

# **Sarasota County Seagrass Target Assessment**

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Sarasota, Florida

**July 2013**



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## **Acknowledgements**

This report is based on data produced by the Surface Water Improvement and Management (SWIM) program of the Southwest Florida Water Management District (SWFWMD). Seagrass targets in this report were established by the Sarasota Bay Estuary Program (SBEP) and the Charlotte Harbor National Estuary Program (CHNEP) under contract with Janicki Environmental, Inc. The Sarasota County Volunteer Seagrass Survey Program provided important on-the-ground data. The USF Florida Center manages the Sarasota Water Atlas posts seagrass maps and related information online. Thanks to Kris Kaufman, Amanda Dominguez, Jay Leverone, Judy Ott, and Rene Janneman and for their valuable contributions to these programs.

## **Executive Summary**

Seagrasses provide habitat that is important to the economy and natural resources of Sarasota County. Human impacts from dredge and fill, nutrient enrichment, and other factors reduced the abundance of seagrass, but regulations and pollutant reductions have produced a subsequent rebound in seagrass acreage. Seagrass targets were established collaboratively by the National Estuary Programs and became the foundation of water quality standards for the state of Florida. Each bay has its own target. The seagrass targets themselves are not regulatory standards, and are for informational and management purposes only. The results from the 2012 seagrass maps show target achievement for half of the 6 bays in Sarasota County and shortcomings in 3 bays. Cumulatively, the acreage of seagrass in 2012 greatly exceeds the sum of the bay targets.

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## **Background**

Seagrasses are marine flowering plants that provide habitat and forage material for various species of animals. In Florida, seagrasses support an estimated \$5.7 billion dollar recreational fishery with more than 70% of the major recreational fish species dependant on seagrass for some portion of their life cycle. Seagrasses provide food for manatees and turtles, both charismatic spokesmen of the coastal environment. Seagrasses also increase water clarity by capturing and stabilizing sediments that would otherwise create turbid conditions in our bays.

Seagrass acreage is a commonly used indicator of watershed management. Excess nutrients cause algal blooms which block sunlight from reaching the seagrasses on the bottom of the bay. Without sufficient sunlight, seagrass photosynthesis is inhibited and the overall acreage of seagrass declines.

Sarasota County has used seagrass as an internal performance measure for watershed management for several years and has also included seagrass monitoring as a component of the National Pollution Discharge Elimination System (NPDES) Municipal Separate Stormwater Sewer System (MS4) Permit monitoring plan. The purpose of NPDES MS4 monitoring is to demonstrate that pollutants coming from the stormwater system are being controlled to the maximum extent practicable. The primary watershed effects on the bays are from stormwater.

The three National Estuary Programs (NEPs) in Southwest Florida, Sarasota Bay, Charlotte Harbor, and Tampa Bay have all adopted seagrass targets in cooperation with their partners, including Sarasota County. The individual bays were found to have unique characteristics in regard to circulation, the influence of tributaries, water depth and other qualities that made individual, bay-specific targets appropriate. In 2012, numeric nutrient criteria (NNC) for Florida were adopted by the Florida Department of Environmental Protection based on recommendations from the NEPs. The NNCs were derived from the seagrass targets. These criteria were ultimately accepted by the U.S. Environmental Protection Agency as Surface Water Quality Standards in support of the Clean Water Act.

The Sarasota Bay NEP targets were chosen as the greater of two possible values. The target was either the historical acreage (circa 1950) or the average of the 2004-2006 seagrass acreages, a time period when seagrass was doing reasonably well. The targets were corrected to exclude areas that were no longer restorable such as land features created by dredge and fill like Bird Key. The Charlotte Harbor NEP used a similar rule but chose the greater of either circa 1950 or the average acreage from 1988 to 2006. The exception to these rules was the target set for Little Sarasota Bay. The 1950 acreage was greater than the average of 2004 and 2006 but the closing of Midnight Pass in 1983 was such major change that using the historical coverage would not be justified, so the average of 2004 and 2006 was used as a default value. Since the NEP target set for Sarasota Bay included both Sarasota and Manatee County, the target used in this analysis was adjusted to include only the portion of Sarasota Bay within Sarasota County. Table 1 lists the segments and their respective targets. Note that the Sarasota Bay target was based on the entire bay, which had a greater acreage bay-wide in 1950.





Figure 1: Bays in Sarasota County

Estuary Program	Bay	Historical	Modern Average	Target
SBEP	Sarasota Bay	2,022	2401	2,022
	Roberts Bay	283	348	348
	Little Sarasota Bay	883	702	702
	Blackburn Bay	273	447	447
CHNEP	Dona / Roberts Bays	112	91	112
	Lemon Bay	880	1,099	1,009

Table 2: Seagrass Targets within Sarasota County

Seagrass acreage is mapped by the Southwest Florida Water Management District (SWFWMD) Surface Water Improvement and Management (SWIM) Program every two years. SWFWMD contractors

collect digital aerial photography from Pinellas to Charlotte County under rigorous quality control specifications. The aerals are converted to Geographic Information System (GIS) format so that it can be compared to maps from previous years. Creating accurate seagrass maps from aerial photography is challenging. Confounding factors that can effect accurate identification of seagrass in photography can include drift algae, oyster beds, turbid or colored water, waves, and sun reflecting on the water. To support aerial mapping, since 2006 Sarasota County has worked closely with the SWFWMD to conduct field surveys (called “ground truthing”) at the same time as when the aerial photographic surveys are being flown. As a result, the data collected in recent years is more accurate. The 1948 maps are among the least accurate because they were black and white images and were not intended to be used for mapping seagrass.

Seagrass coverage is mapped in two categories: patchy and continuous. This report is an analysis of the total acreage, a combination of patchy and continuous seagrass. A trend toward more continuous seagrass would indicate a positive trend. See Appendix 3 for more information.

Seagrass is a complex and dynamic natural ecosystem that is influenced by many factors, not just nitrogen and algae. Herbivores like manatees, turtles or urchins may reduce acreage through grazing, dark water from stormwater runoff may shade the seagrass, and epiphytic algae growing directly on the seagrass blades may have an influence. Regardless of the challenges in data analysis, seagrass is a critical coastal habitat that is used as a valuable measure of estuarine health in coastal communities around the planet.

Sarasota County also operates a Volunteer Seagrass Monitoring Program to learn about and to monitor the health of our seagrasses and to educate students and other interested persons about seagrass – by far the largest underwater habitat feature in our area. Seagrass is in a global decline and some problems, like a shift from one species to another is not visible from an aircraft. The volunteer seagrass monitoring program is not the subject of this report.

## **Analysis**

The SWFWMD recently released the 2012 seagrass maps for southwest Florida. This report provides an analysis of seagrass acreage in Sarasota County only and does not include the portions of Sarasota and Lemon Bays within adjacent counties. County-wide there has been a general increase in seagrass acreage, nearing or exceeding the amount of seagrass visible in the relatively pristine period of the 1950s. In 2012, there were approximately 1,300 more acres of seagrass than there was in 1948, as shown in Figure 1. The red line in Figure 1 is the sum of the six targets and is 4,640 acres of seagrass. Similar success at seagrass restoration has been documented in Tampa Bay and Charlotte Harbor and has been attributed primarily to the implementation of the Grizzle-Figg legislation in 1990 that mandated advanced wastewater treatment (low nitrogen) for discharges of treated sewage to surface waters in southwest Florida. Improved stormwater regulations also contributed to this success.

### Seagrass in All Sarasota County Bays

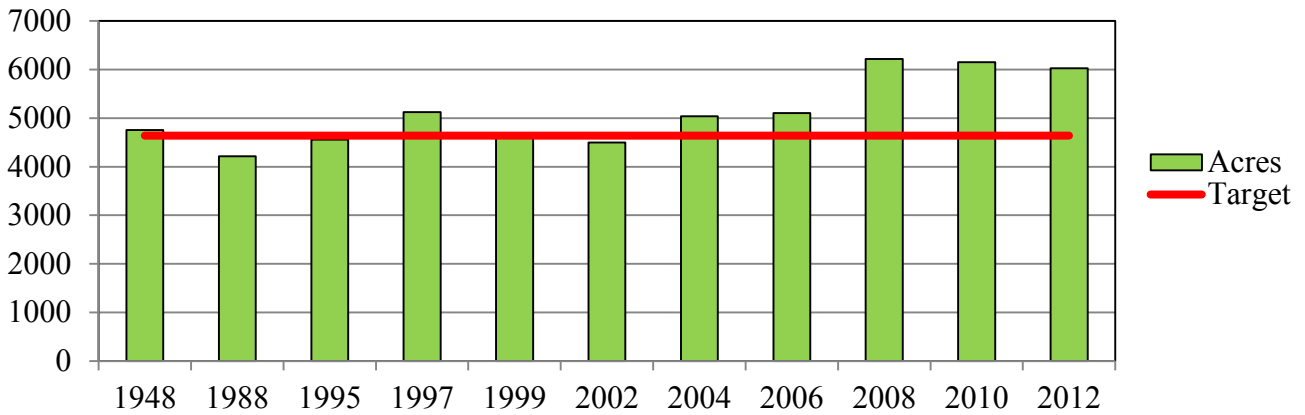


Figure 2: Seagrass acreage County-wide for all years

Although there has been a cumulative increase in seagrass in recent years, all bays have not achieved their individual seagrass targets. In 2012, Sarasota Bay, Little Sarasota Bay and Lemon Bay achieved targets but Roberts Bay, Blackburn Bay and the Dona and Roberts Bay area did not. Figure 2 depicts the achievement of targets. Green boxes indicate meeting the target and red boxes indicate acreage less than the target. Each bay is discussed individually below.

Below Target	Sarasota Bay	Roberts Bay	Little Sarasota Bay	Blackburn Bay	Dona / Roberts Bays	Lemon Bay
Achieves Target						
1948						
1988						
1995						
1997						
1999						
2002						
2004						
2006						
2008						
2010						
2012						

Figure 3: Assessment of Seagrass Targets in Sarasota County

## Sarasota Bay

The SBEP Sarasota Bay target is 7,269 acres and is based on the historic extent and covers the entire bay, both in Manatee and Sarasota County. The Sarasota County portion is 2,022 acres and has been exceeded almost every year that seagrasses have been mapped. Seagrass acreage since 2006 has been more than 1000 acres (50%) over the target on average. The urbanized contributing watersheds include the City of Sarasota and Town of Longboat Key. The presence of Big Pass and New Pass allow tidal mixing of bay and Gulf water bodies and prevents the persistent accumulation of pollutants in lower Sarasota Bay.

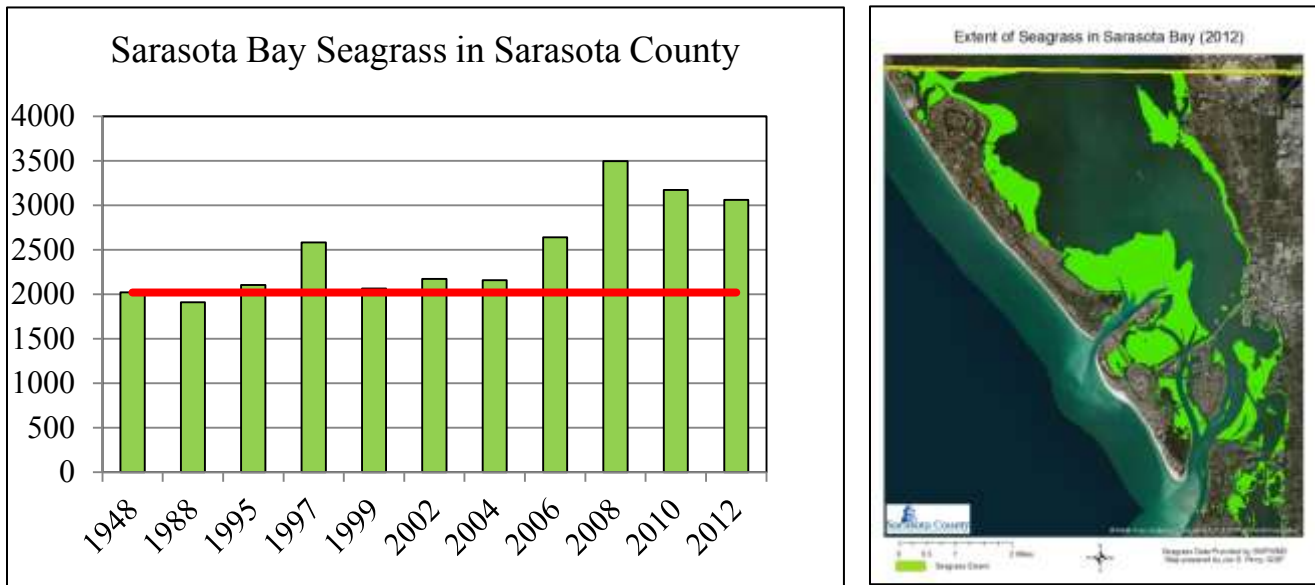


Figure 4: Sarasota Bay Seagrass in Sarasota County

## Roberts Bay (north)

The Roberts Bay target is 348 acres and is based on the average of 2004 and 2006. Seagrass acreage from 2006 through 2012 has been about 9% (32 acres) below the target on average. The large and urban Phillippi Creek watershed drains to Roberts Bay and may be the cause of the failure to achieve seagrass targets. The replacement of septic systems with central sewer system service is expected to improve water quality in Roberts Bay and may also increase seagrass acreage in coming years. The SWFWMD has estimated that there may be mapping error where oyster beds were incorrectly mapped as seagrass in previous maps. County staff is investigating mapping accuracy and pollutant loading to learn more about the situation.

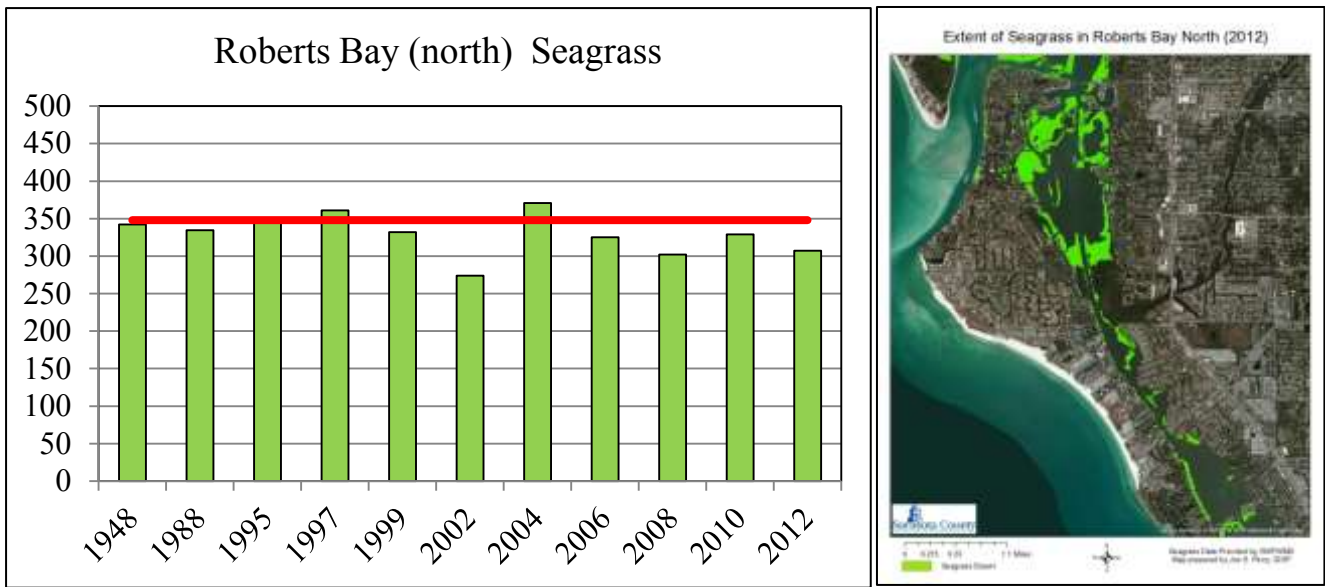


Figure 5: Roberts Bay Seagrass

Little Sarasota Bay

The seagrass target for Little Sarasota Bay is 702 acres and is based on the average of 2004 and 2006 despite the fact the historical average was greater. It is believed that the closure of Midnight Pass in 1983 caused a reduction in seagrass and Little Sarasota Bay is still rebounding from that event, but has not yet reached the 1950s level. Appendix 5 has more information about Midnight Pass. The acreage has averaged 25% (175 acres) more than the target on average since 2008. Little Sarasota Bay is located midway between Venice inlet and Big Pass and has a relatively little mixing with Gulf of Mexico waters. The watersheds contributing to Little Sarasota Bay are relatively small in size and are suburban so do not have the intense pollutant loading of a more urban area.

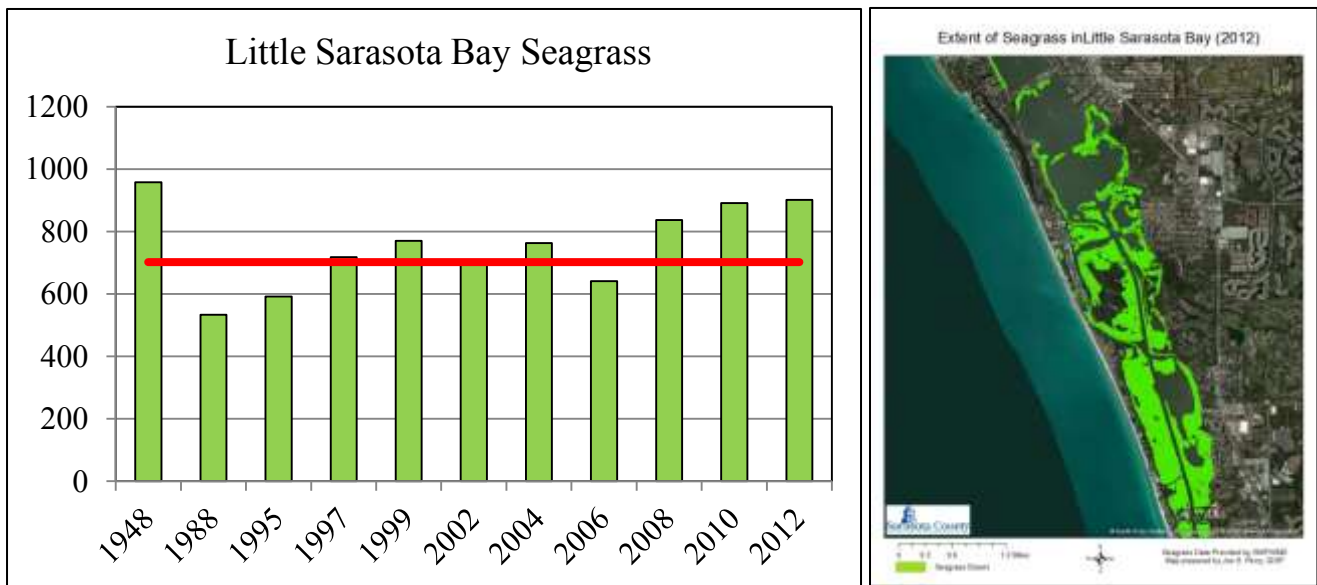


Figure 6: Little Sarasota Bay Seagrass

## Blackburn Bay

In Blackburn Bay the target was set at 447 acres and is based on the average of 2004 and 2006. Although not achieving the targets in the last four assessments, Blackburn Bay has the greatest seagrass coverage of any bay (58%) and the overall coverage is increasing. The deficiency has averaged 13% (59 acres) less than the target on average since 2006. The acreage in 1948 is below the target. Blackburn Bay has only one major tributary, South Creek, which is a relatively undeveloped watershed. Staff will investigate possible causes of the seagrass deficit.

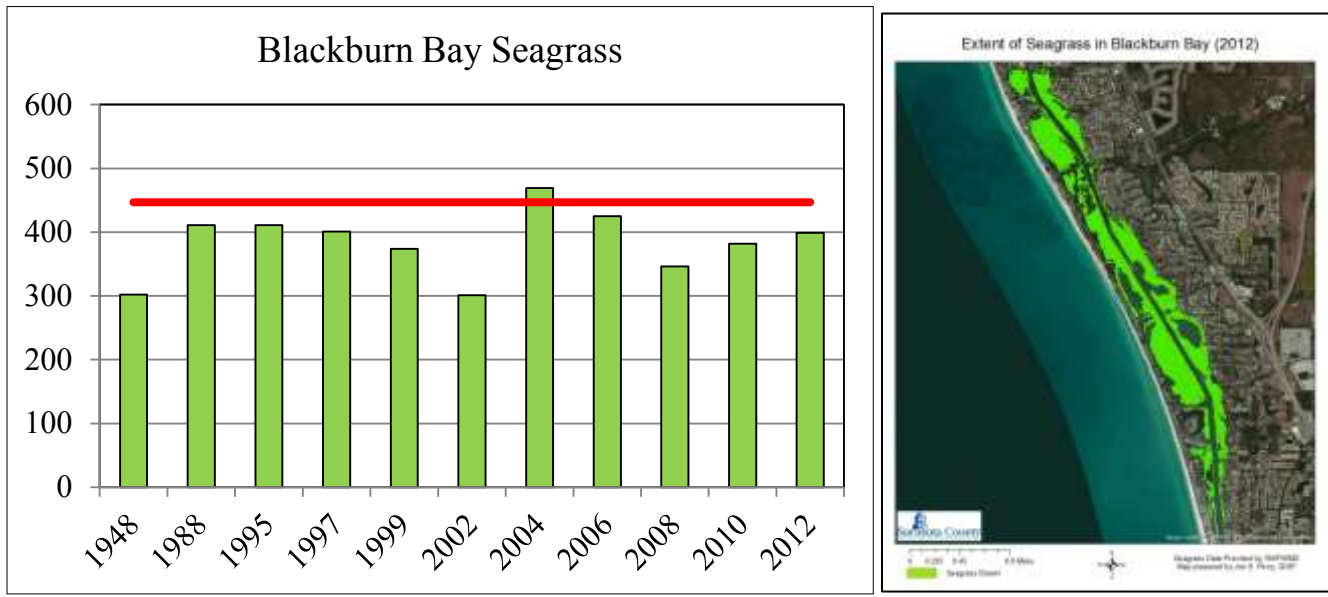


Figure 7: Blackburn Bay Seagrass

## Dona / Roberts Bays Area

The area near Venice Inlet includes the Lyons, Dona, and Roberts Bays and is influenced by blackwater (tannic) flows from Cowpen Slough, Shakett Creek, Hatchett Creek, Myakka River (via Blackburn Canal and Curry Creek) and from northern Lemon Bay (via the Intracoastal Waterway). It is believed that this dark, tannic water has the dominant shading effect on seagrass in this bay system. It is predicted that diversions of unnaturally high flows from Cow Pen Slough by the Dona Bay project will restore seagrass to historic levels as the bay clarity increases. The seagrass target is 112 acres and is based on the 1948 aerial map. This bay system does not support much seagrass except in the relatively natural Lyons Bay and near the inlet. The average deficit over the last three assessments is 31 acres (27%).

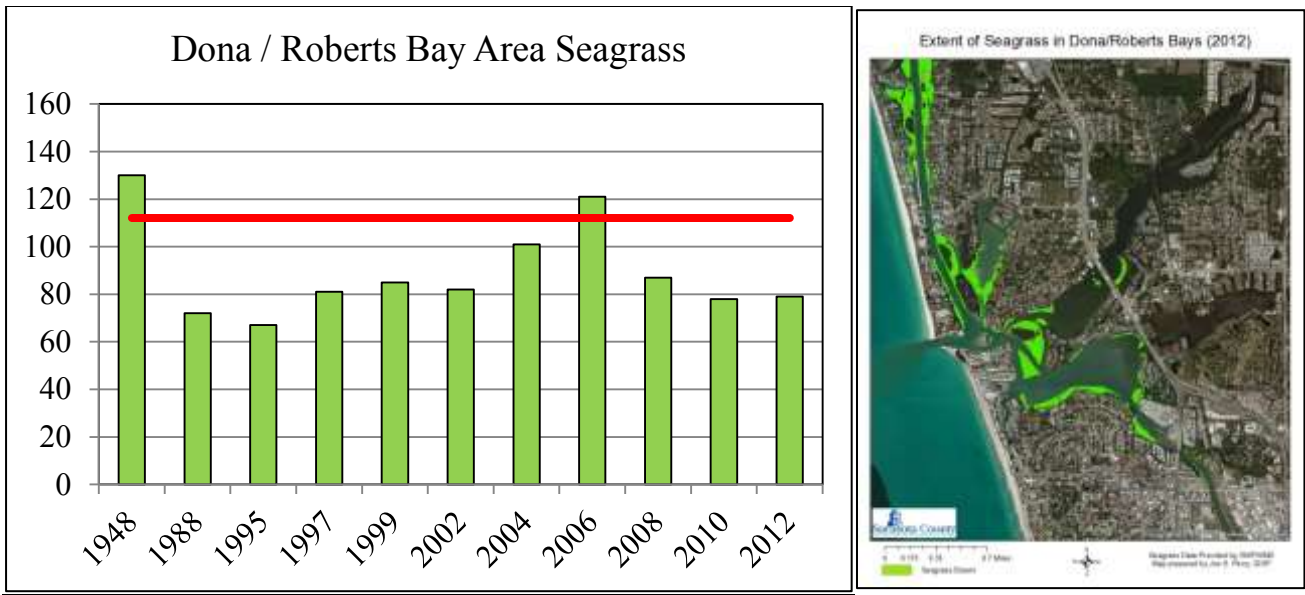


Figure 8: Dona / Roberts Bays Seagrass

Lemon Bay

Seagrass in Lemon Bay is increasing and is well above the CHNEP target of 1009 acres that was based on the average of recent years. Since 2008 the surplus has been about 230 acres (23%) above the target on average. The Lemon Bay watershed includes no large tributaries but in the northern portion (Alligator Creek) many septic systems are in close proximity to waterways. Capital improvement projects underway in the watershed can be expected to improve water quality in Lemon Bay.

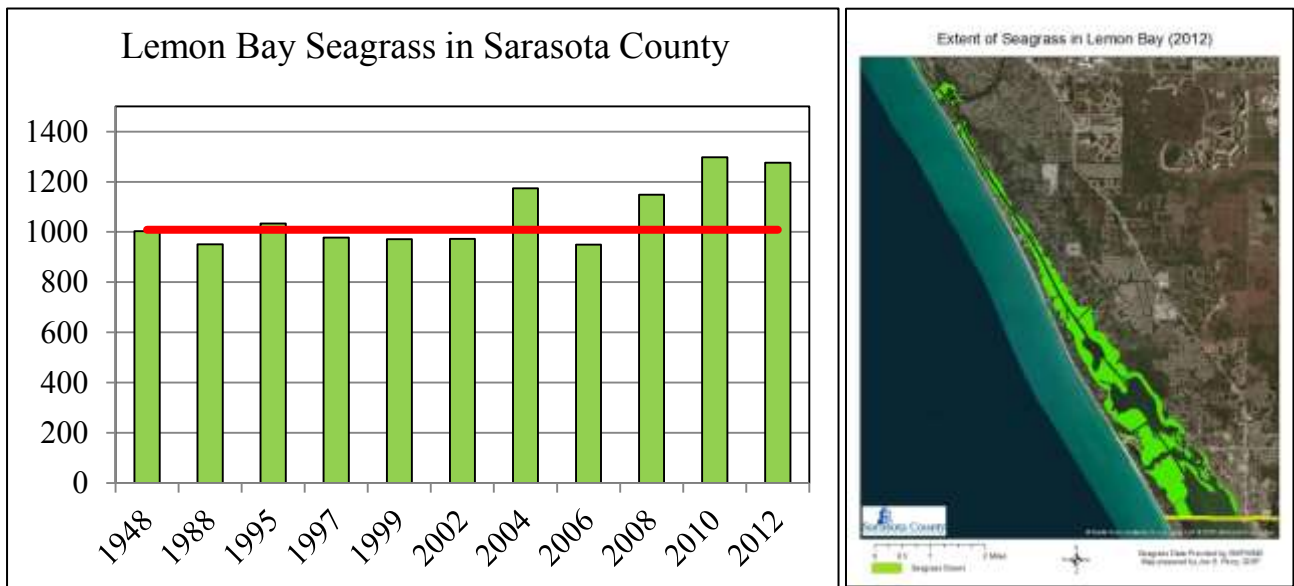


Figure 9: Lemon Bay Seagrass

Additional analysis about the relationship between seagrass and bay water quality may be found on the Bay Conditions pages of the Sarasota Water Atlas website at: <http://www.sarasota.wateratlas.usf.edu/coastal/conditions-overview.aspx>



## **Recommendations**

In the bays not meeting seagrass targets a better understanding is needed of the causes. Possible explanations include changes in water quality such as nitrogen loading, turbidity, dark color, or mapping error. Natural causes may include increased grazing or biological disturbance of the seagrass beds (stingrays have been known to root up seagrass).

## **Conclusions**

Seagrass acreage is generally increasing in Sarasota County which indicates that successful watershed management is having a positive effect on bay health. It is expected that the increase in seagrass habitat will support an increase of game fish and other aquatic life. In 2012, three bays achieved targets and three did not. Staff will investigate the bays not meeting targets and will report new information as it becomes available. Implementation of water quality and natural systems watershed projects would facilitate attainment of seagrass targets in all bays.



## **Appendices**

Appendix 1: Seagrass Acreage Table

Appendix 2: Seagrass Maps

Appendix 3: Patchy and Continuous Seagrass

Appendix 4: Florida's Seagrasses Poster

Appendix 5: Midnight Pass 1948 to 2012

## **References**

Janicki Environmental, Inc. 2008. Seagrass Targets for the Sarasota Bay Estuary Program. Prepared for Sarasota Bay Estuary Program, Sarasota, FL.

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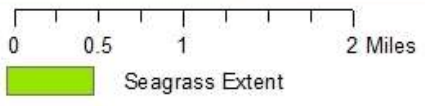
Witherington, D. 2006. Florida's Seagrasses. Loxahatchee River District Poster Series, No.1

## Appendix 1: Seagrass Acreage in Sarasota County

	Sarasota Bay	Roberts Bay	Little Sarasota Bay	Blackburn Bay	Dona / Roberts Bays	Lemon Bay	County Wide
1948	2022	342	958	302	130	1003	4757
1988	1912	335	533	411	72	951	4214
1995	2105	348	592	411	67	1034	4557
1997	2583	361	718	401	81	978	5122
1999	2066	332	770	374	85	971	4598
2002	2172	274	699	301	82	972	4500
2004	2160	371	763	469	101	1174	5038
2006	2641	325	641	425	121	949	5102
2008	3498	302	837	346	87	1148	6218
2010	3174	329	891	382	78	1297	6151
2012	3061	307	902	399	79	1276	6024
Target	2022	348	702	447	112	1009	4640

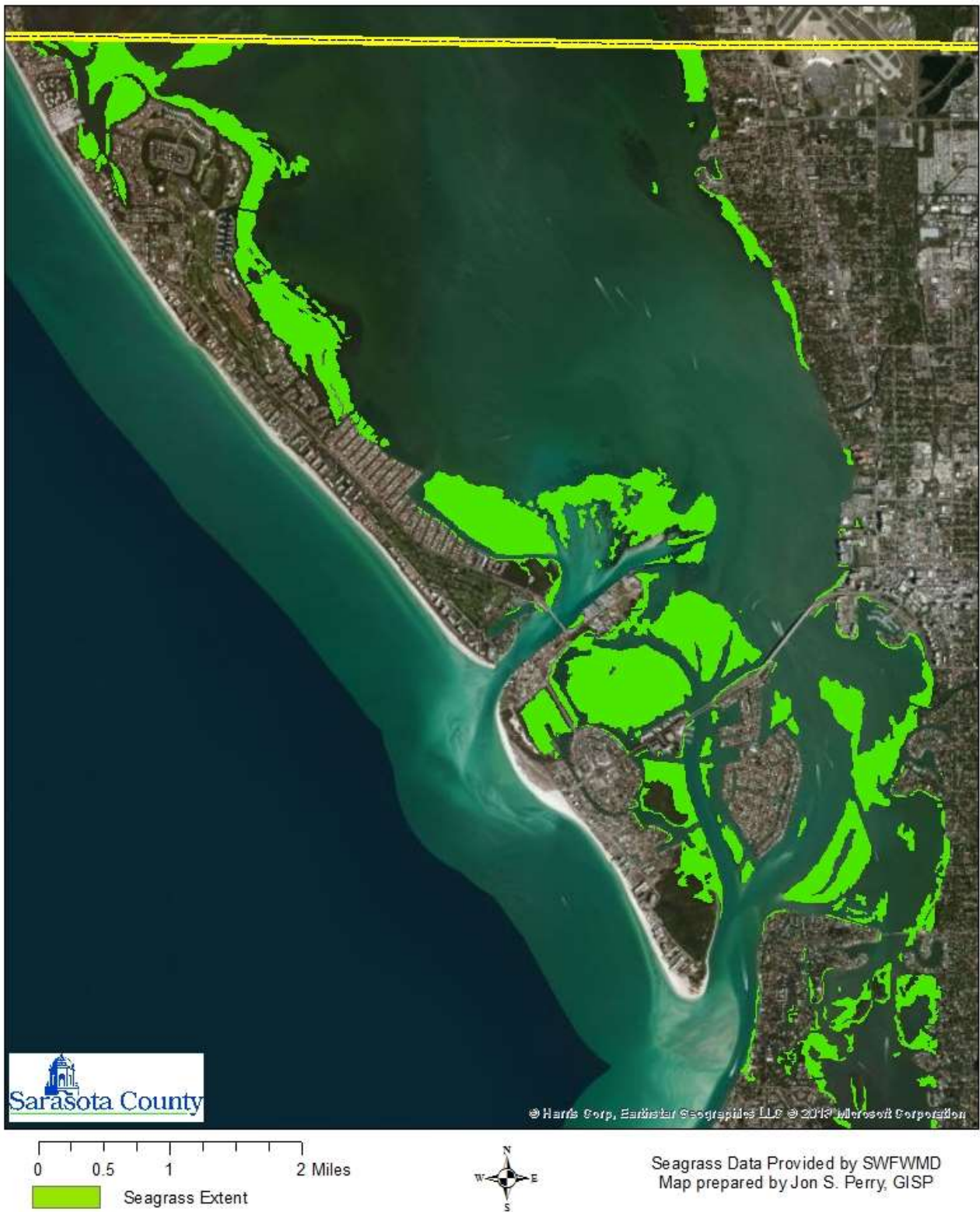
Sarasota Bay  
Seagrass Acreage  
1948 to 2012

### Extent of Seagrass in Sarasota Bay (1948)



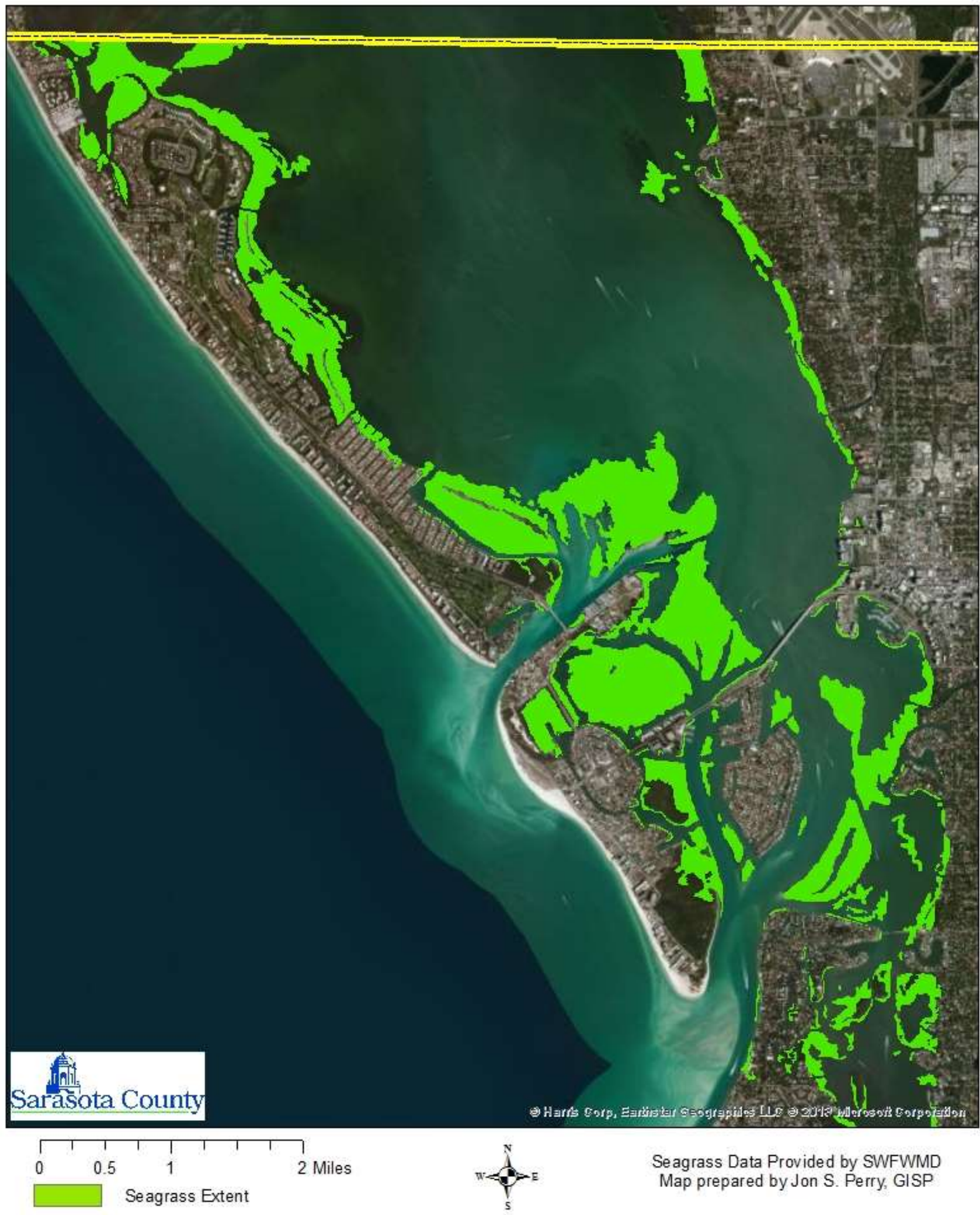
Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

### Extent of Seagrass in Sarasota Bay (1988)





### Extent of Seagrass in Sarasota Bay (1994)



### Extent of Seagrass in Sarasota Bay (1996)

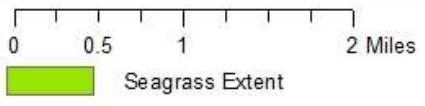




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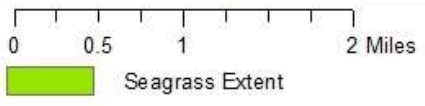
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Map prepared by Jon S. Perry, GISP



### Extent of Seagrass in Sarasota Bay (2001)



Seagrass Data Provided by SWFWMD  
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### Extent of Seagrass in Sarasota Bay (2004)

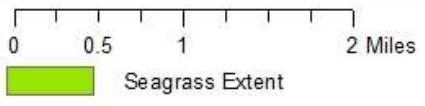




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Map prepared by Jon S. Perry, GISP

### Extent of Seagrass in Sarasota Bay (2008)





### Extent of Seagrass in Sarasota Bay (2010)

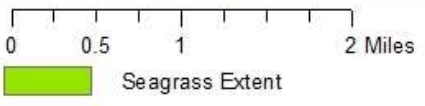


### Extent of Seagrass in Sarasota Bay (2012)



 Sarasota County

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Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

Roberts Bay  
Seagrass Acreage  
1948 to 2012

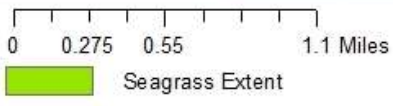
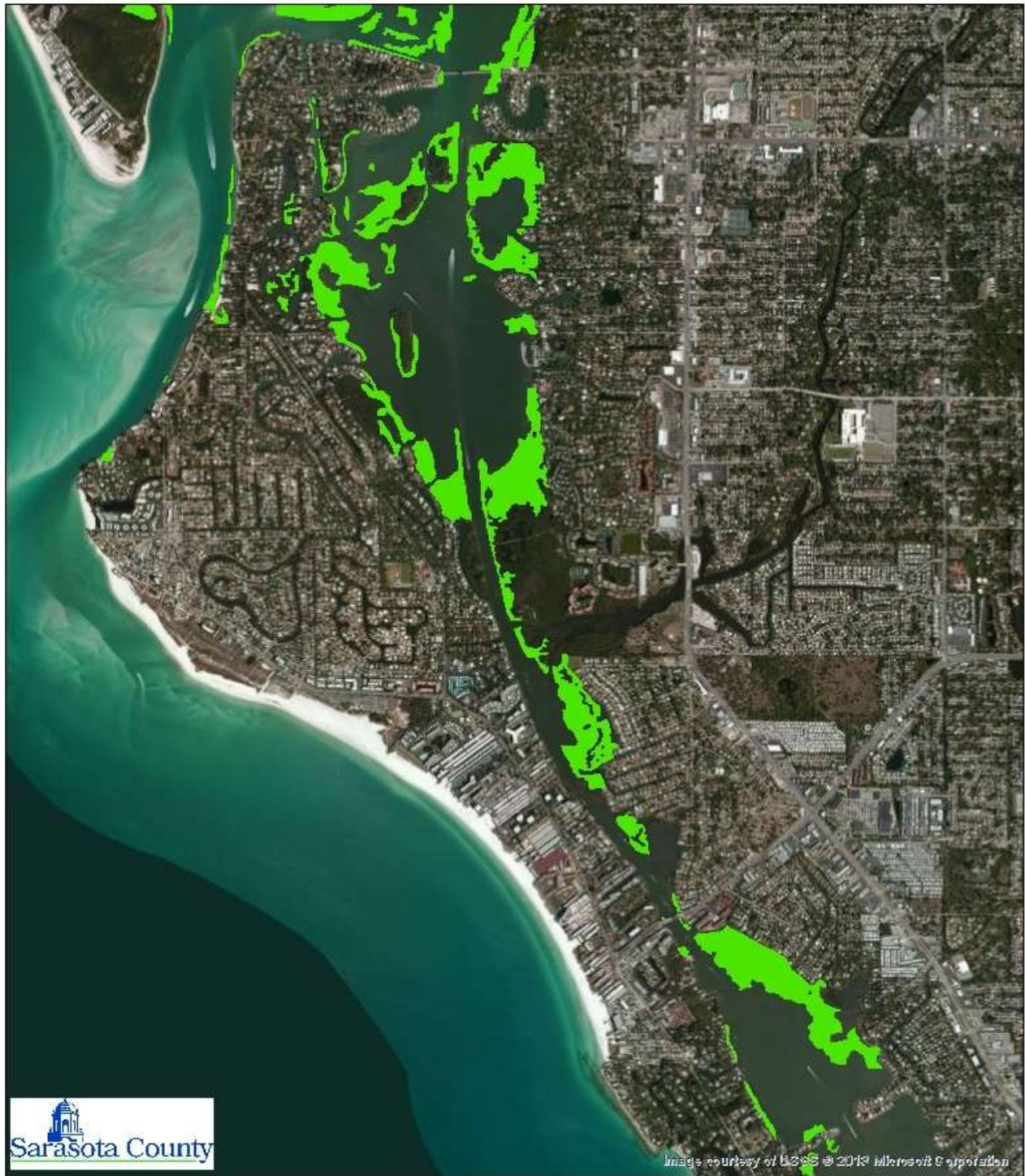


### Extent of Seagrass in Roberts Bay North (1948)





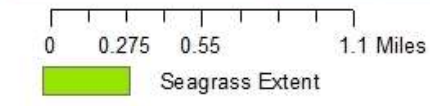
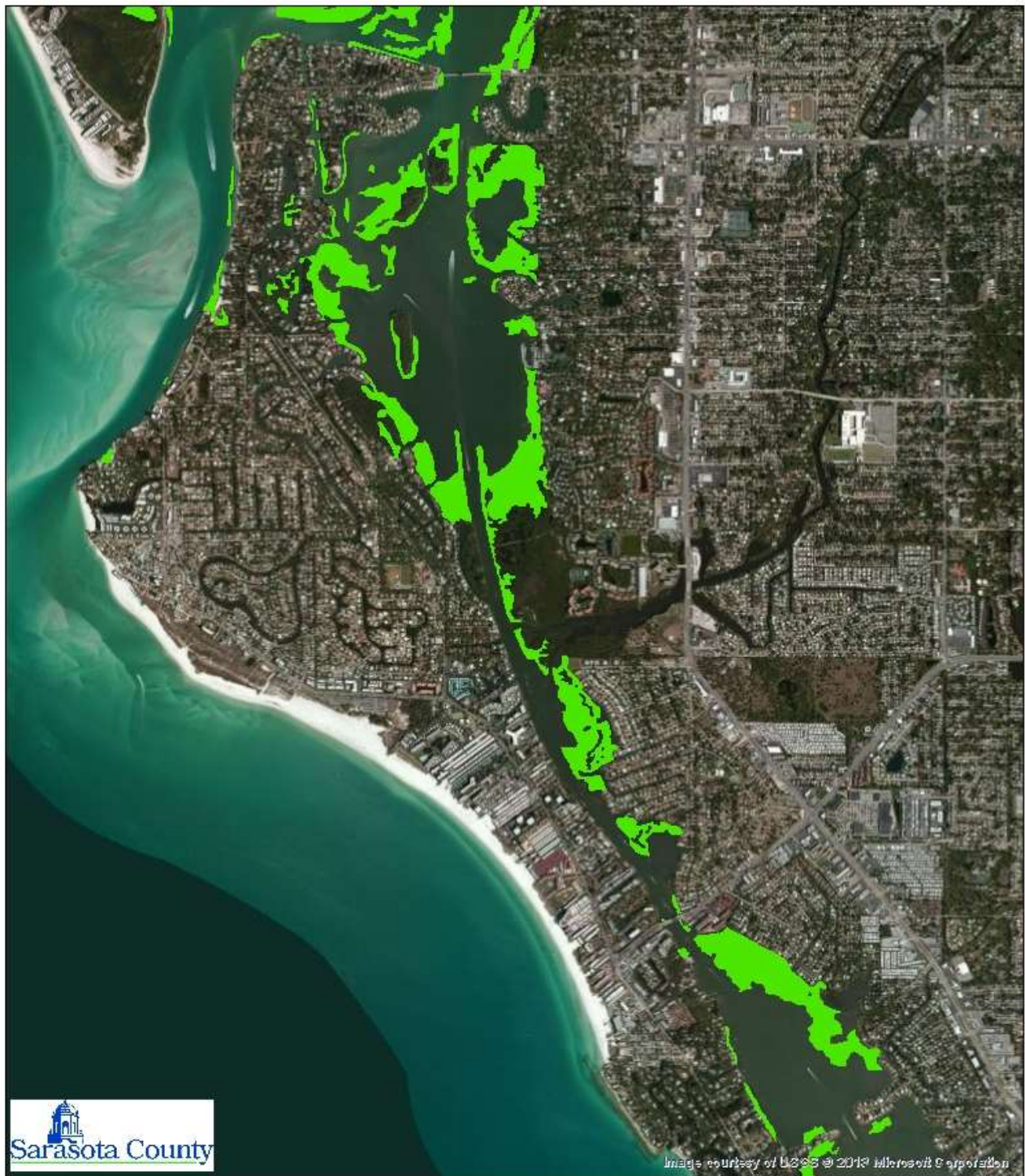
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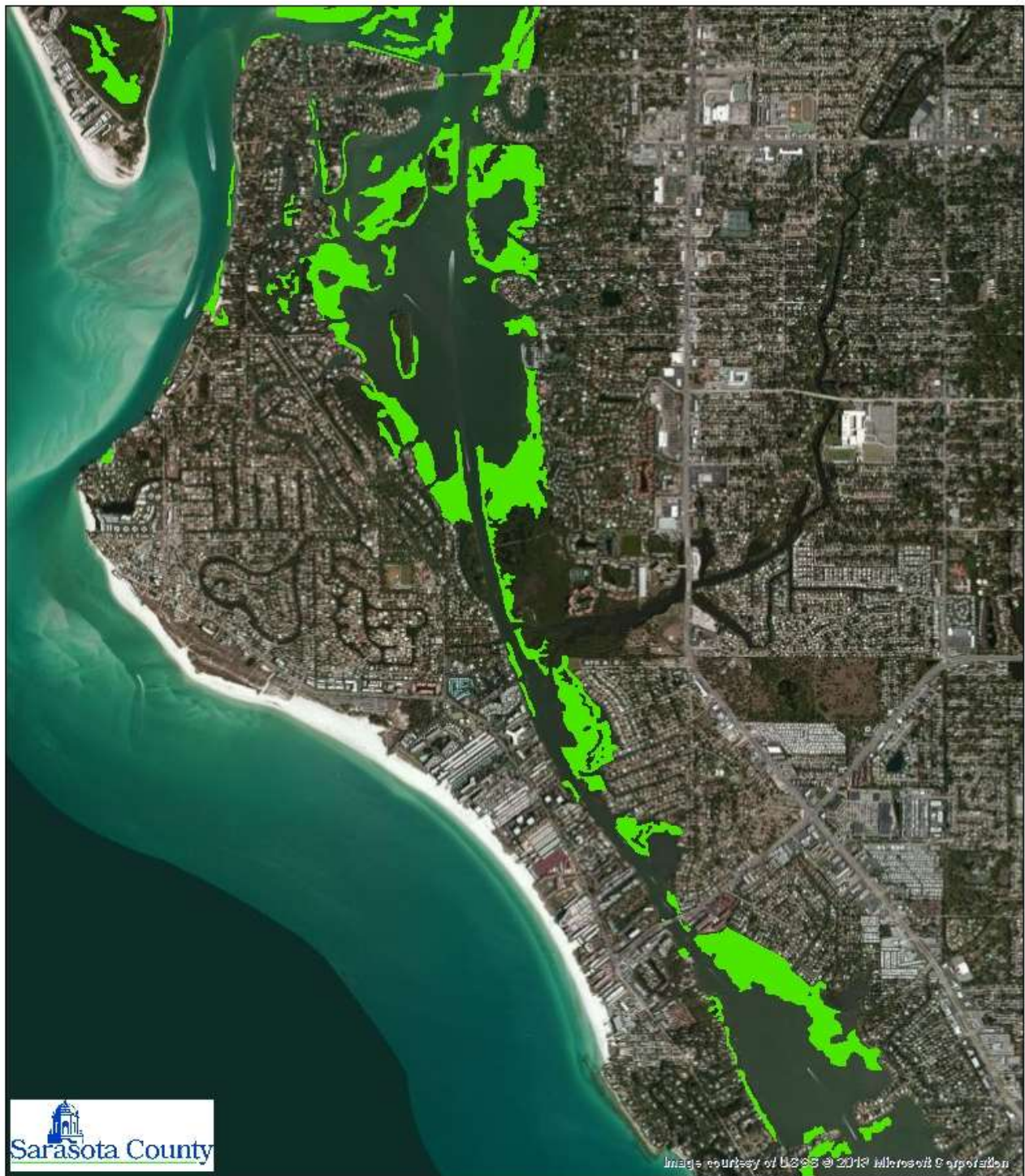
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### Extent of Seagrass in Roberts Bay North (1996)



 Sarasota County

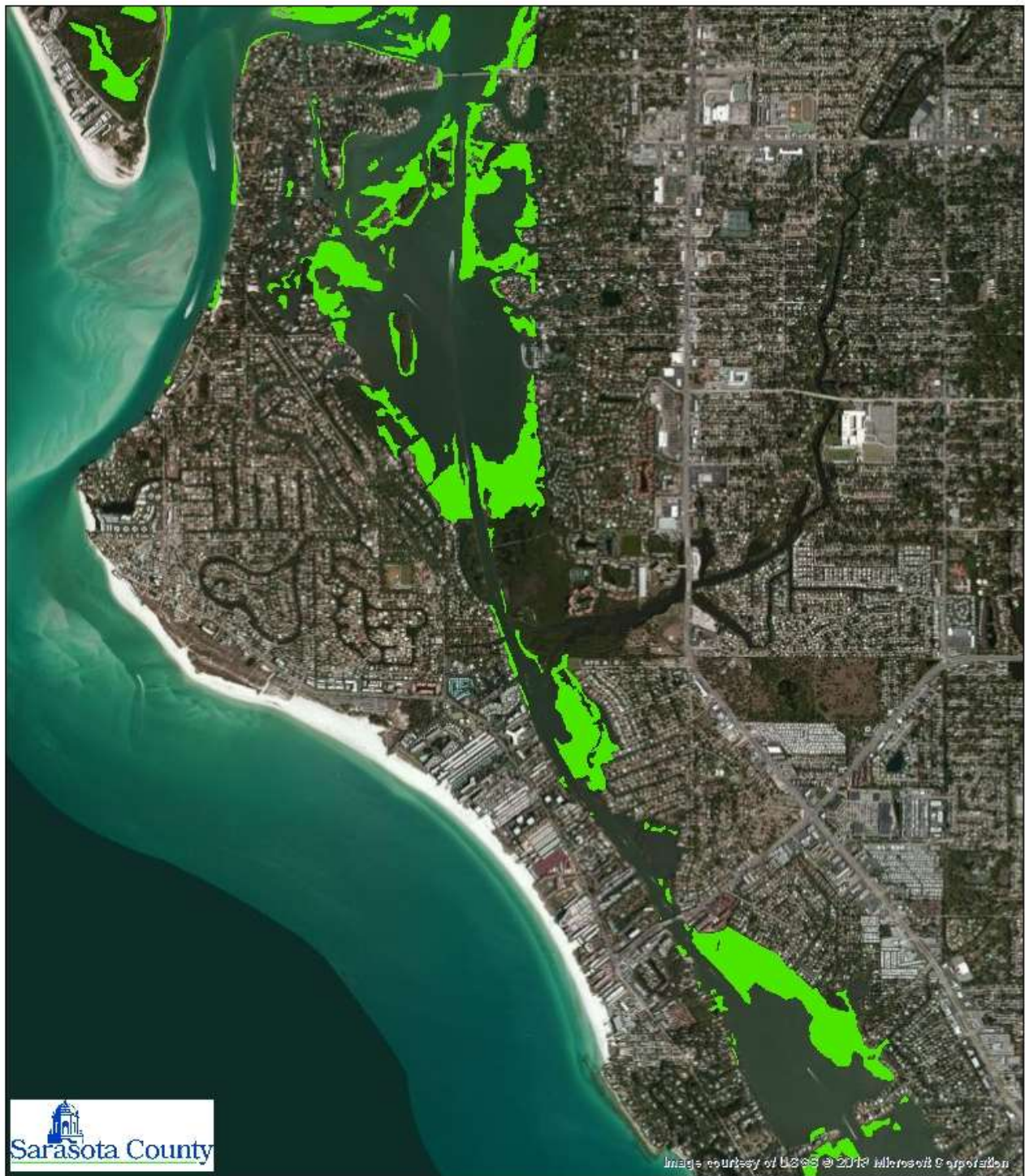
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 Seagrass Extent



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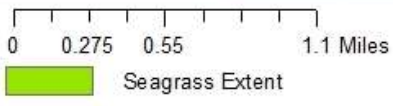
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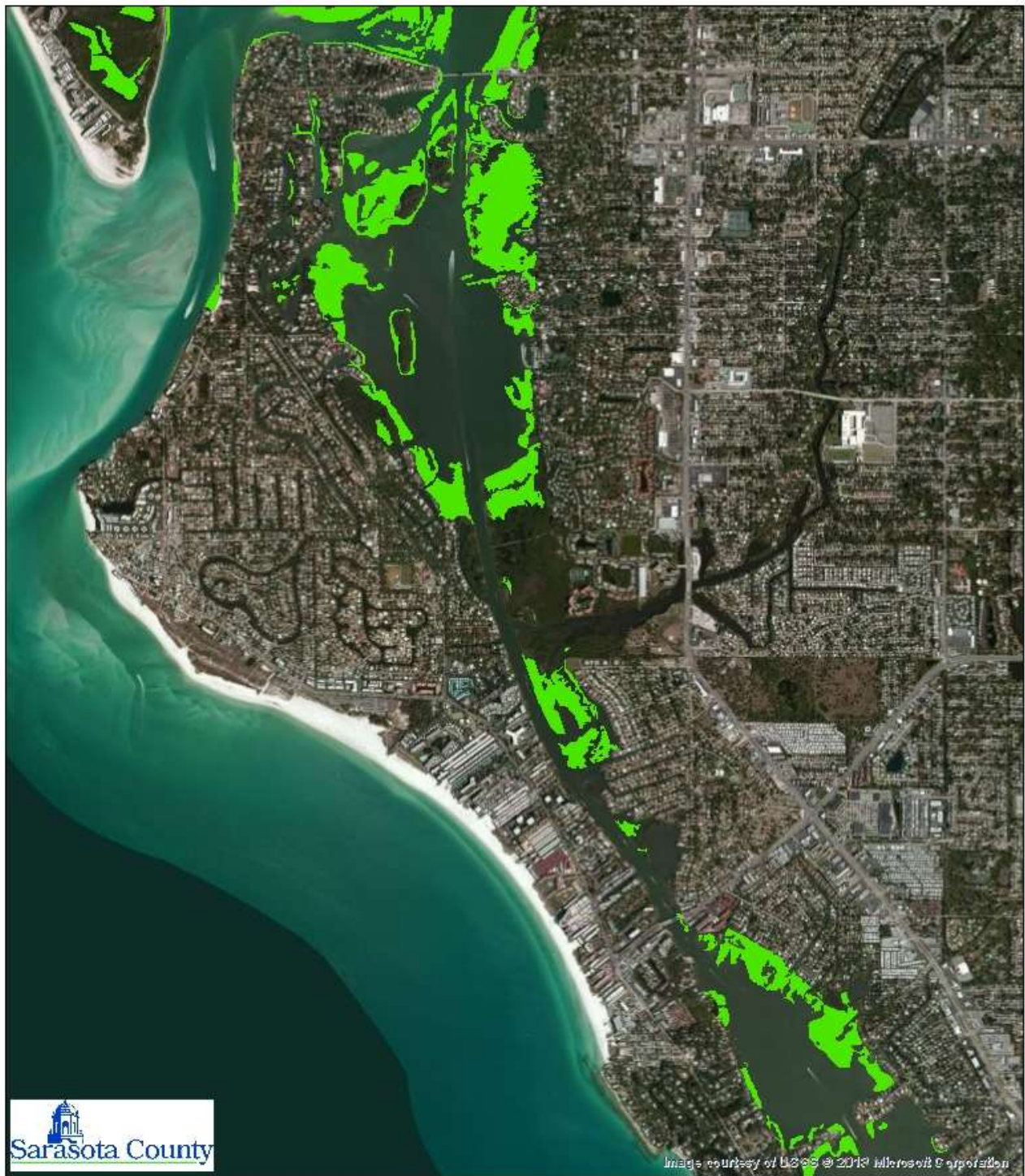


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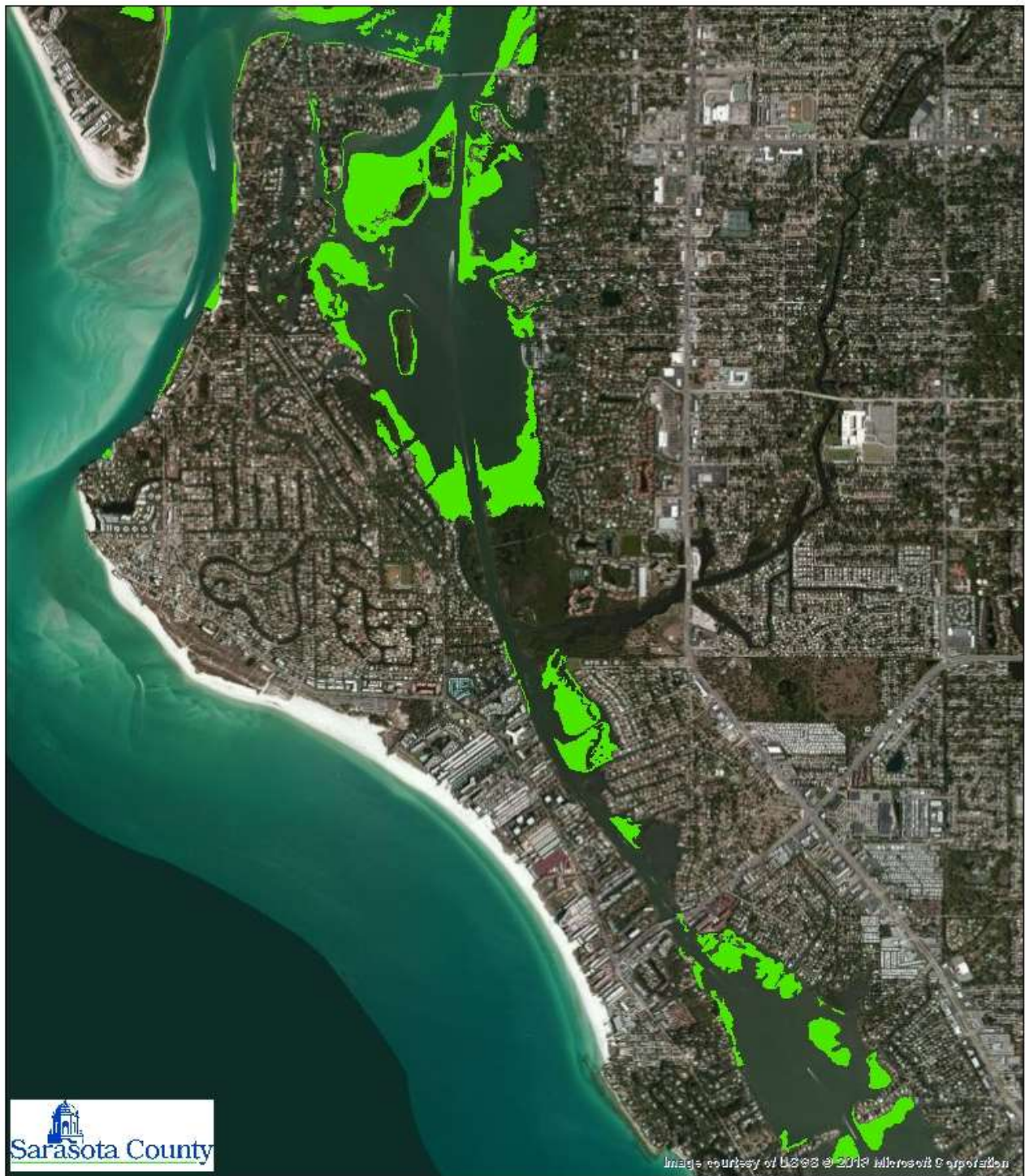


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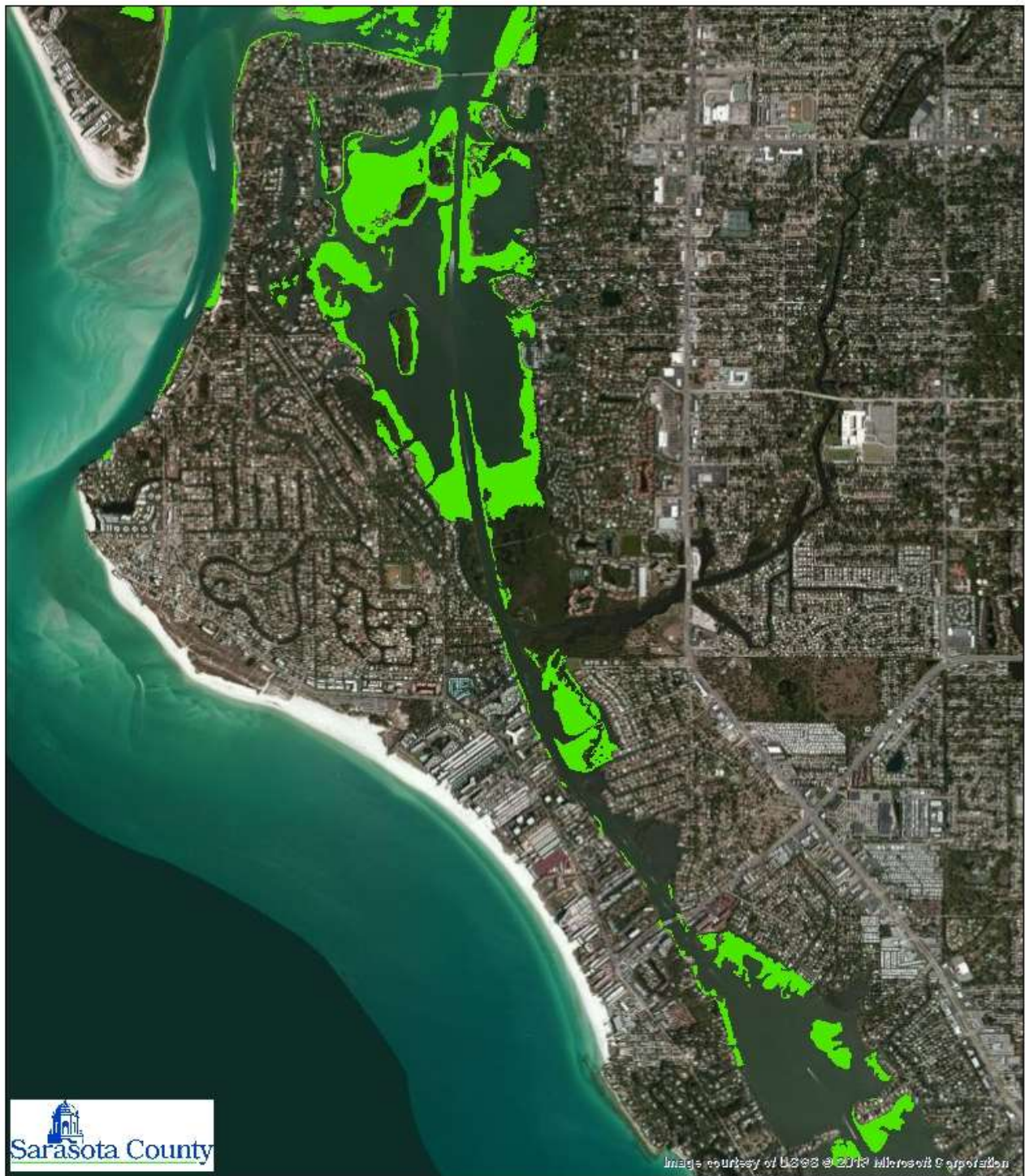


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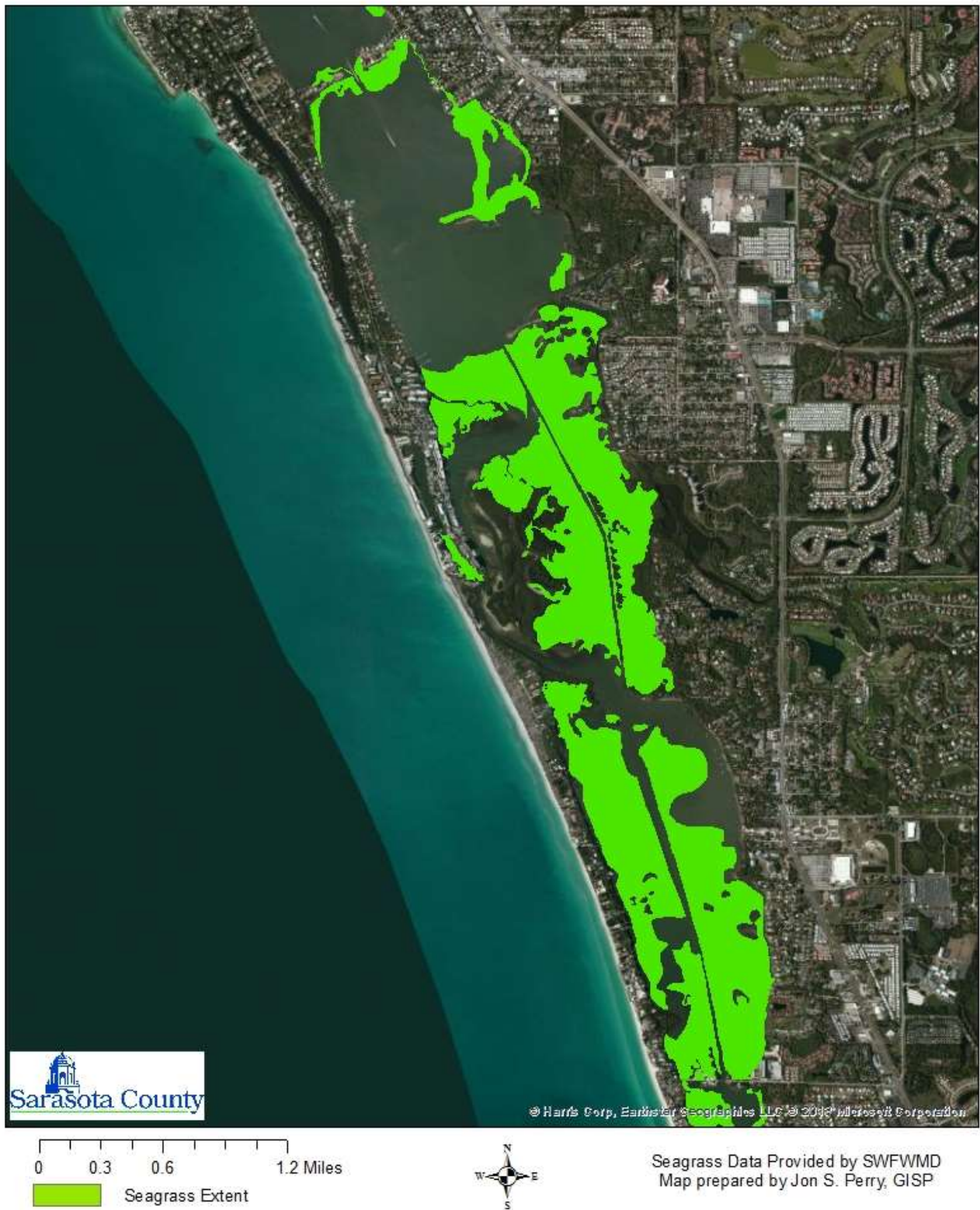
### Extent of Seagrass in Roberts Bay North (2012)



Little Sarasota Bay  
Seagrass Acreage  
1948 to 2012



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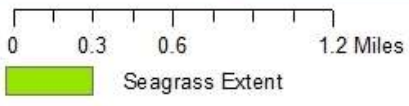




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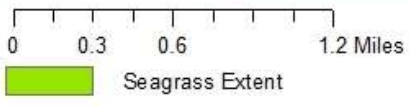
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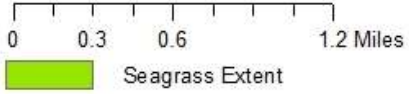


### Extent of Seagrass in Little Sarasota Bay (2001)



 Sarasota County

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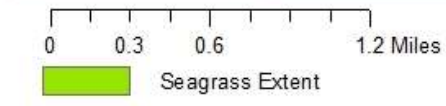




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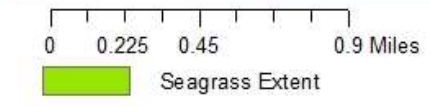
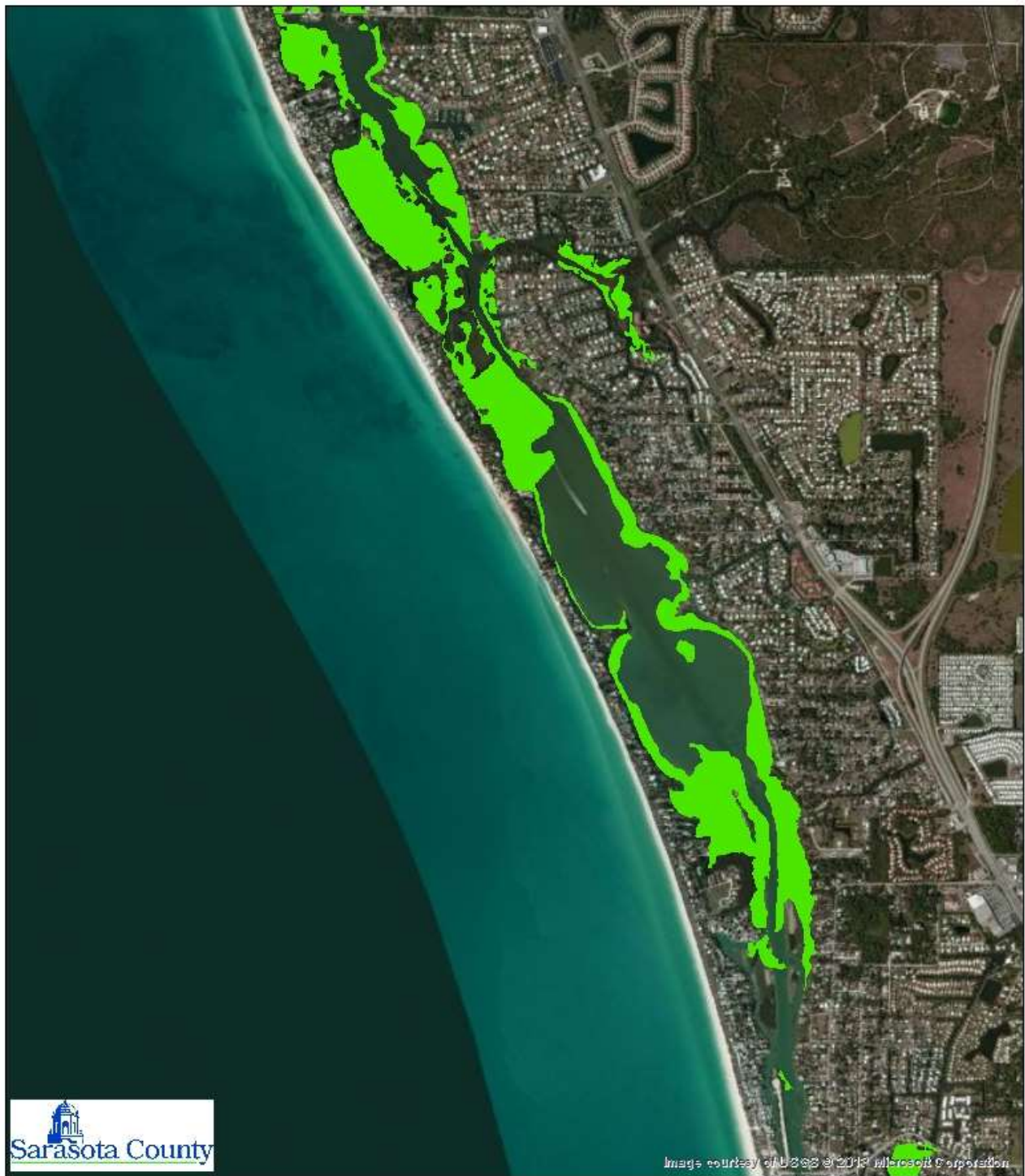


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Seagrass Acreage  
1948 to 2012

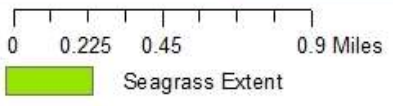
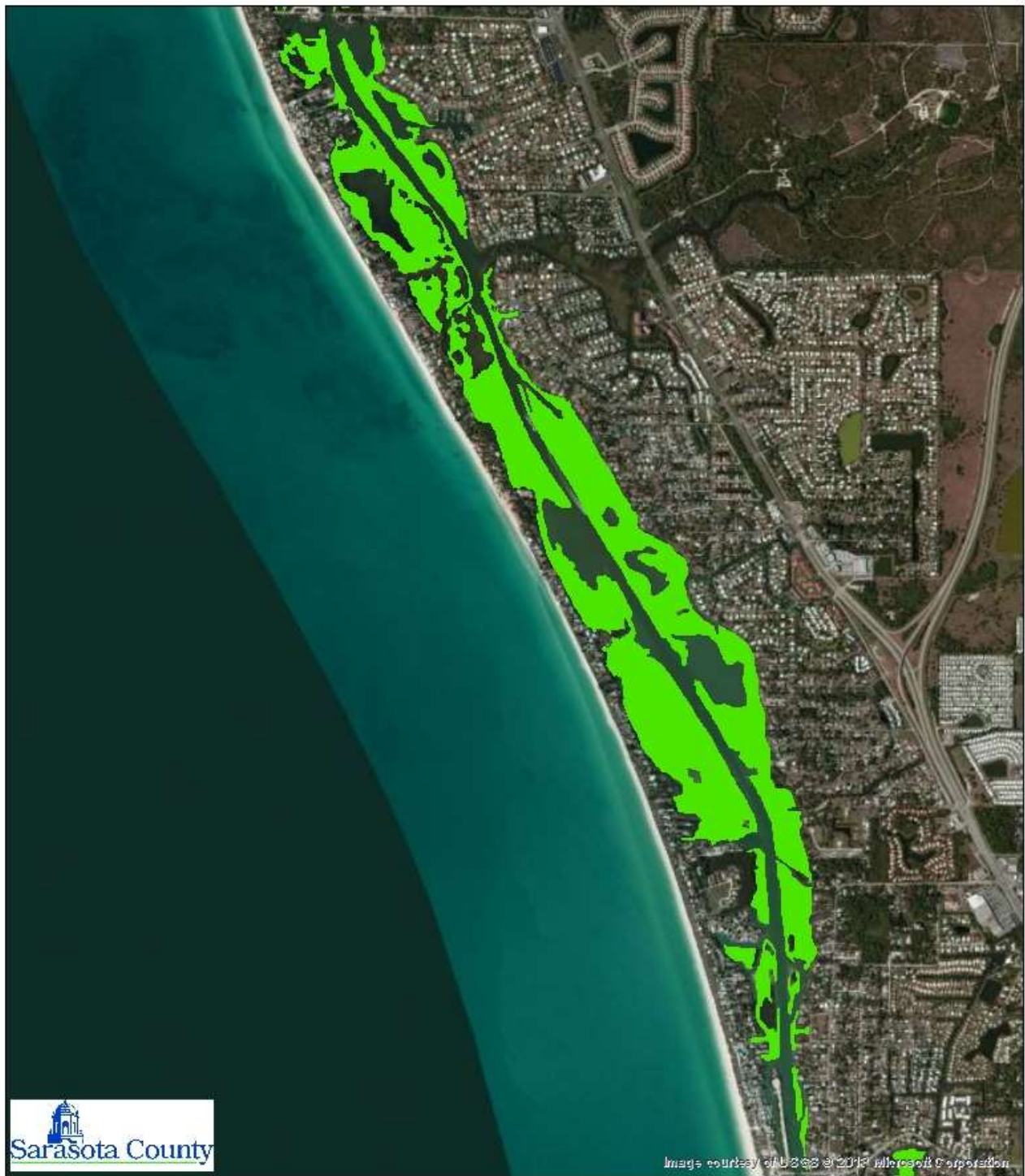
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Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP



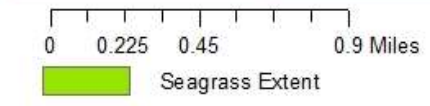
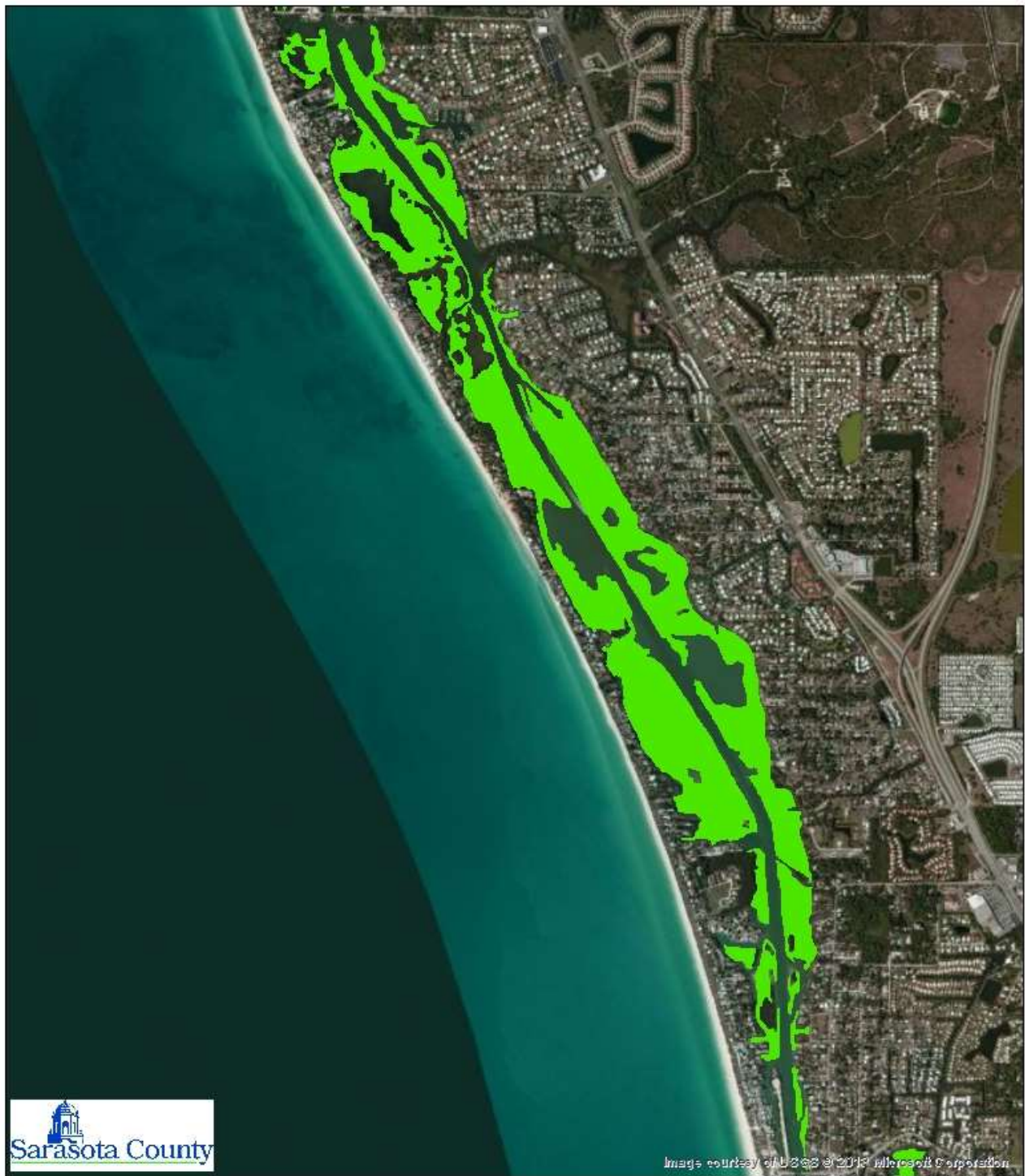
### Extent of Seagrass in Blackburn Bay (1988)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

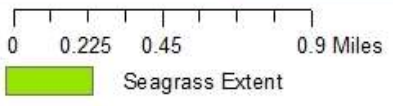
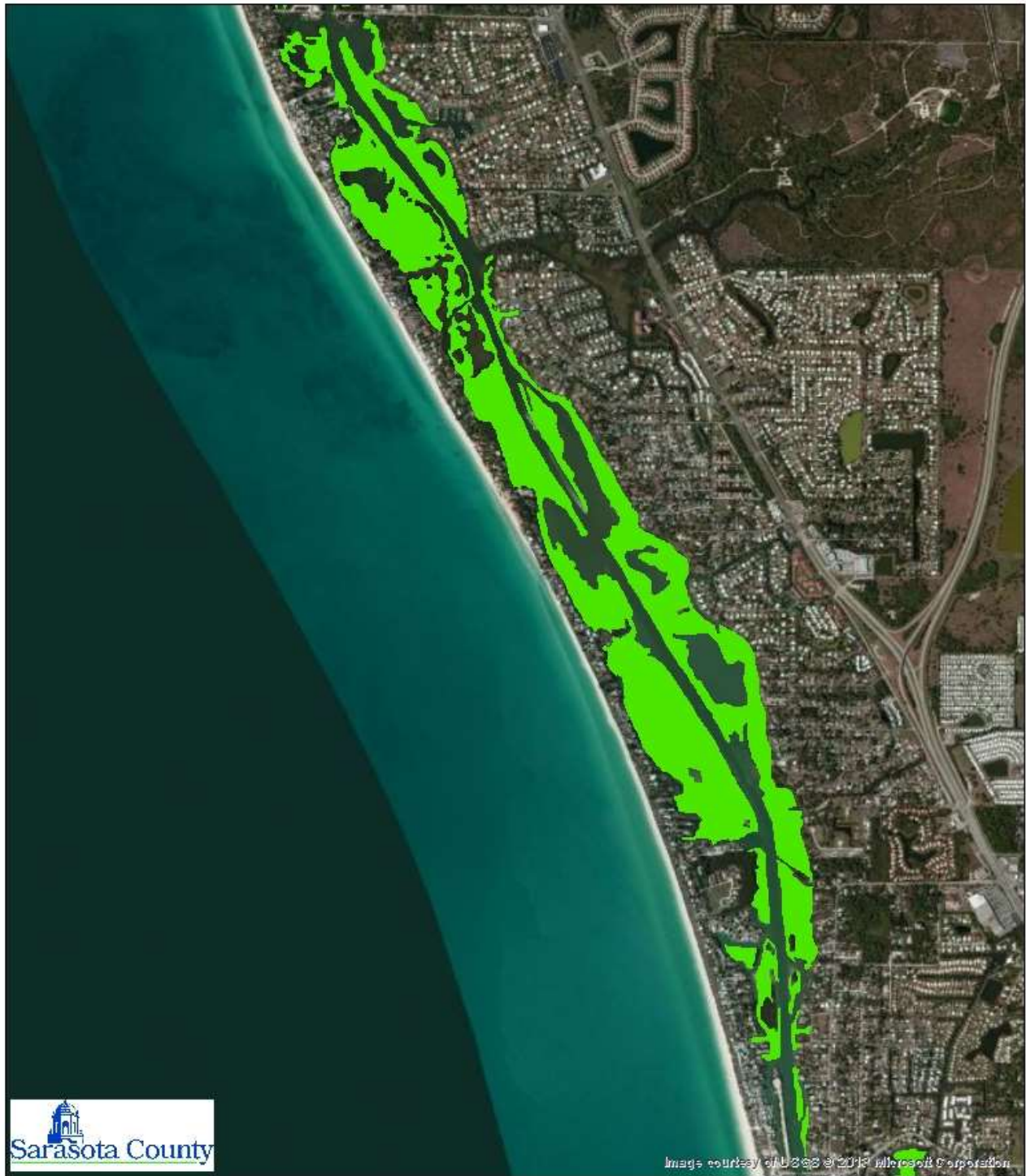


### Extent of Seagrass in Blackburn Bay (1994)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

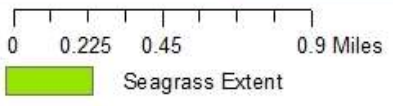
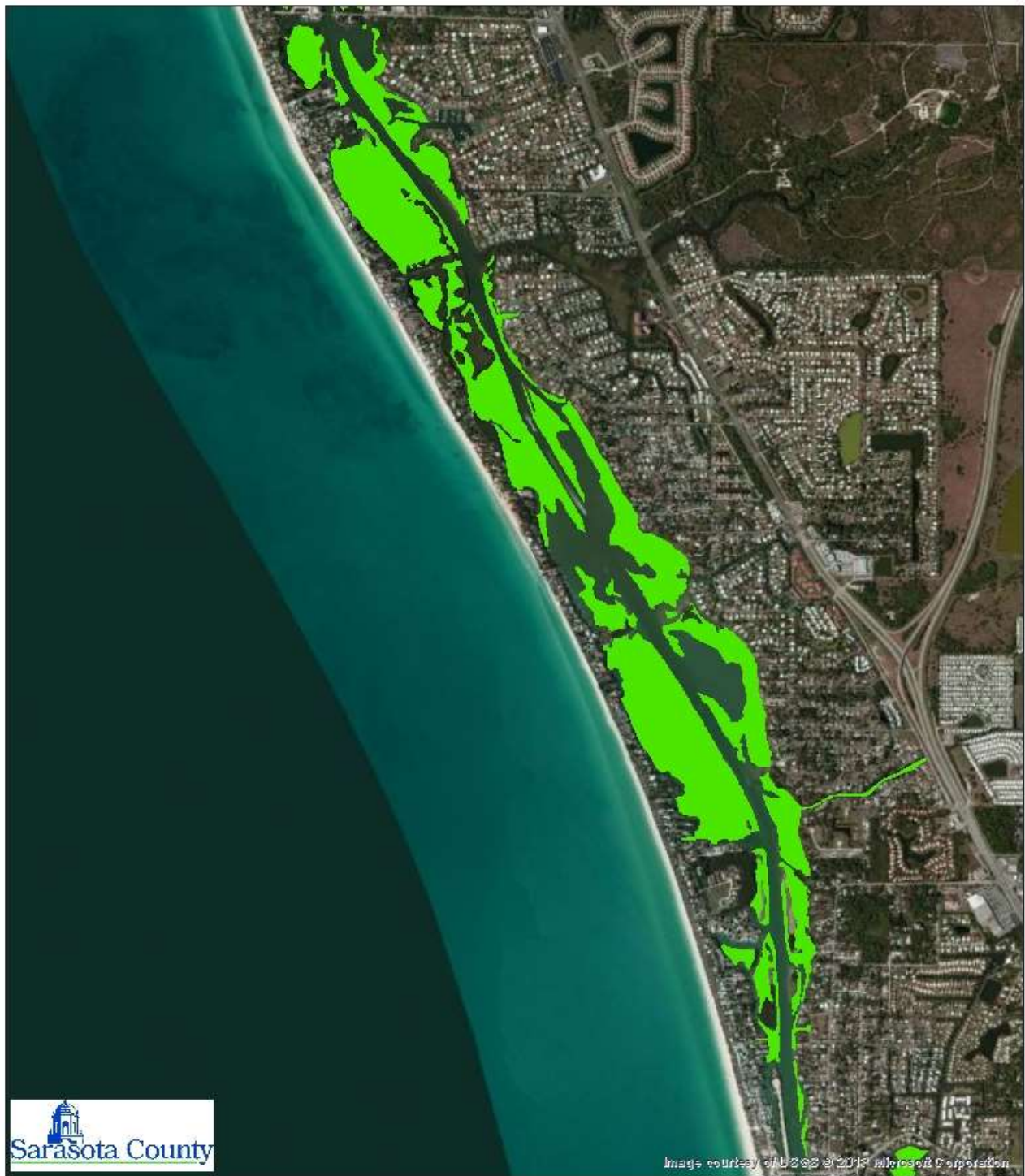
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Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

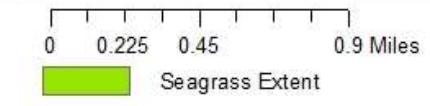
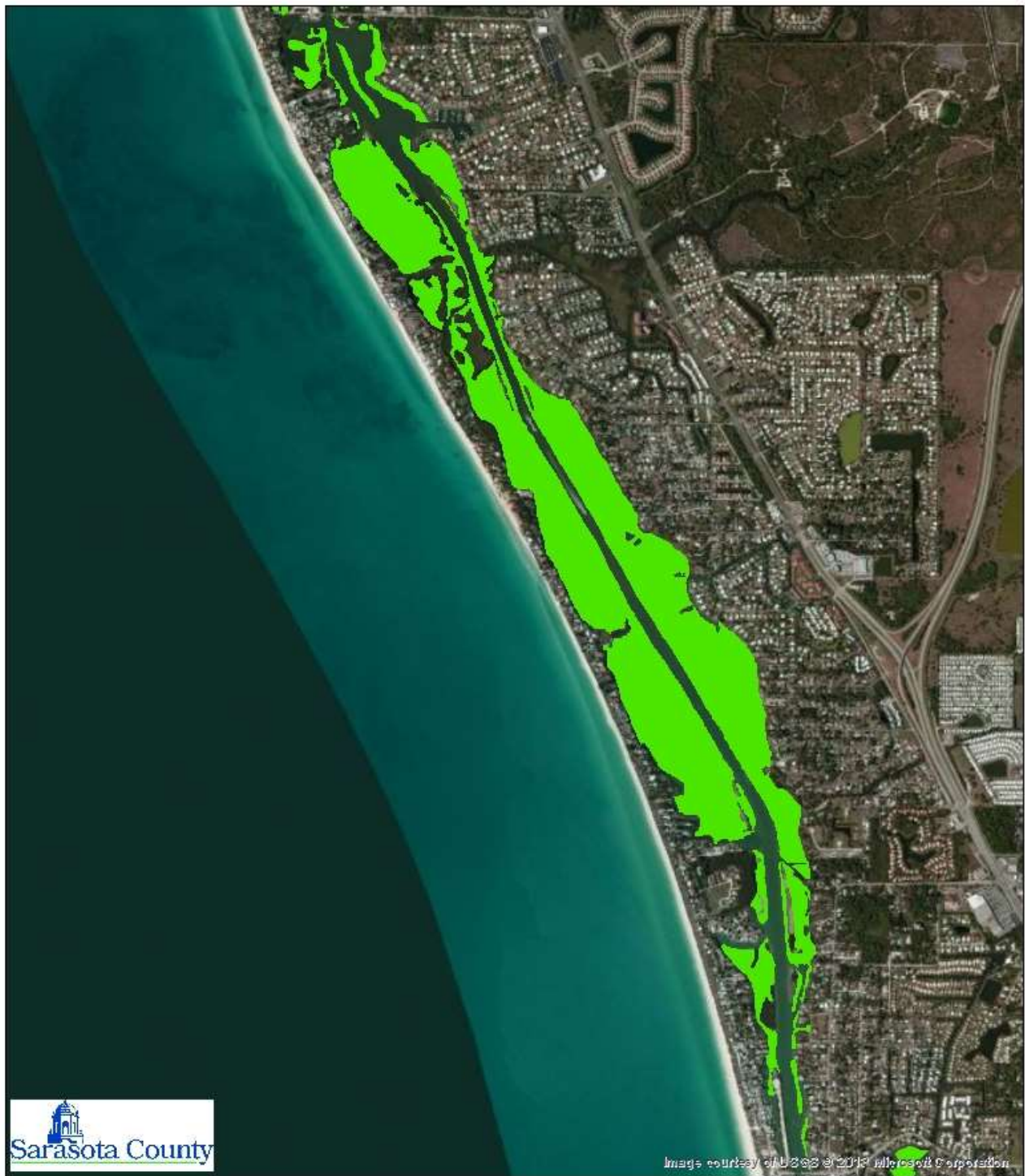


### Extent of Seagrass in Blackburn Bay (1999)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

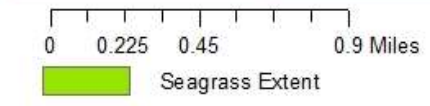
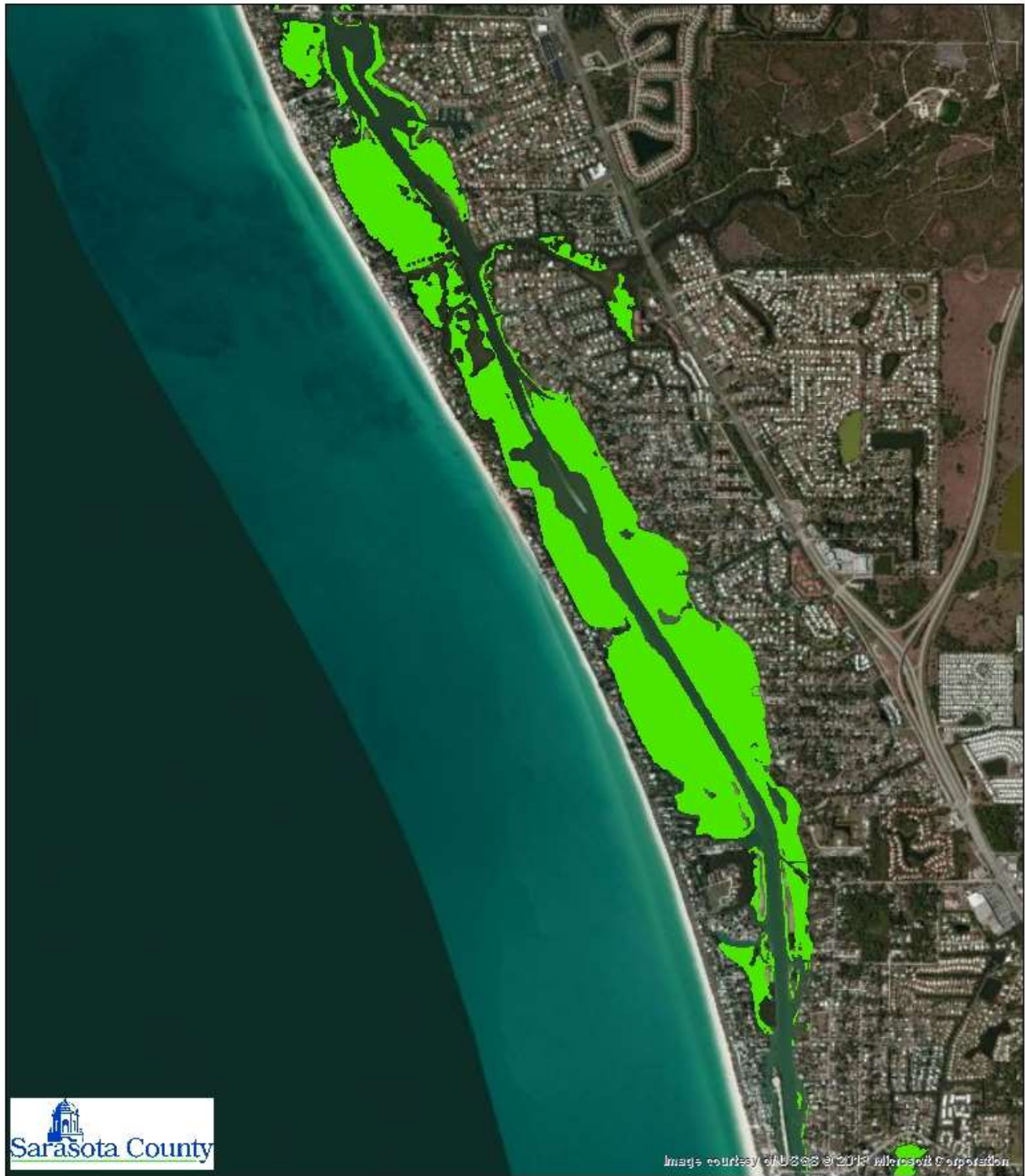
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Map prepared by Jon S. Perry, GISP

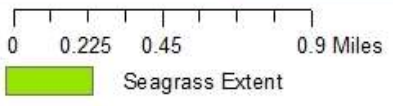
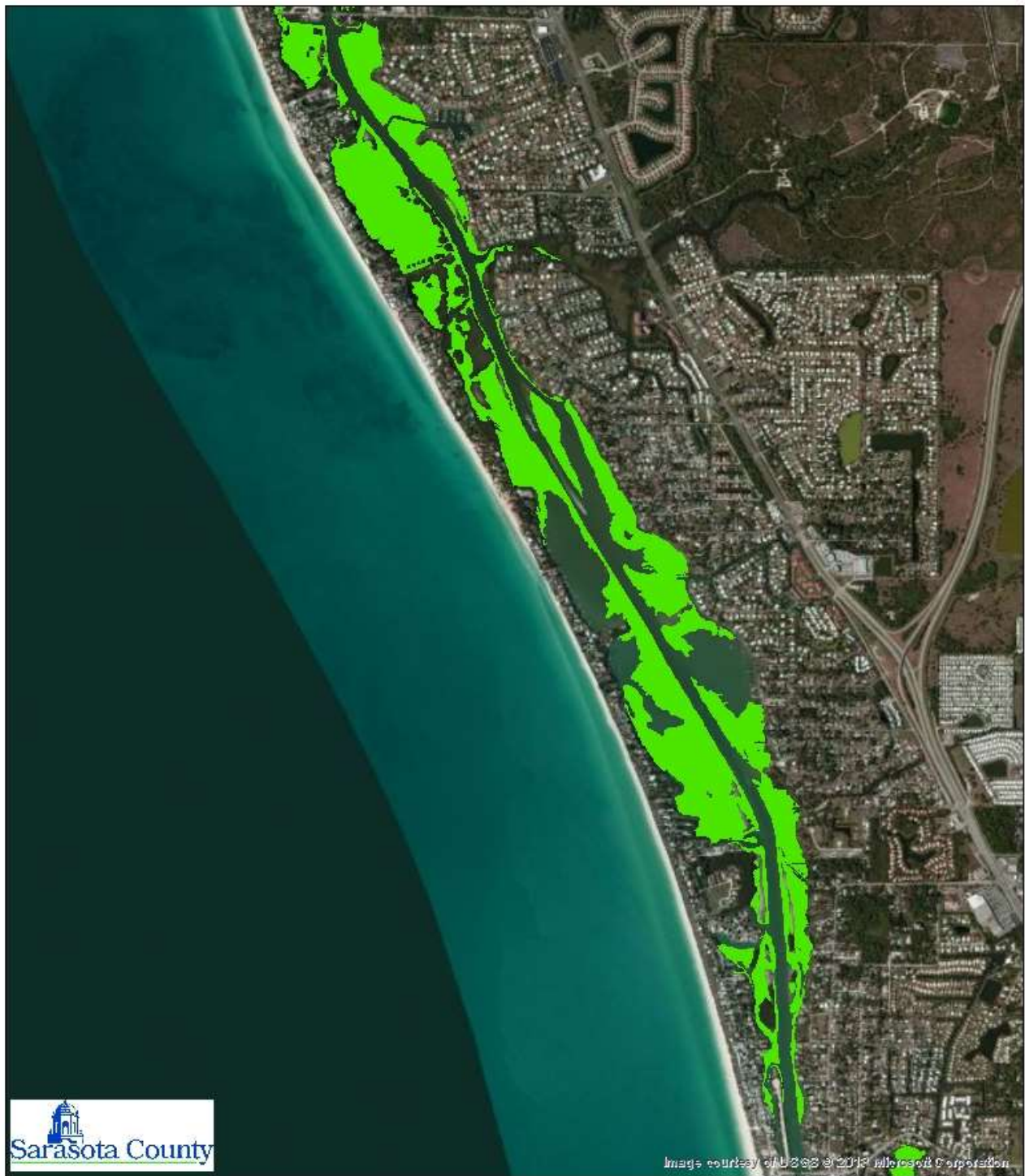


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Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

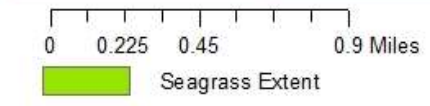
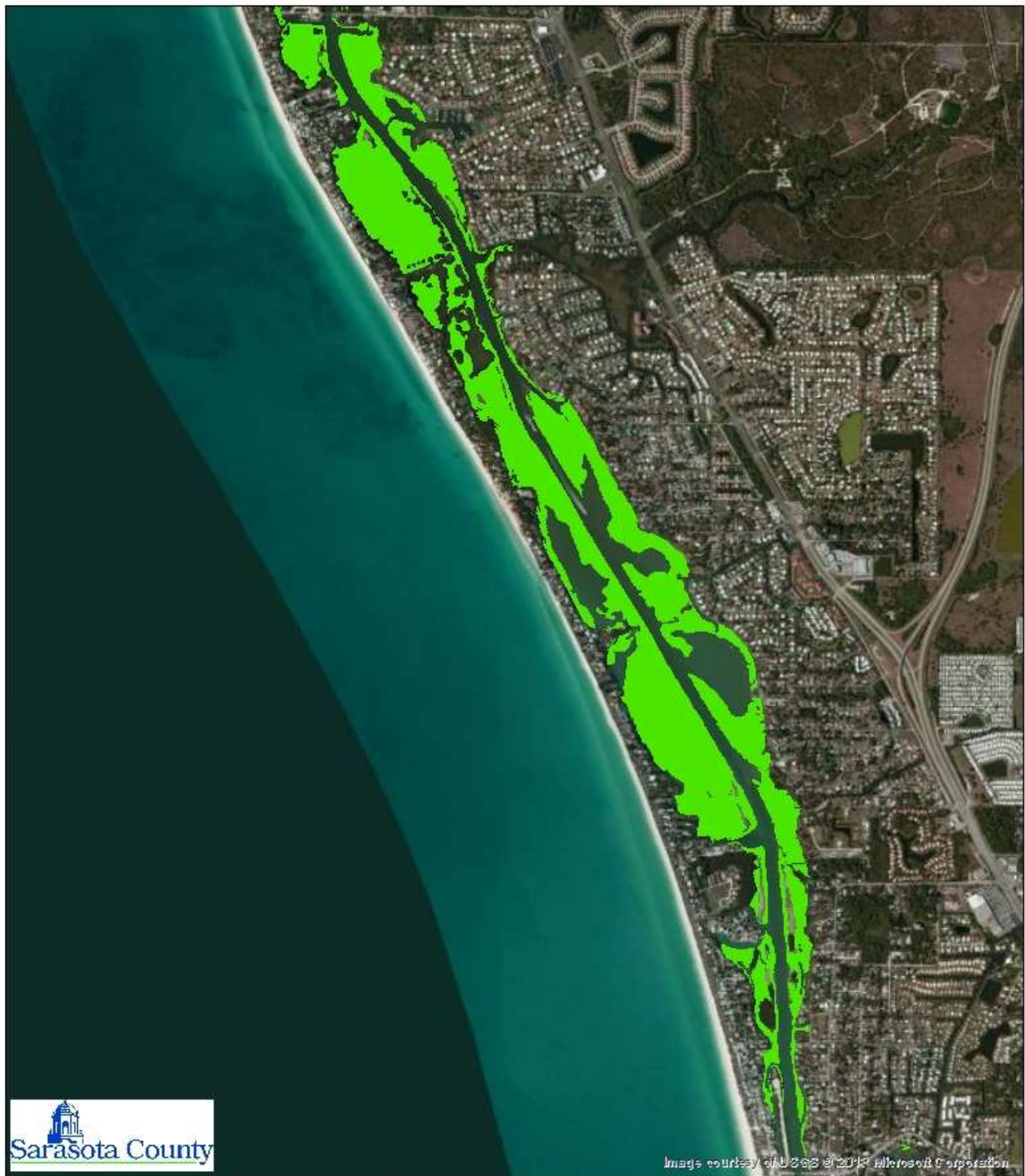
### Extent of Seagrass in Blackburn Bay (2008)



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Map prepared by Jon S. Perry, GISP

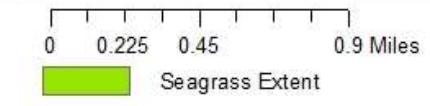
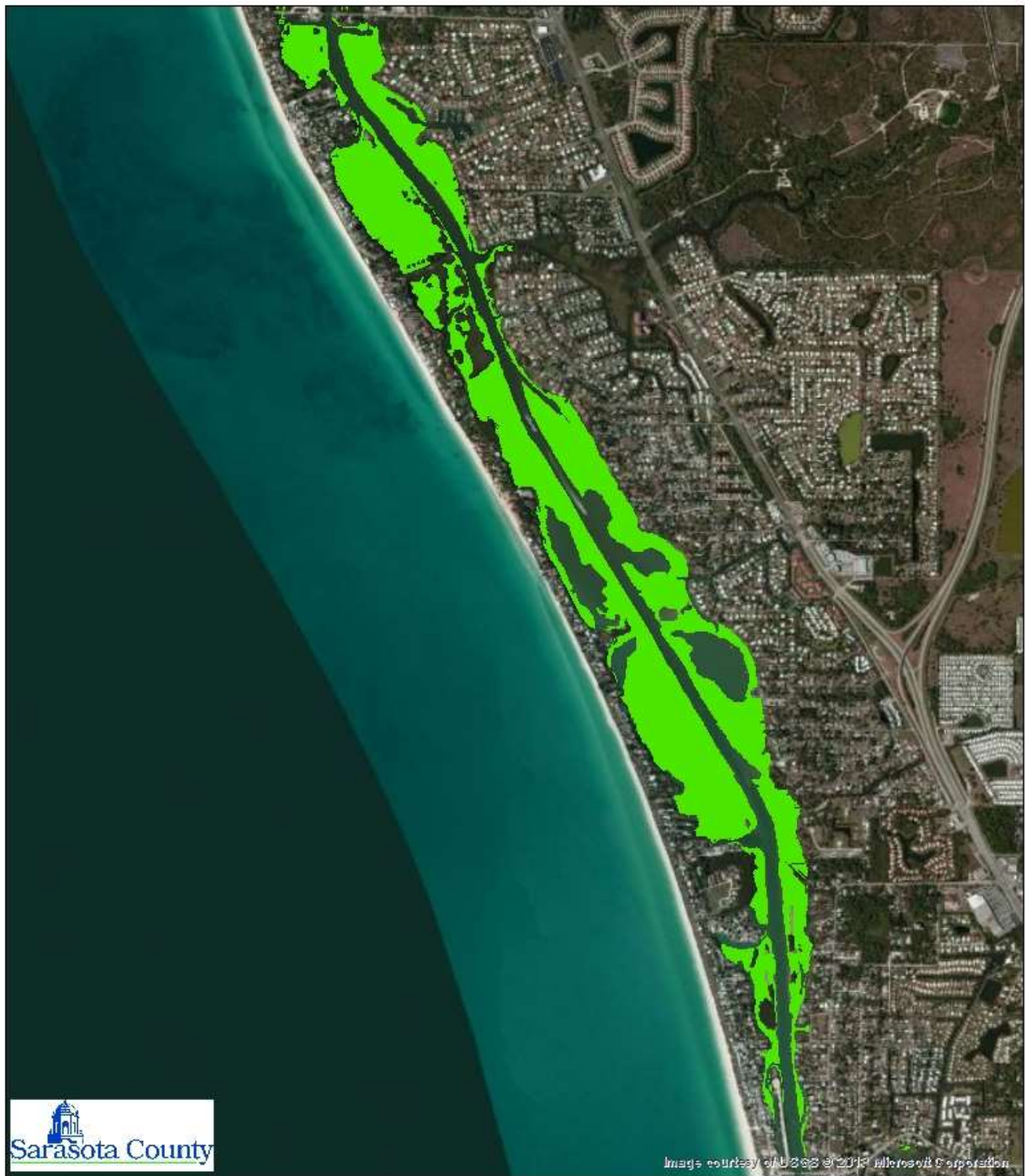


### Extent of Seagrass in Blackburn Bay (2010)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

### Extent of Seagrass in Blackburn Bay (2012)

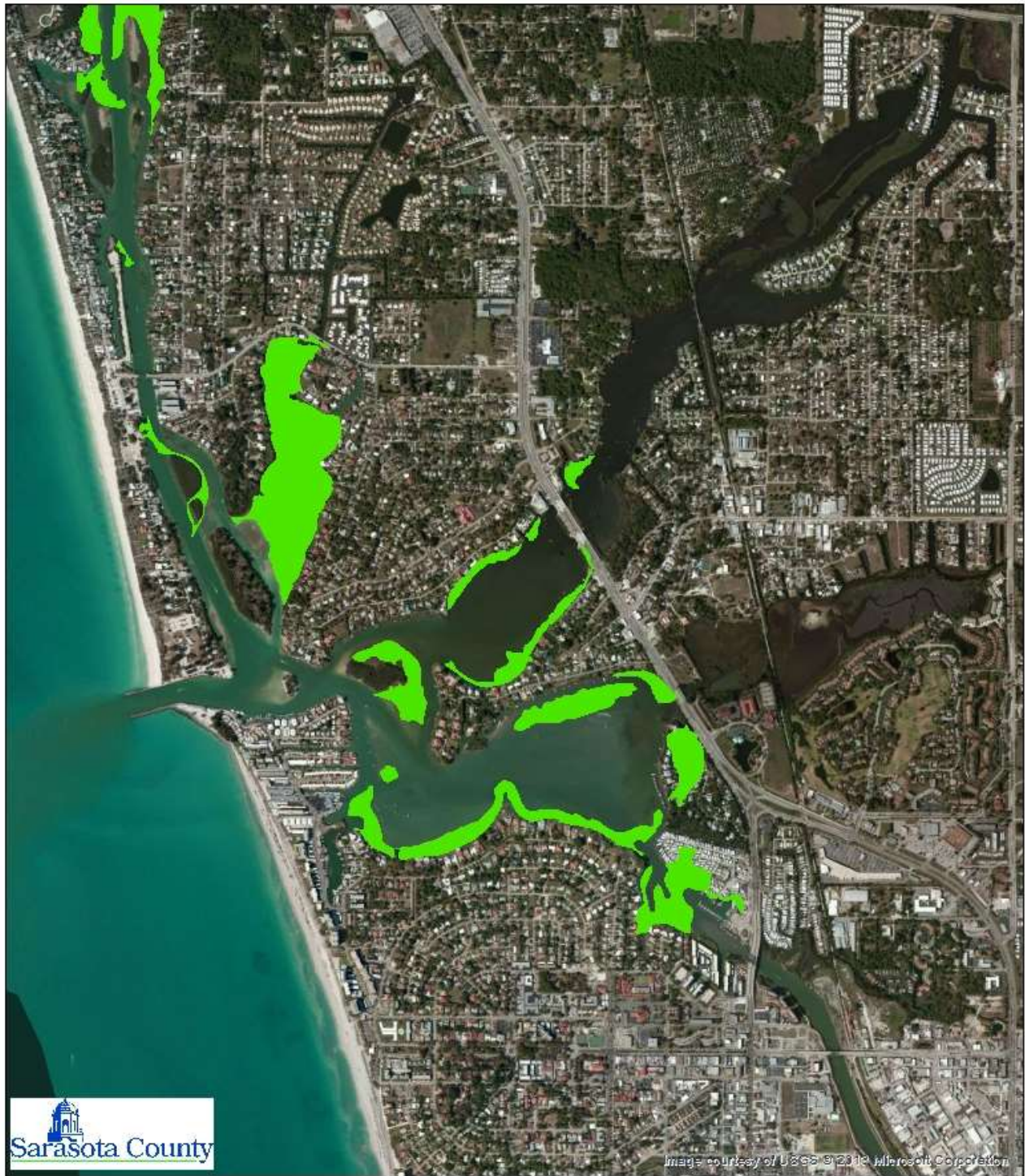


Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP



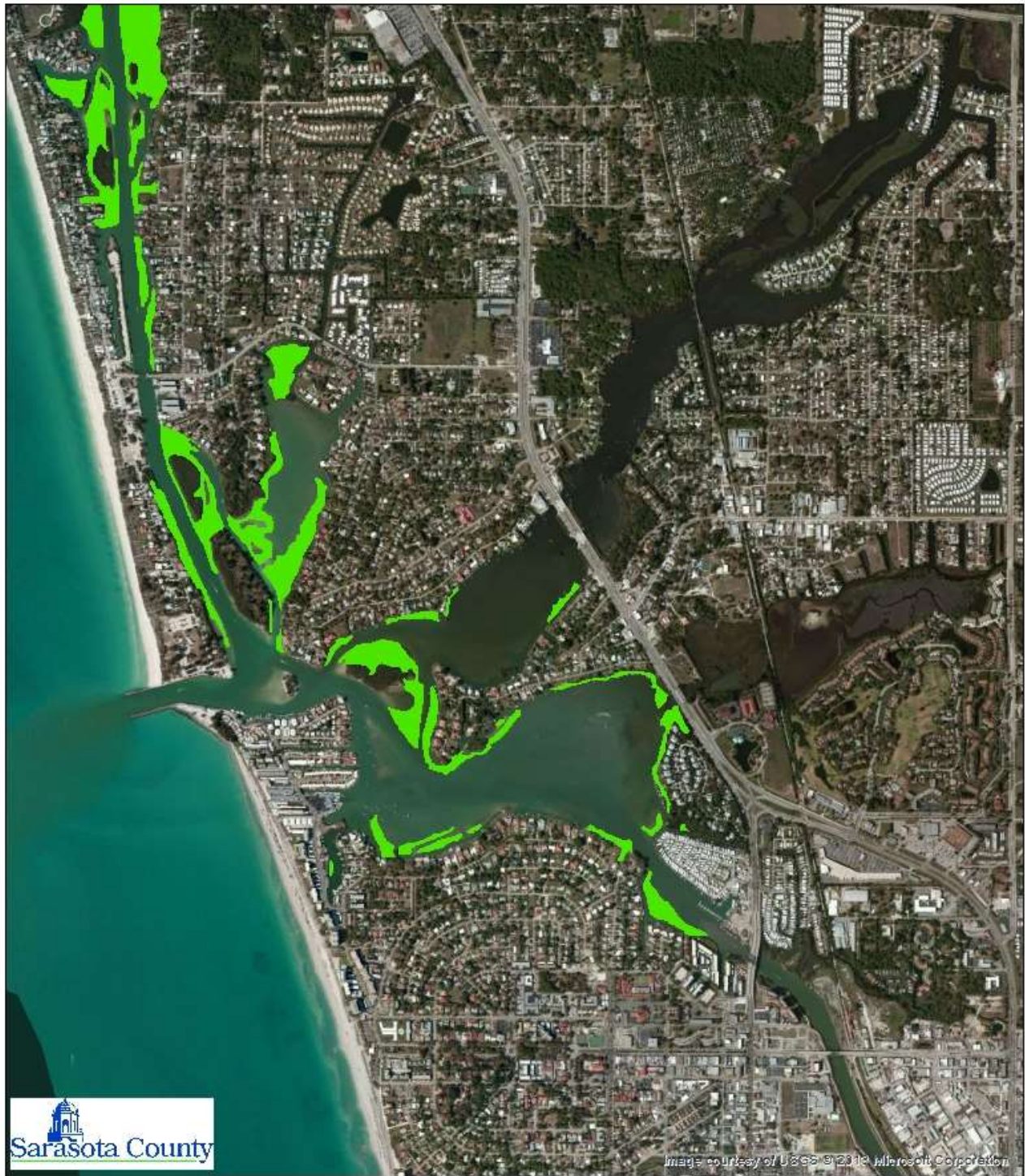
Dona / Roberts Bays Area  
Seagrass Acreage  
1948 to 2012

### Extent of Seagrass in Dona/Roberts Bays (1948)



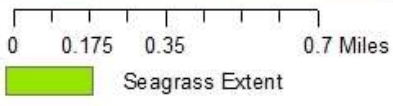
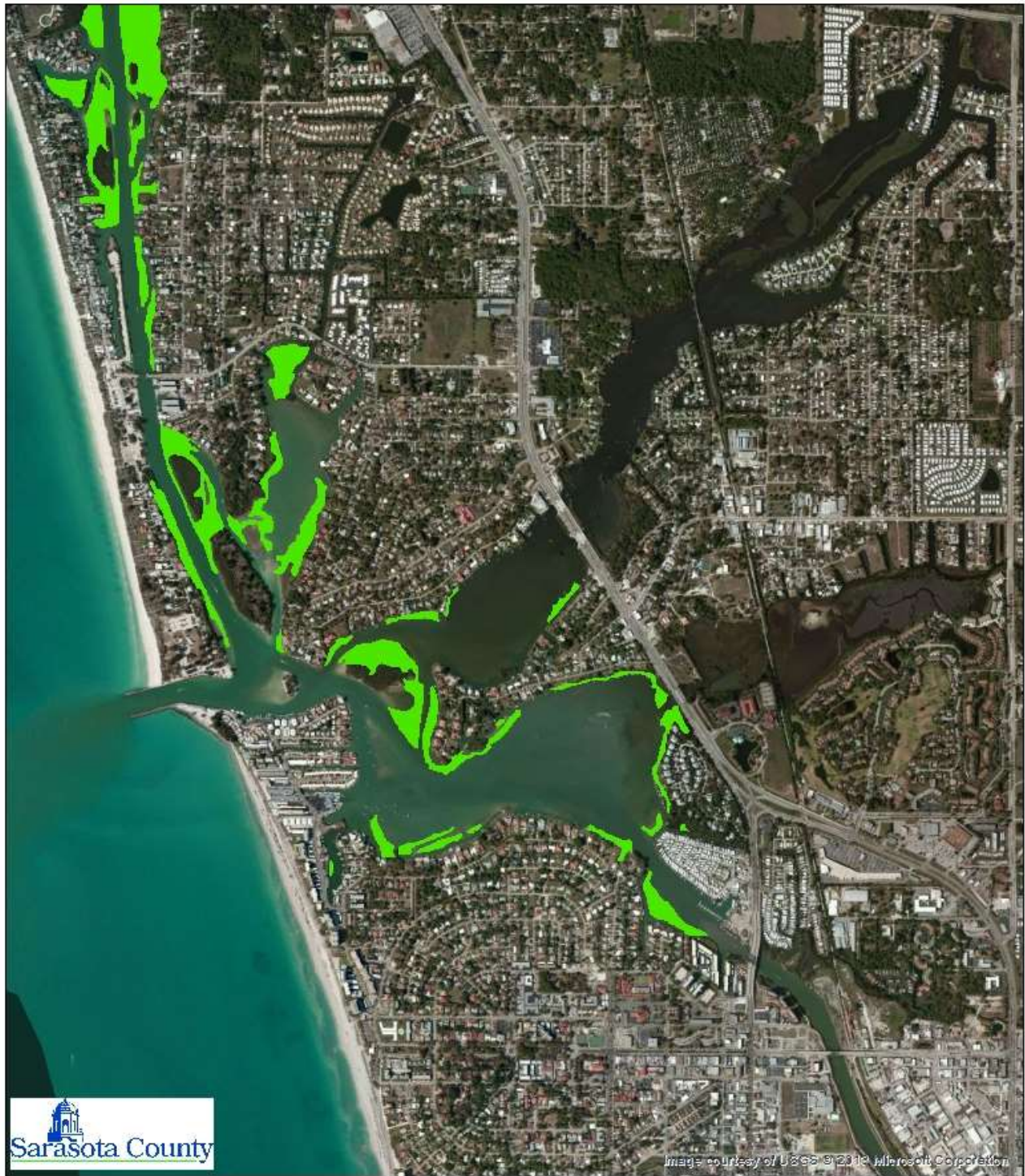


### Extent of Seagrass in Dona/Roberts Bays (1988)





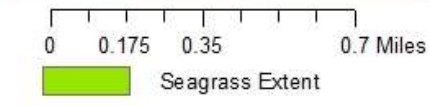
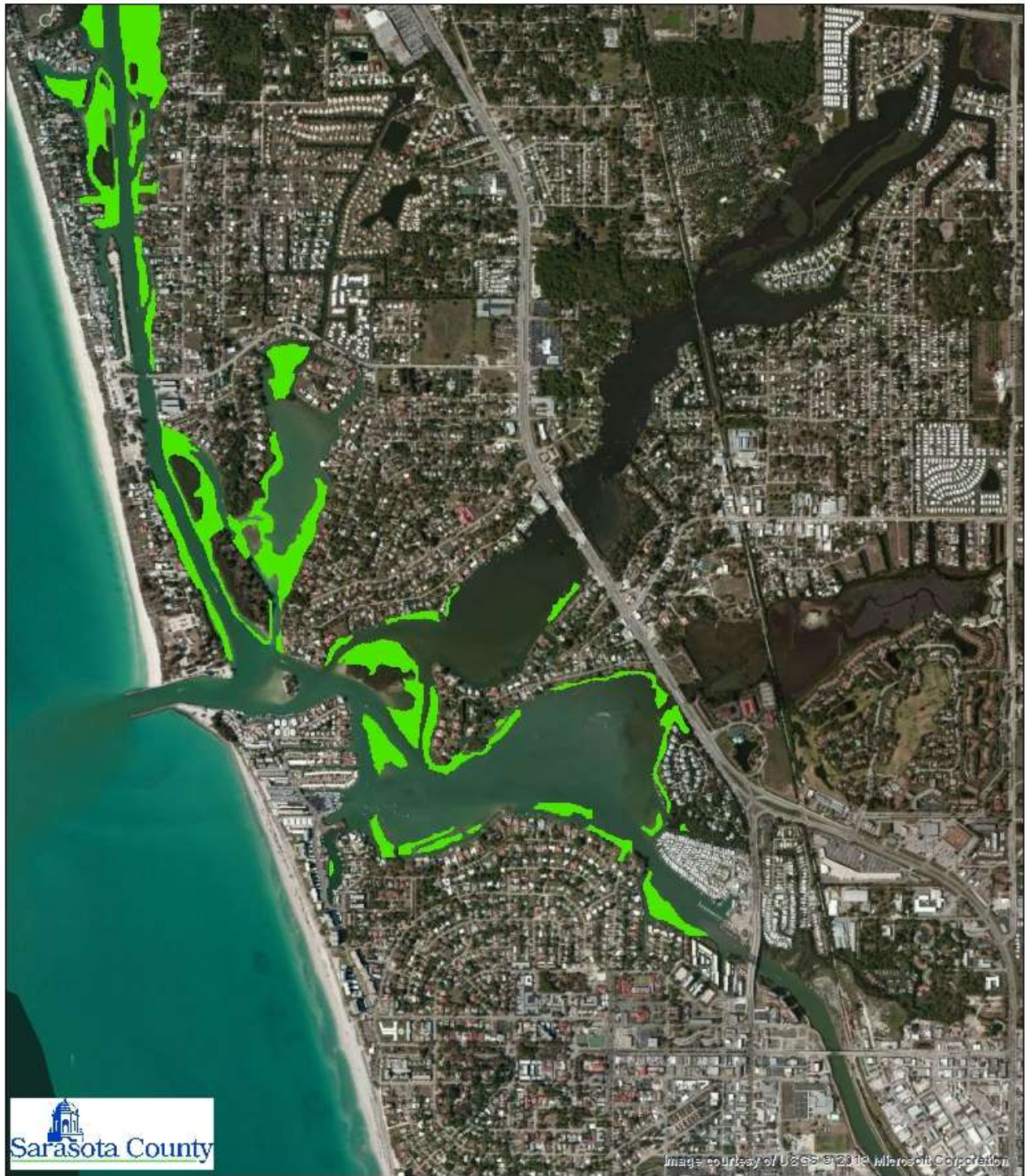
### Extent of Seagrass in Dona/Roberts Bays (1994)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP



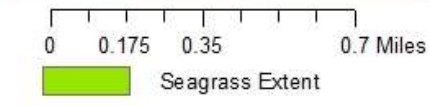
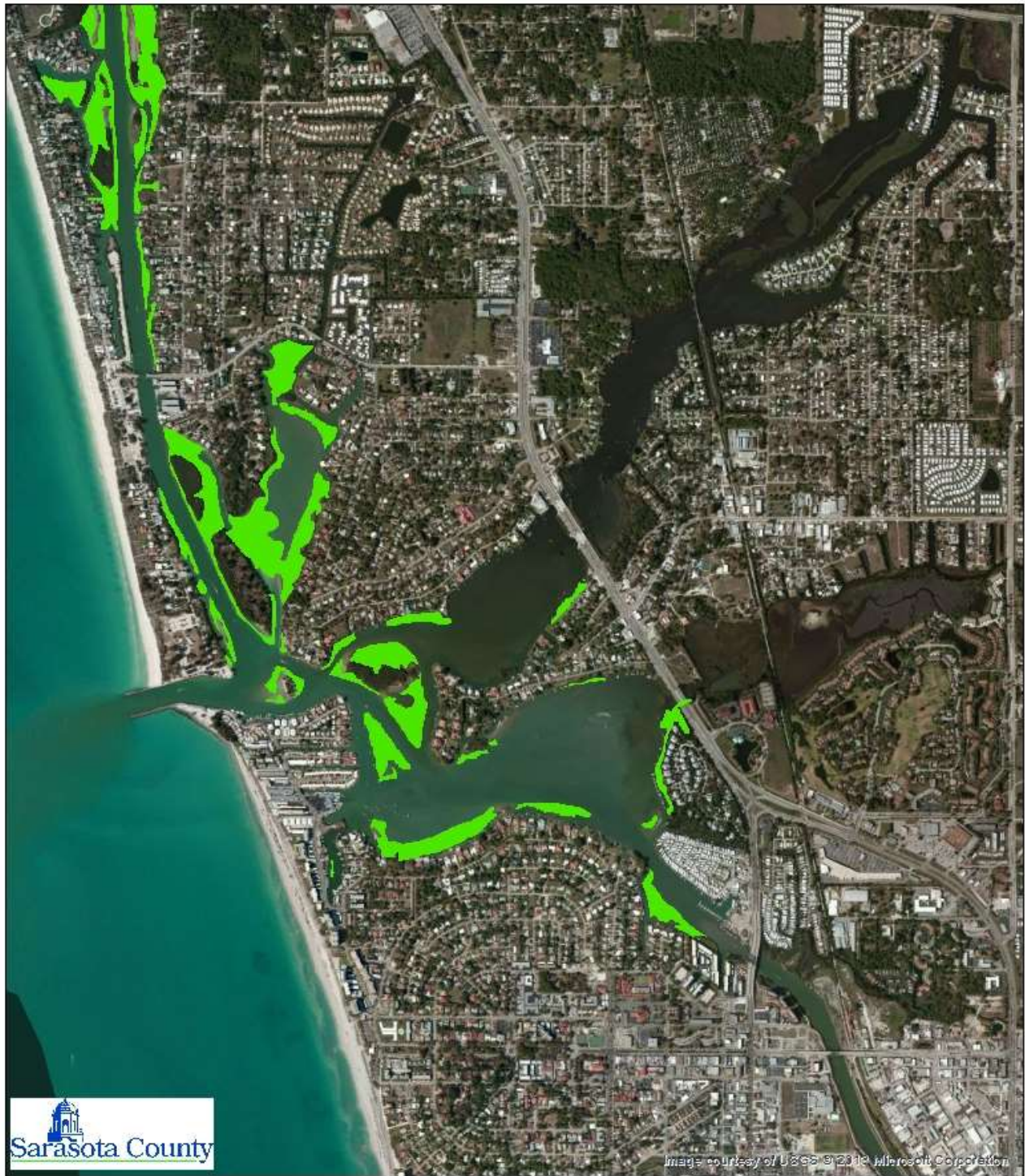
### Extent of Seagrass in Dona/Roberts Bays (1996)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP



### Extent of Seagrass in Dona/Roberts Bays (1999)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP



### Extent of Seagrass in Dona/Roberts Bays (2001)

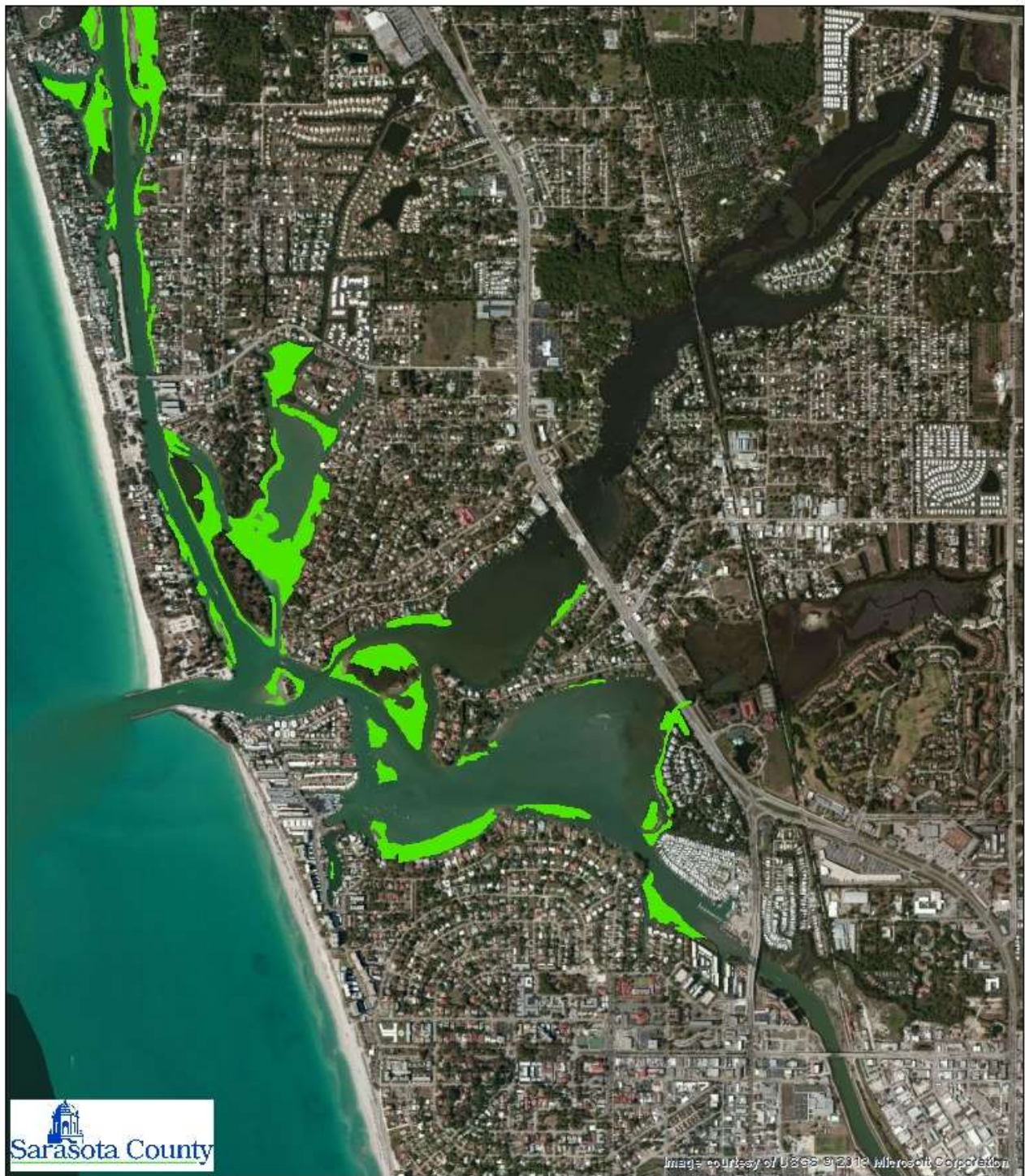
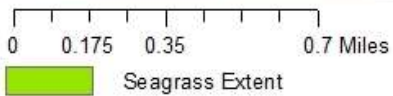


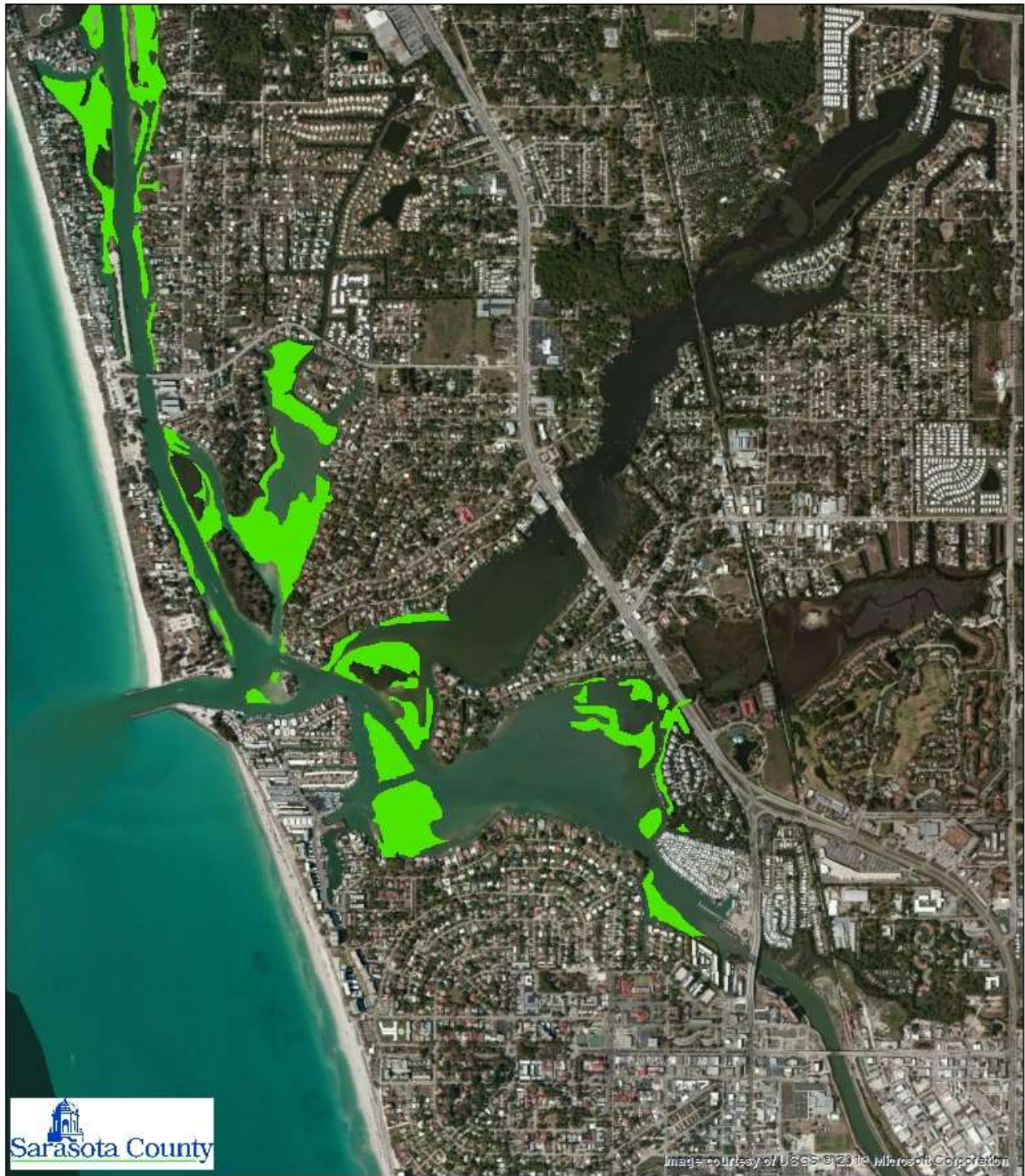
Image courtesy of USGS © 2010 Microsoft Corporation



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

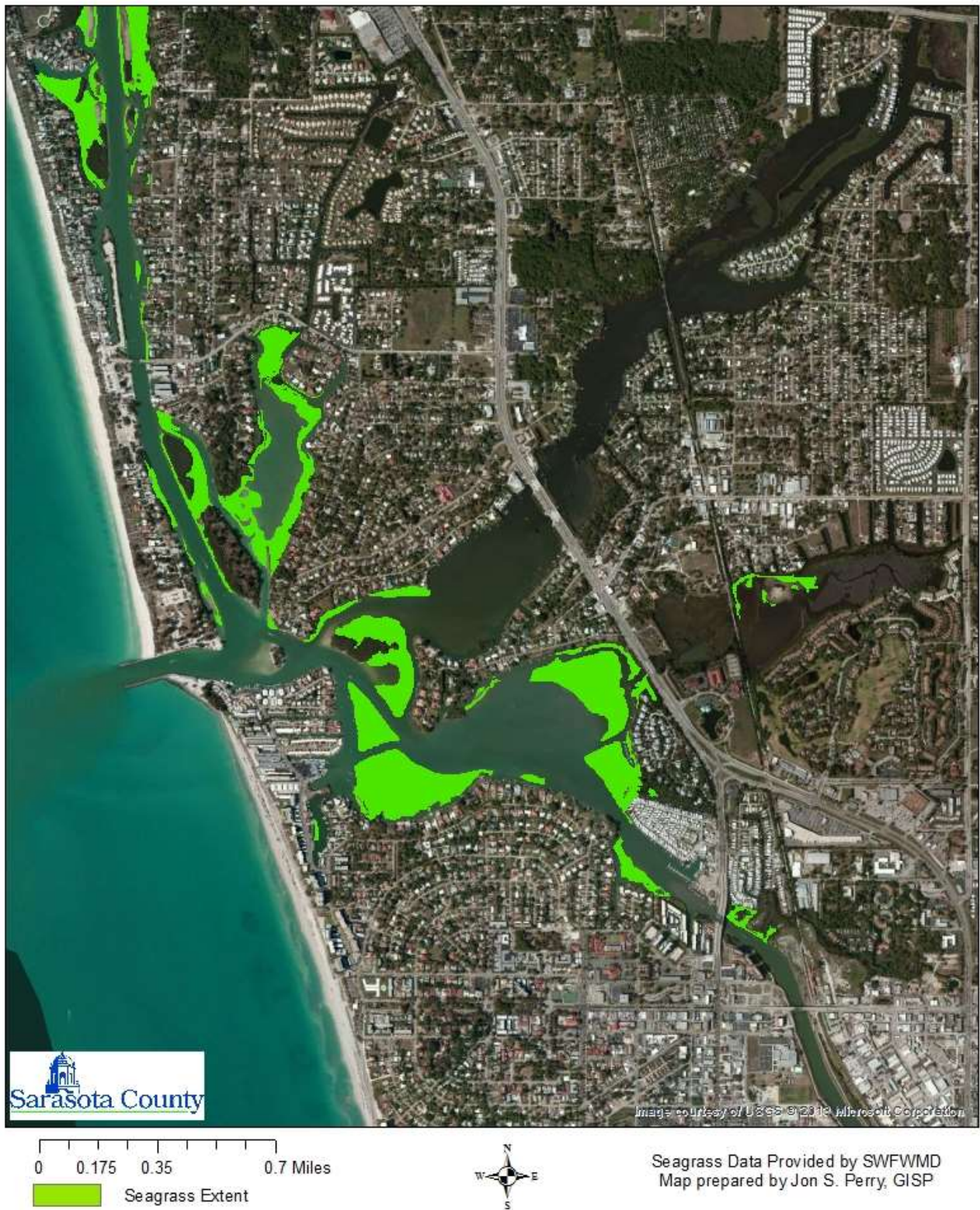


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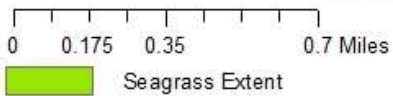
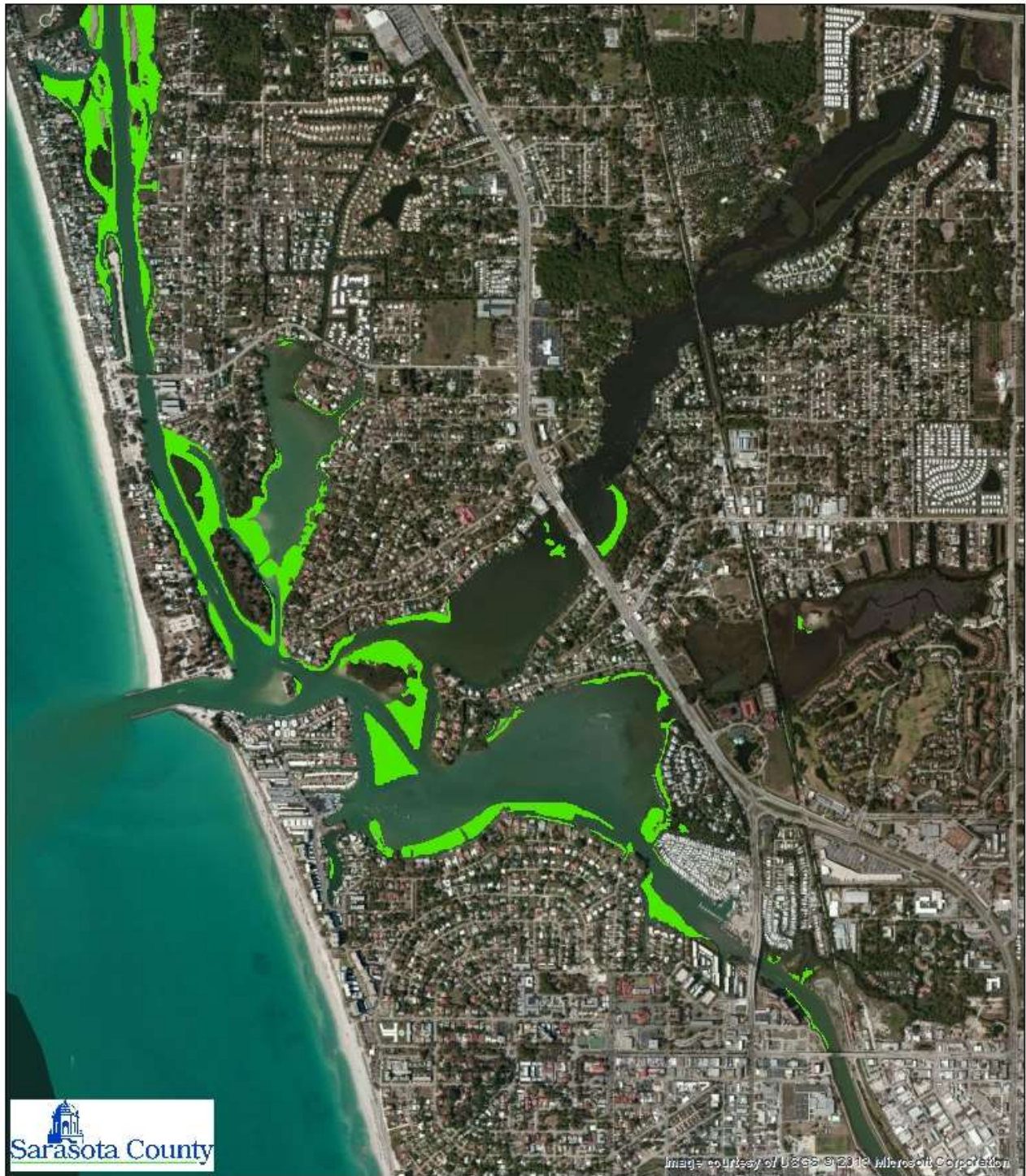


## Extent of Seagrass in Dona/Roberts Bays (2006)





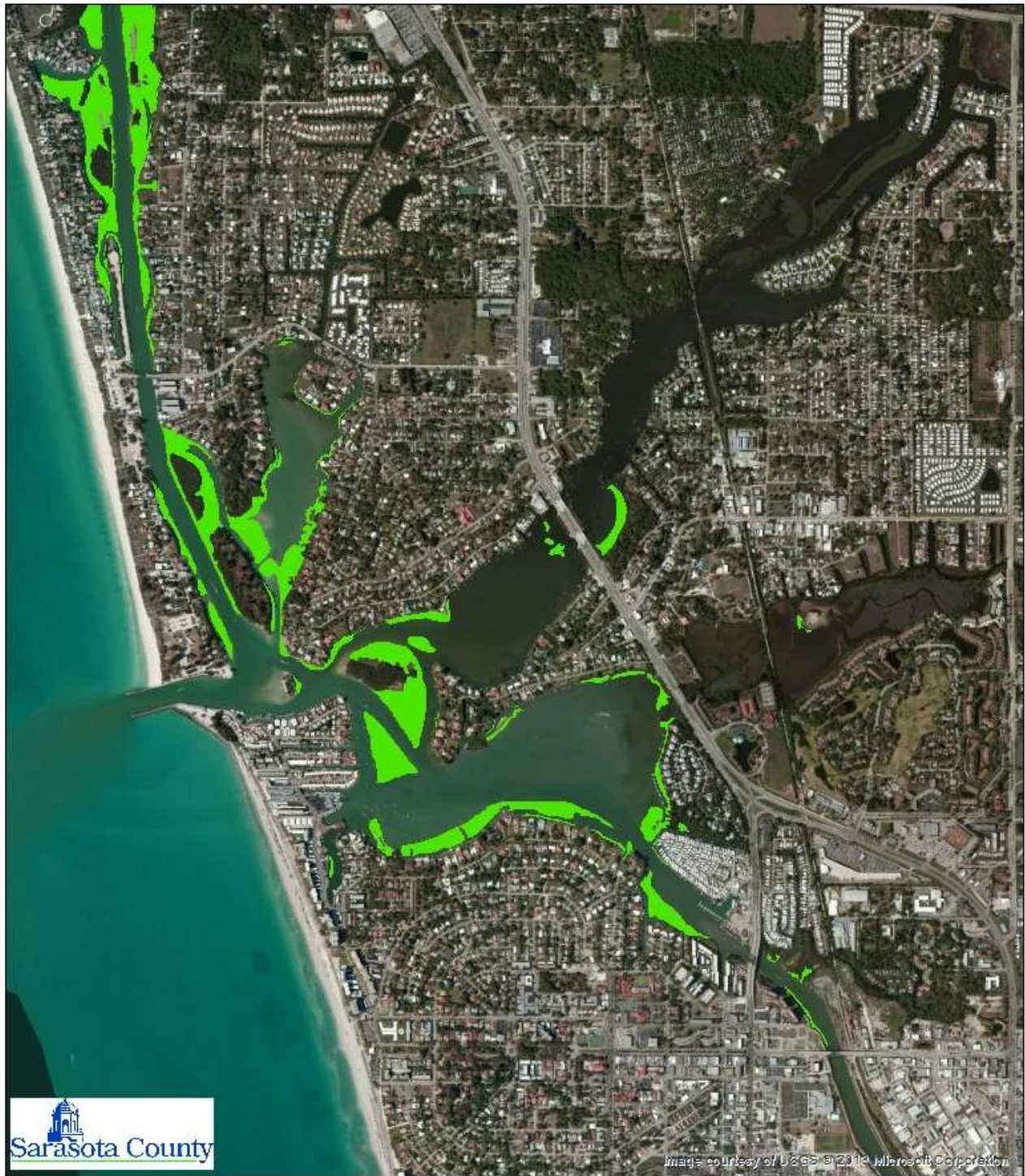
## Extent of Seagrass in Dona/Roberts Bays (2010)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP



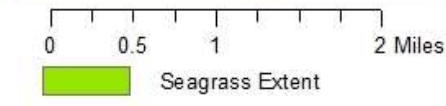
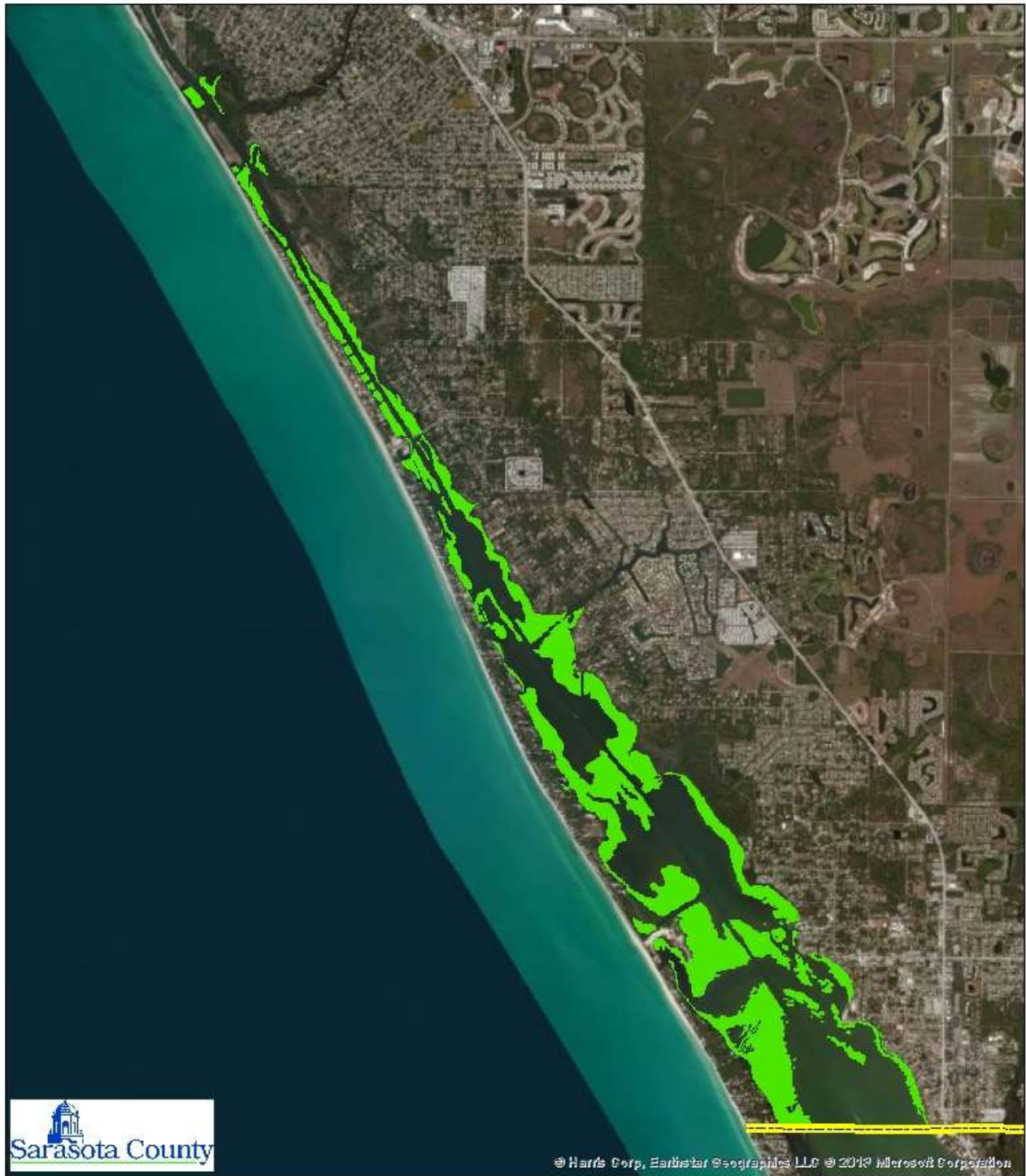
## Extent of Seagrass in Dona/Roberts Bays (2012)



Lemon Bay  
Seagrass Acreage  
1948 to 2012

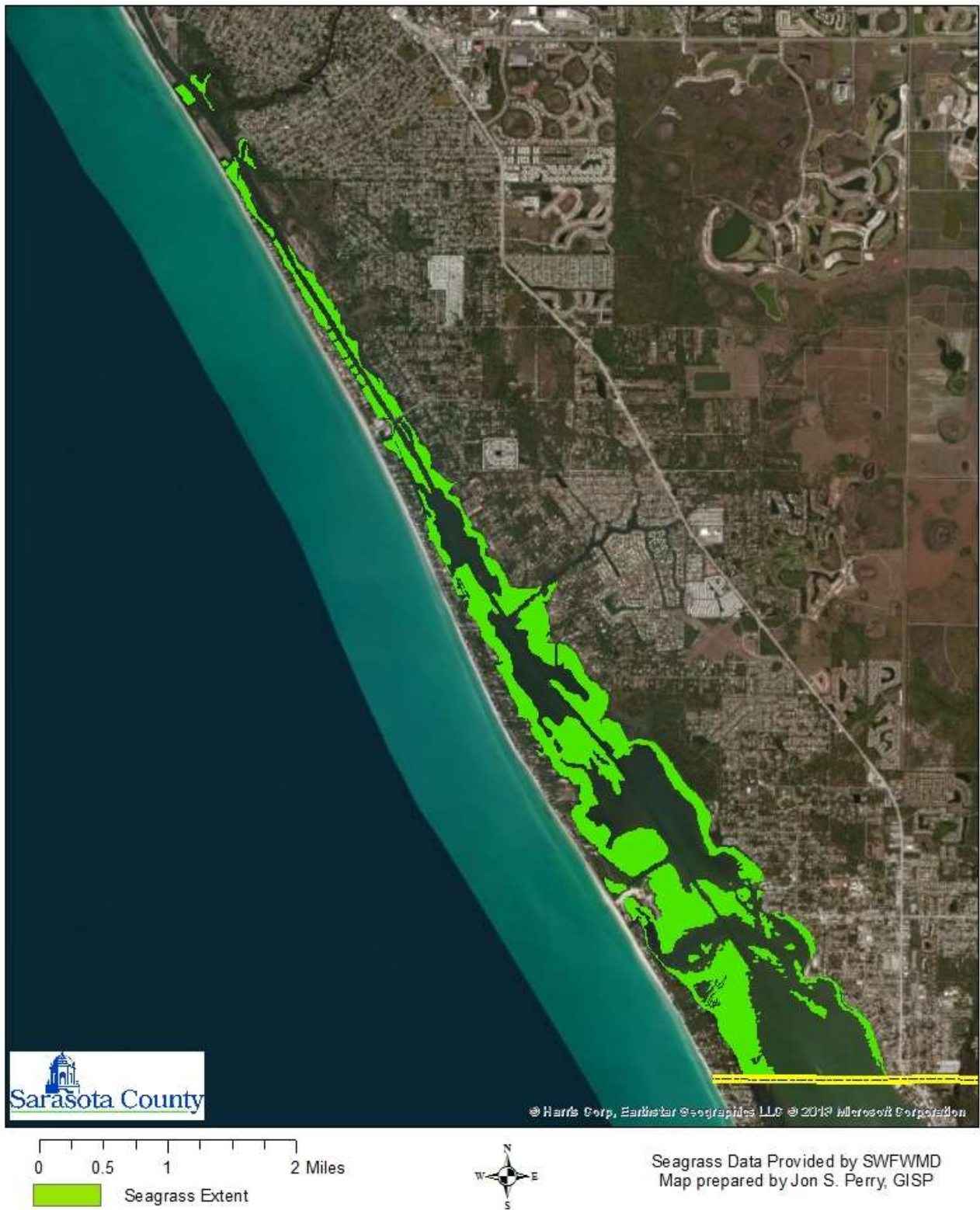


### Extent of Seagrass in Lemon Bay (1988)



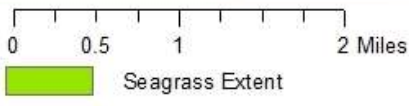
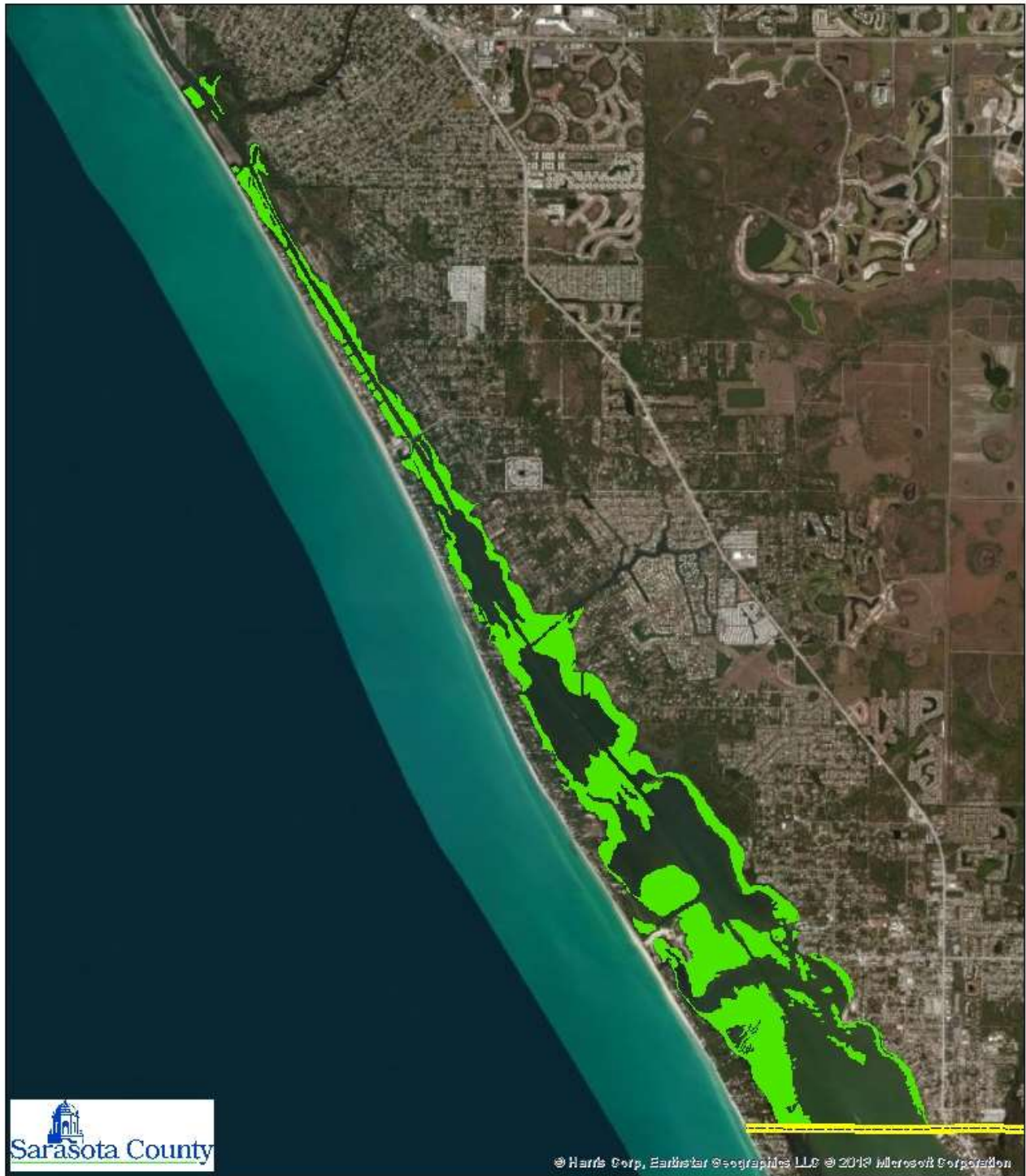
Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

### Extent of Seagrass in Lemon Bay (1994)



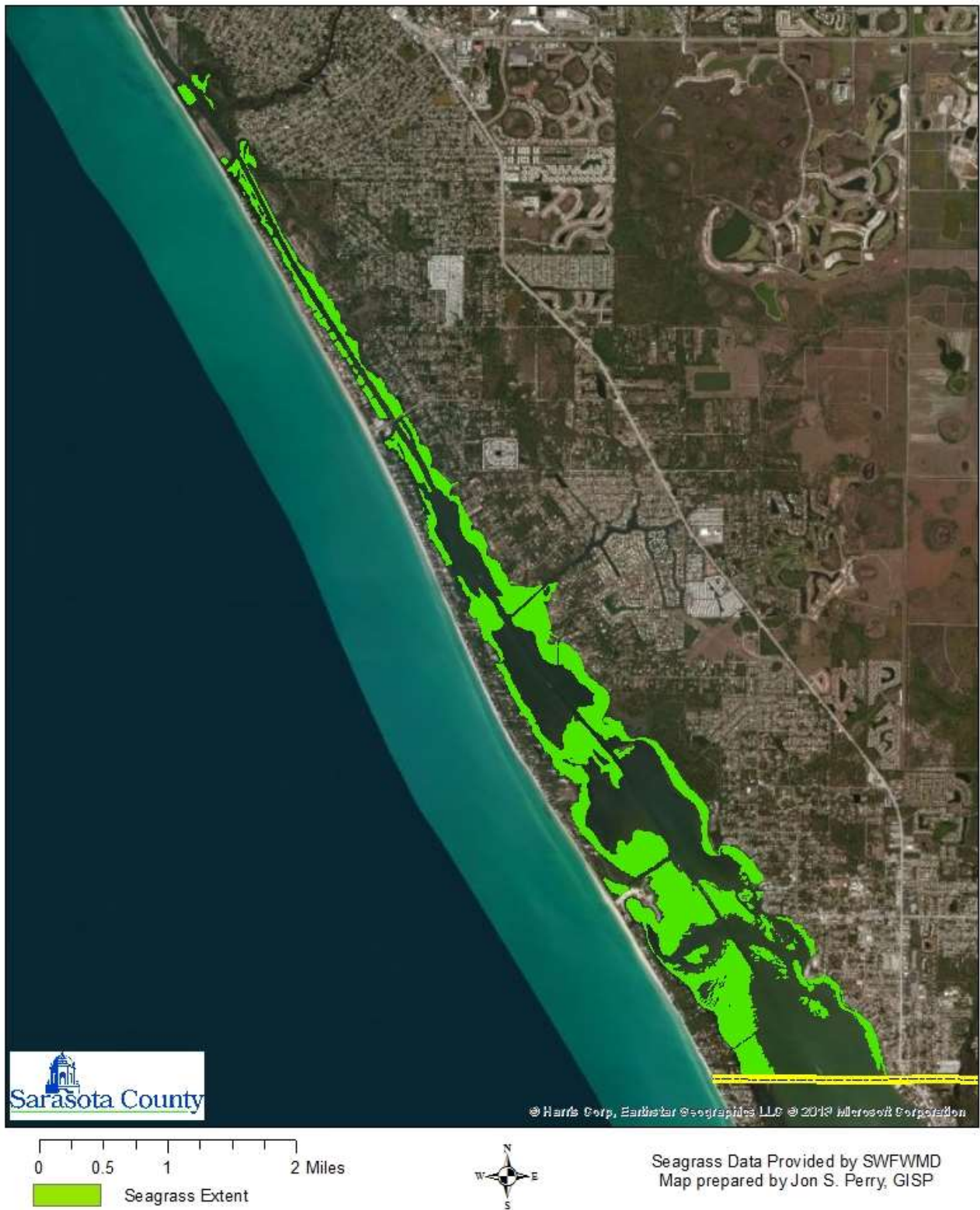


### Extent of Seagrass in Lemon Bay (1996)



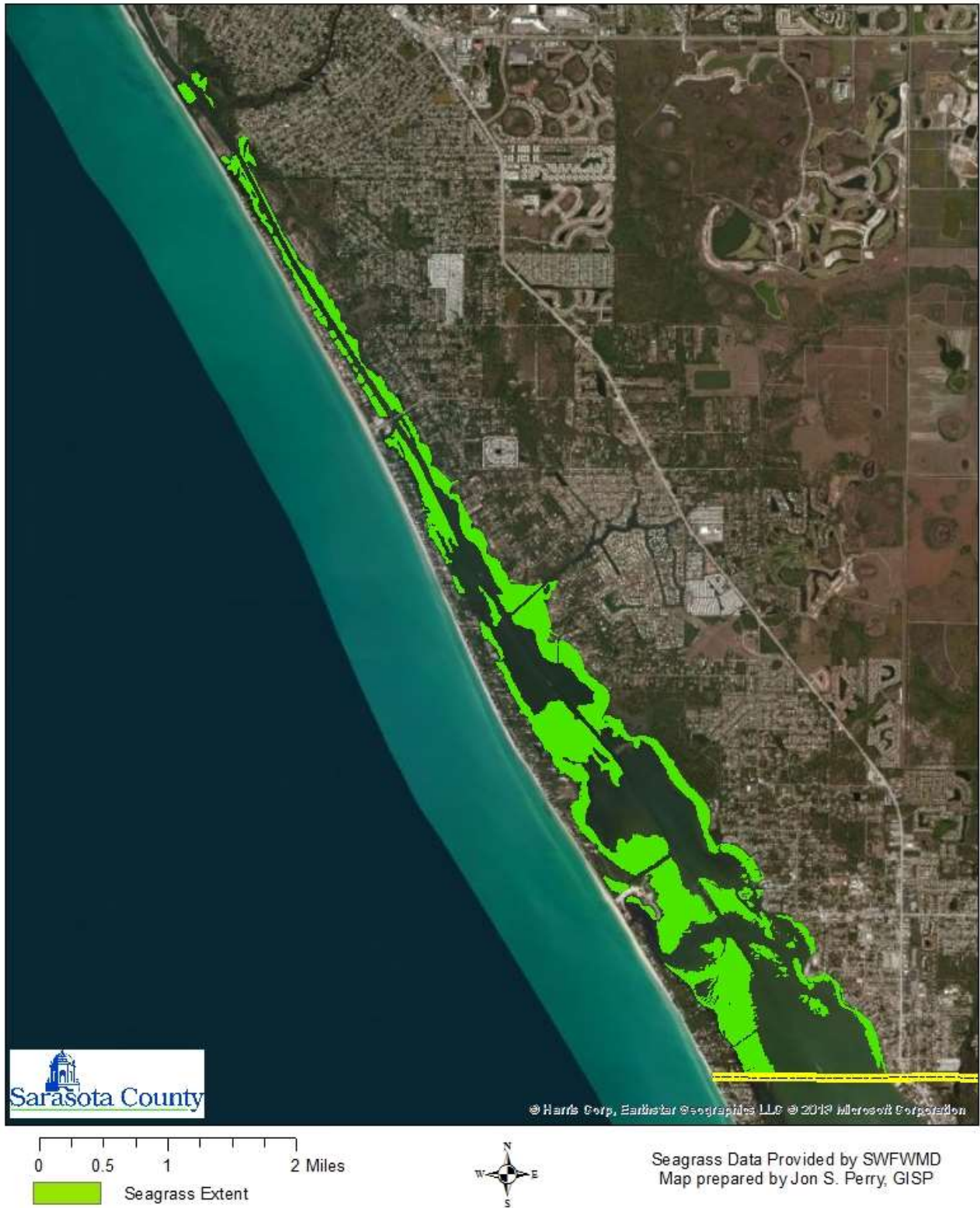
Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

### Extent of Seagrass in Lemon Bay (1999)

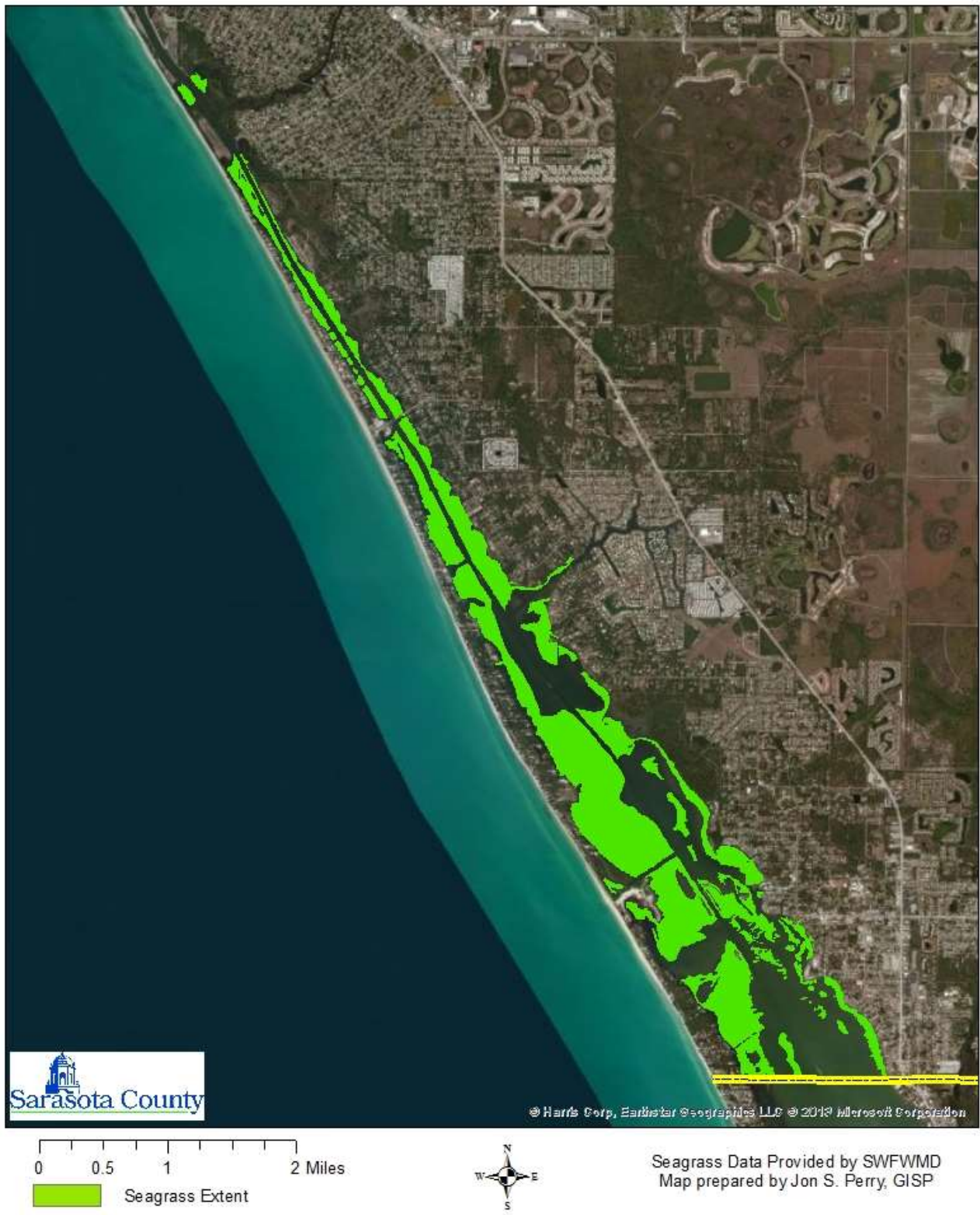




### Extent of Seagrass in Lemon Bay (2001)

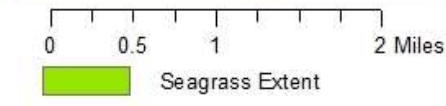
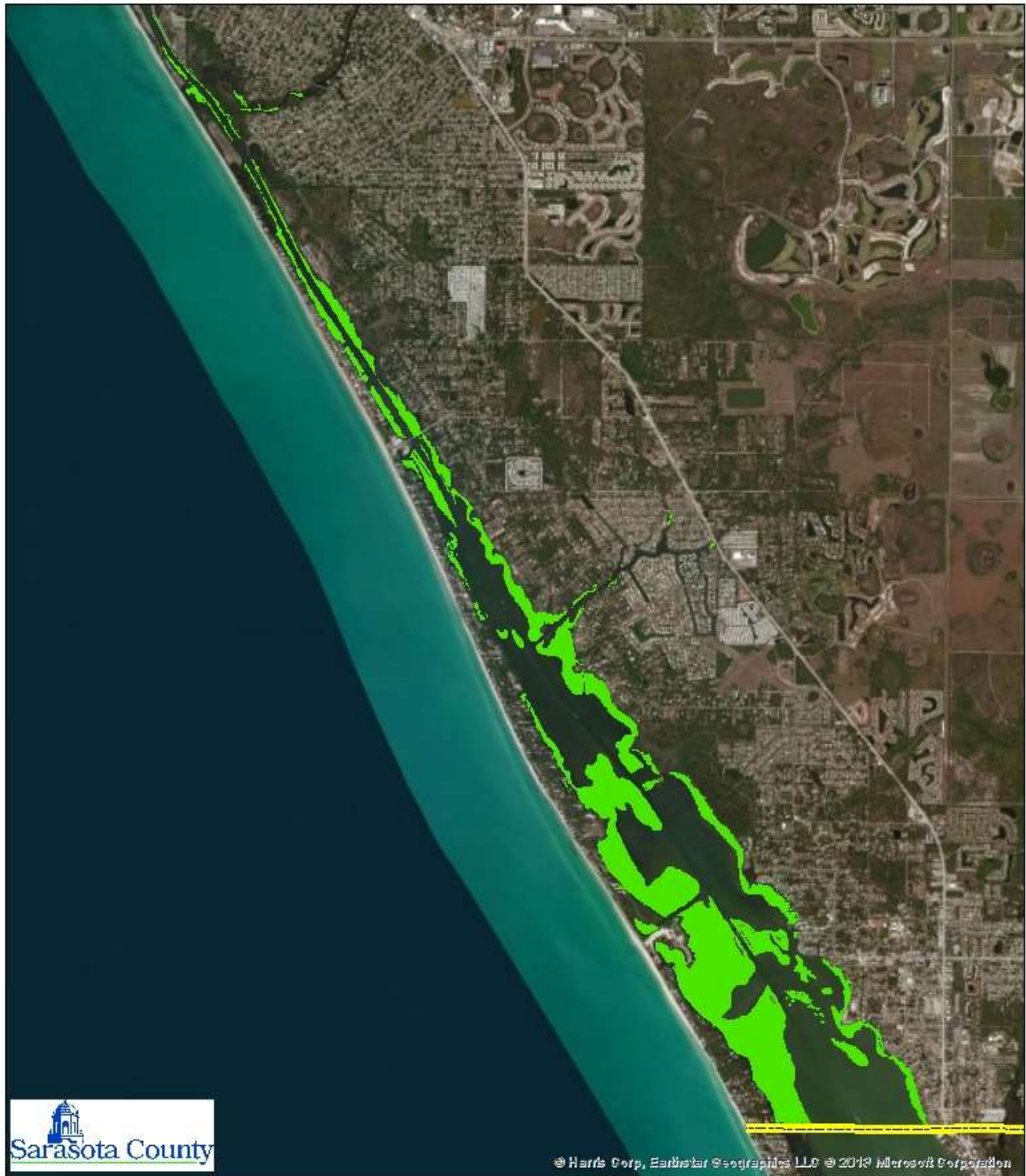


### Extent of Seagrass in Lemon Bay (2004)



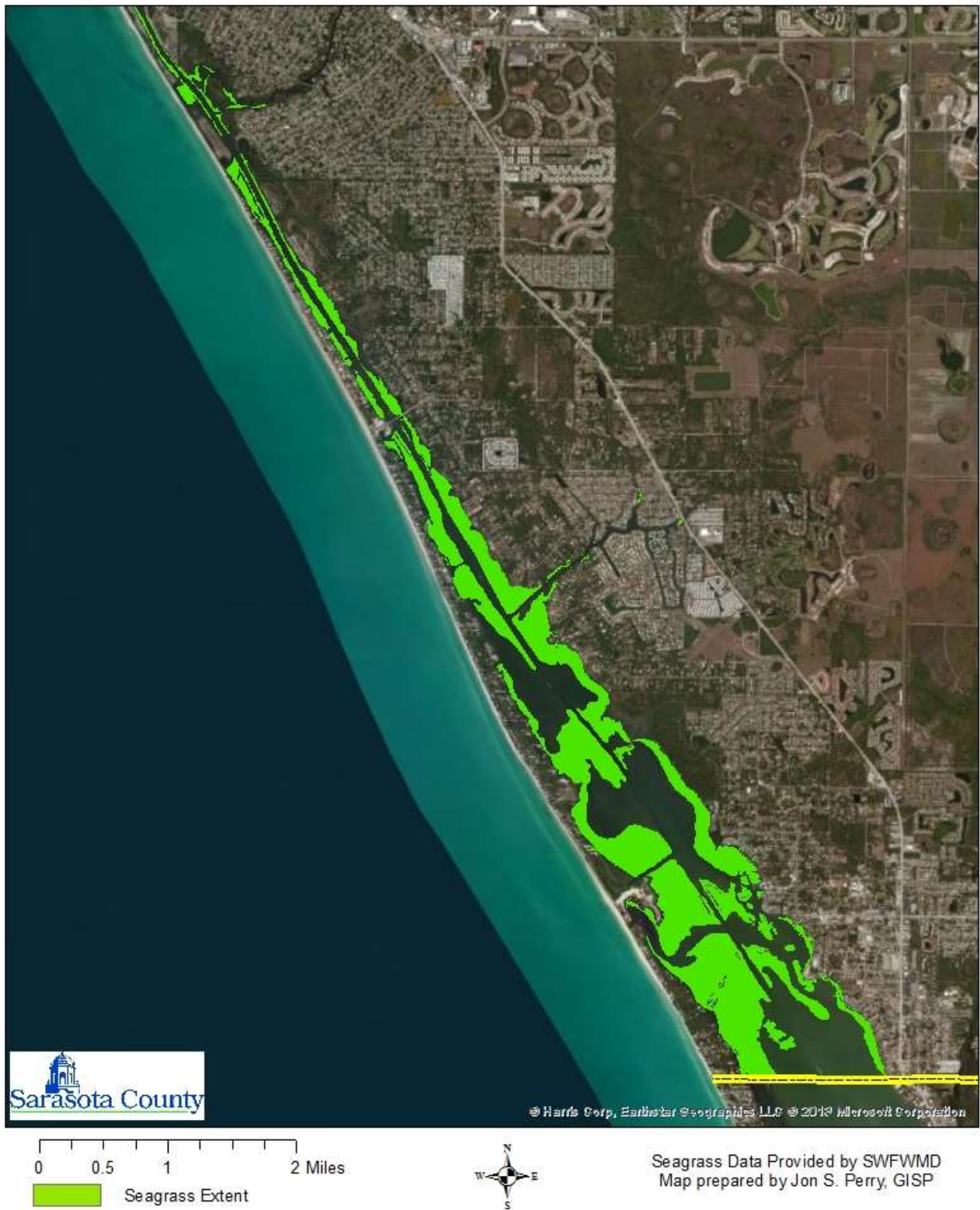


### Extent of Seagrass in Lemon Bay (2006)



Seagrass Data Provided by SWFWMD  
Map prepared by Jon S. Perry, GISP

### Extent of Seagrass in Lemon Bay (2008)

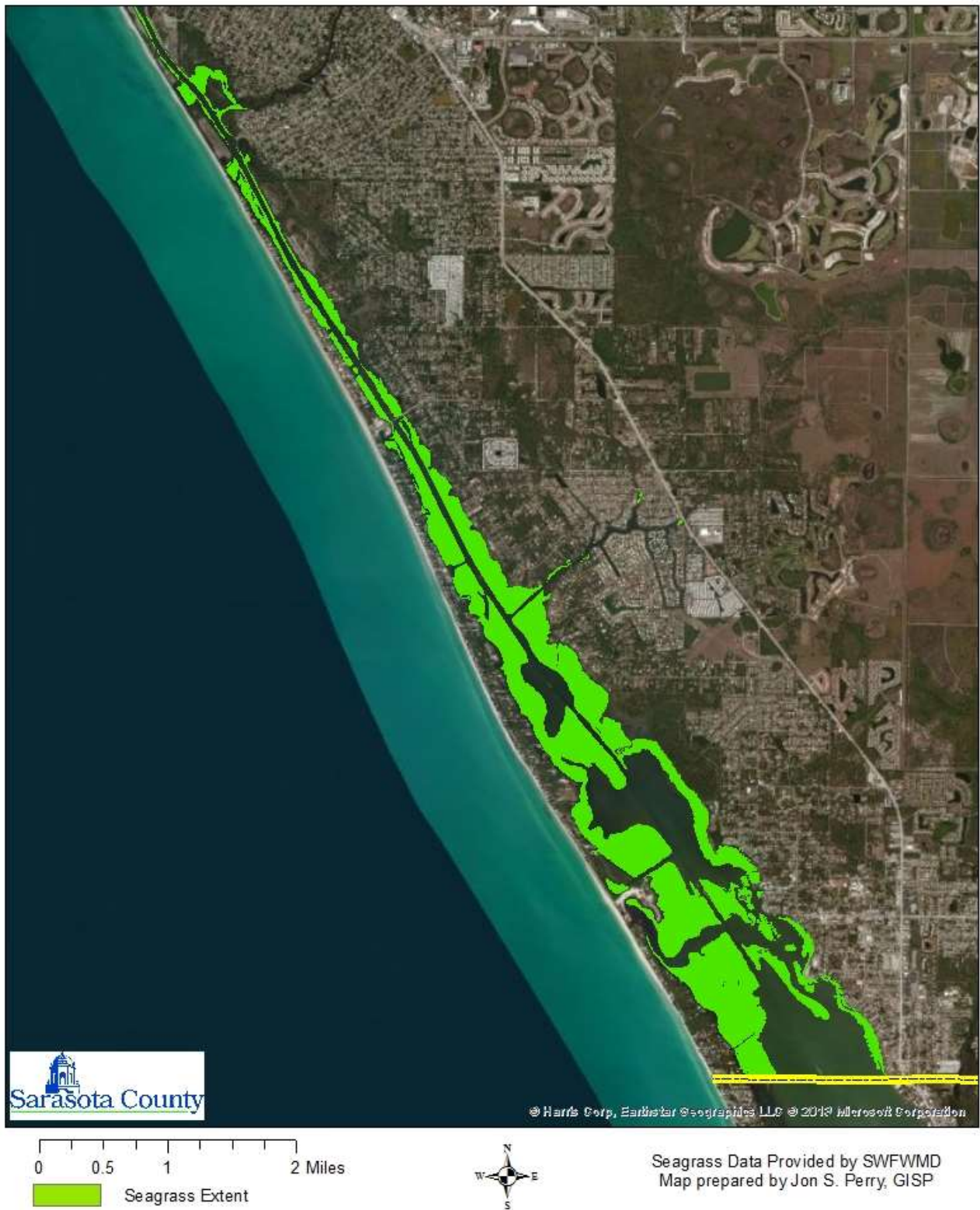




### Extent of Seagrass in Lemon Bay (2010)



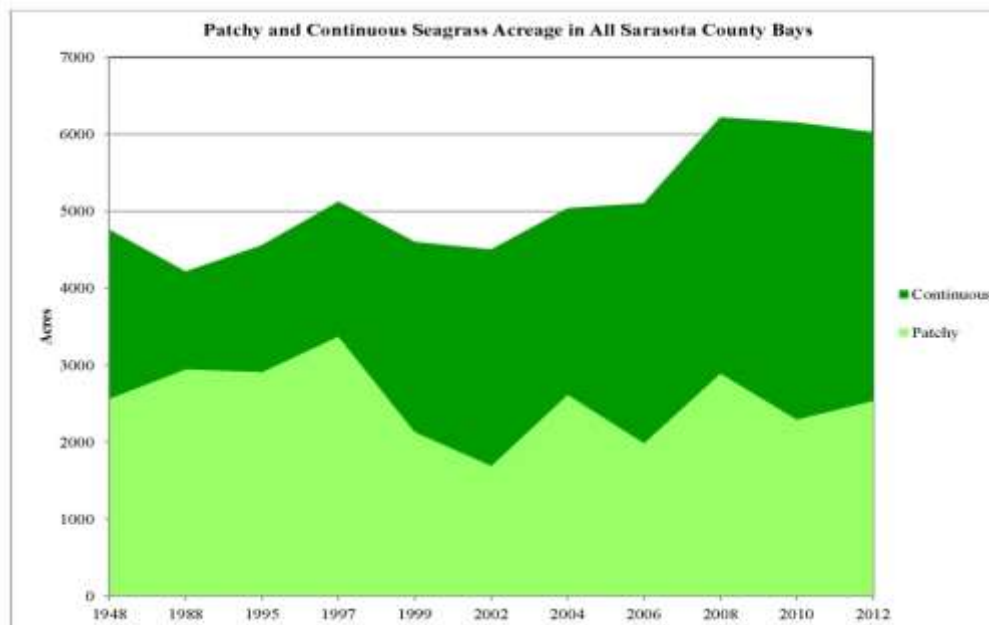
### Extent of Seagrass in Lemon Bay (2012)





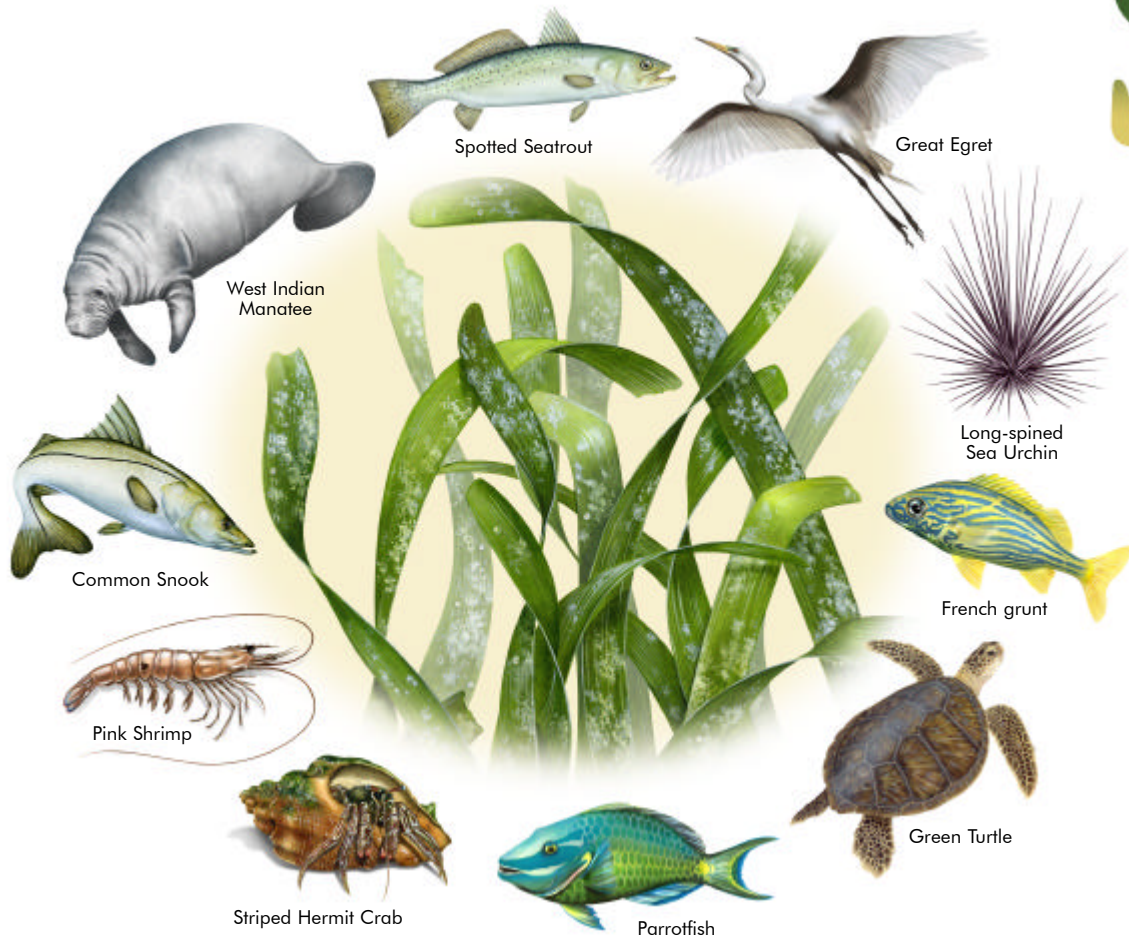
### Appendix 3: Patchy and Continuous Seagrass in All Bays in Sarasota County

	Sarasota Bay		Roberts Bay (north)		Little Sarasota Bay		Blackburn Bay		Dona / Roberts Bays		Lemon Bay		Total Patchy	Total Continuous	Percentage Continuous
	Patchy	Continuous	Patchy	Continuous	Patchy	Continuous	Patchy	Continuous	Patchy	Continuous	Patchy	Continuous			
1948	924	1098	204	138	821	137	79	223	100	30	437	566	2566	2191	46%
1988	1220	692	270	65	408	125	303	108	38	35	711	240	2949	1265	30%
1995	1278	827	246	102	442	150	268	143	25	41	653	381	2913	1644	36%
1997	1750	834	259	103	510	207	279	122	39	41	539	439	3376	1746	34%
1999	1018	1048	214	118	336	434	150	224	41	44	375	597	2134	2465	54%
2002	812	1360	145	129	353	346	97	205	48	34	240	732	1695	2805	62%
2004	893	1267	249	122	448	315	256	212	74	27	699	475	2620	2417	48%
2006	837	1804	130	196	394	247	193	233	98	23	338	611	1989	3113	61%
2008	1710	1788	171	131	357	479	103	244	76	11	479	669	2896	3322	53%
2010	1214	1960	164	165	189	702	86	296	64	15	580	716	2297	3855	63%
2012	1060	2002	196	111	360	542	114	285	64	15	745	531	2538	3486	58%





## Seagrasses Are Important



- Seagrasses and associated attached algae convert nutrients and sunlight into organic matter forming the base of food webs that support manatees, sea turtles, and other valuable species.
- Economically and ecologically important species such as grouper and snapper use seagrass beds as nursery habitats and hunting grounds.

- Wave energy is reduced by seagrasses in coastal areas making them more habitable for plant and animal species.
- Seagrasses capture sediments and absorb nutrients, which helps increase water clarity. Clear water promotes photosynthesis and increases the amount of dissolved oxygen available in the water for other marine life.

# FLORIDA'S Seagrasses

## Florida has 7 species of seagrasses



**Turtle Grass *Thalassia testudinum***  
Turtle grass grows in areas with near-ocean salinities (30 to 40 parts per thousand or ppt). It thrives in tropical areas and is the dominant species in many parts of Florida including the Florida Keys and Florida Bay.



**Manatee Grass *Syringodium filiforme***  
Manatee grass cannot tolerate large swings in salinity and prefers salinity greater than 20 ppt. It is distinguished by its cylindrical leaves.



**Shoal Grass *Halodule wrightii***  
Shoal grass can tolerate a large range in salinity and is often considered a pioneer species for disturbed areas. It is commonly found in estuaries near sources of freshwater such as river mouths. Blades are narrow and flat with a blunt square tip.



**Paddle Grass *Halophila decipiens***  
Paddle grass is the only annual seagrass species, coming back from seeds every spring. It can be found in very deep water with low light levels.



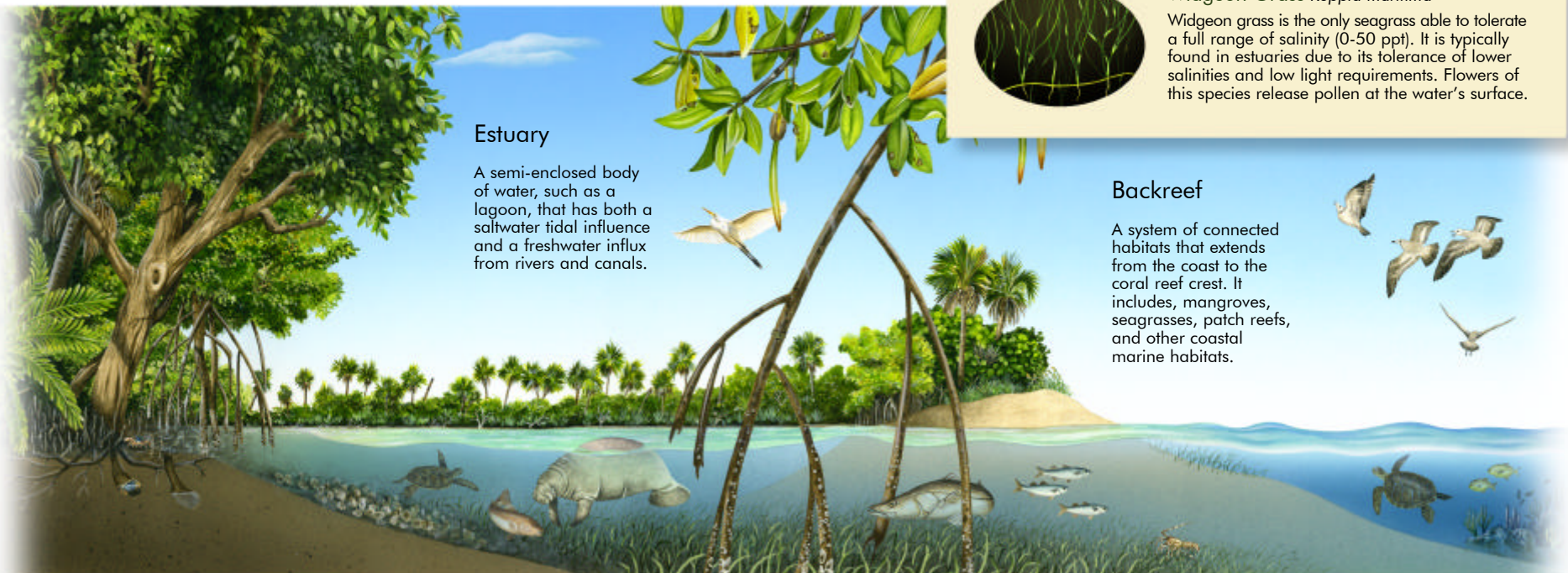
**Johnson's Grass *Halophila johnsonii***  
Johnson's grass is the rarest seagrass and is listed as Threatened under the U.S. Endangered Species Act. It occurs only between Biscayne Bay and Sebastian Inlet on the east coast of Florida.



**Star Grass *Halophila engelmanni***  
Star grass is the easiest of the three *Halophila* species to identify because of its whorl of 5-7 leaves.



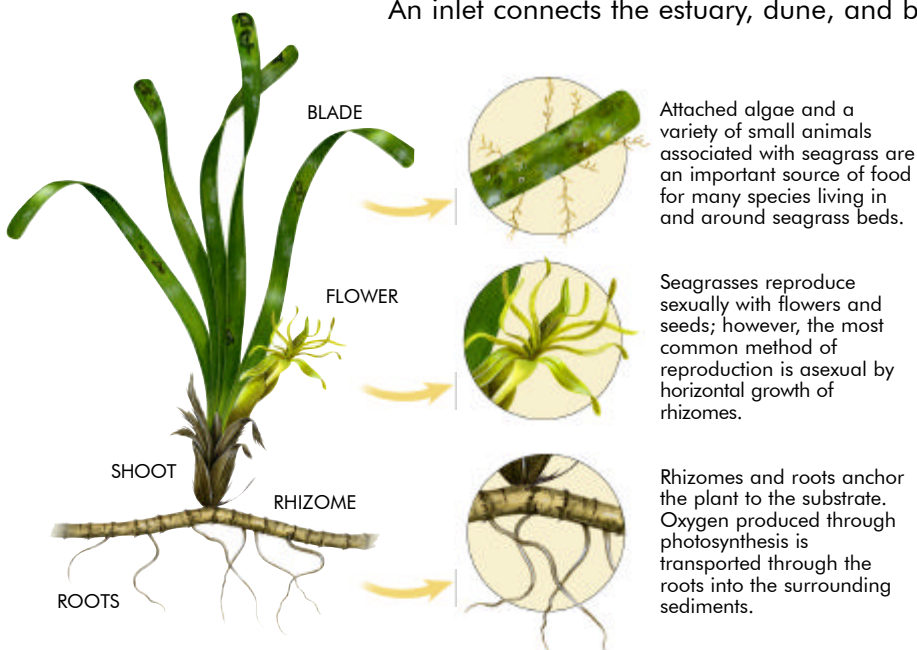
**Widgeon Grass *Ruppia maritima***  
Widgeon grass is the only seagrass able to tolerate a full range of salinity (0-50 ppt). It is typically found in estuaries due to its tolerance of lower salinities and low light requirements. Flowers of this species release pollen at the water's surface.



**Estuary**  
A semi-enclosed body of water, such as a lagoon, that has both a saltwater tidal influence and a freshwater influx from rivers and canals.

**Backreef**  
A system of connected habitats that extends from the coast to the coral reef crest. It includes, mangroves, seagrasses, patch reefs, and other coastal marine habitats.

An inlet connects the estuary, dune, and backreef habitats where seagrasses may be found.

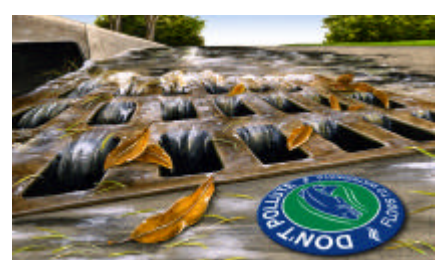


## Seagrasses Need Protection

- Prop-scarring from boats can cause severe damage to seagrass beds.
- Eutrophication, or excess nutrients from run off, can reduce water clarity and stress seagrass beds.
- Large freshwater influx into estuaries via canals or stormwater can drastically alter salinities and water quality and severely stress seagrasses.
- Dredging canals and waterways removes seagrass and often fill is placed over seagrass areas.

## You Can Help

- When boating, avoid shallow seagrass areas.
- Use time-released fertilizer on landscaping to reduce nutrient runoff to storm drains and surface waters.
- Convert from septic systems to sewer to improve water quality by eliminating nutrients from septic tank leaching.
- Avoid trampling seagrasses. Trampled seagrasses often do not recover.



## Water Quality is Critical

**Salinity:** the measure of salt in the water. Plants and animals are adapted to living in a variety of salinities from ocean, to brackish, to fresh water. Most seagrasses are harmed by large fluctuations in salinity.

**Water Clarity:** a measure of how "clear" the water is. Plants, including seagrasses, convert sunlight to produce food/energy, a process called photosynthesis. Sediments and other particles that become suspended in water can block sunlight from reaching seagrasses and may cause them to die. The better the clarity of the water, the more sunlight will penetrate to the seagrasses.



Loxahatchee River District

"Preserving Nature by Design"

Poster Series, No. 1

[www.loxahatcheeriver.org](http://www.loxahatcheeriver.org)

The Loxahatchee River District monitors all 7 seagrass species in the Loxahatchee River and southern Indian River Lagoon as part of its mission to protect and preserve the Loxahatchee River.



Appendix 5:

Midnight Pass Seagrass  
1948 to 2012

# Midnight Pass - 1948

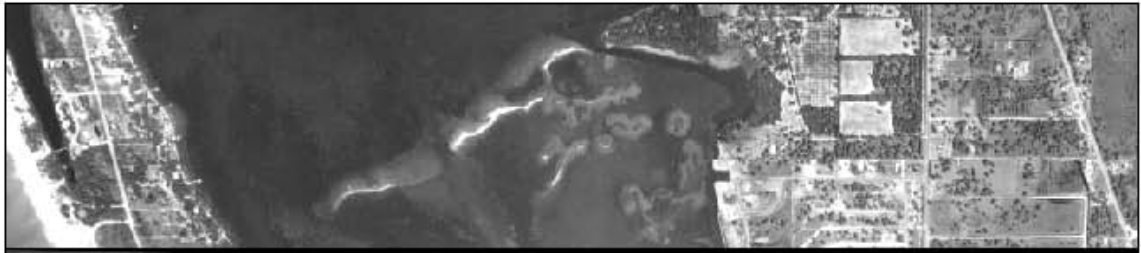


● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP



# Midnight Pass - 1957



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP

# Midnight Pass - 1969



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP



# Midnight Pass - 1972



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP

# Midnight Pass - 1978



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP



# Midnight Pass - 1983



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP

# Midnight Pass - 1986



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP



# Midnight Pass - 1995

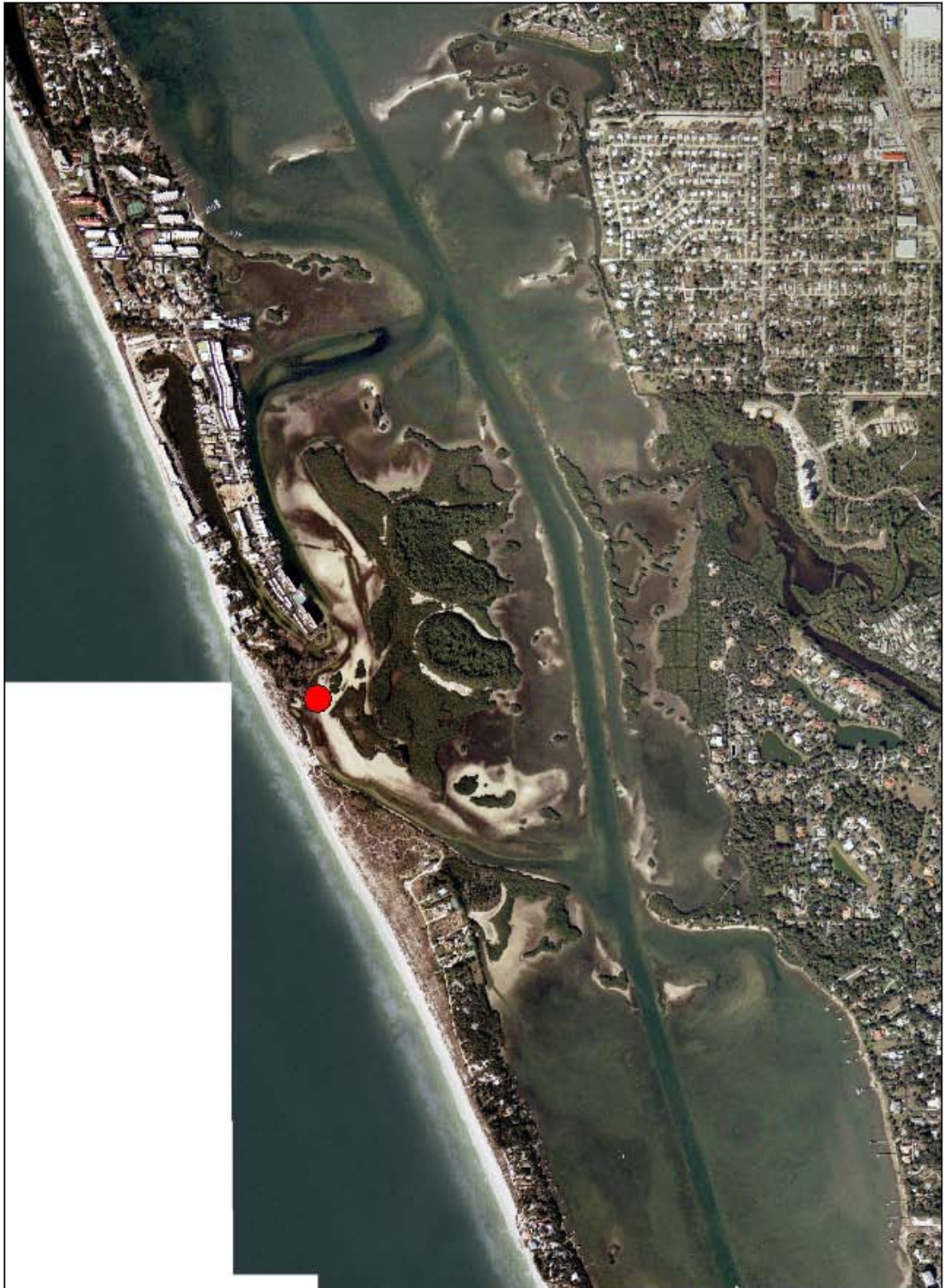


● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP



# Midnight Pass - 2001

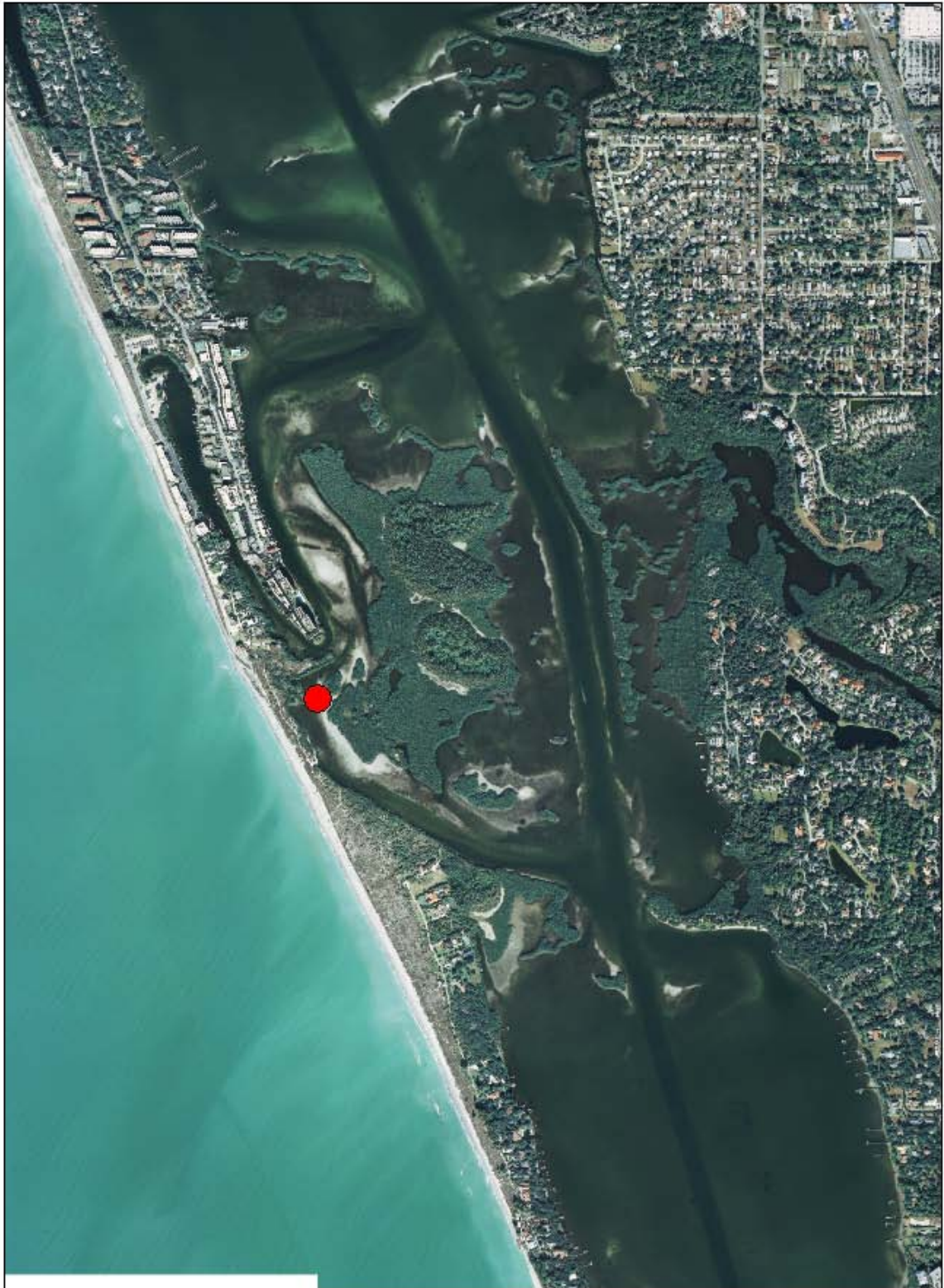


● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP



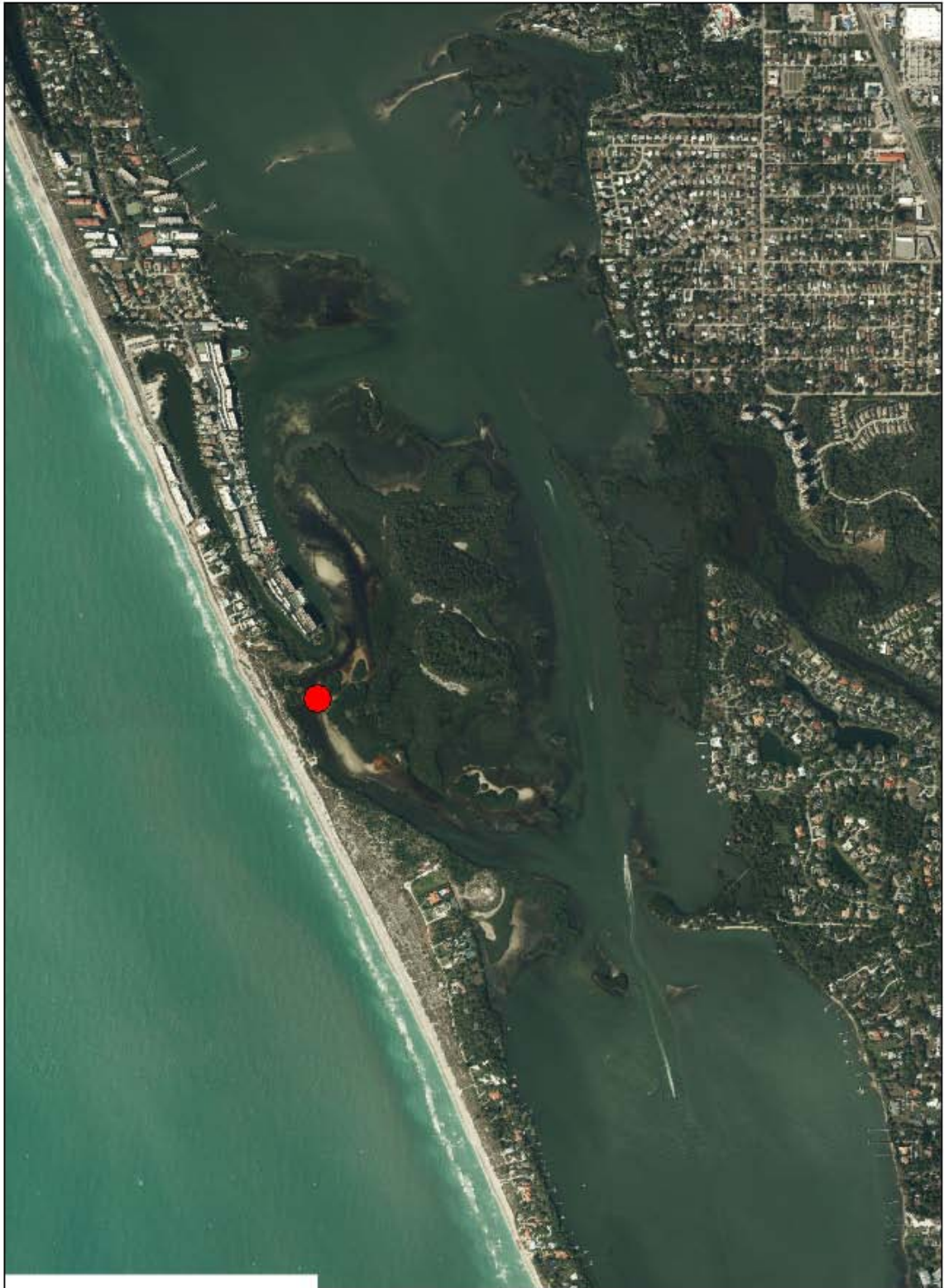
# Midnight Pass - 2011



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by the Florida Department of Transportation  
Map prepared by Jon S. Perry, GISP

# Midnight Pass - 2012



● = Reference point at the southern extent of Siesta Key in 1948

Data provided by Sarasota County  
Map prepared by Jon S. Perry, GISP