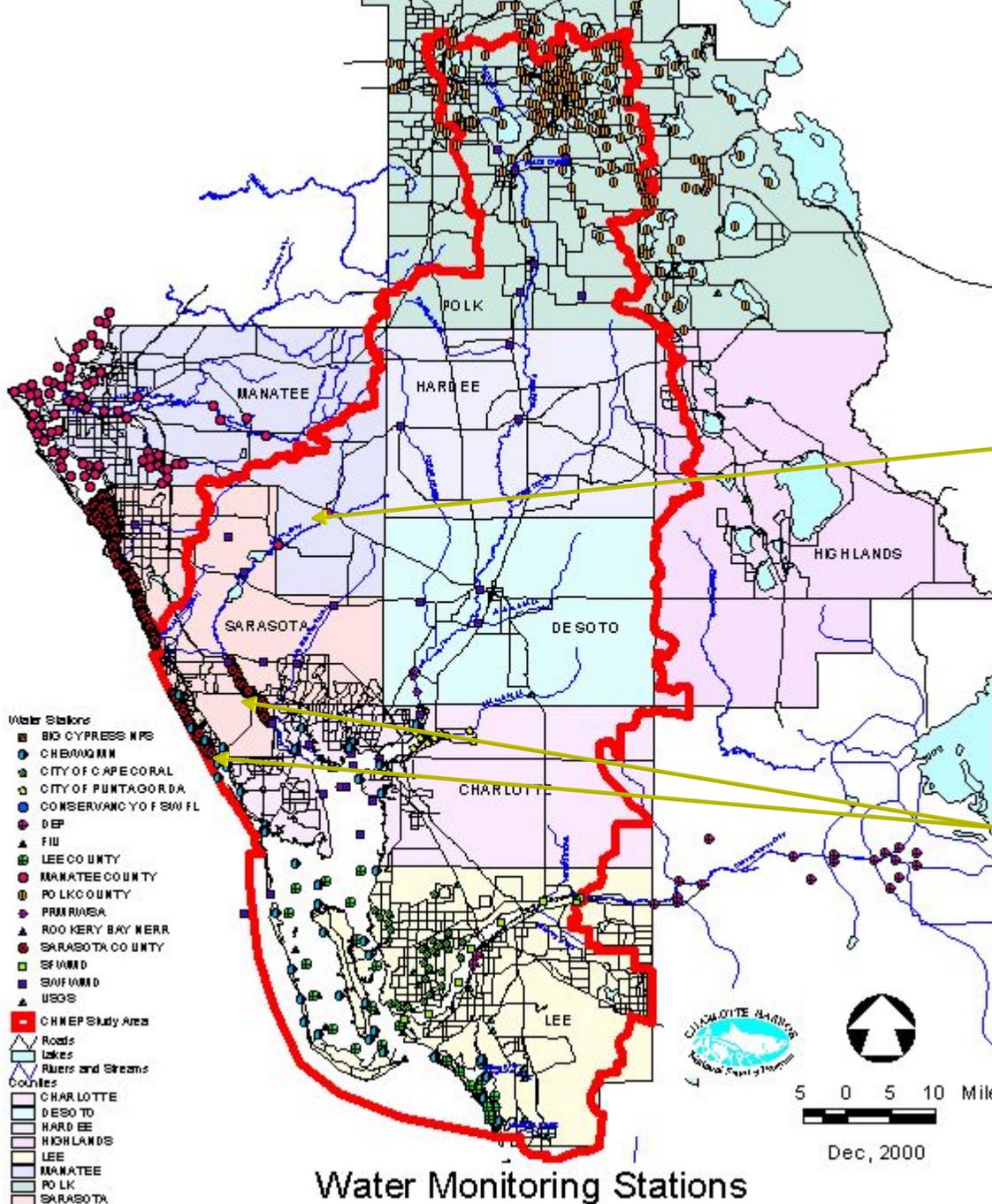
# Current Surface Water Quality Monitoring Sites

## Manatee County

2 fixed sites in upper Myakka River on monthly basis; 9 bi-weekly sites for TMDLs

## Sarasota County

40 sites per month in County, another 40 the next month etc; total of 480 sites per year



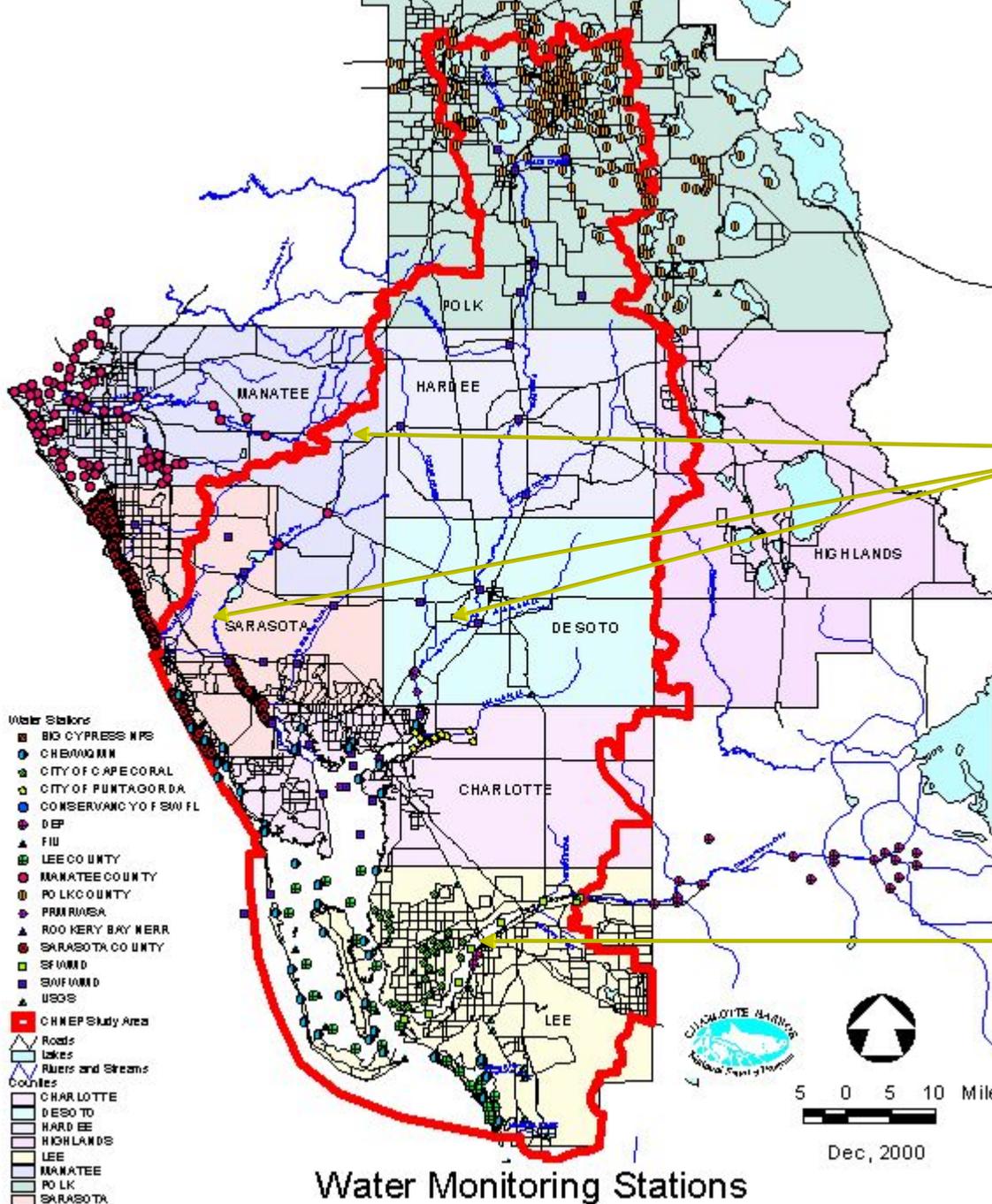
# Current Surface Water Quality Monitoring Sites

## SWFWMD

11 & 5 fixed monthly stations in Peace & Myakka rivers respectively; 16 sites in Flatford Swamp

## SFWMD

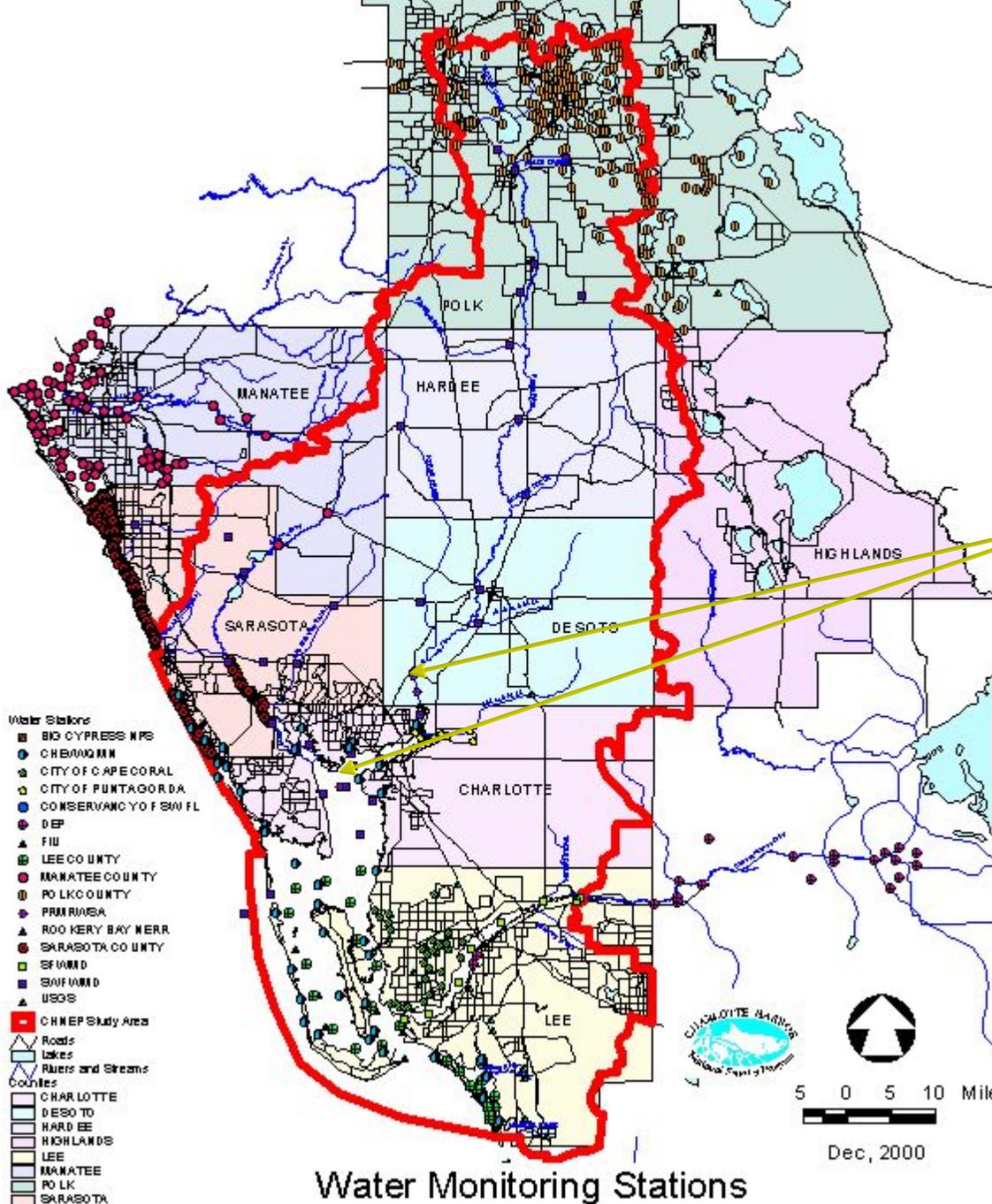
4 fixed stations monthly in tidal Caloosahatchee River



# Current Surface Water Quality Monitoring Sites

## PR/MRWSA

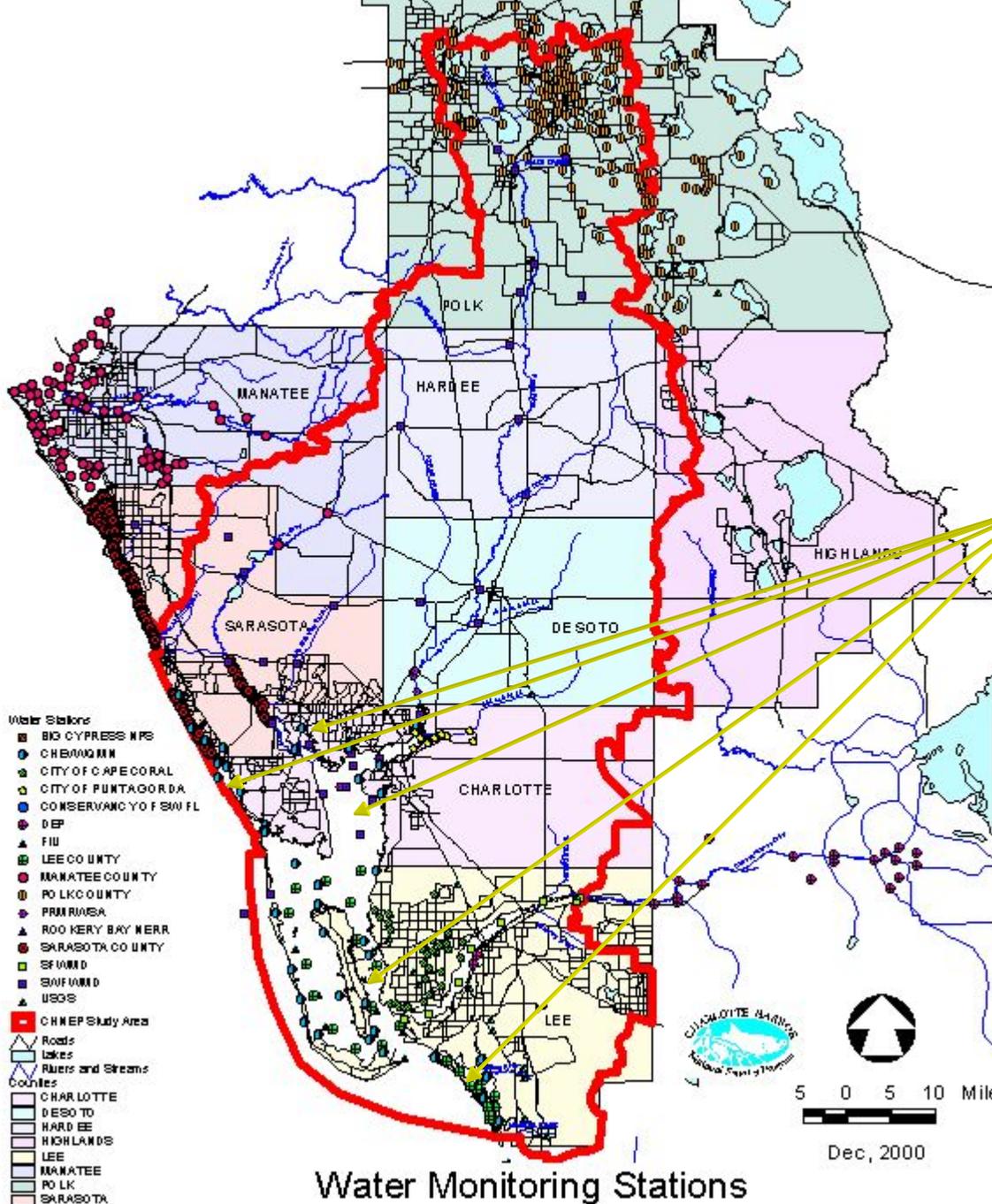
- 3 U.S.G.S. flow gages at 15 minute intervals; 2 collect conductivity
- 4 “moving” salinity-based isohaline stations monthly
- 16 fixed monthly



# Current Surface Water Quality Monitoring Sites

**CHEVWQMN-DEP-  
Aquatic Preserves**

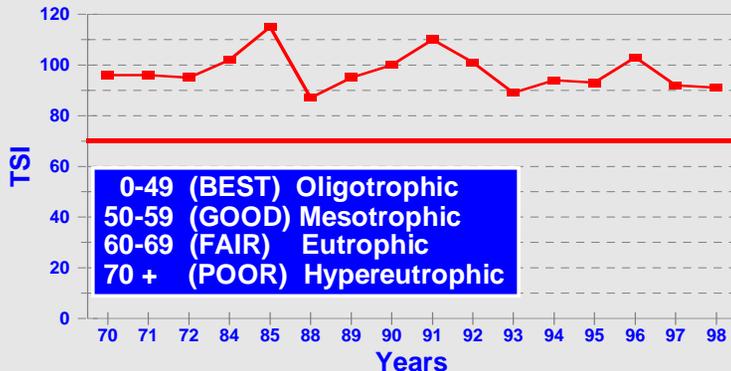
**Volunteers monitor  
about 44 sites from  
Lemon to Estero  
Bays, Charlotte  
Harbor and tidal  
rivers**



# NEP Water Quality Goals

Trophic State Index

## Lake Hancock TSI



SWFWMD

- Identify those waterbodies that do not meet their designated water quality standards and develop a plan during the year 2000 to meet those standards.
- Meet or exceed designated water quality standards throughout basins of the Charlotte Harbor NEP study area by the year 2015 with possible exceptions for natural and/or site-specific conditions.

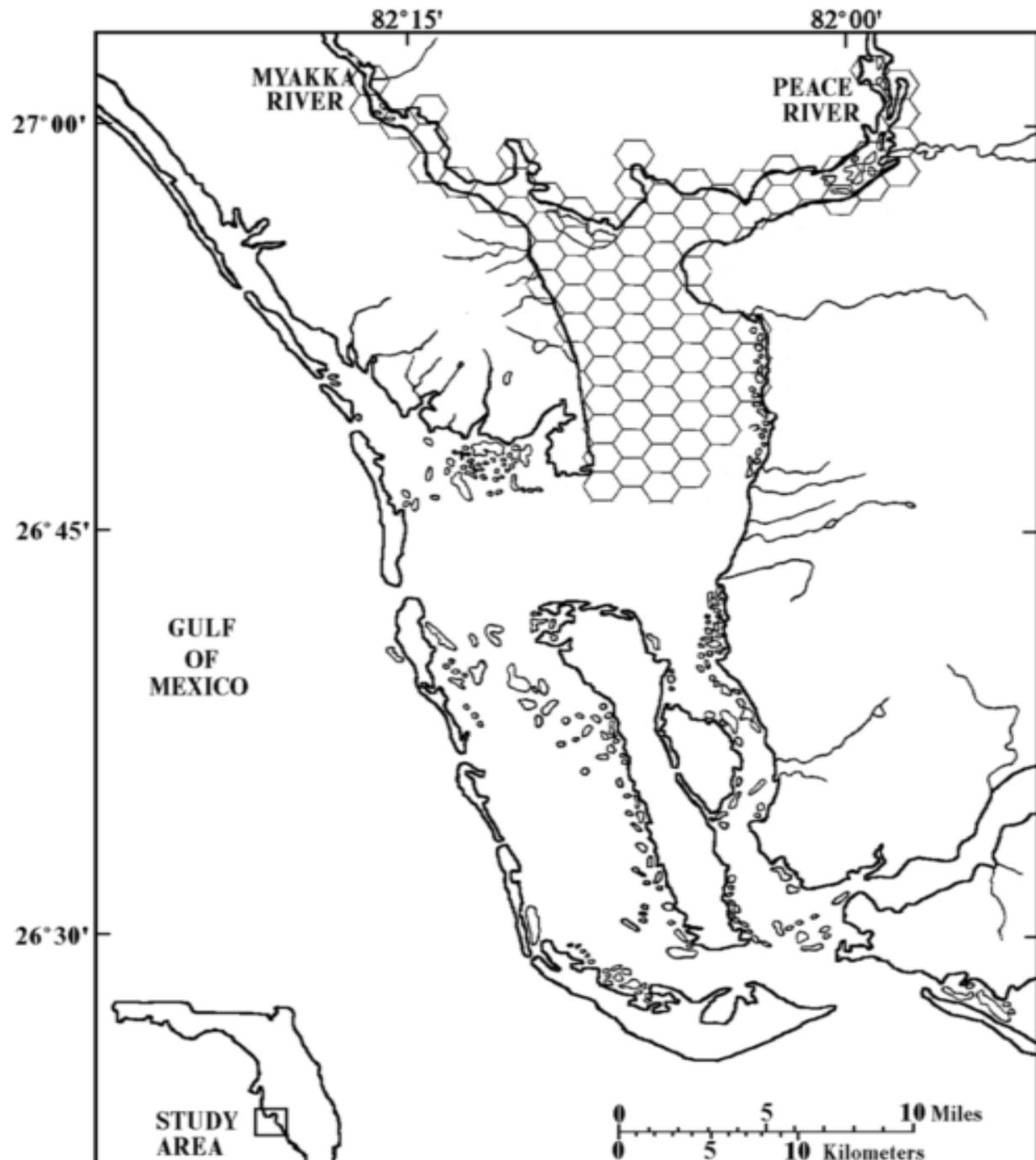
# Charlotte Harbor NEP

## Long Term Monitoring Strategy

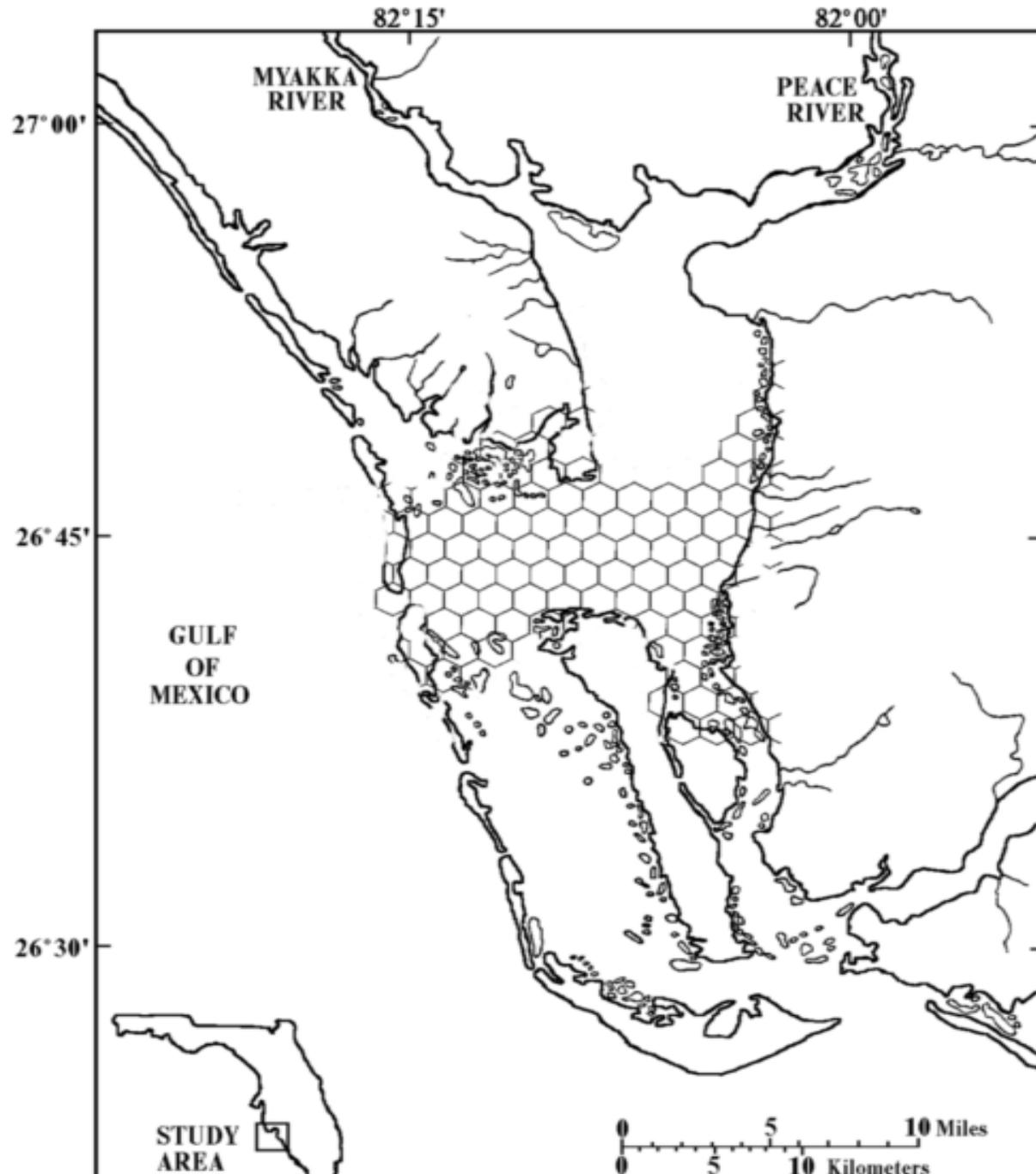
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- Fixed stations in fresh water
- Stratified, random stations for all tidal waters
- Stratified according to estuarine basin = 6 strata
  - Gasparilla-Venice/Lemon Bay
    - Upper Charlotte Harbor
    - Lower Charlotte Harbor
  - Pine Island Sound/San Carlos Bay
  - Tidal Caloosahatchee River and Estero Bay
- 30 hexagons overlaid on each stratum; 1 site *randomly* chosen within each hexagon; equal opportunity to sample all sites within stratum
- 30 sites per season; 2 seasons per year = 60 sites/yr

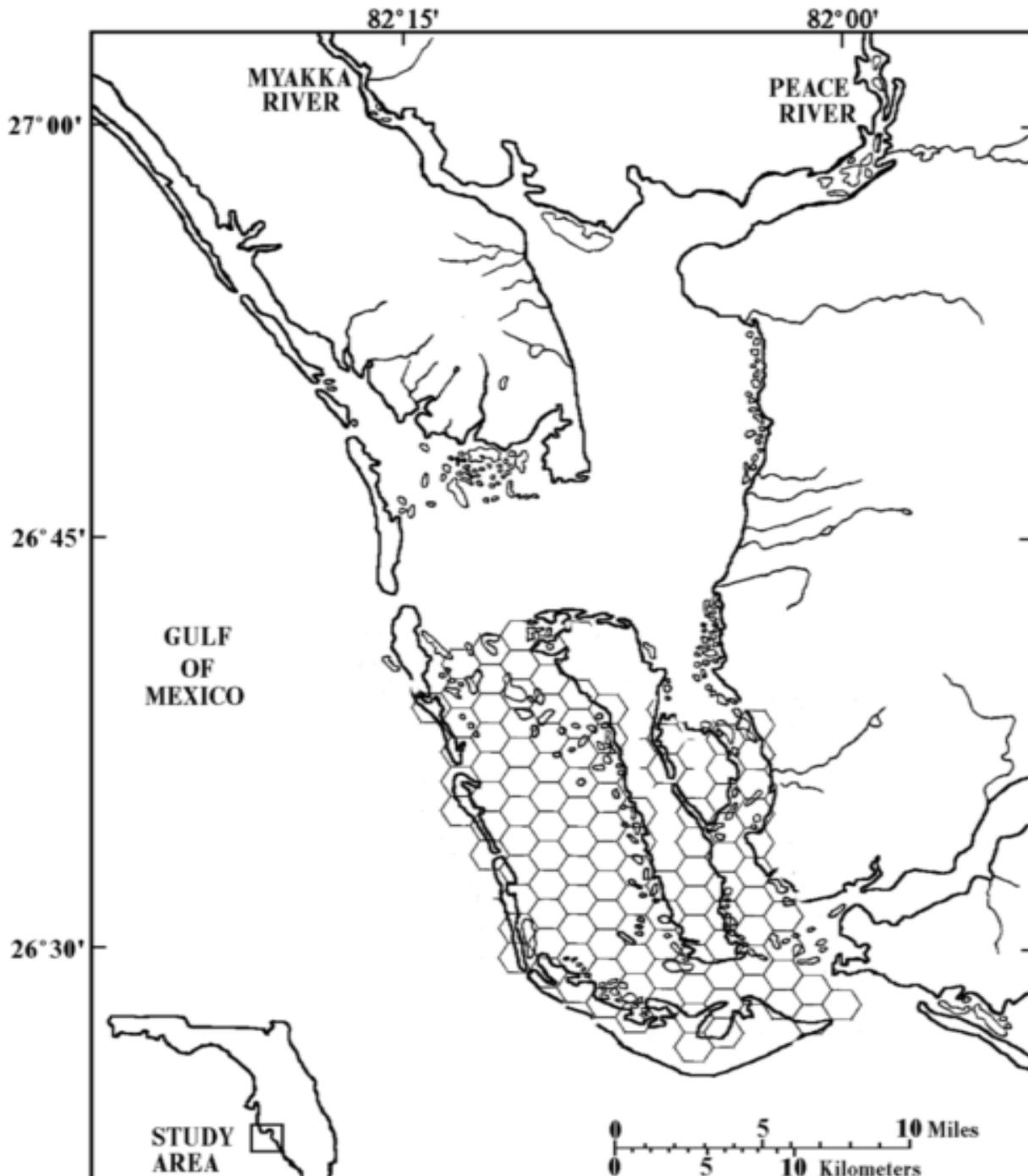
UPPER CHARLOTTE HARBOR STRATUM



# LOWER CHARLOTTE HARBOR STRATUM



PINE I. SOUND - SAN CARLOS BAY STRATUM



# Coastal Charlotte Harbor Monitoring Network



Katie Fuhr & Judy  
Ott of FDEP

# Coastal Charlotte Harbor Monitoring Network

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- SWFWMD, FWC-FMRI, DEP-Aquatic Preserves and Charlotte County—started in April 2001
- Monitor 6 strata monthly:
  - Tidal Peace River
  - Tidal Myakka River
  - West wall of Charlotte Harbor
  - East wall of Charlotte Harbor
  - Cape Haze/Lower Charlotte Harbor proper
    - Lower Lemon Bay
- 5 sites per stratum, randomly chosen—re-randomized each month; equals 30 sites per season and 60 sites per year

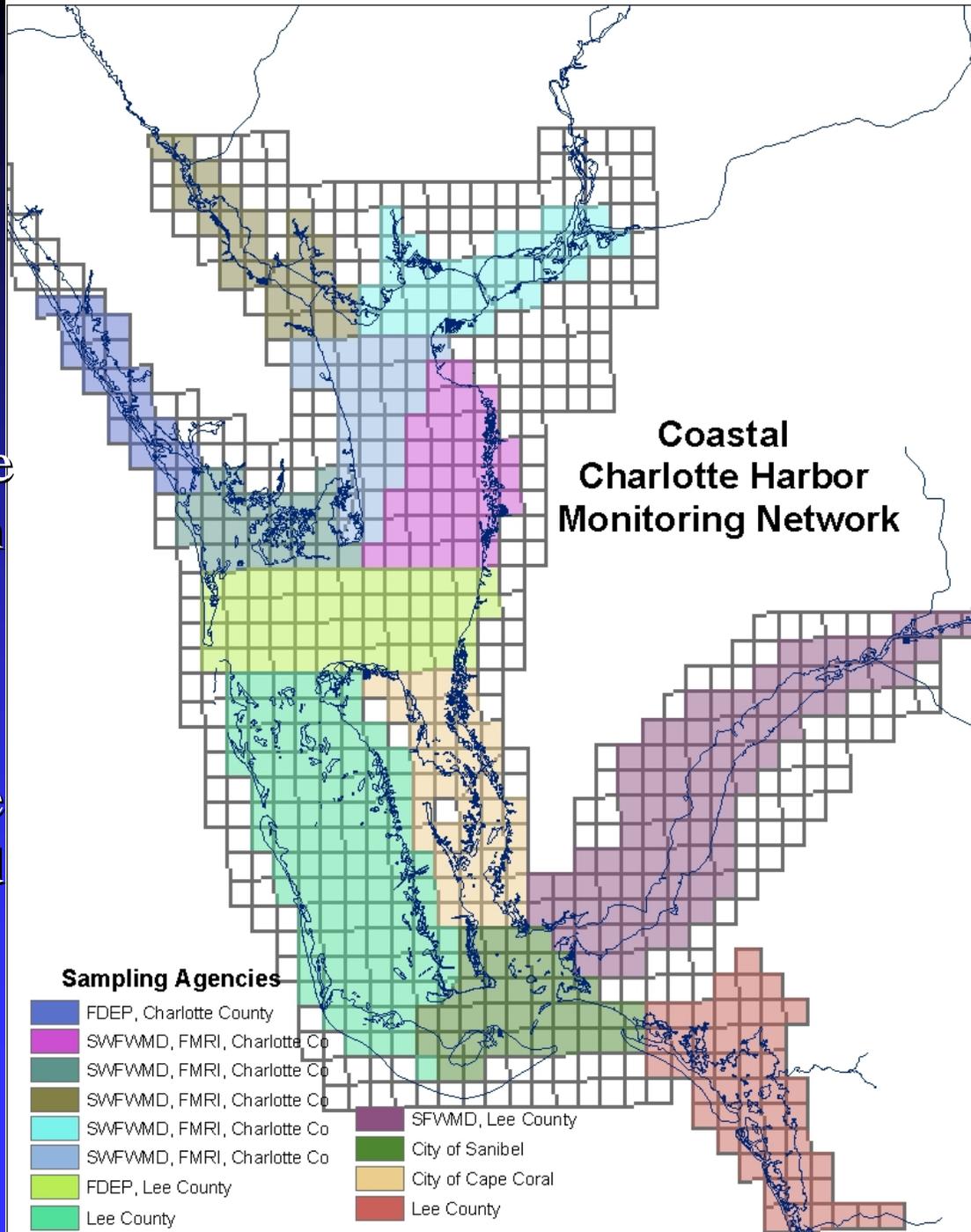
# Coastal Charlotte Harbor Monitoring Network

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- Expansion of this program into 6 more strata:
  - Bokeelia area of Charlotte Harbor,
    - Pine Island Sound,
    - Matlacha Pass,
    - San Carlos Bay,
  - the tidal Caloosahatchee River and
    - Estero Bay
- SFWMD, Lee County, DEP-Aquatic Preserves, and the Cities of Cape Coral and Sanibel
- Started April/May 2002

# Monitoring Network's Square Grid System

- 1<sup>st</sup> choose grid within stratum
- then choose site within grid



- 12 strata
- 5 sites/ month randomly chosen
- 30 sites per season



# Program Design

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- Objective, unbiased results that answer:
  - ◆ Is the water quality changing through time for a specific water body?
  - ◆ Did water quality change as a result of implementing some management practice?
  - ◆ Did water quality change by some specific target level?
- Data will approach normal distribution with  $N=30$ ; therefore can use parametric statistics to determine means between strata, between seasons and between years

# Program Benefits

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- Comprehensive, area-wide program to monitor water quality
- Cooperative, inter-agency effort
- Same sampling protocols used for entire network; help ensure data comparability
- Low number of labs will also help ensure data comparability
- Parametric statistical data analysis to determine means between strata, between seasons and between years

# Problems Encountered

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- **Entering data into STORET**
  - ◆ hired contractor to develop protocols to allow Members to upload their data independently
- **Lab Analysis Comparability**
  - ◆ developed list of laboratory data quality objectives
- **Field Sampling Comparability**
  - ◆ developed Standard Operating Procedures manual and annual field audit

# Acknowledgements

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- David Tomasko, SWFWMD-SWIM
- Rebecca Hensley & Philip Stevens, FWC-FMRI
- Judy Ott & Elizabeth Staugler, DEP-CHASBP
- Charles Walter & Michael Tisch, Charlotte County
- Keith Kibbey, Lee County
- Connie Jarvis, City of Cape Coral
- James Evans, City of Sanibel
- Peter Doering & Dan Crean, SFWMD
- Dan Quick & Joanne Vernon, Charlotte County
- Gerold Morrison & Al Cheatham, Charlotte Harbor Environmental Center
- others

A top-down view of a crocodile swimming in shallow, clear water. The crocodile's body is oriented diagonally from the bottom left towards the top right. The water is a mix of blue and brown, with some ripples and reflections. The crocodile's head is visible in the upper right, and its tail is in the lower left. The texture of its scales is clearly visible.

**Contact: Catherine Corbett**

**Charlotte Harbor National Estuary Program**

**239/995-1777 email: [ccorbett@swfrpc.org](mailto:ccorbett@swfrpc.org)**

**Myakka River Croc**

**By ReAnna Montwheler, FMRI**