

**Sarasota County
Comprehensive Oyster Monitoring Plan**



Prepared for:
Sarasota County
Water Core Services Management Team

Prepared By:
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March 2006

Executive Summary

The Sarasota County oyster monitoring plan is designed to both support and to be easily integrated into other projects that meet County objectives.

Sarasota County uses the GOVMAX scoring and tracking system to measure how well County Government is meeting its stated objectives. One of the stated objectives is fishable and swimmable waters. The percent of live oysters is a measure that is scored in support of the fishable swimmable water objective.

Sarasota County is cooperating with Mote Marine Laboratory on creating an index scoring system for tidal creeks. Currently, a rapid survey and scoring indices for tidal creeks does not exist. The EPA and Florida Department of Environmental Protection have an index for freshwater streams and lakes and are interested in developing a system for tidal creeks. DEP has met with Sarasota County and Mote Marine Laboratory and are interested in the development of this index. The comprehensive oyster monitoring plan and scoring system is anticipated to be used as part of the tidal creek scoring index.

Globally as well as locally there is an ongoing paradigm shift where governments are leaning towards comprehensive management of water resources. This philosophical shift is a response to an increasing knowledge base that stormwater (flood protection), natural systems (wetlands and estuaries) water supply (potable and irrigation) and water quality (water pollution) are interrelated and are best served managed together using a geographic watershed basis. Sarasota County is in the process of restructuring its organization around the comprehensive watershed management principle. Oyster colonies are good environmental indicators because of their role in ecological processes and their position in the landscape. Oysters exist at the bottom of watersheds and the health of those oyster colonies can assist in determining water management problems at the landscape level. An ongoing oyster monitoring program is a relatively cost effective easy way to assist in tracking the success of the County's comprehensive watershed management practices.

Sarasota County has been divided into five major watersheds. The oyster monitoring plan looks at oysters at two to four locations within two to three of the tidal creeks that drain major contributing hydrologic basins for each of the five watersheds. Each sampling station receives a numerical score that can be rolled up into a score for each creek that will be used in the tidal creek matrix system. These scores per creek can then be averaged for a score for the watershed which, in turn, can be averaged to get a score for the county.

The following pages explain the draft plan and scoring process for the oyster monitoring plan.

Introduction

Oysters as an Environmental Indicator

Oysters fill an important environmental niche. Oyster beds provide habitat for many types of marine fauna. They also provide habitat for species that are adapted to oyster beds, such as oyster drills, conch, mud crabs, other bivalves, and specialized fish. An individual oyster can filter between 4 and 40 liters of water per day (Volety et al, 2003), providing a valuable water quality function. Water clarity and PAR have been observed to increase immediately downstream of oyster beds.

Oysters have specific environmental requirements and are susceptible to environmental fluctuations. For example, salinity is a primary factor that affects oyster status. Optimal salinity range for oysters is 15 ppt - 25 ppt (Kennedy et al., 1996). Salinities below 10 ppt affect reproductive success. Salinity below 3 ppt is lethal to most juvenile oysters (spat). If salinity remains below 2 ppt for more than a month, most adult oysters perish. The growth rate of oysters slows above 30 ppt and they become more susceptible to predators, parasites, and disease. Oysters also provide shoreline stabilization. Due to their wide variety of ecosystem functions and values, oysters are considered a keystone species, or a species that is the foundation on which an entire community is based.

Oysters have a history of being a popular food commodity. Oyster meat is in great demand and an industry has grown around oyster harvesting and cultivation. With some coastal economies depending on oysters, scientific research and study on this species has garnered a great deal of support. Therefore, a wealth of scientific literature exists on this species.

Oysters grow near the mouths of most of the tidal creeks in Sarasota County. Due to their immobility, importance as a habitat, responsiveness to environmental change, and water quality enhancement capabilities, oysters are relatively easy to monitor and an important indicator of estuarine health. SCG has developed a target of 70% live oysters on oyster reefs. Healthy oyster beds occurring in areas that are not heavily impacted range between 65% and 85% live oysters. Oyster studies further south in areas such as the Caloosahatchee River and Fakahatchee Bay, have healthy oyster populations ranging from 600 to 1400 live oysters per square meter. Healthy oyster beds in the southern Gulf Coast region typically support 500-1000 or more oysters per square meter.

Purpose

The Sarasota County oyster monitoring plan is designed to both support and to be easily integrated into other projects that meet County objectives. Oyster colonies are good environmental indicators because of their role in ecological processes and their position in the landscape. Sarasota County is in the process of restructuring its organization around the comprehensive watershed management principle. Oysters exist at the mouth of tidal creeks in the downstream portion of Sarasota County watersheds and the health of those oyster colonies can assist in determining water management problems at the landscape level. A continuous oyster monitoring program is a relatively cost effective easy way to assist in tracking the success of the County's comprehensive watershed management practices. The scores generated from the

monitoring program can be used in the GOVMAX scoring and tracking system (a system used to track how well local governments are meeting the public's objectives), the tidal creek scoring index, and can be used to evaluate the success of other watershed management projects.

Materials

Shallow draft boat
Appropriate boat safety equipment
Appropriate footwear.
 (Ankle high booties or equivalent)
0.25m x 0.25m PVC (weighted quadrat)
Mesh gloves
Clipboard
Oyster sampling sheets (Appendix A)
Pencils
2 five gallon buckets
Measuring tape (metric)
Hand-held GPS
Refractometer
Needle nose pliers
Flat-head screwdriver
Hydrogen peroxide
Soft bristle scrub brush



Methods

Oysters are monitored at the end of the dry season (spring) and again at the end of the wet season (fall). Oysters at each sampling site are collected from three randomly placed quarter-meter square weighted PVC quadrats. All oysters that fall within the quadrat are collected down to the shell substrate. The collected oysters are placed in five gallon buckets for counting on the boat, where the number of live oysters, dead oysters, and spat are recorded. Spat are juvenile oysters generally smaller than the terminal joint of a human thumb. The five longest live oysters are also recorded. For ongoing monitoring purposes, only recently dead oysters are recorded. Oysters are considered recently dead if both shells of the bivalve are still conjoined yet contain no tissue. Sometimes it is difficult to ascertain if an oyster is alive or dead. Generally live oysters are not easily opened and, by tapping them with a screw driver, live oysters make a full sound while dead ones make a hollow sound. It is often necessary to wash or scrub the oysters with a soft bristle brush in order to identify spat. Information such as oyster parasites, mud crabs, conch drills, mussels, amount of silt, and other general observations should be noted. Salinity, GPS position (once), and field conditions are also recorded at each sampling station. Sampling is easiest with two field personnel, one for recording and one for counting. Generally there is always some counting error expected. In order to reduce error it is preferred to have the same person count the oysters. After oysters are counted, they are returned to the quadrat location. Average time at each station is approximately one hour.

Oyster data sheets are turned into a project coordinator who will evaluate, score, and enter the data into the appropriate database. The percent live oysters for each quadrat will be assigned a

score similar to a grade point average system. Those scores will then be averaged to obtain a score for each station. The station scores can then be averaged yielding a score for each creek which can finally be rolled up into a score for those particular coastal watersheds. The scoring system is summarized in the following table.

Percent Live Oysters	Numerical Score	Letter Score	Descriptor
0% - 20%	0	F	Very Poor
> 20% - 49.9%	1	D	Poor
> 50% - 69.9%	2	C	Fair
> 70% - 80%	3	B	On Target
> 80% - 100%	4	A	Excellent

Oyster Sampling Stations

The sampling stations found on the following maps were originally identified using GIS aerial photography. Field verification of each location will be necessary before sampling is initiated. Sites were selected in an attempt to cover the full range of healthy oyster habitat for each creek. Figure 1 is an overall location map for the creeks. Subsequent figures show sampling sites for each creek.

The Sarasota Bay Watershed contains two sampled creeks: Hudson Bayou and Philippi Creek. Hudson Bayou has two sampling sites and Phillippi Creek has three.

The Little Sarasota Bay Watershed contains four sampled creeks: North Creek, Catfish Creek, and South Creek. Catfish Creek and North Creek contain two sites. South Creek contains two sites.

Dona and Roberts Bay Watershed oyster monitoring began in October 2003 as part of the Dona Bay Watershed Management Program. Six permanent oyster-sampling sites were originally selected, one site in each of the three bay segments (Dona-DB1, Lyons-LYB1 and Robert's Bay RB1), two in Shakket Creek (SC1 and SC2), and one in Curry Creek (CC1). In 2005 two more sites were added, one upstream site in Shakket Creek and one upstream site in Curry creek.

The Lemon Bay Watershed contains four sampled creeks: two occur in upper Lemon Bay and two in lower Lemon Bay. The two upper bay creeks are Alligator Creek with two sites and Forked Creek with two stations. The lower bay creeks are Gottfried Creek with three sites and Ainger Creek with three sites.

The portion of the Myakka River Watershed that is contained within Sarasota County is too fresh to have oyster colonies and is generally too far from the Gulf to be considered a tidal creek of the type in the rest of the coastal basins above. Therefore, no oyster monitoring is proposed for the Myakka River at this time.

The following pages contain figures of sampling sites and locations as well as a sample of the oyster monitoring sheet.



Sarasota County Comprehensive Oyster Monitoring Program
Tidal Creek Location Map

ENV1\Vol2\Data\Nat\RM(1:)\WaterResources

0 5,000 10,000 20,000 30,000 40,000 Feet

Map Date: April 25, 2006

Created By: Michael Jones, Water Core Services

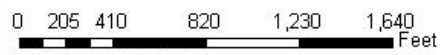




Hudson Bayou Oyster Sites

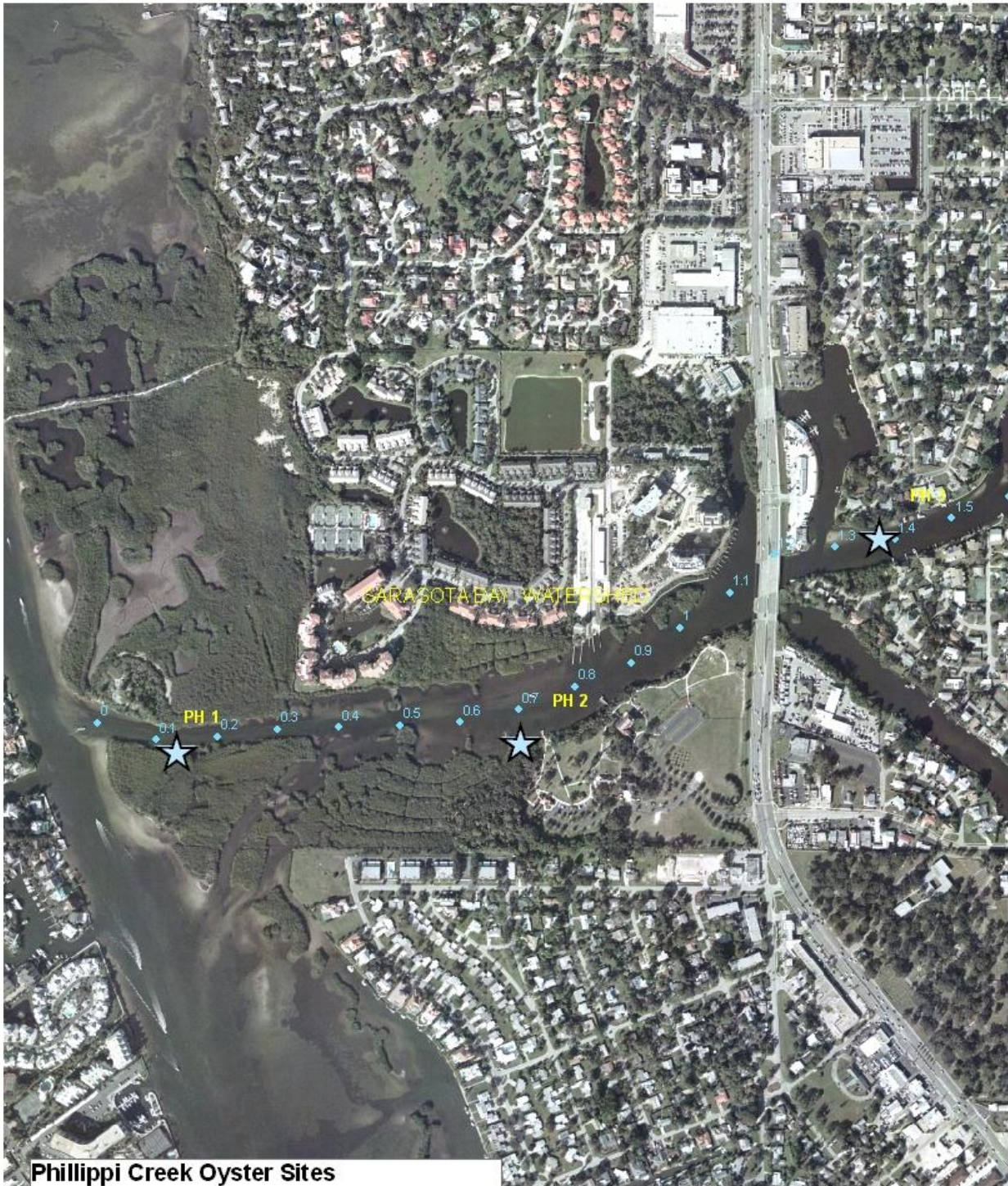
- ☆ Oyster Monitoring Site
- ◆ Creeks

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WATERSHED PROJECTS\Oysters



Map Date: April 23, 2007
Created By: Michael Jones, Water Core Services

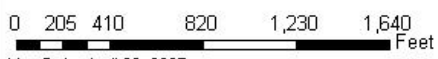




Phillippi Creek Oyster Sites

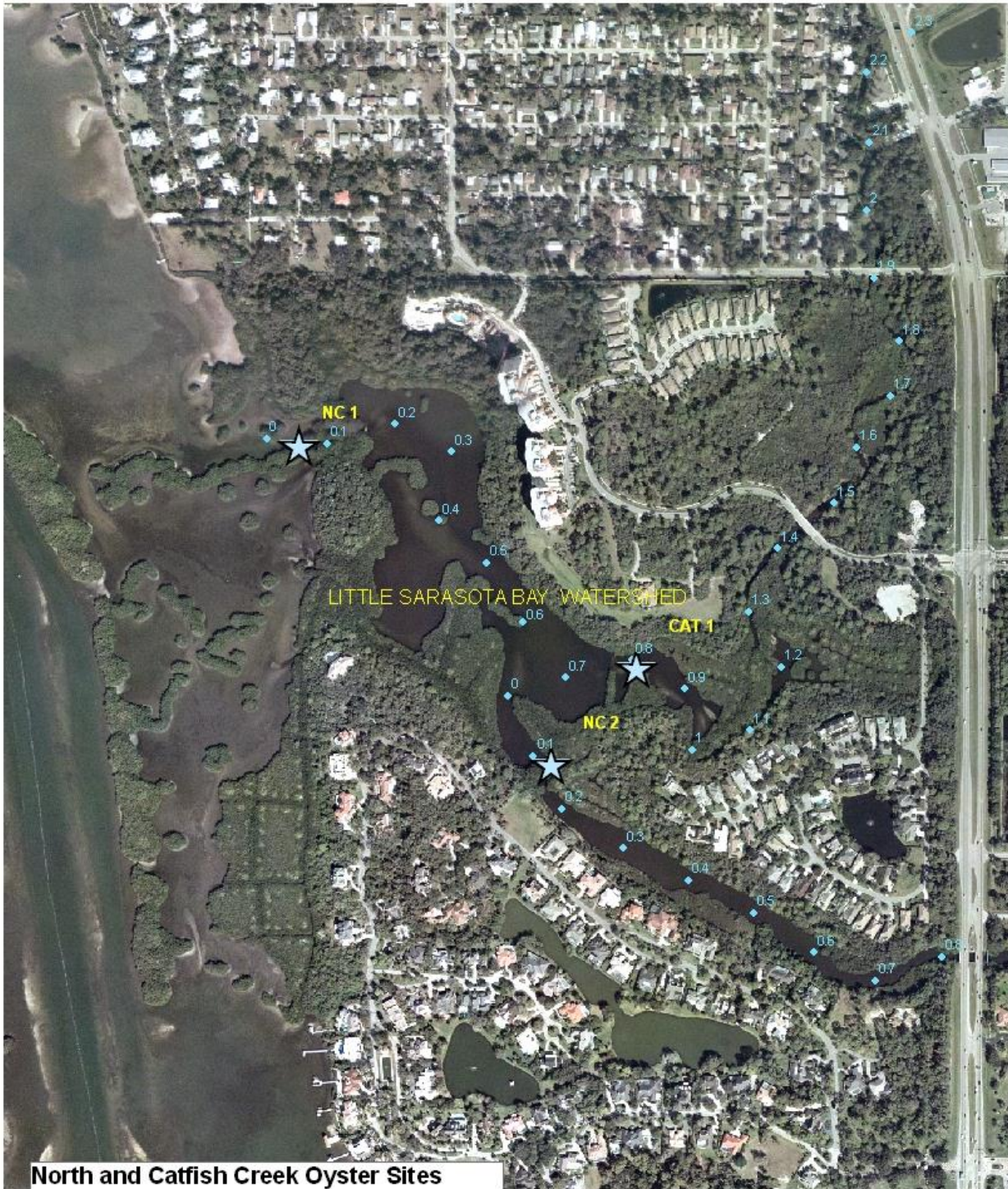
- ★ Oyster Monitoring Site
- ◆ Creeks

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Map Date: April 23, 2007
Created By: Michael Jones, Water Core Services





North and Catfish Creek Oyster Sites

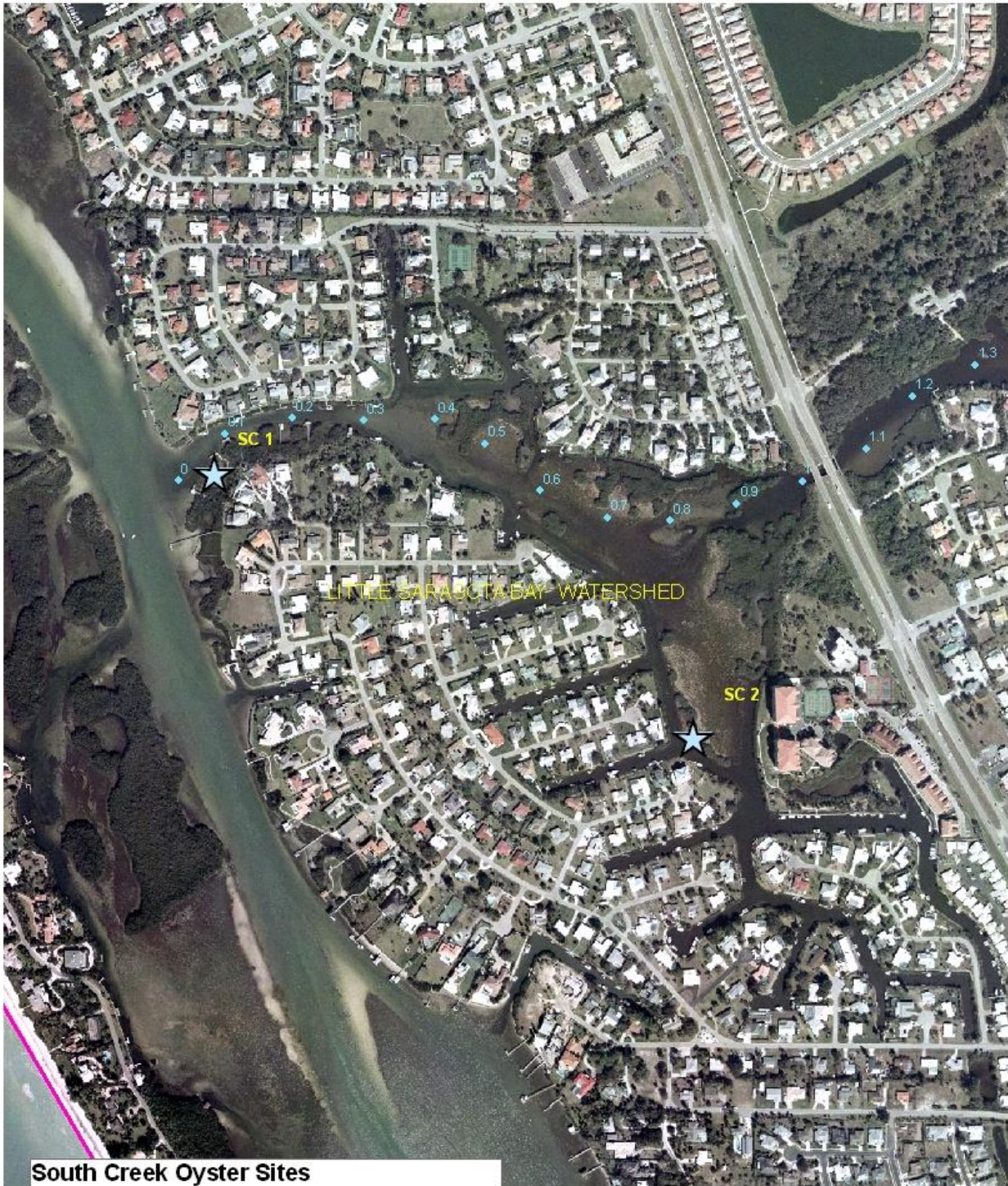
- ★ Oyster Monitoring Site
- ◆ Creeks

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0 175 350 700 1,050 1,400
Feet

Map Date: April 23, 2007
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South Creek Oyster Sites

- ★ Oyster Monitoring Site
- ◆ Creeks

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Dona and Robert's Bay Oyster Sites

- ☆ Oyster Monitoring Site
- ◆ Creeks

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Map Date: April 23, 2007
Created By: Michael Jones, Water Core Services





Alligator Creek Oyster Sites

☆ Oyster Monitoring Site

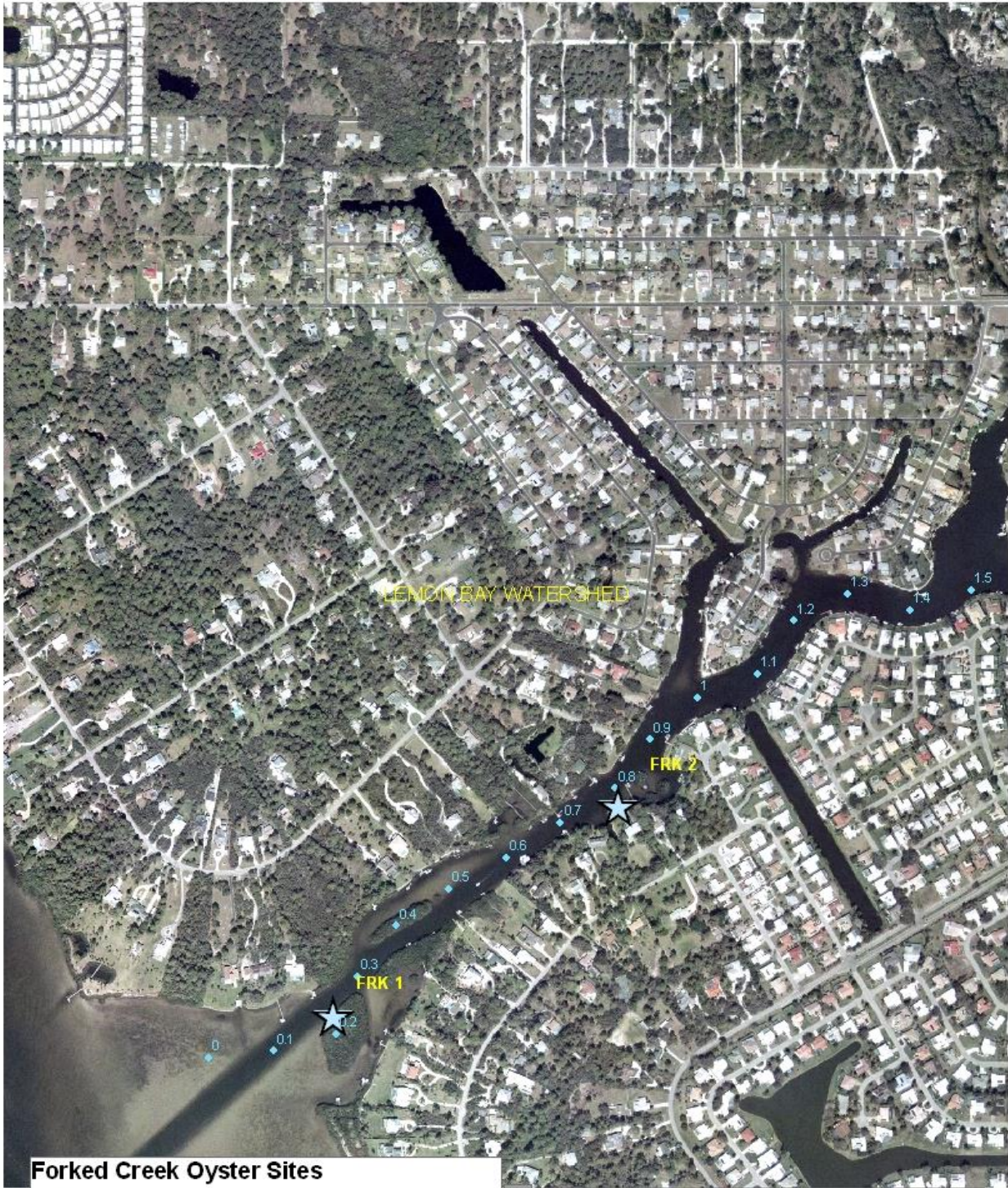
◆ Creeks

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0 205 410 820 1,230 1,640 Feet

Map Date: April 23, 2007
Created By: Michael Jones, Water Core Services






Forked Creek Oyster Sites

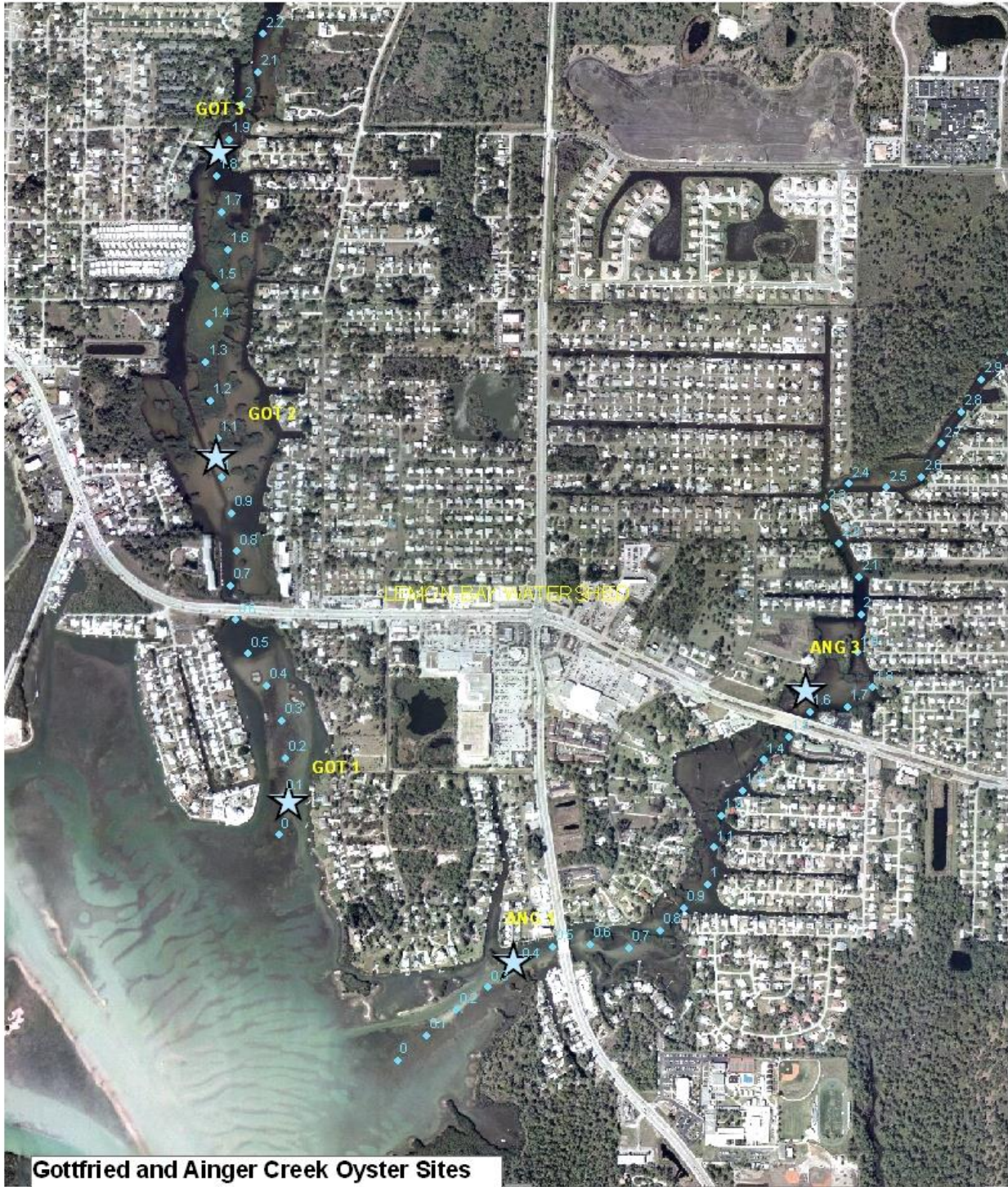
- ☆ Oyster Monitoring Site
- ◆ Creeks

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0 205 410 820 1,230 1,640 Feet

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Gottfried and Ainger Creek Oyster Sites
 ☆ Oyster Monitoring Site
 ◆ Creeks
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0 345 690 1,380 2,070 2,760 Feet
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