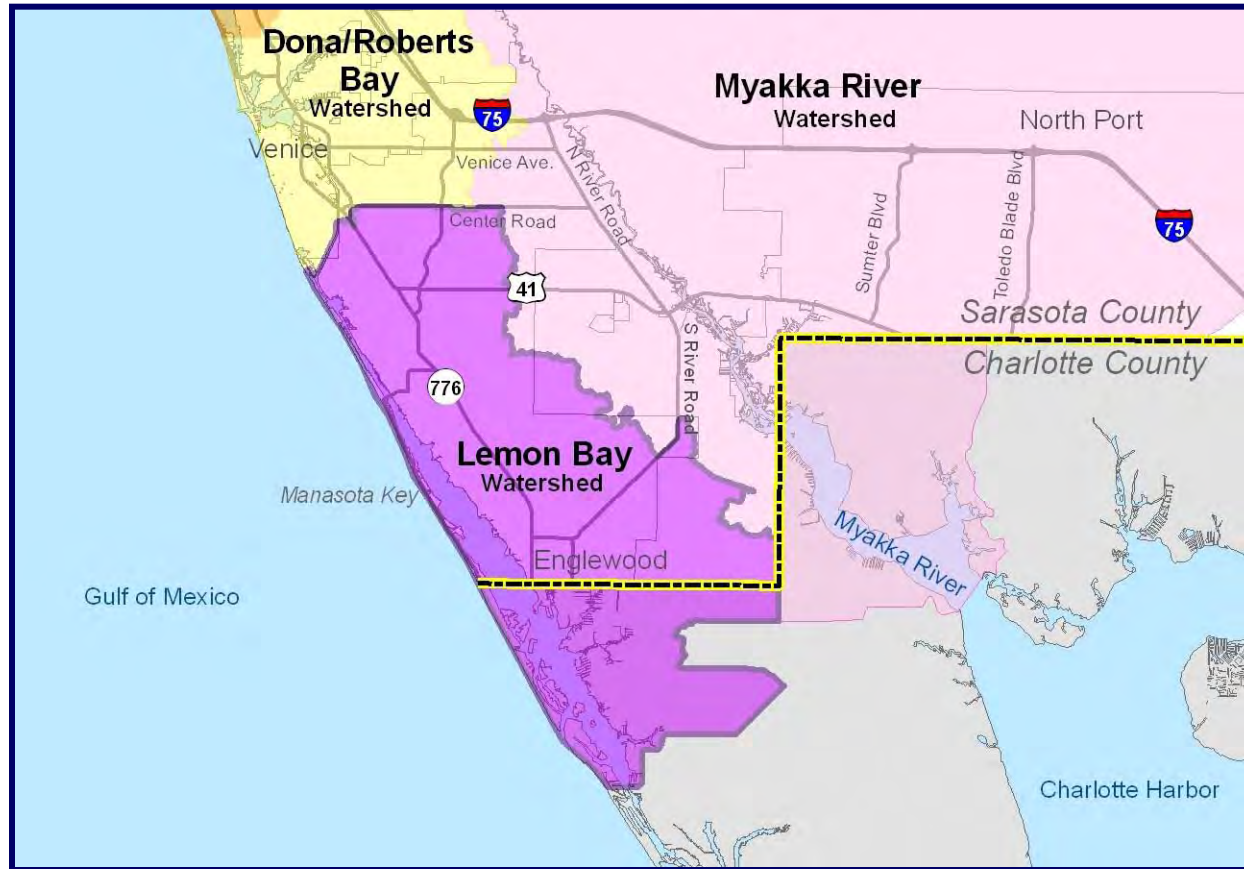


Lemon Bay Watershed Management Plan

Presentation to
CHNEP Science
Forum
July 8, 2009

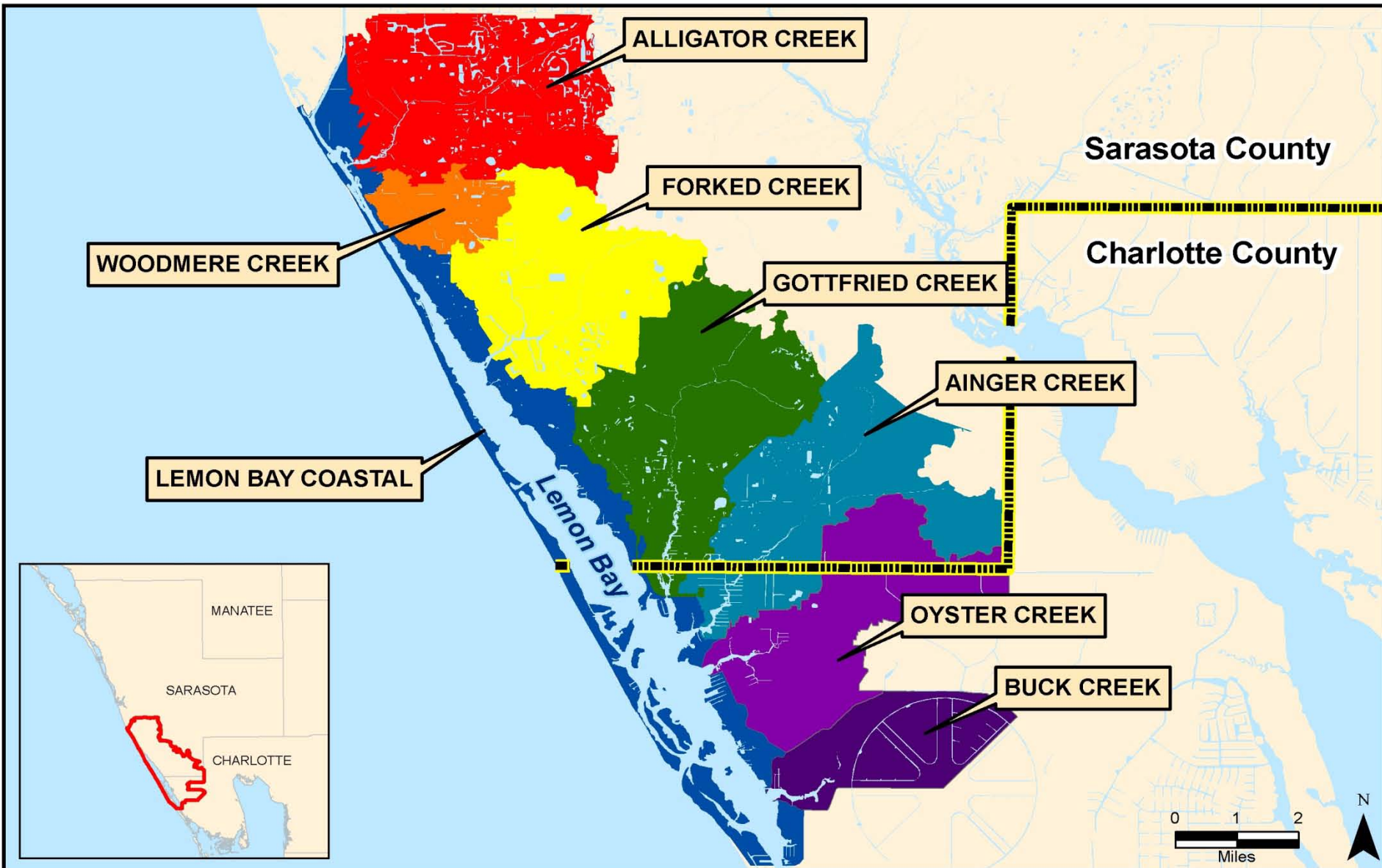


The Lemon Bay Watershed

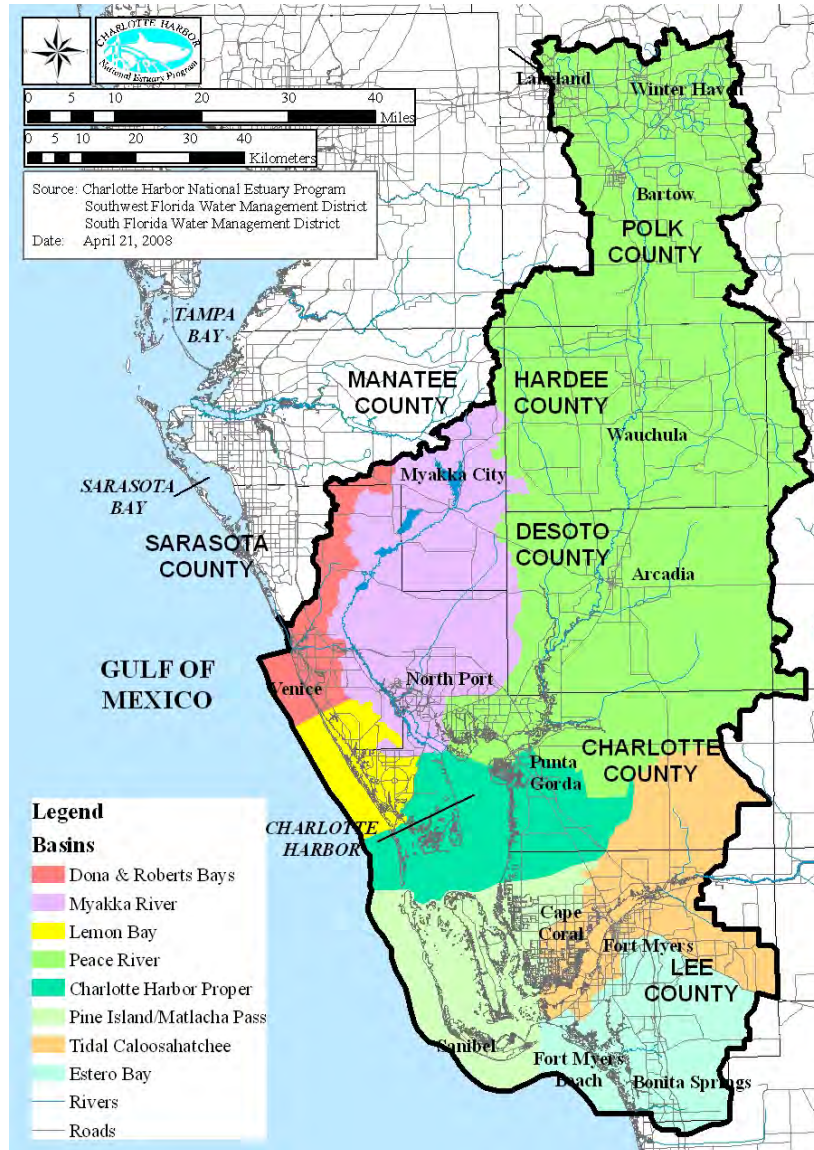


- **74+ square miles**
- **About half is developed**
- **Includes land in two counties (70% SC)**

Lemon Bay Watershed



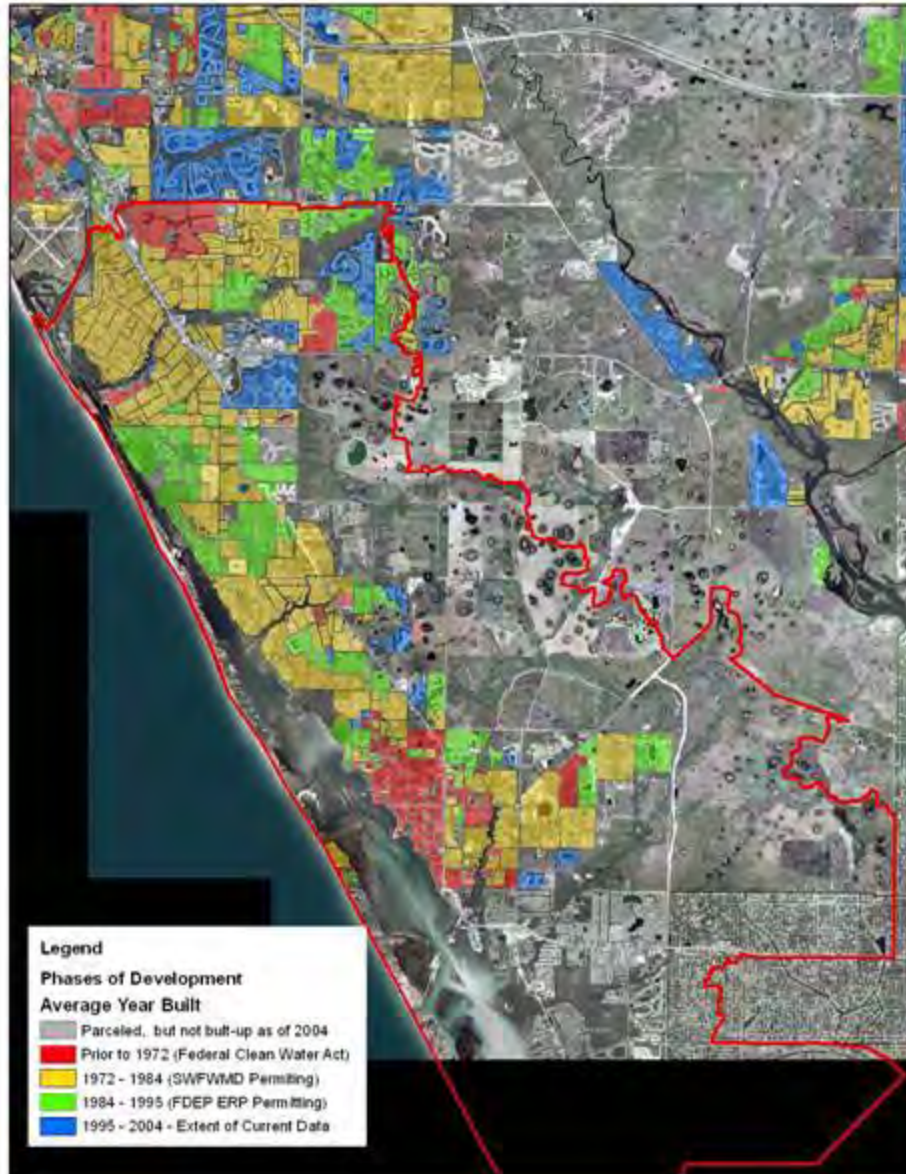
Charlotte Harbor National Estuary Program



SWFWMD Manasota Basin – Lemon Bay & Watershed



Lemon Bay Watershed landscape development timeline



Developed Prior to
1972

Clean Water Act.



- Developed between
1972 and 1984

- Developed After
1984

Statewide ERP
permitting

requirements

Sarasota County

Lemon Bay Watershed Management Plan Focus

Lemon Bay
Interagency Comprehensive Watershed
Management Plan

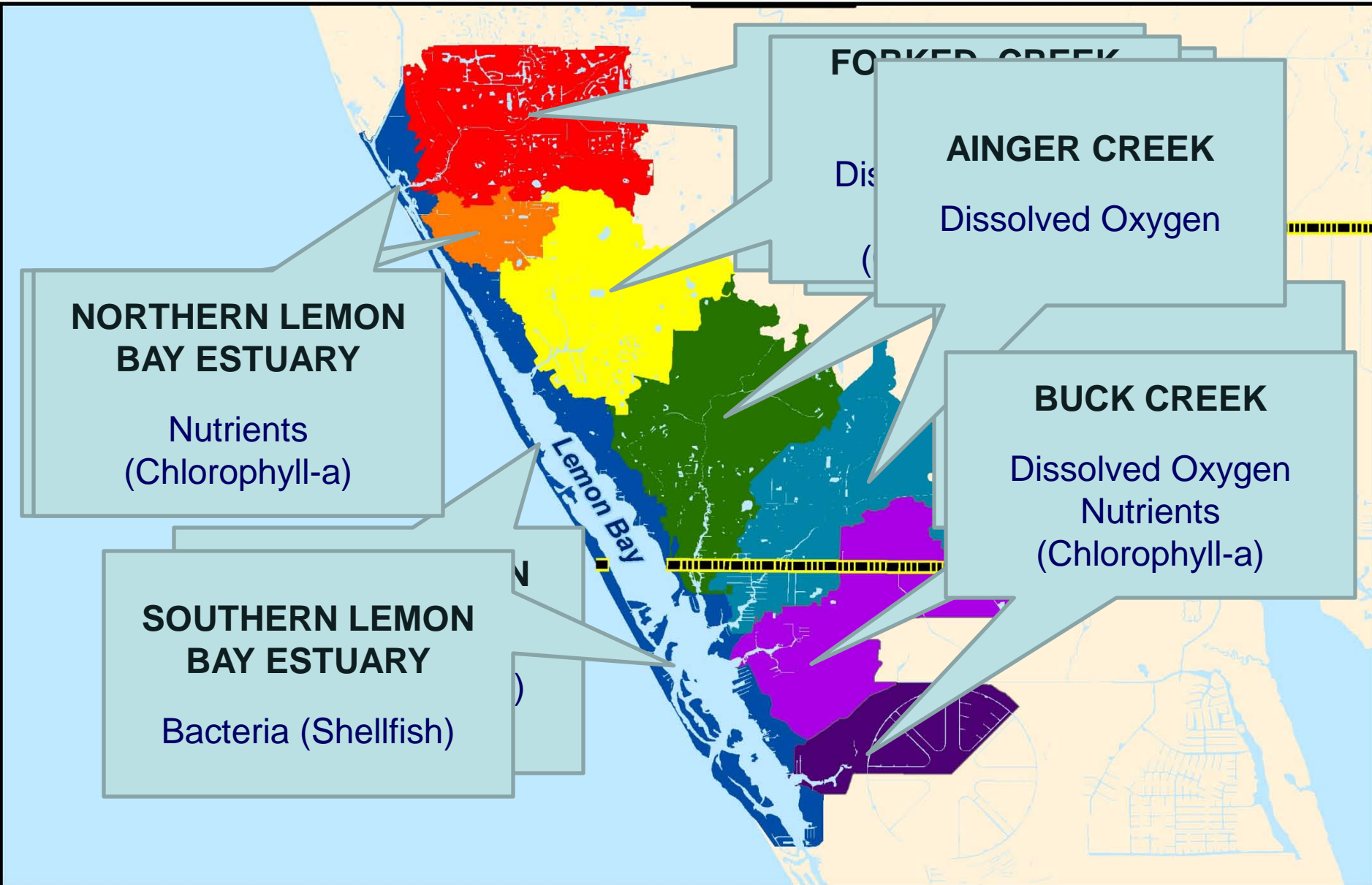


Community Based Watershed Management

2004

- Build upon 2004 Lemon Bay League Interagency Comprehensive Watershed Management Plan
- Formulate plans and actions to address federal and state water quality standards.

TMDL impairments



Identify goals

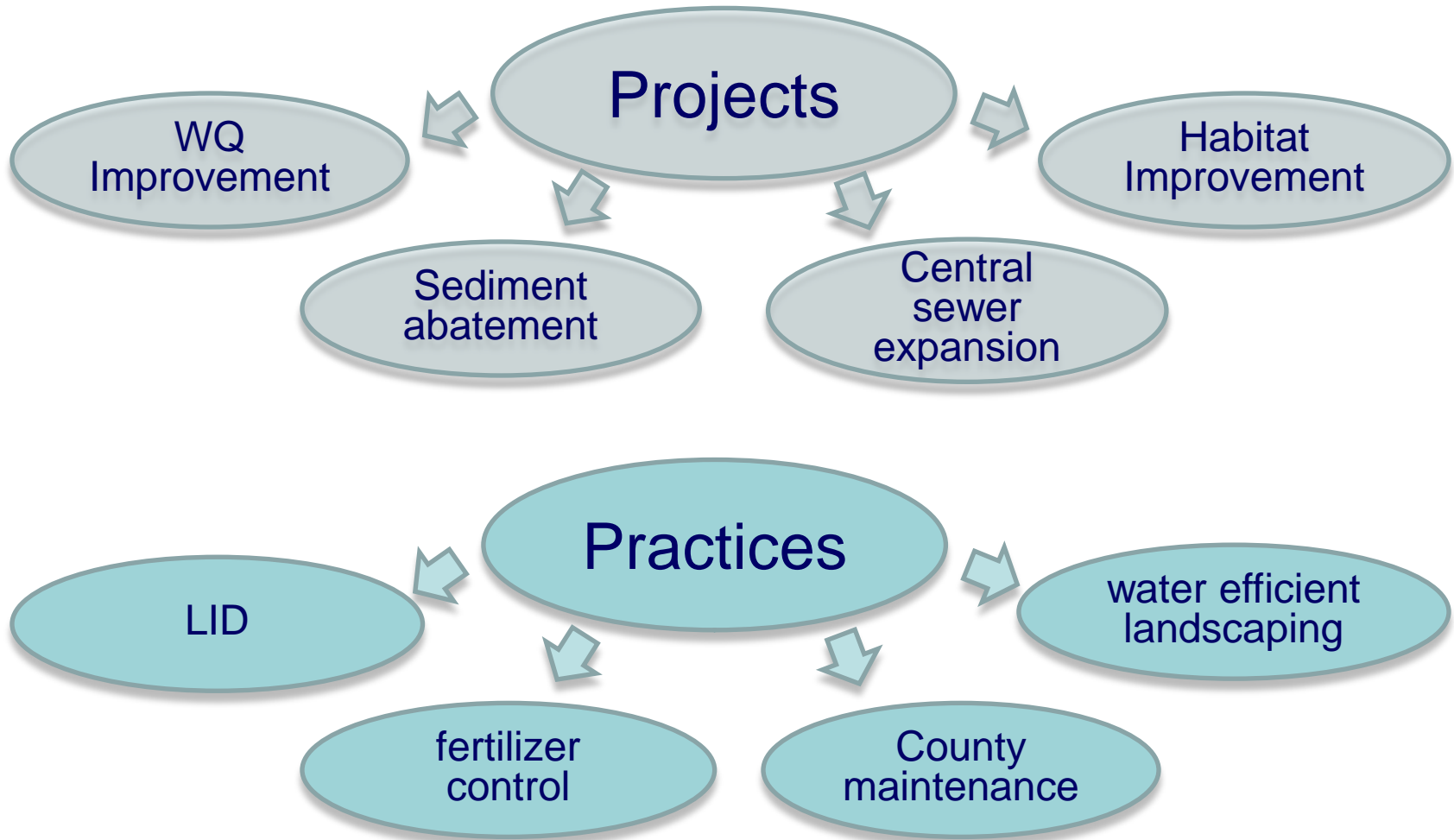
- Minimize water pollution in the creeks and bay
- Maintain water clarity in estuary
- Improve natural habitat
- Conserve water (right water, right use)
- Optimize flood protection
- Reduce sediment
- Involve the community

Assess watershed

Historical and Existing Conditions

- Flows to the bay?
- Pollutants to the bay?
- Habitat/Land-use changes?
- Impacts to the bay?

Develop and implement recommendations



Developing a watershed plan

1. Collect Existing Information

- Historical Information
- Data

2. Identify Natural Resources for Protection


- Wetlands, Mangroves, Seagrass, Water Quality, Shellfish, Etc.

3. Identify Targets Protective of Resources

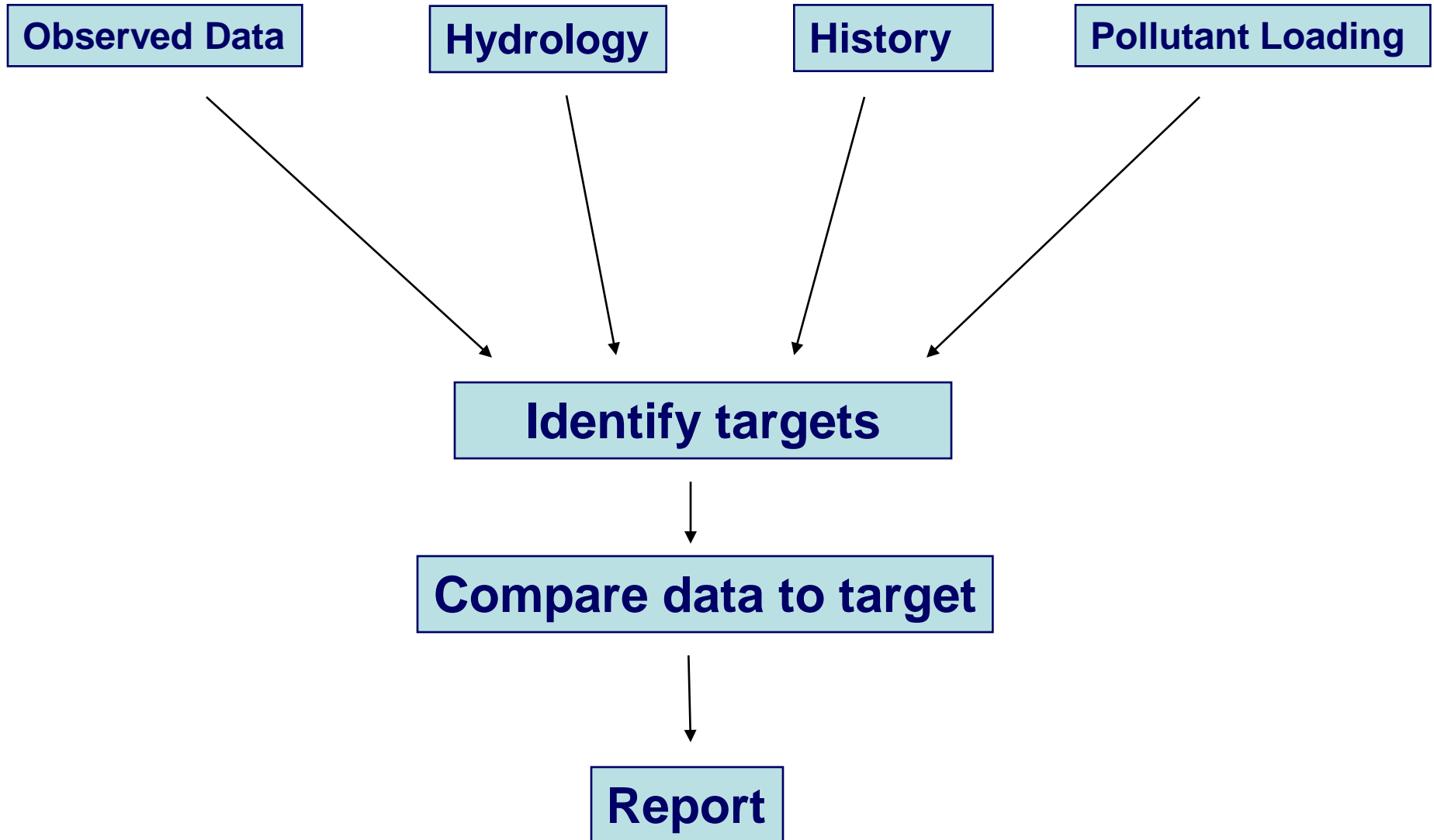
4. Develop Goals-Recommendations-Projects to Meet Targets

5. Develop Tools to Evaluate Progress Towards Goals

Environmental Indicators

- Seagrasses
 - Habitat for many species
 - Limited by light availability  influenced by WQ
- Pollutant Loading
 - Includes oil/grease as well as nitrogen and phosphorus which influence algal blooms
- Water quality
 - Dissolved oxygen
 - Chlorophyll – algae
 - Light
- Land use
 - Impervious surfaces

Evaluation



Example: water budget

Steps

1) Identify Historic Flows

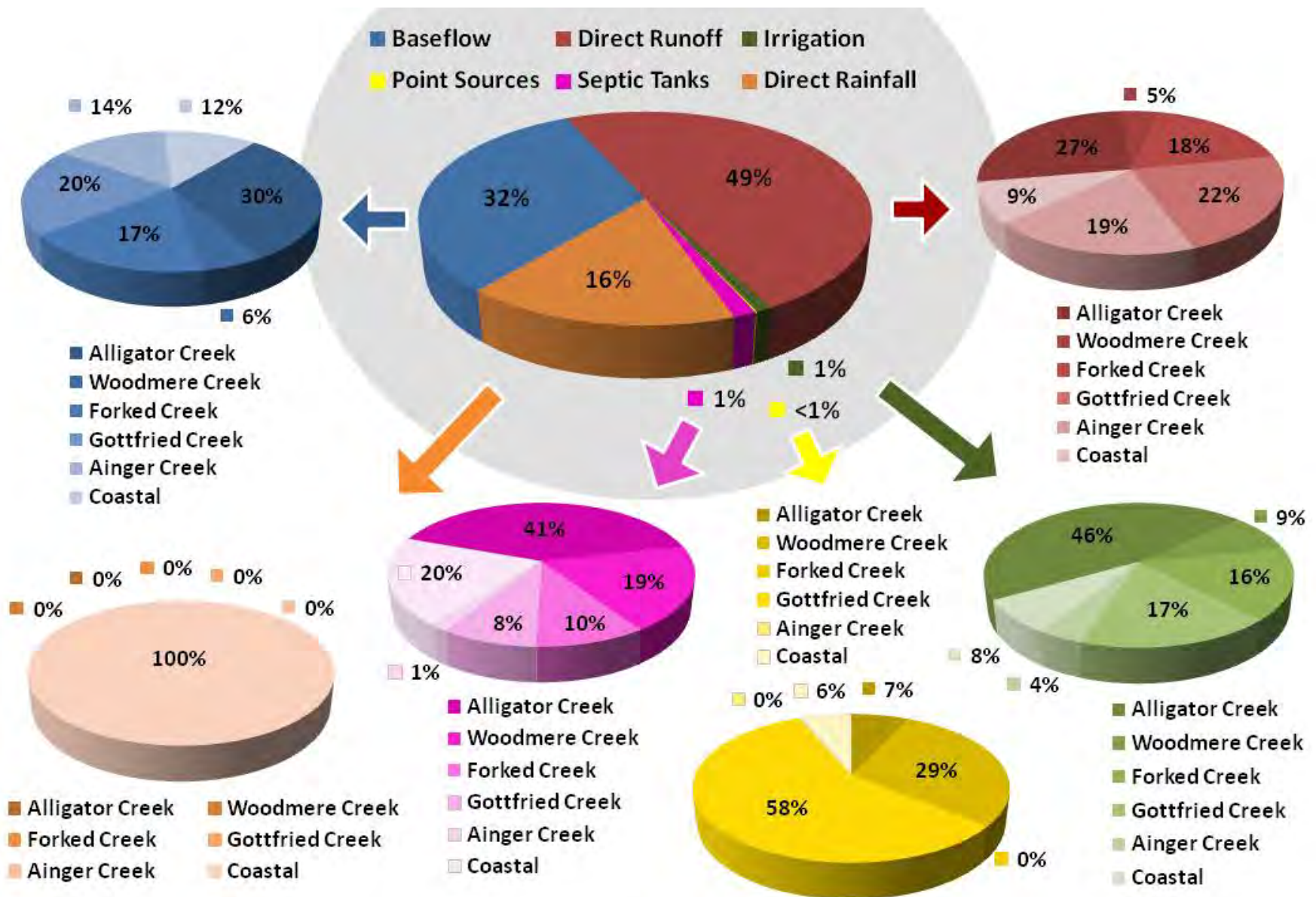
- 1948 Land Use – aerial photo's

2) Identify Current Flows

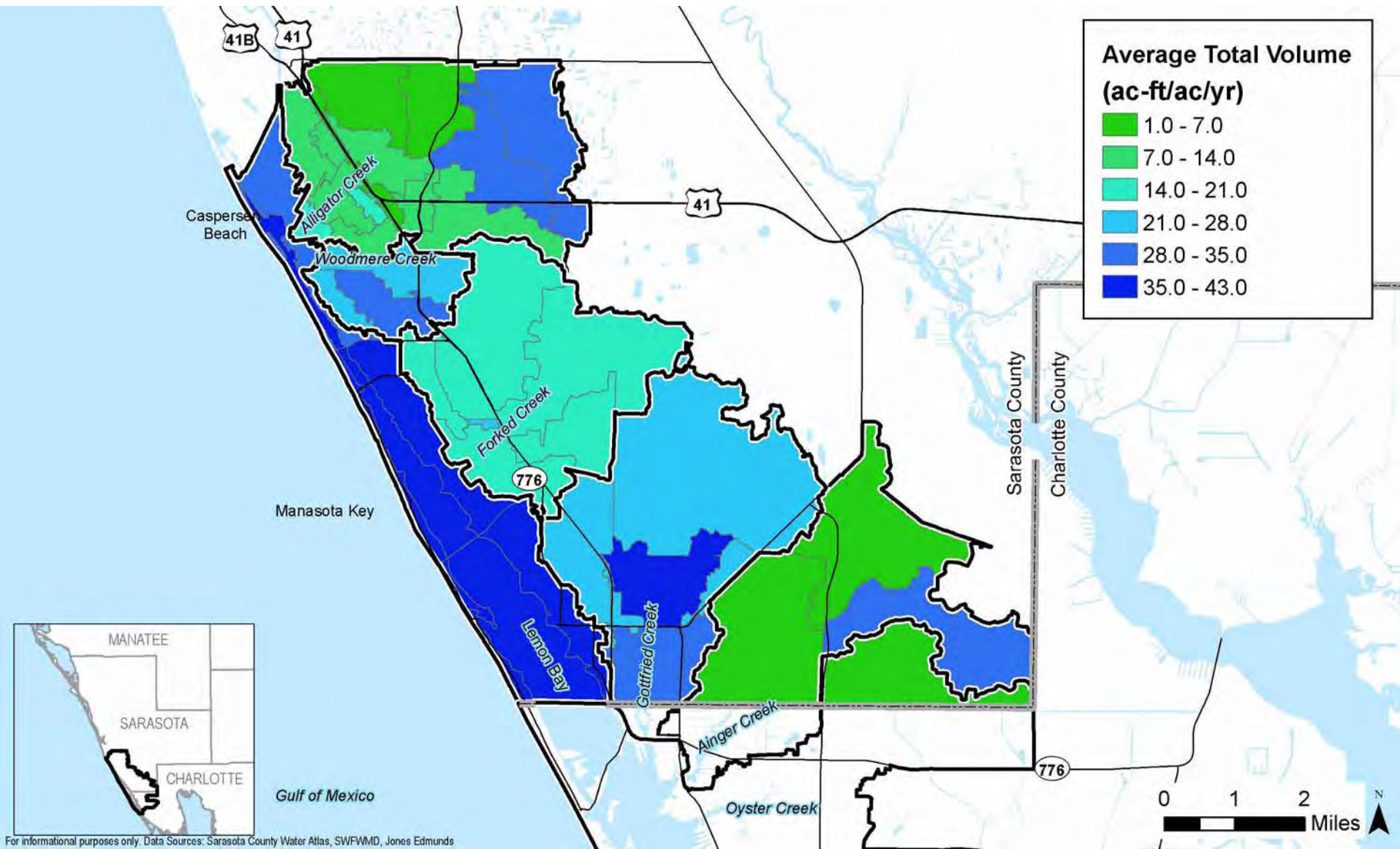
- 2006 Land Use

3) Compare – using same hydrology

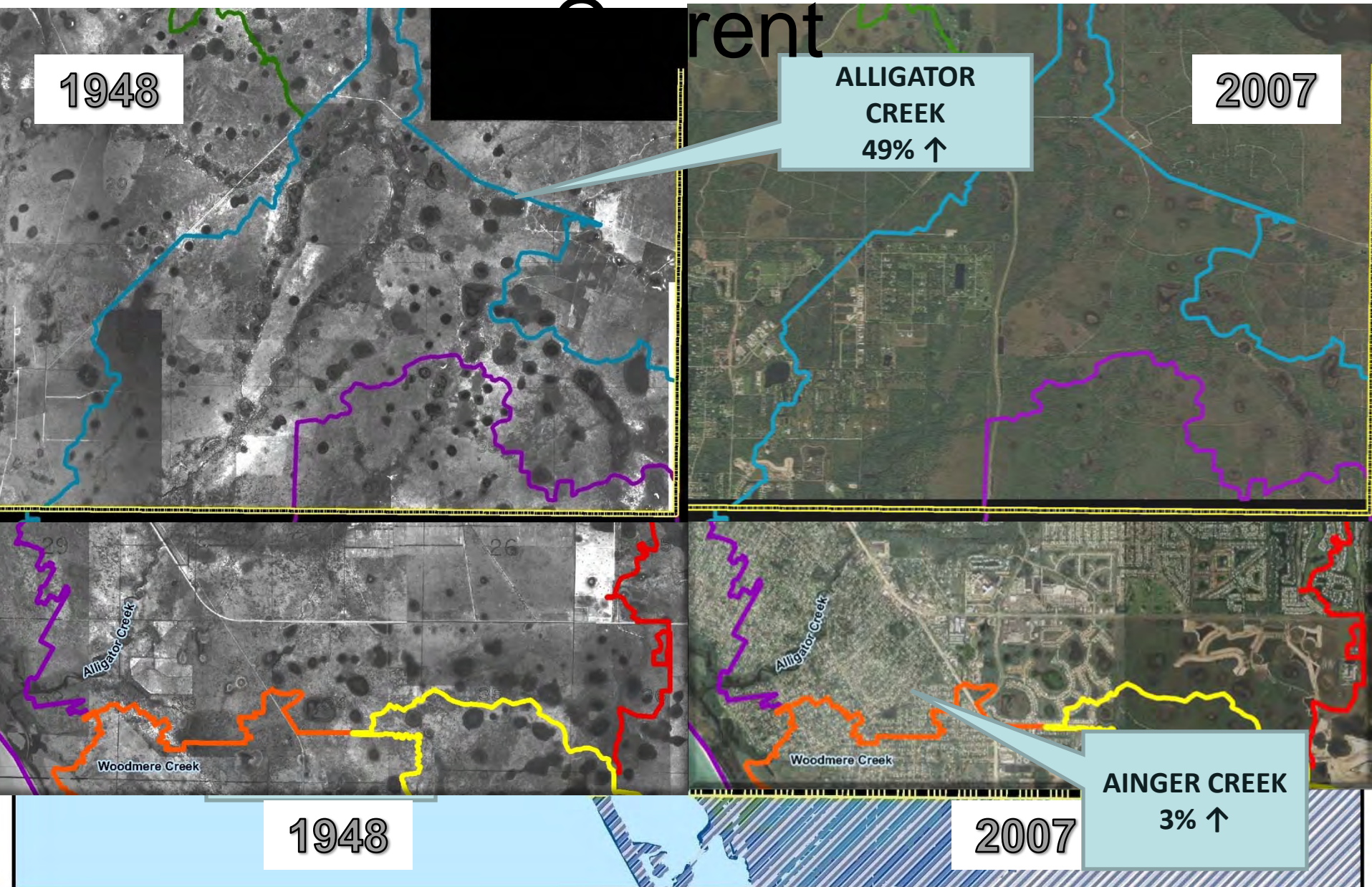
Lemon Bay Volume Inputs



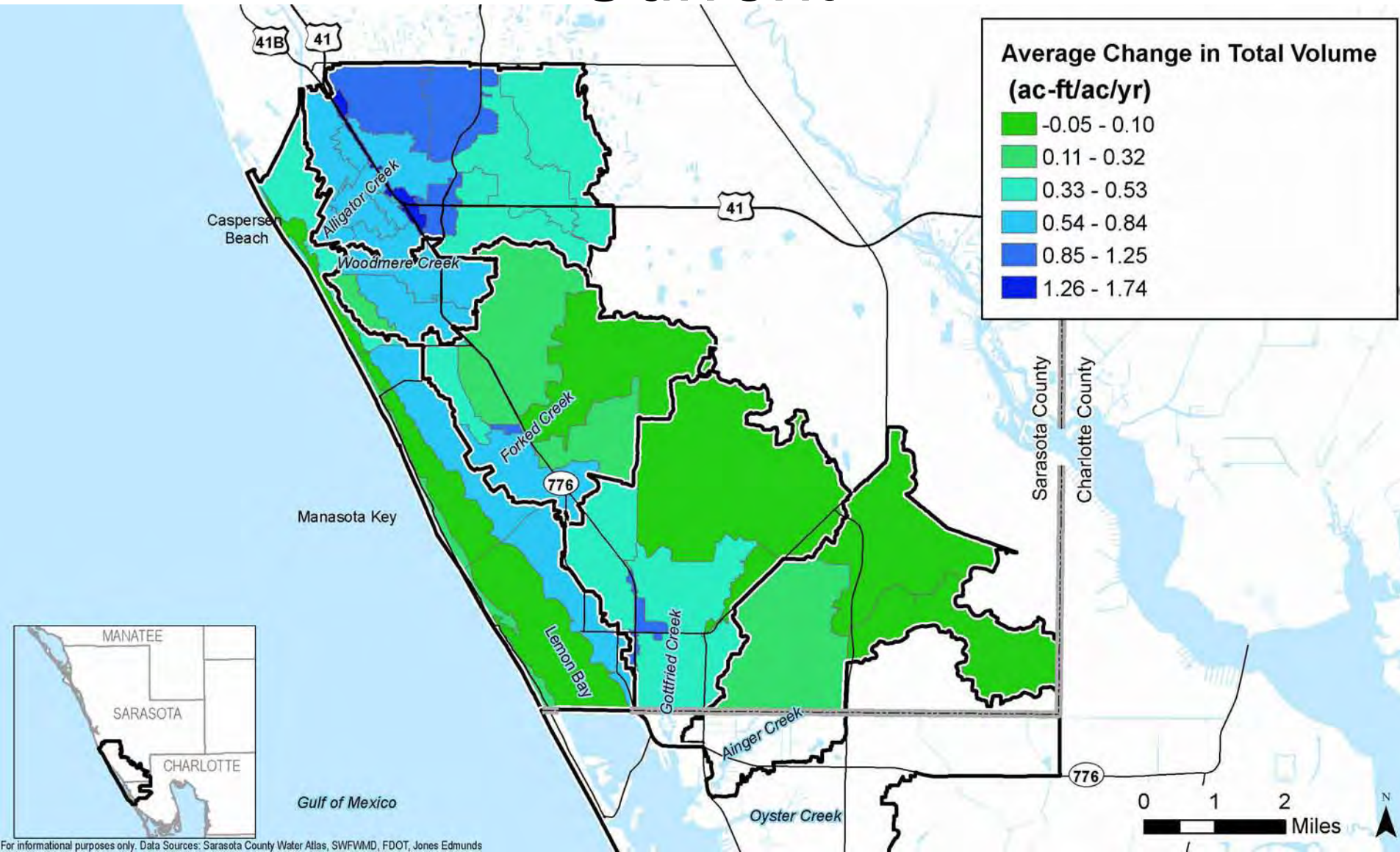
Current Total Volume



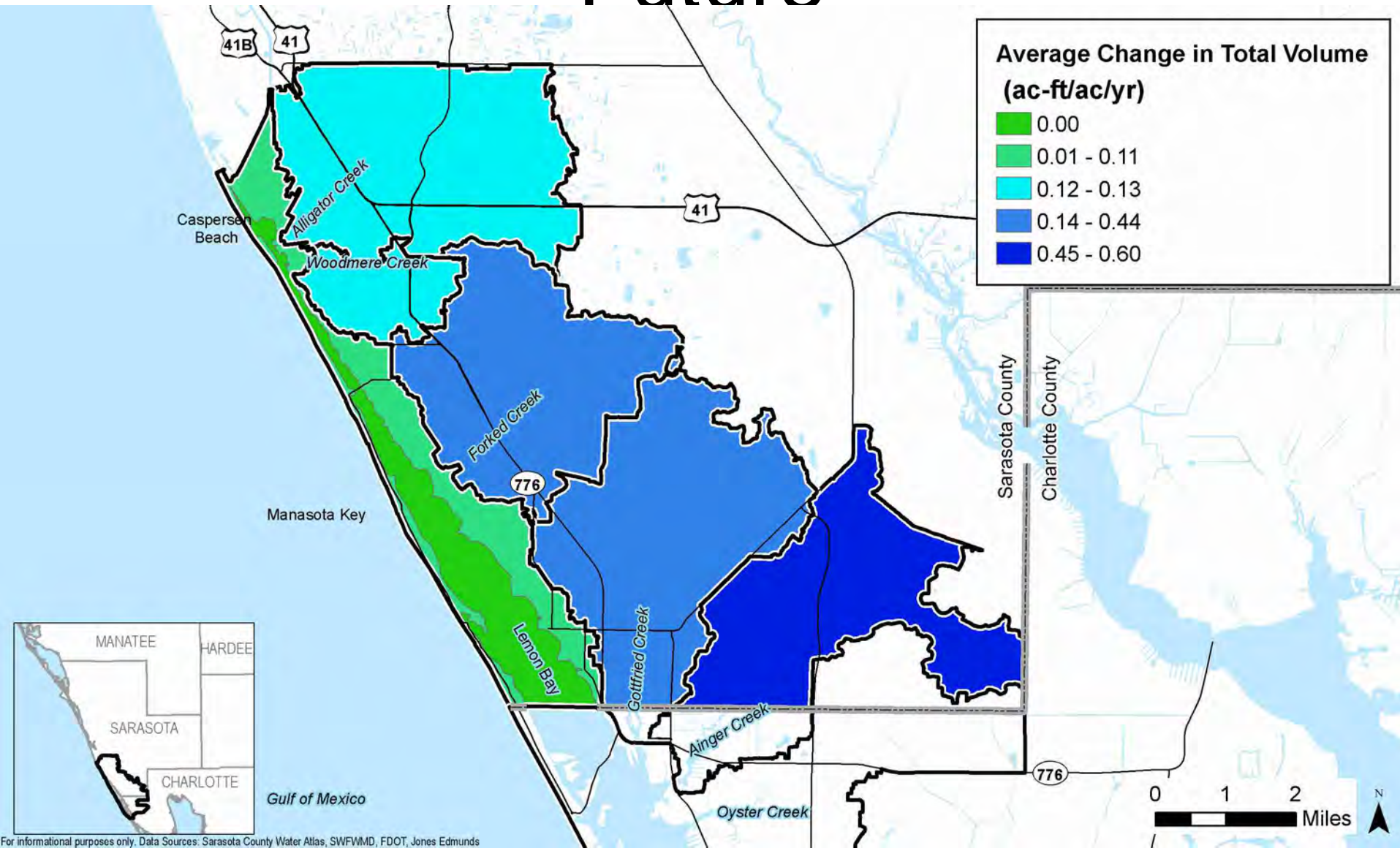
Volume Changes: Historic to



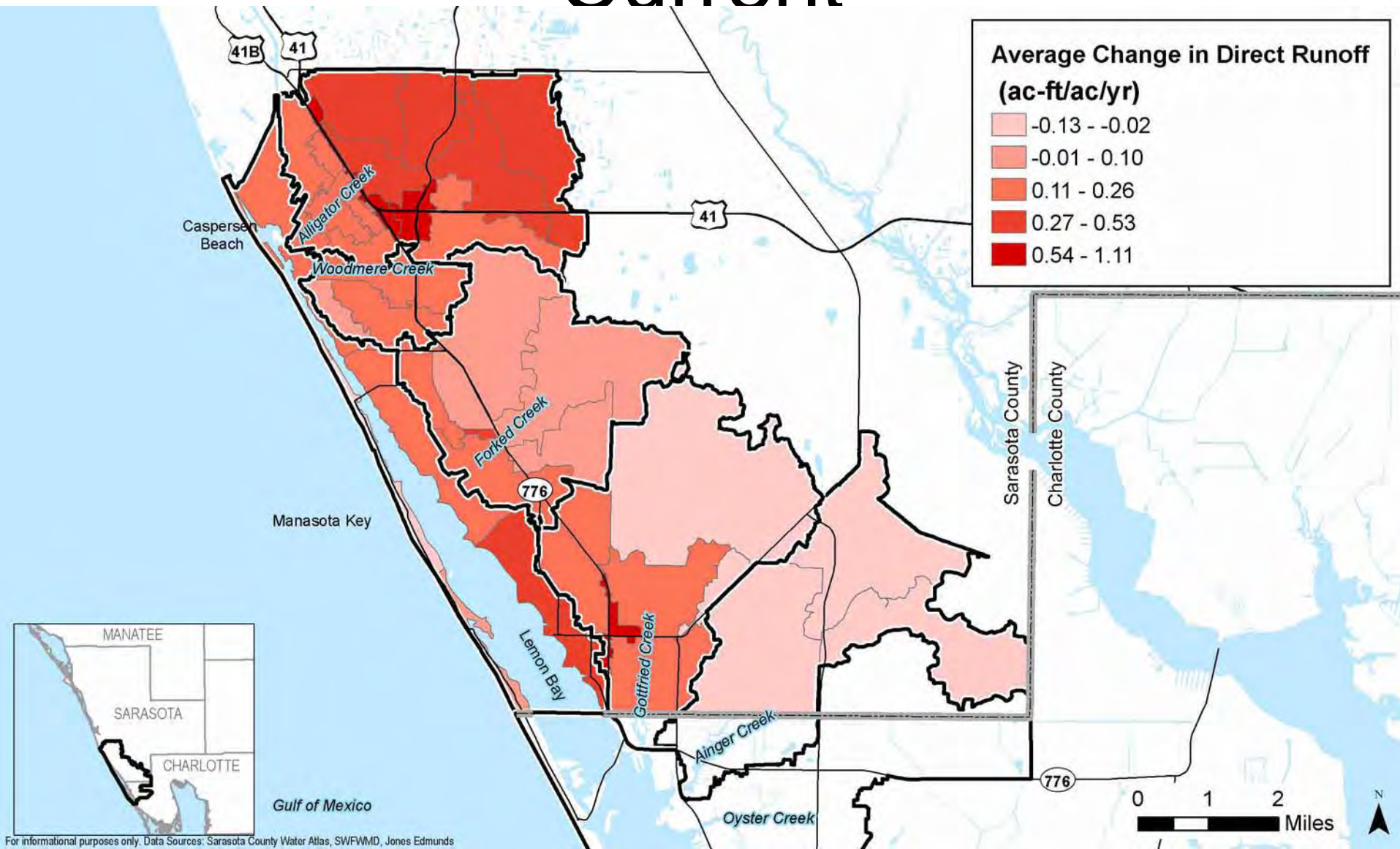
Volume Changes: Historic to Current



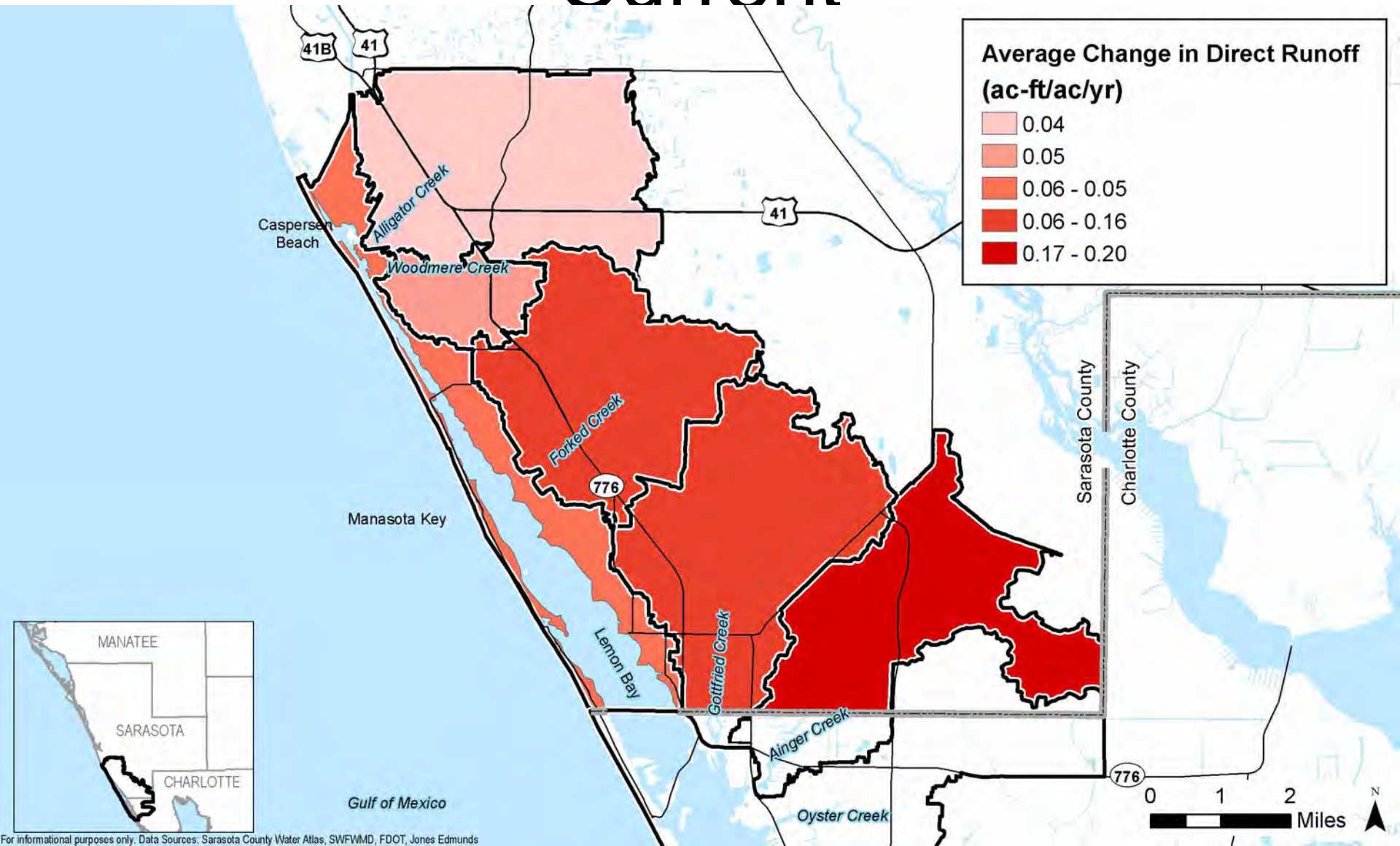
Volume Changes: Current to Future



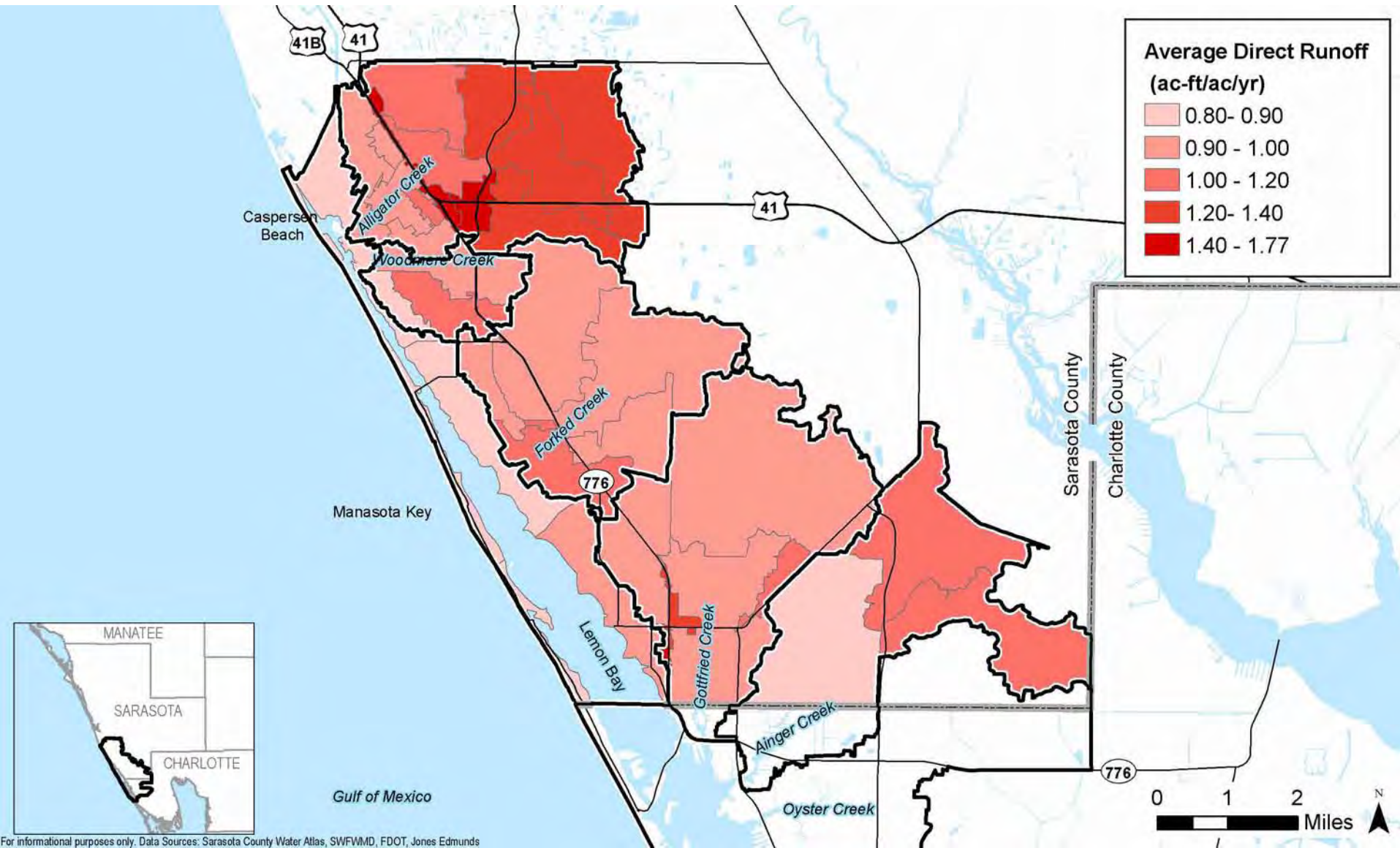
Runoff Changes: Historic to Current



Runoff Changes: Historic to Current



Current Runoff



Example: seagrass extent

In cooperation with the CHNEP, seagrass targets are being established in Lemon Bay.

Steps:

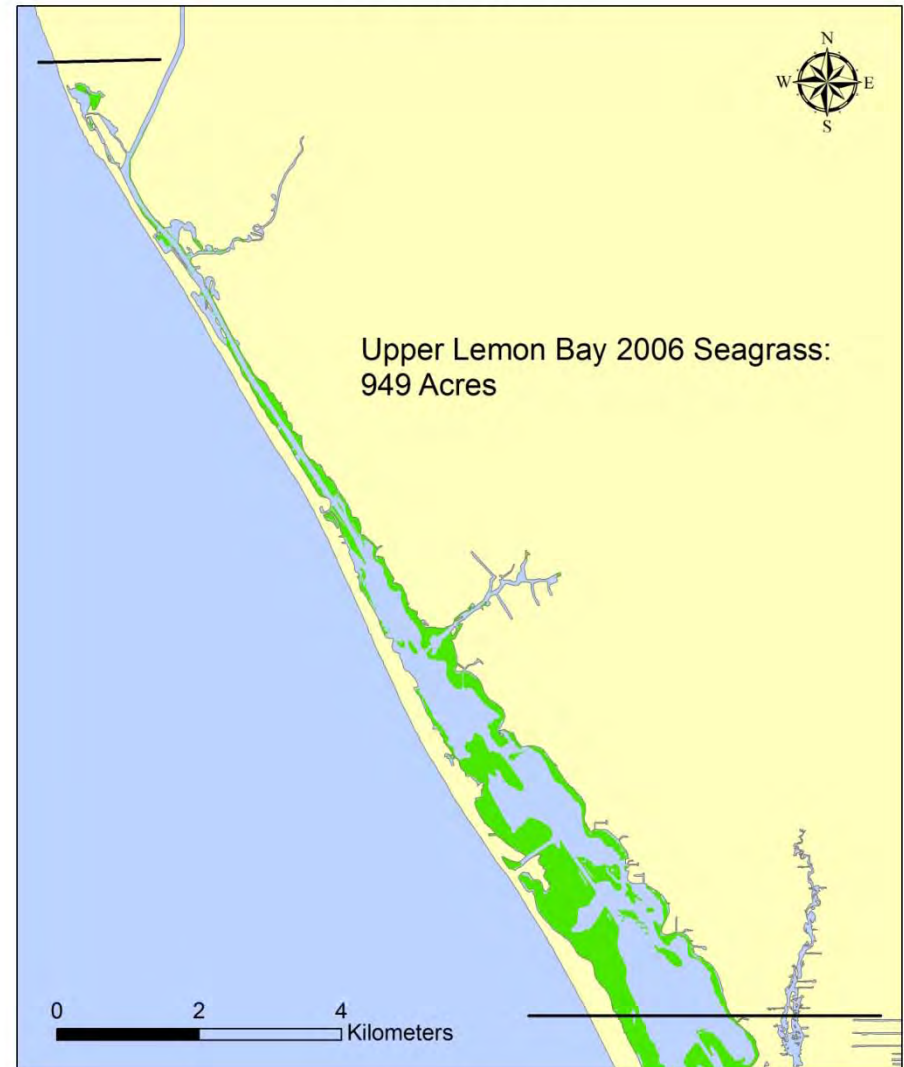
1. Identify baseline:
 - 1950's areal extent of seagrass
2. Compare current seagrass extent to 1950's
 - Photo-interpretation

Upper Lemon Bay (draft)

Upper Lemon Bay
1950 Seagrass



Upper Lemon Bay
2006 Seagrass



Lower Lemon Bay (draft)

Lower Lemon Bay
1950 Seagrass



Lower Lemon Bay
2006 Seagrass



Example: seagrass targets cont'd

3. Evaluate the difference between historical and current seagrass coverage
4. Establish target
5. Identify requirements necessary to achieve goals (e.g. Water Quality Conditions)

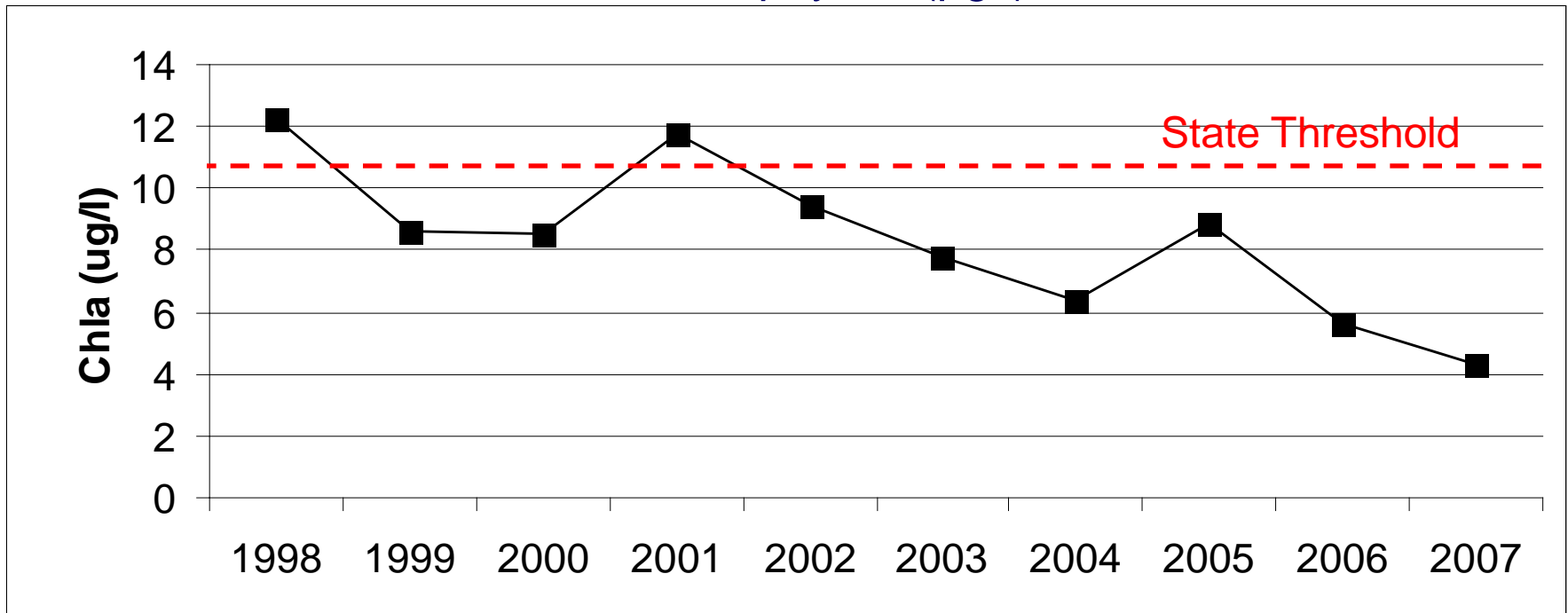
Example: water quality indicators status and trends

Indicators include:

- Phosphorus
- Nitrogen
- Chlorophyll - Phytoplankton
- Light Attenuation
- Dissolved oxygen

Example: water quality (draft)

Chlorophyll a ($\mu\text{g/l}$)



Report Card Indicators

Water Quality

- Chlorophyll – a measure of algae in the water; depends upon nutrient loading and water circulation; affects water clarity.
- Water Clarity – a measure of the amount of light that reaches the bottom; depends upon chlorophyll, turbidity, water color, and suspended sediments; affects seagrass growth and reproduction.
- Dissolved Oxygen – a measure of the amount of O₂ in the water; depends upon the amount of algae and decomposing organic matter; affects habitats for fish and bottom-dwelling organisms.
- Total Nitrogen – a measure of the amount of nitrogen in the water; depends upon amount of runoff from fertilizer, pet waste, and other sources; affects algae levels.
- Pollutant Loading – an estimate on the amount of nutrients flowing off the watershed to the bay; depends upon rainfall, and land use; affects water quality

Seagrass – a critical habitat for many organisms and a good indicator of bay ecological health; depends upon water clarity and physical setting.

Oysters – an important bay resource and indicator of bay ecological health; depends upon good water quality and physical setting.

Other Indicators

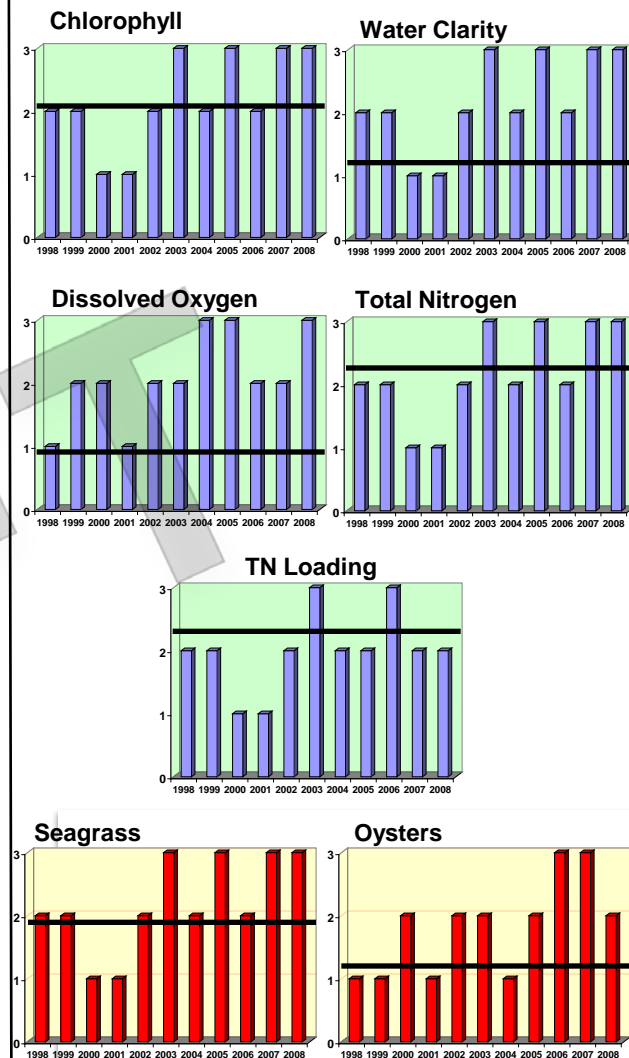
- No Swim Advisory – 1
- Red Tide Cell Counts – Below detection
- DEP Assessment showed no impairments

2008 Report Card Results

BAY WATER QUALITY INDEX	
Indicator	Score
Chlorophyll	Good
Water Clarity	Good
Dissolved Oxygen	Good
Total Nitrogen	Good
Nutrient Loading	Fair
TOTAL WQI SCORE	Good
BIOLOGICAL BAY QUALITY INDEX	
Indicator	Score
Seagrass	Good
Oysters	Good
TOTAL BQI SCORE	Good

**2008 Overall
Lemon Bay Score
Good**

Trends in Indicators



How are these scores calculated?

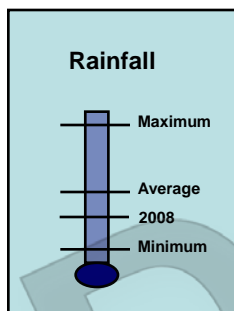
The methods used to calculate these scores and the data used can be found on the Sarasota County Watershed Atlas

<http://www.sarasota.wateratlas.usf.edu/>

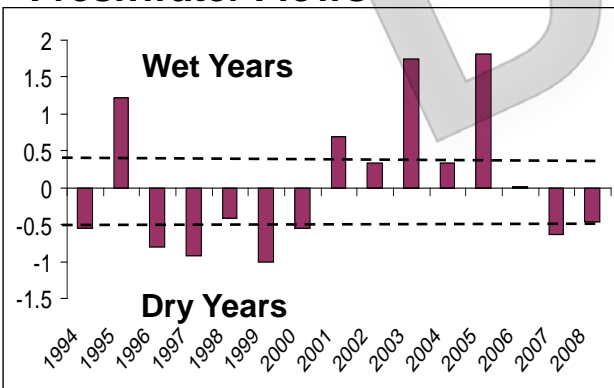
2008 Update

- The rainfall in 2008 was significantly lower than the long-term average.
- Chlorophyll and water clarity were exceptionally good.
- Lower pollutant loads followed the lower rainfall.
- The most recent aerial survey results show an increase in seagrass coverage.
- 9 Neighborhood Environmental Stewardship Teams working to improve the watershed
- Watershed projects were started in several tributaries.
- Scallops have been found for the first time since XXXX in the bay.
- Other CIP updates?

2008 Hydrologic Conditions



Freshwater Flows



Acknowledgements and Further Information

The data and information used in the Lemon Bay Report Card were provided by the following monitoring programs:

Support through the Southwest Florida Water Management District was made possible with funding from the Manasota Basin Board's Cooperative Funding Program.

Further information regarding the contents of this report card can be found on the Sarasota County Water Atlas at <http://www.sarasota.wateratlas.usf.edu/>

LINKS

www.scgov.net
www.sarasota.wateratlas.usf.edu
www.swfwmd.state.fl.us
www.lemonbayconservancy.org
www.sarasotabay.org
www.chnep.org
www.dep.state.fl.us
www.ifas.ufl.edu
www.epa.gov



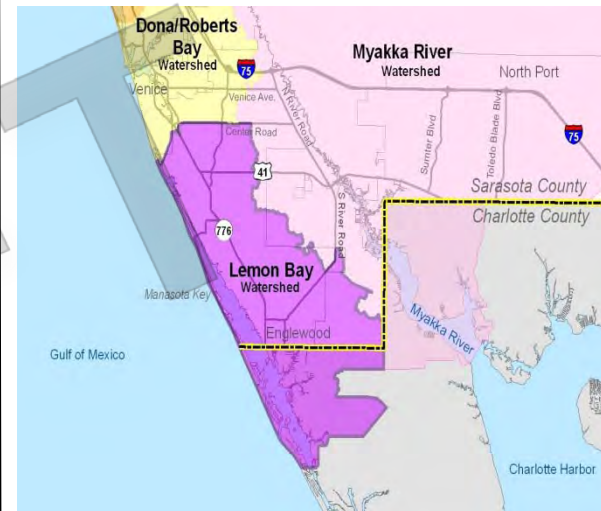
HOT LINE INFORMATION:
555-123-4567



Southwest Florida
Water Management District
WATERMATTERS.ORG • 1-800-423-1476



Lemon Bay 2008 Report Card



Fast Facts

Watershed Area ~75 square miles - 50% urbanized

- Major Tributaries
 - Alligator Creek, Woodmere Creek
 - Forked Creek, Gottfried Creek
 - Ainger Creek, Buck Creek, Oyster Creek

- Aquatic Preserve

- Extensive seagrass, mangrove and shellfish habitat