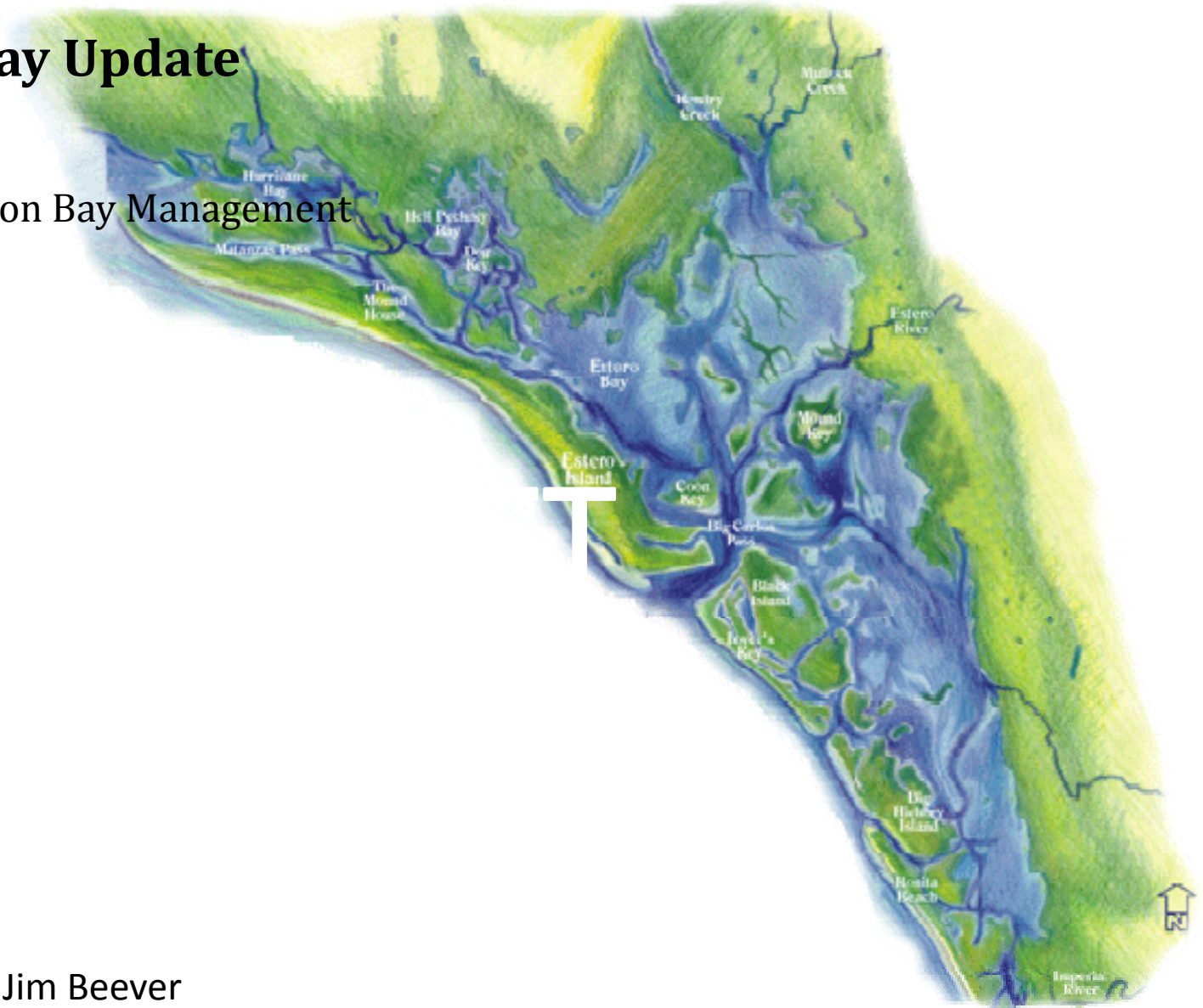


State of the Bay Update

Estero Bay Agency on Bay Management

2009



Whitney Gray and Jim Beever
Southwest Florida Regional Planning Council

State of the Bay Update 2009

Water Quality

- Parameters and Standards

Hydrology

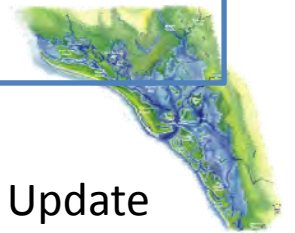
- Flows and Salinity

Wildlife

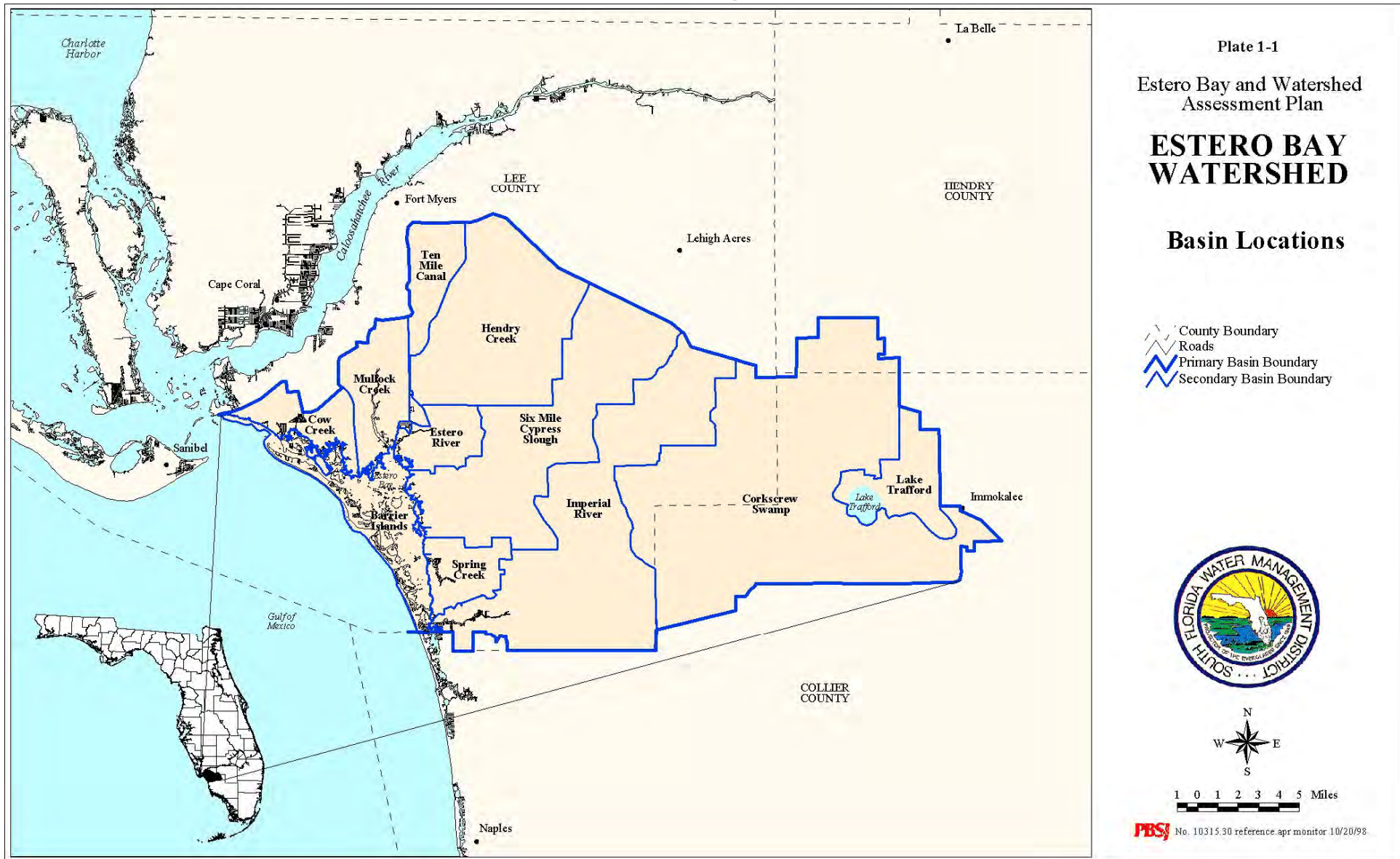
- Listed Species, Seagrass, and Fisheries

Social

- Population, Recreation, and Building Permits



The Estero Bay Watershed



Calusa Indians



Ponce de Leon



Koreshan House



FGCU Construction



It's Great to be in Florida!



Tamiami Trail



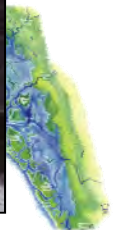
Southwest Florida International Airport



Six Mile Cypress Slough Preserve



Mosquito Spraying



Changes in Water Quality Standards

Parameter	State Standards		EPA	
	2004	2009	2004	2009
Chlorophyll-a	11 mg/mL3 estuarine 20 mg/mL3 streams	No mention in 62-302 (2008)	0.4 ug/L rivers/streams	0.4 ug/L rivers/streams
Copper	3.7 mg/mL3 marine 3.7 mg/mL3 fresh	3.7 ug/L estuarine	0.125 mg/L estuarine 0.125 mg/L fresh	3.1 ug/L estuarine 9.0 ug/L fresh
Dissolved oxygen	4.0 mg/L estuarine 4.0 mg/L fresh	5.0 mg/L estuarine 5.0 mg/L fresh	5.0 mg/L estuarine 5.0 mg/L fresh	5.0 mg/L estuarine 5.0 mg/L fresh
Fecal coliform	200 count/100 mL estuarine (2004 State Of the Bay) 400 count/100 mL (Impaired Waters Rule in 2002)	200 count/100 mL		
	200 count/100 mL estuarine (2004 State Of the Bay) 400 count/100 mL (Impaired Waters Rule in 2002)	200 count/100 mL		
Total nitrogen	Narrative	In development	0.7-3.5 mg/L estuarine = caution >3.5 mg/L = impaired (2004 SOB) 0.9 mg/L (Summary Table for Nutrient Criteria in 2002)	0.9 mg/L
Total phosphorus	Narrative	In development	0.1-0.5 mg/L estuarine = caution >0.5 = impaired (2004 SOB) 40 ug/L (Summary Table in 2002)	40 ug/L
Turbidity	No mention	No mention	25-100 NTU estuarine = caution >100 = impaired (Summary Table in 2002)	1.9 NTU rivers/streams

Note: mg/mL3 = ug/L (micrograms/Liter)

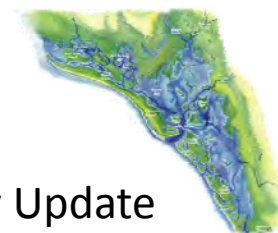
62-302 = Surface Water Quality Standards (FDEP 2008)

62-303 = Impaired Waters Rule (FDEP 2002)

Summary Table for Nutrient Criteria (USEPA 2002)

Gold Book (USEPA 1986)

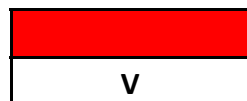
National Recommended Water Quality Criteria (USEPA 2009)



2009 State of Estero Bay Update

2008 Water Quality Status

	Chlorophyll-a	Copper	DO	Fecal Coliform	Total Nitrogen	Total Phosphorus	Turbidity	Total Met
Estuarine								
Estero Bay								7
Mullock Creek								7
Hendry Creek			V	V				5
Estero River			V	V				5
Spring Creek								5
Imperial River			V	V				5
Fresh								
Mullock Creek			V	V				5
10-Mile Canal			V					6
Hendry Creek			V					6
Spring Creek								6
Imperial River	V		V	V				4
Total Met	11	11	6	4	11	11	11	



Water Quality Standard not met for average in 2008

On the FDEP Verified List for Water Quality Impairments

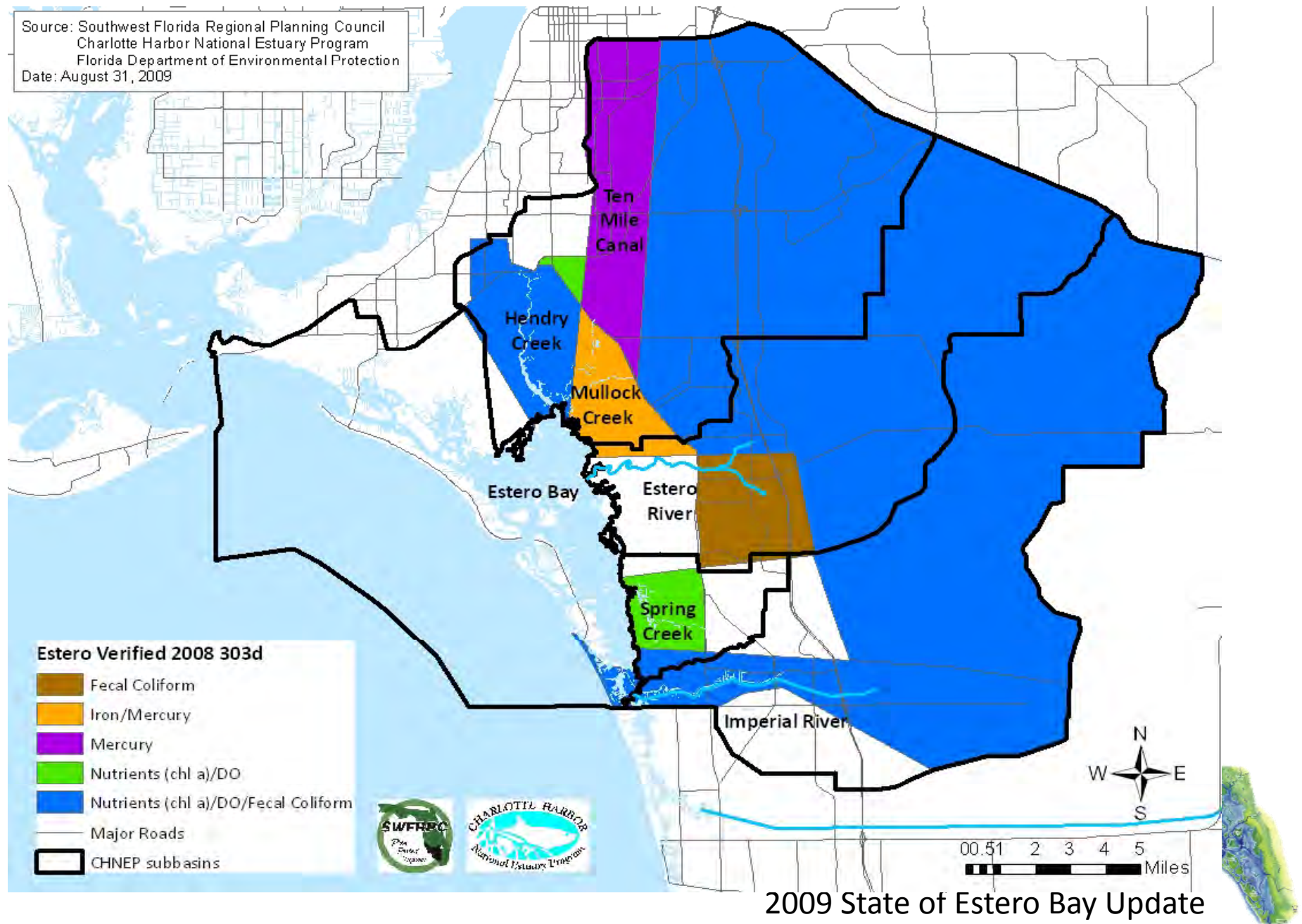
(Florida Department of Environmental Protection 2009; Lee County Environmental Lab 2009)



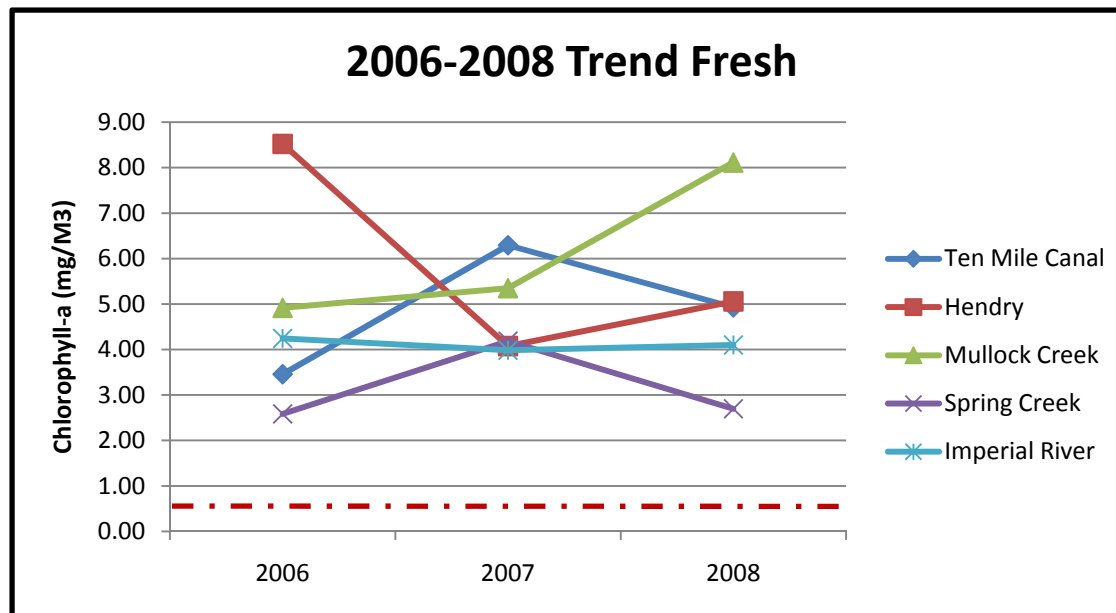
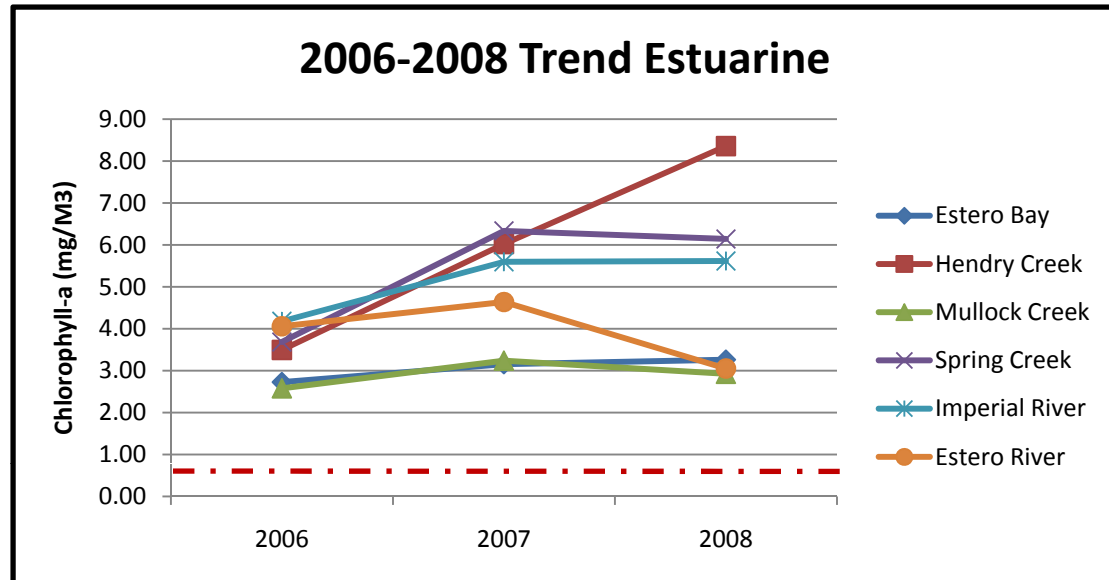
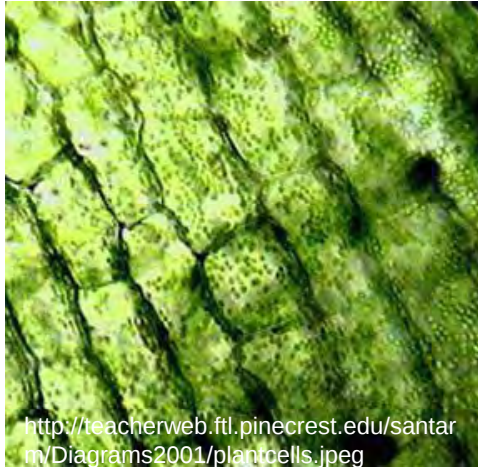
2009 State of Estero Bay Update

Impaired Waters

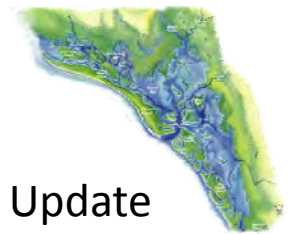
Source: Southwest Florida Regional Planning Council
Charlotte Harbor National Estuary Program
Florida Department of Environmental Protection
Date: August 31, 2009



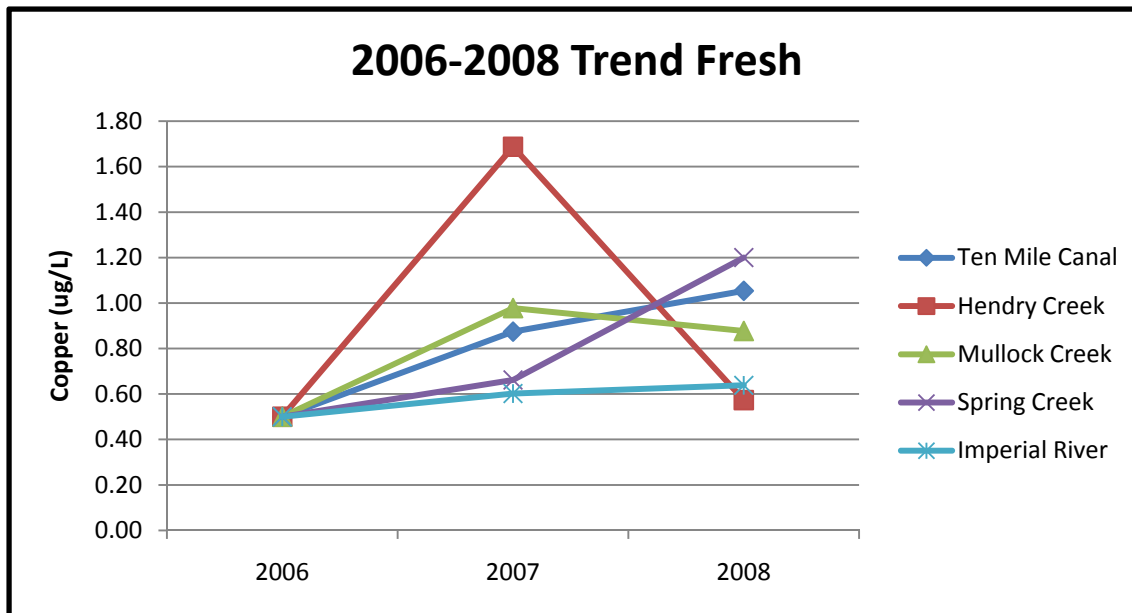
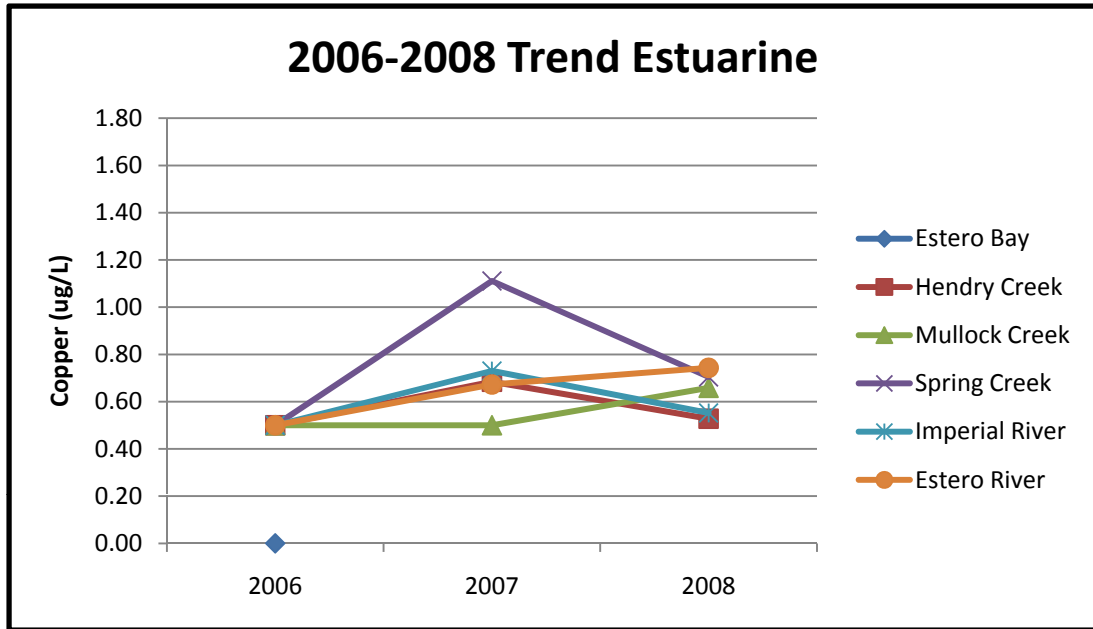
Chlorophyll-a Trends



2009 State of Estero Bay Update



Copper Trends

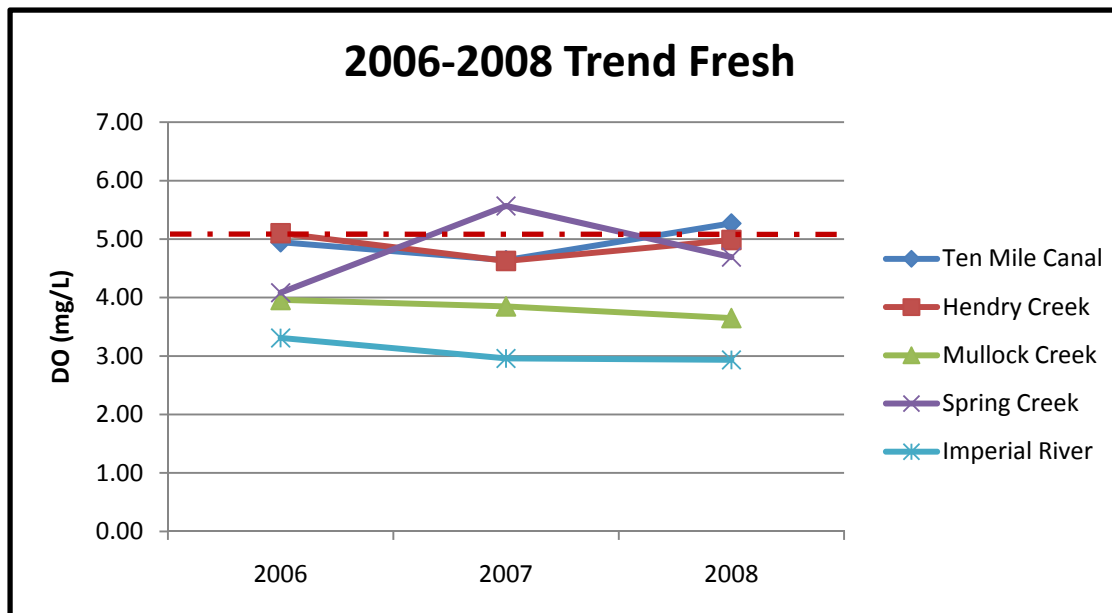
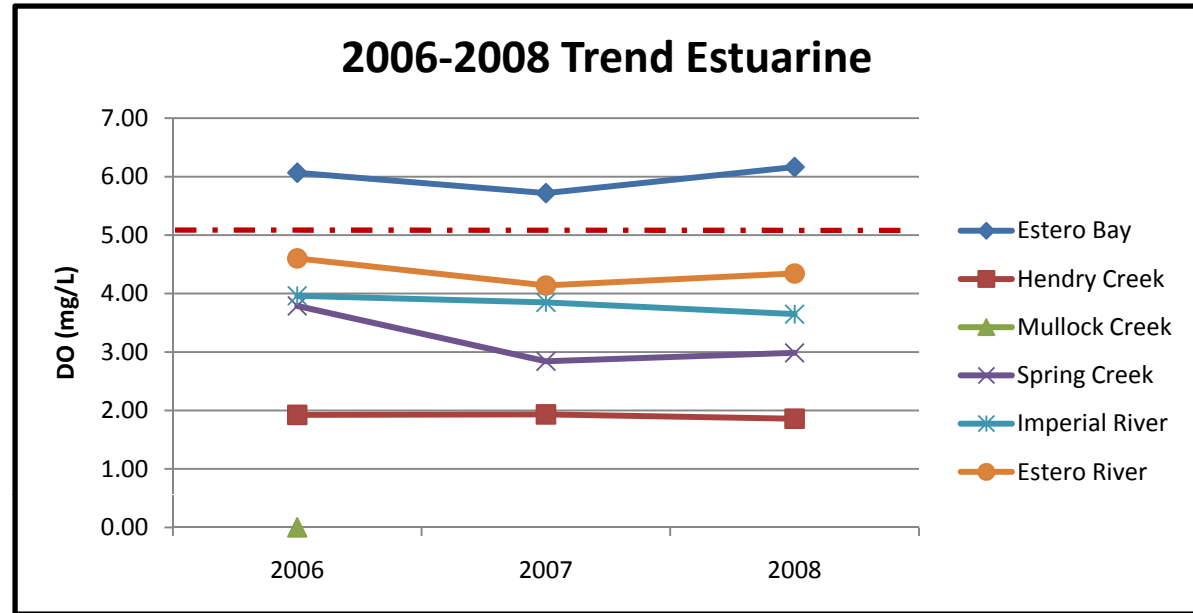


◆ No data for Estero Bay

2009 State of Estero Bay Update



Dissolved Oxygen Trends

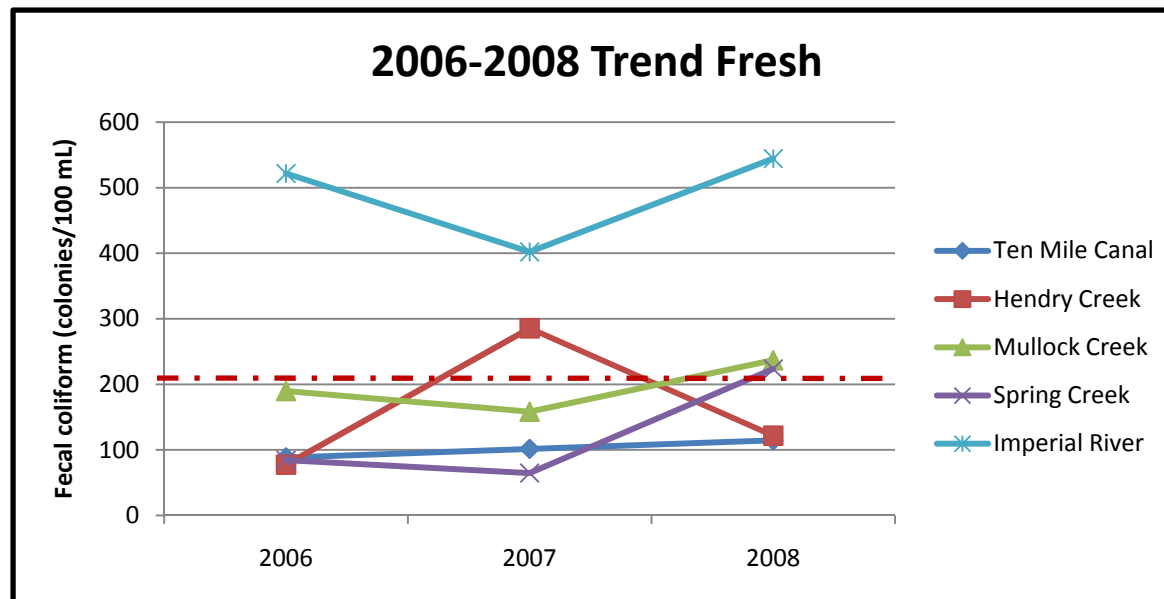
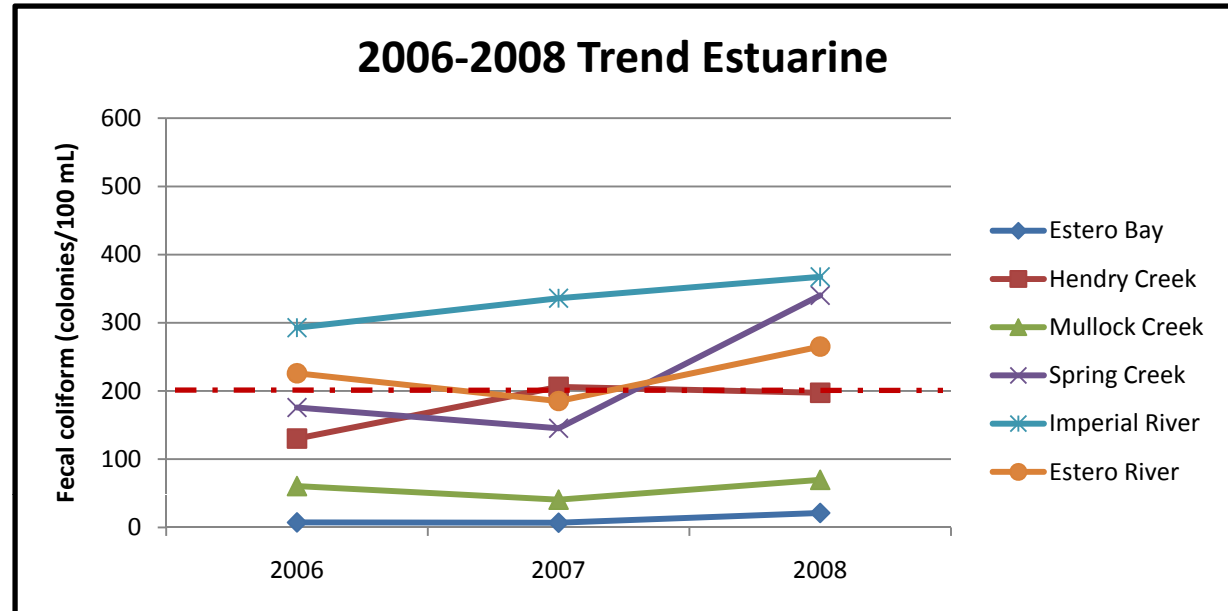
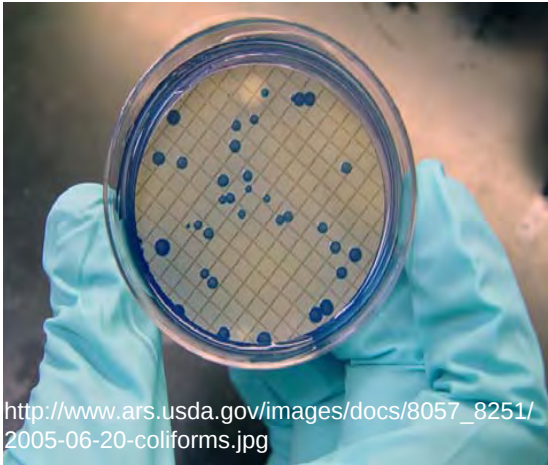


▲ No data for Mullock Creek

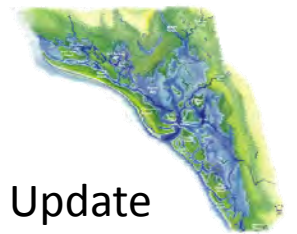
2009 State of Estero Bay Update



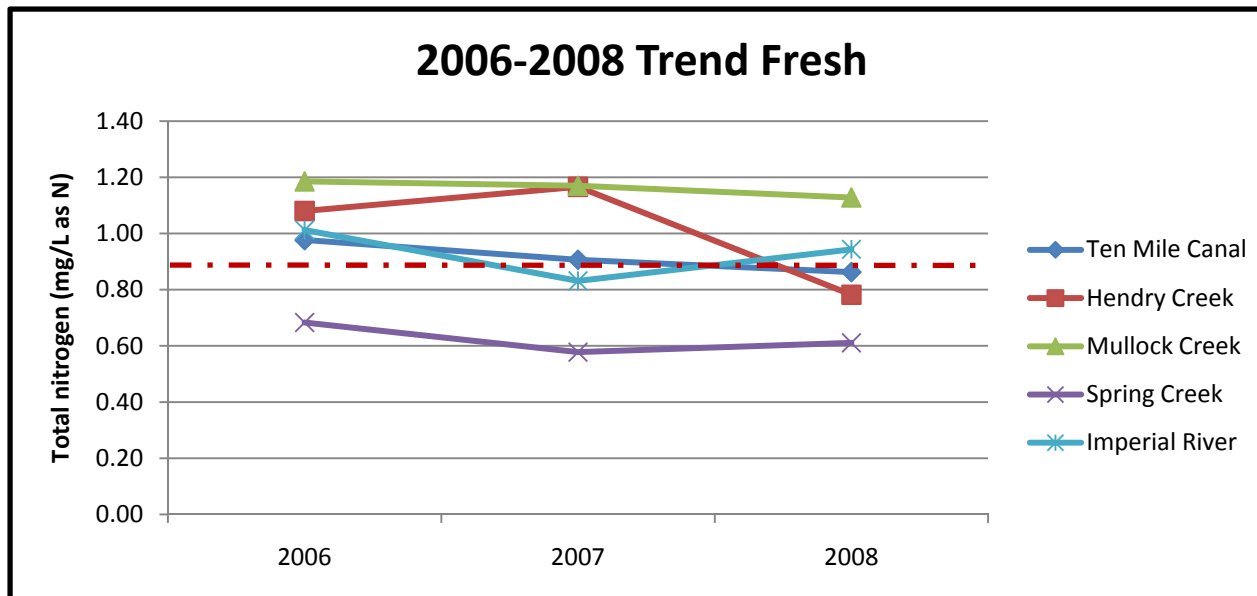
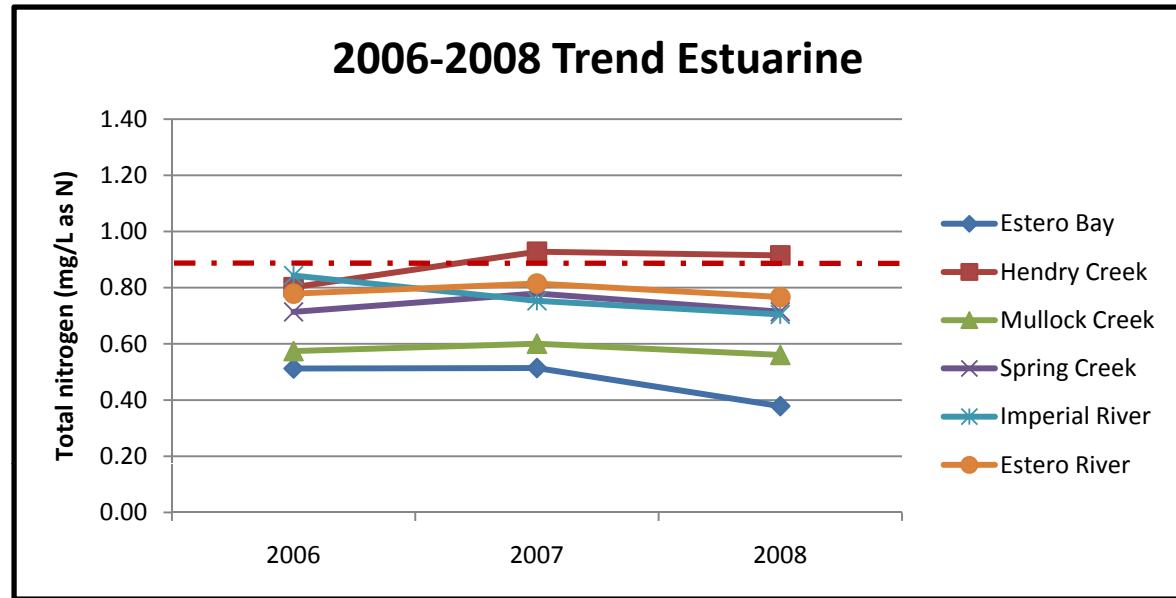
Fecal Coliform Trends



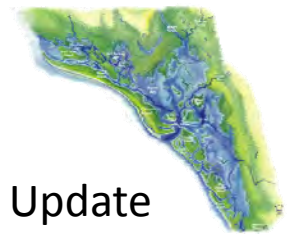
2009 State of Estero Bay Update



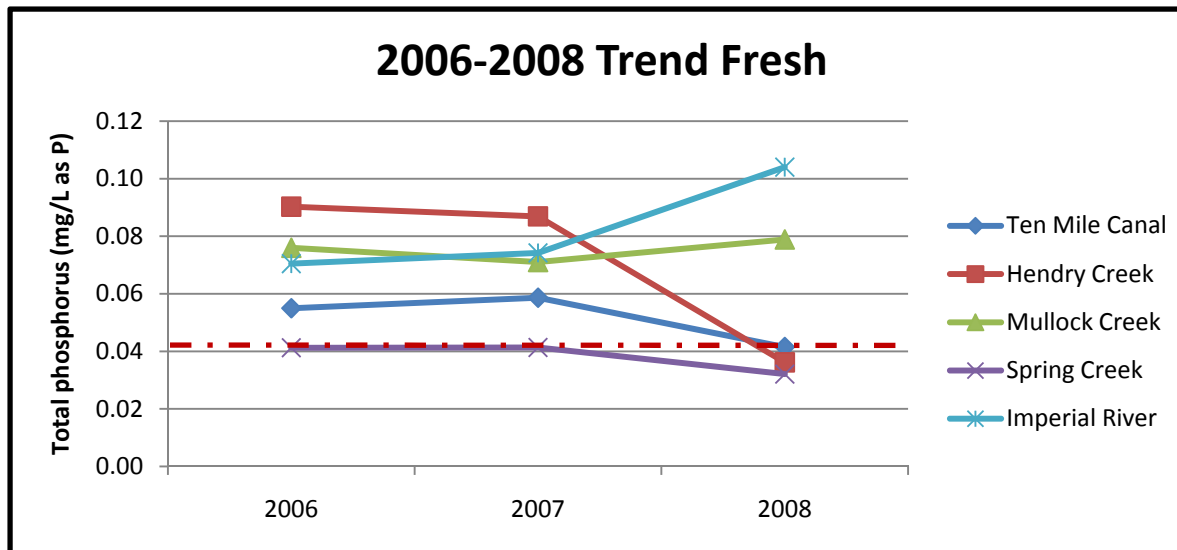
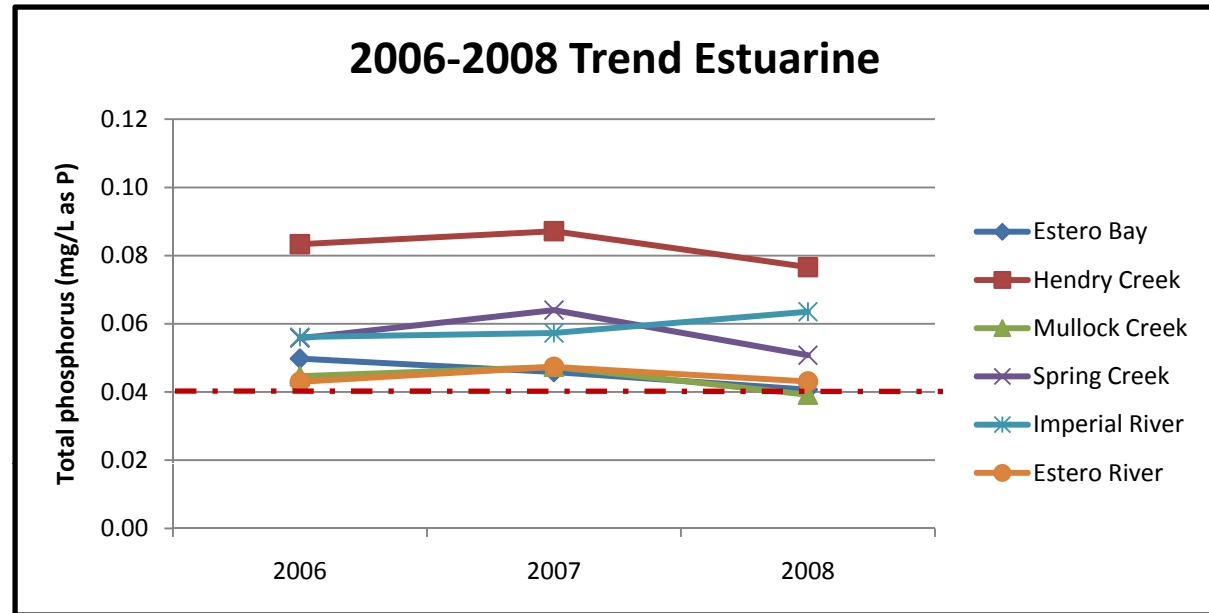
Total Nitrogen Trends



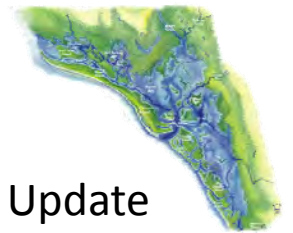
2009 State of Estero Bay Update



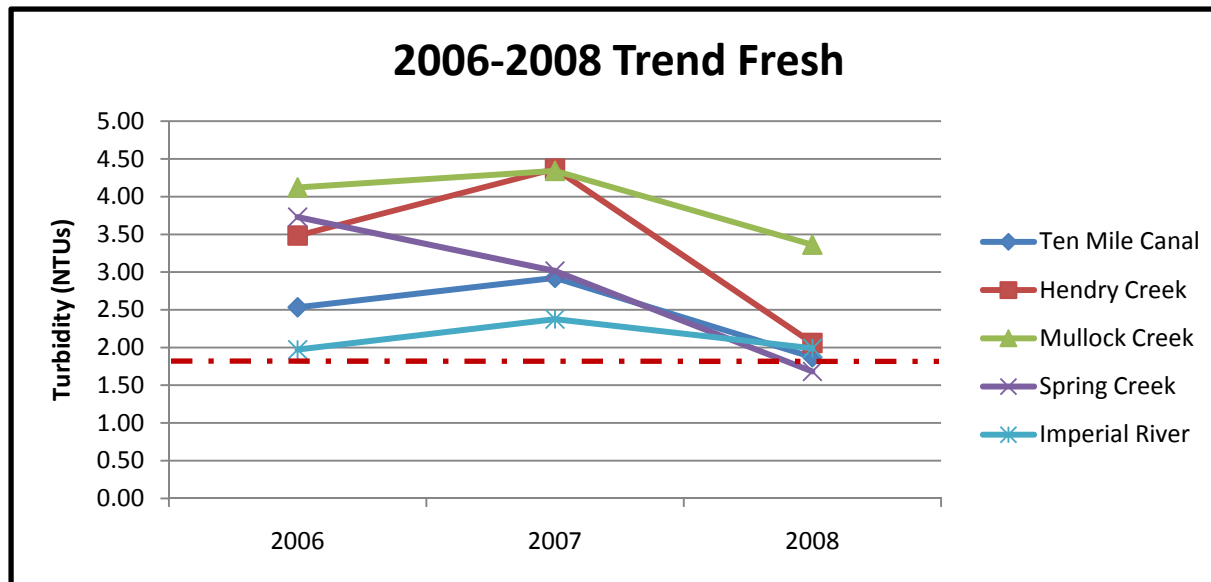
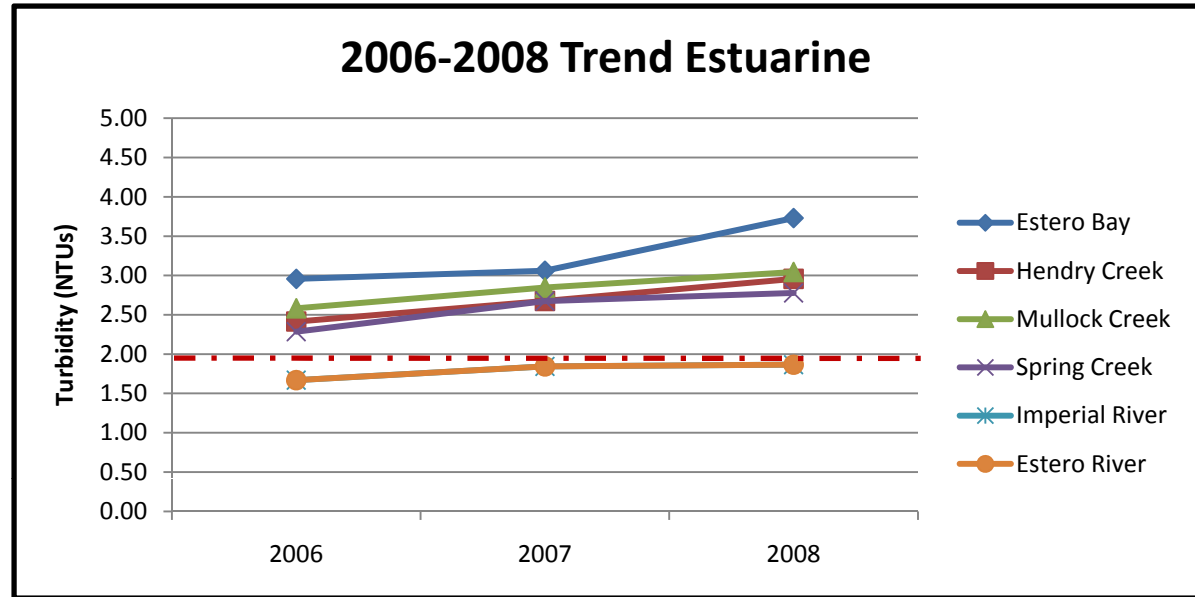
Total Phosphorus Trends



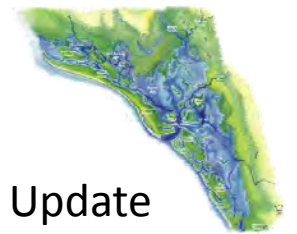
2009 State of Estero Bay Update



Turbidity Trends



2009 State of Estero Bay Update



CHNEP Water Quality Status and Trends Data for Estero Bay Basin 1995-2005

•Ten Mile Canal showed the highest number of parameters that had degraded.

•Estero River and Spring Creek showed the fewest parameters that had degraded.

•Ten Mile Canal also showed the highest number of parameters that had improved.

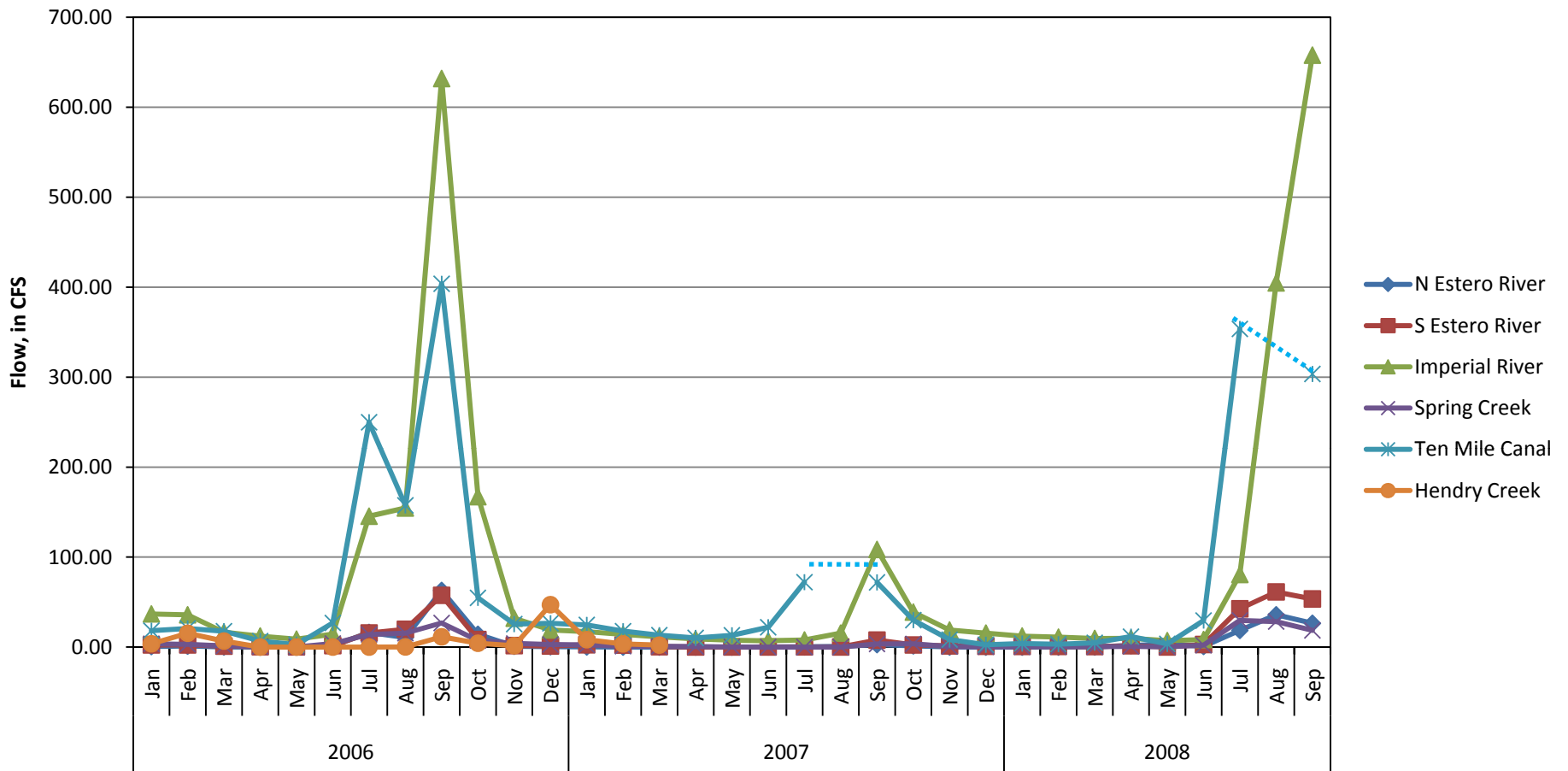
•Hendry Creek showed the fewest parameters that had improved.

Parameter	Estero Bay	Estero River	Hendry Creek	Imperial River	Spring Creek	Ten Mile Canal	Basin Net
BOD	0					-3	-3
Chl-a corr	2		-1	0		1	2
Cl							
Color		0				2	2
DO	6	4	1	2	2	10	25
F Coli	0			1	0	0	1
NH3	-2			-1		-3	-6
NO23	-4	0	-1	0	0	-2	-7
NO3	-2		-2	0	0	-1	-5
pH	0				1	3	4
PO4		0	-1	-2	0	-1	-4
Salinity	9						9
SO4							
Temp	-1			0		0	-1
TkN	-1		-1	-1		-2	-5
TN	-2		-1	-1	0	1	-3
TOC							
TP	1						1
TSS	1	1	0	2		1	5
Turb	5	5	0	1	0	0	11

	positive trend
	neutral trend
	negative trend

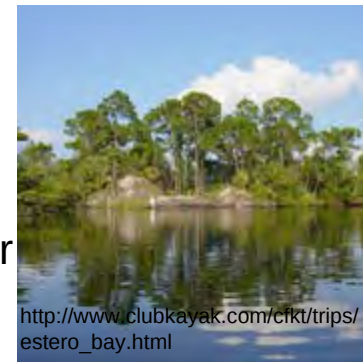


Estero Bay Tributary Flows



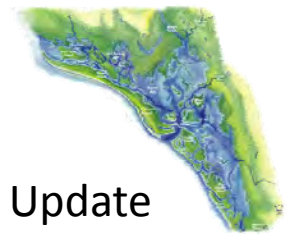
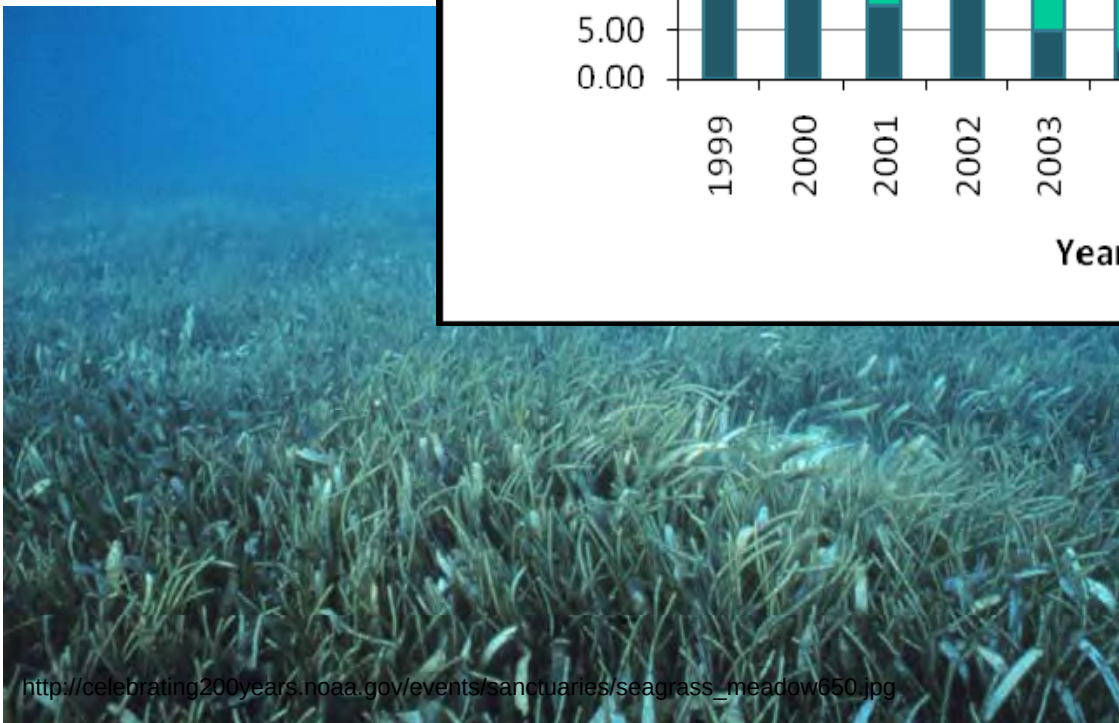
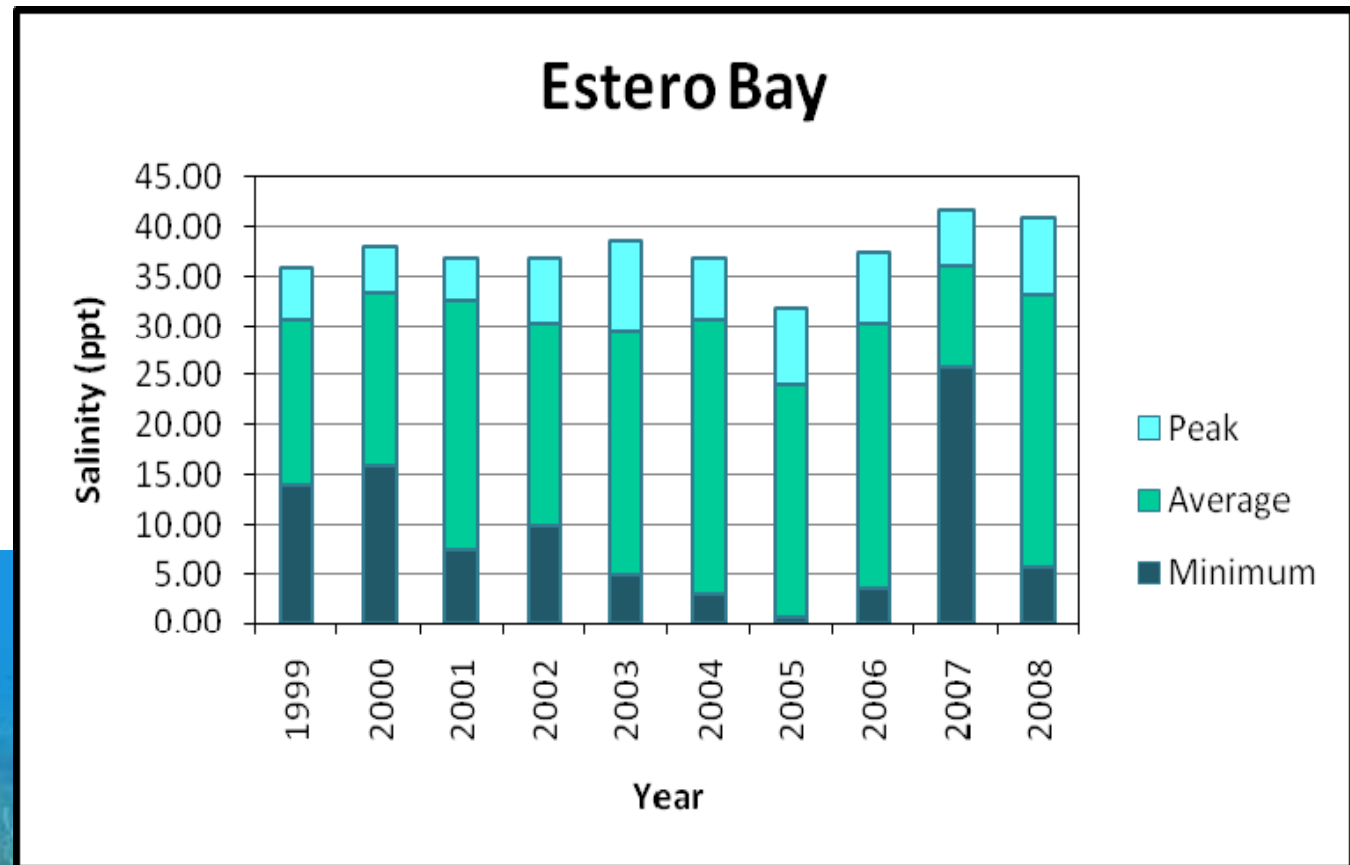
Imperial River

Estero River

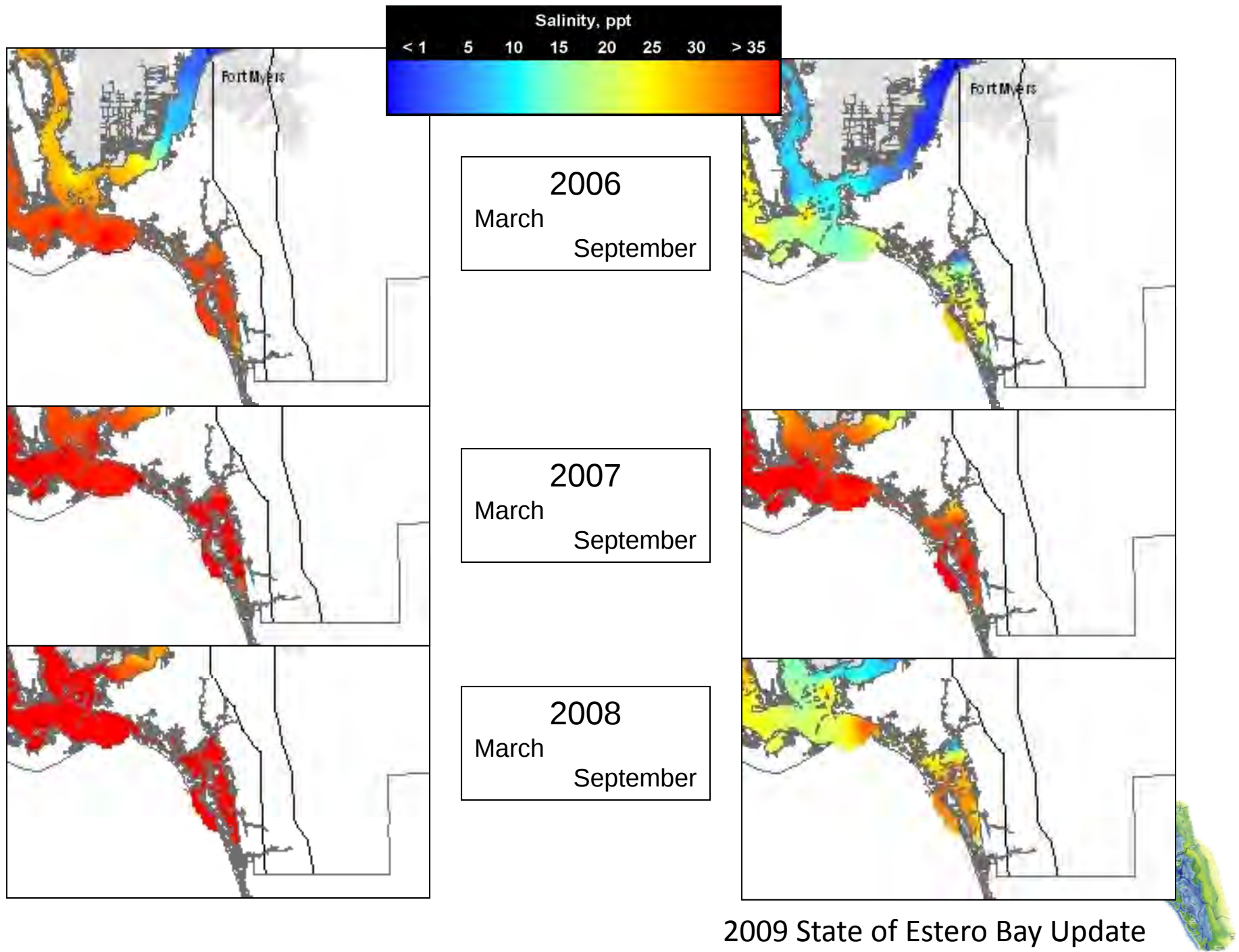


2009 State of Estero Bay Update

Salinity



2009 State of Estero Bay Update



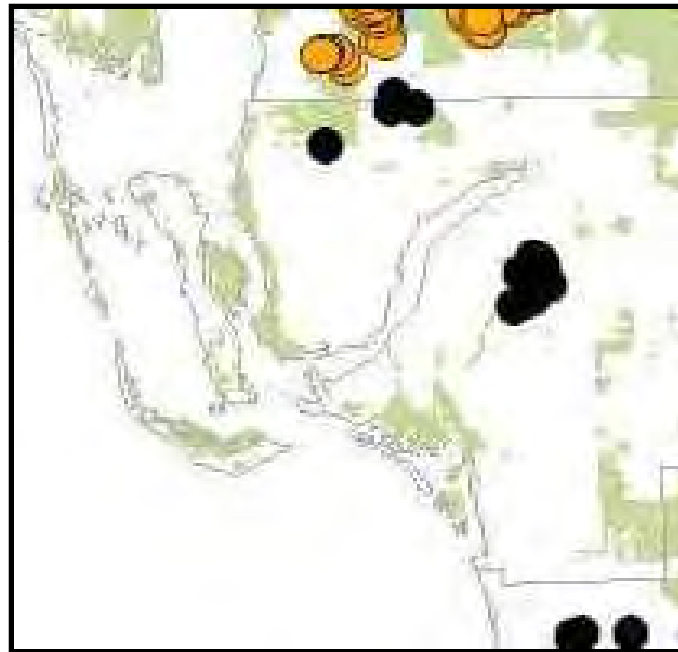
Measure: Number of Red-Cockaded Woodpecker Family Groups

Time Frame: 1991-2001

Data Source: FWC

Level of Change: -100% in EBABM area

Meeting Recovery? No



- RCW_locations_thought_extant6_working_072009
- RCW_locations_thought_extirpated3_working_062009
- Florida Conservation Lands

Red-cockaded woodpecker *Picoides borealis*

2009 State of Estero Bay Update





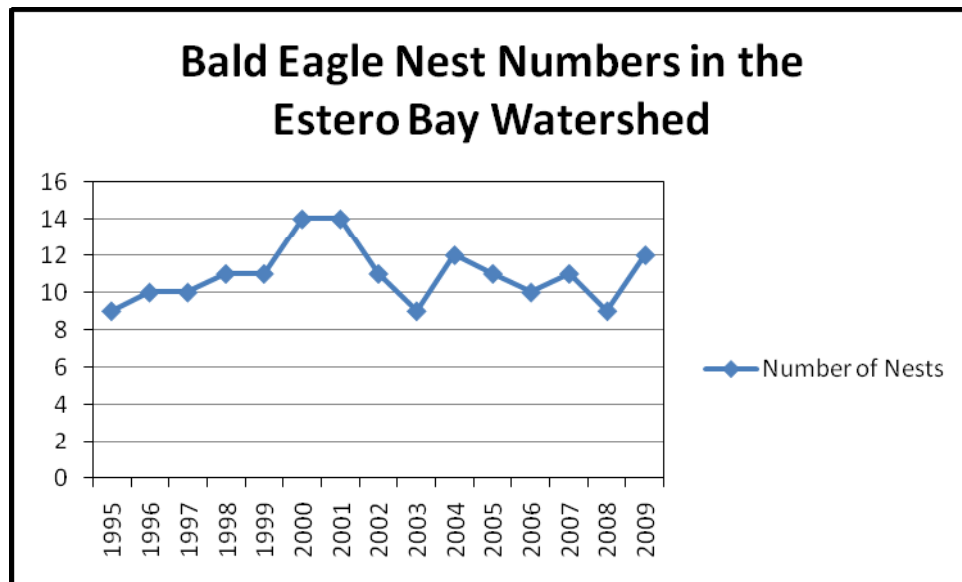
Measure: Number of Successful Bald Eagle Nests

Time Frame: 1995-2009

Data Source: FWC

Level of Change: + 33% in EBABM area

Meeting Recovery? Yes according



Year	Number of Nests	Success Rate
1995	9	5 (55%)
1996	10	6 (60%)
1997	10	4 (40%)
1998	11	7 (64 %)
1999	11	6 (55 %)
2000	14	?
2001	14	10(71%)
2002	11	2(18%)
2003	9	2(22%)
2004	12	6(50%)
2005	11	?
2006	10	7(70%)
2007	11	4(37%)
2008	9	6(67%)
2009	12	5(42%)

Bald Eagle *Haliaeetus leucocephalus*

2009 State of Estero Bay Update



Measure: Number of Successful Florida Scrub Jay Nests

Time Frame: 1995-2009

Data Source: FWC

Level of Change: -100% in EBABM area

Meeting Recovery? No



Year	Number of Nests	Success Rate
1989	2	2 (100%)
1993	1	unknown
1995	0	0
1999	0	0
2001	0	0
2009	0	0

Florida Scrub Jay *Aphelocoma coerulescens*



2009 State of Estero Bay Update



Photo by Whitney Gray

Measure: Acres of gopher tortoise habitat impacted

Time Frame: 1999-2009

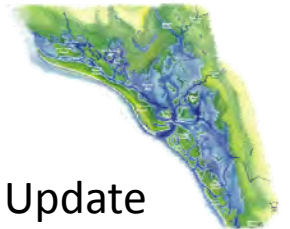
Data Source: FWC?

Level of Change: -4% in EBABM area by 1999 to 2003

Meeting Recovery? No

Date	Acres Gopher Tortoise Habitat Impacted	Acres Gopher Tortoise Habitat Preserved Off-Site	Acres Gopher Tortoise Habitat Preserved Onsite	Net Gopher Tortoise Habitat Lost	Total Project Impact
1999	27	4	0	23	76
2000	121	18	5	98	436
2001	387	56	15	316	1,108
2002	0	0	0	0	0
2003	43	9	6	28	88
2004					
2005					
2006					
2007					
2008					
8-year total	577	86	26	465	1,707

Gopher Tortoise *Gopherus polyphemus*



2009 State of Estero Bay Update

Time Frame: 1986-1999/2000

Data Source: FWC

Level of Change: 0 + 15% in EBABM area

Meeting Recovery? Not Yet



<http://www.ecotrail.com/images/pelicans.jpg>



http://fl.water.usgs.gov/cesi/images/wildlife/woodstork1_2.jpg

Year	Number of Rookeries	Success Rate
1986	9	5 (55%)
1999	6	6 (55 %)
2008	13	?

Wading Bird & Brown Pelican Rookeries

Pelicanus occidentalis

2009 State of Estero Bay Update



Rank	Frog Species	% Occurrence
1	Oak toad, <i>Bufo quericus</i>	17.1
2	Southern toad, <i>Bufo terrestris</i>	10.3
3	Florida cricket frog, <i>Pseudacris nigrita verrucosa</i>	9.0
4	Green treefrog, <i>Hyla cinerea</i>	8.8
5	Squirrel treefrog, <i>Hyla squirella</i>	7.6
6	Greenhouse frog, <i>Eleutherodactylus planirostris</i>	6.3
7	Narrow-mouthed toad, <i>Gastrophryne carolinensis</i>	5.7
8	Pinewoods treefrog, <i>Hyla femoralis</i>	4.8
9	Pig frog, <i>Rana grylio</i>	3.8
10	Barking treefrog, <i>Hyla gratiosa</i>	3.4
11	Cuban treefrog, <i>Hyla septentrionalis</i>	3.2
12	Florida chorus frog, <i>Pseudacris nigrita verrucosa</i>	2.9
13	Southern leopard frog, <i>Rana sphenoccephala</i>	2.5
14	Little grass frog, <i>Limnaeodius ocularis</i>	0.6
15	Eastern spadefoot toad, <i>Scaphiopus holbrooki</i>	0.4
16	Bull frog, <i>Rana catesbeiana</i>	0.2
17	Giant toad, <i>Bufo marinus</i>	0.2
18	none detected	13.1

Frog species detected and rank based on frequency of occurrence during the 2000 season. Based on 525 "detection events"

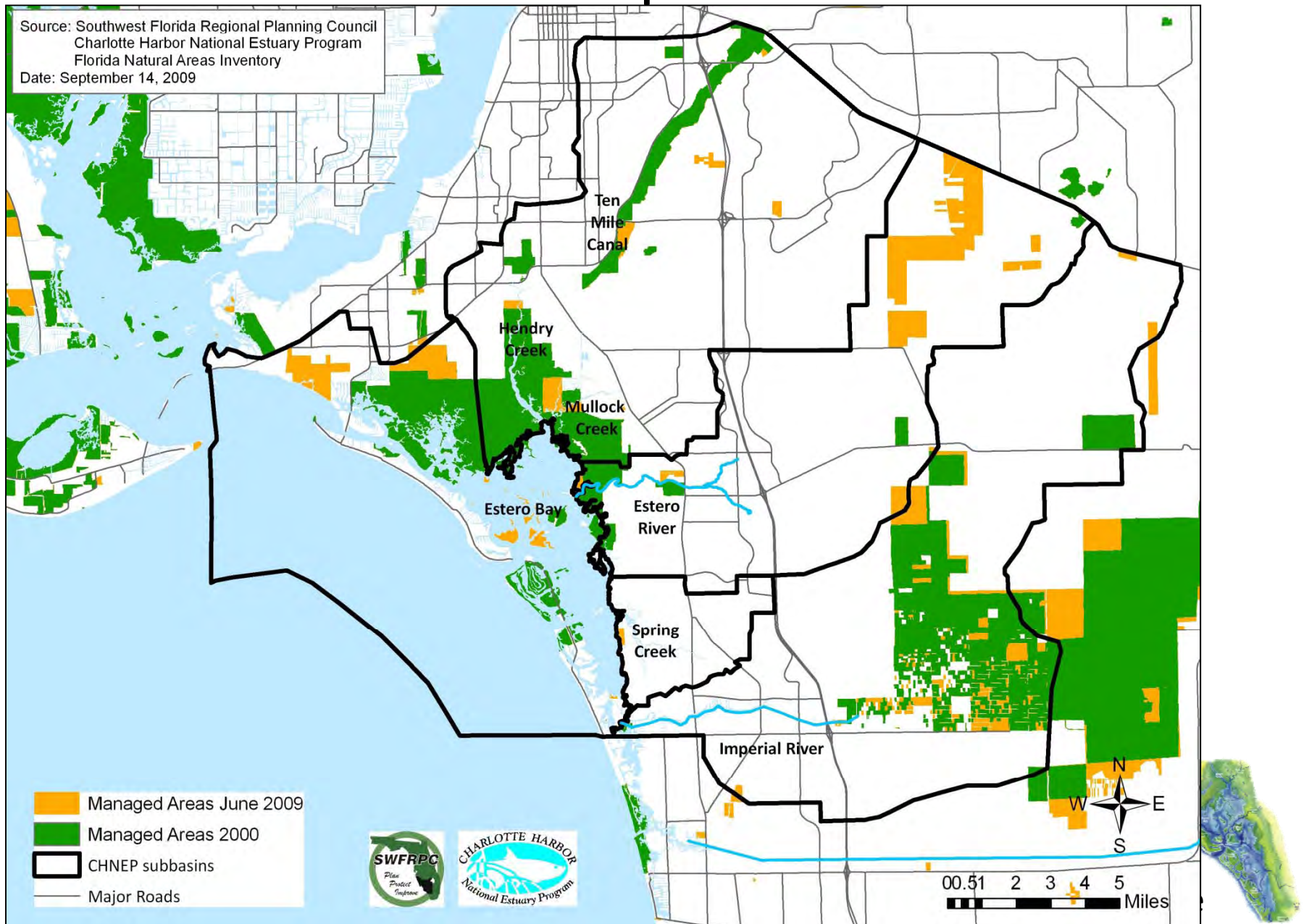


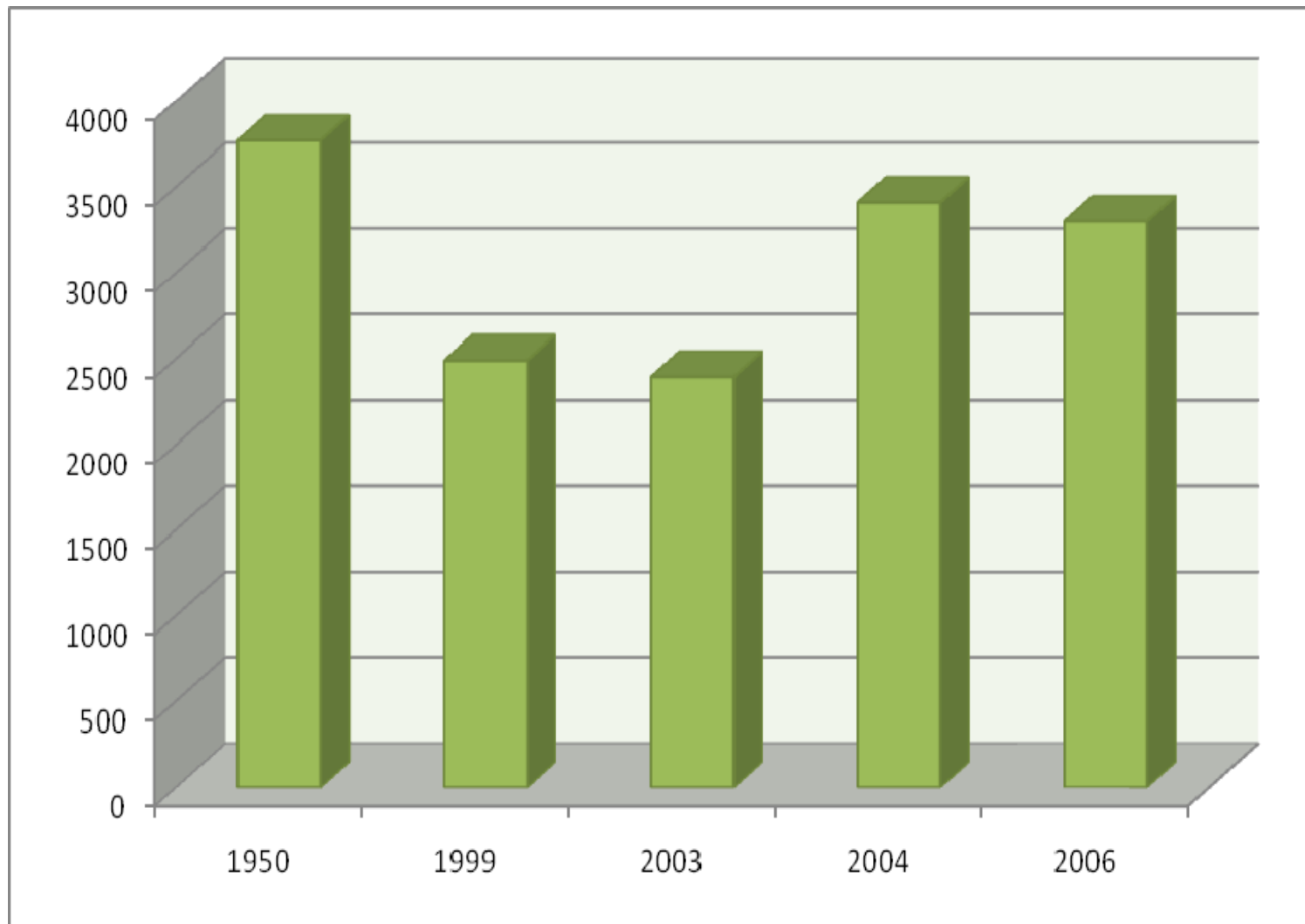
Amphibians

2009 State of Estero Bay Update



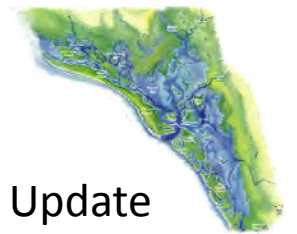
Conservation Land Acquisitions 2000-2009



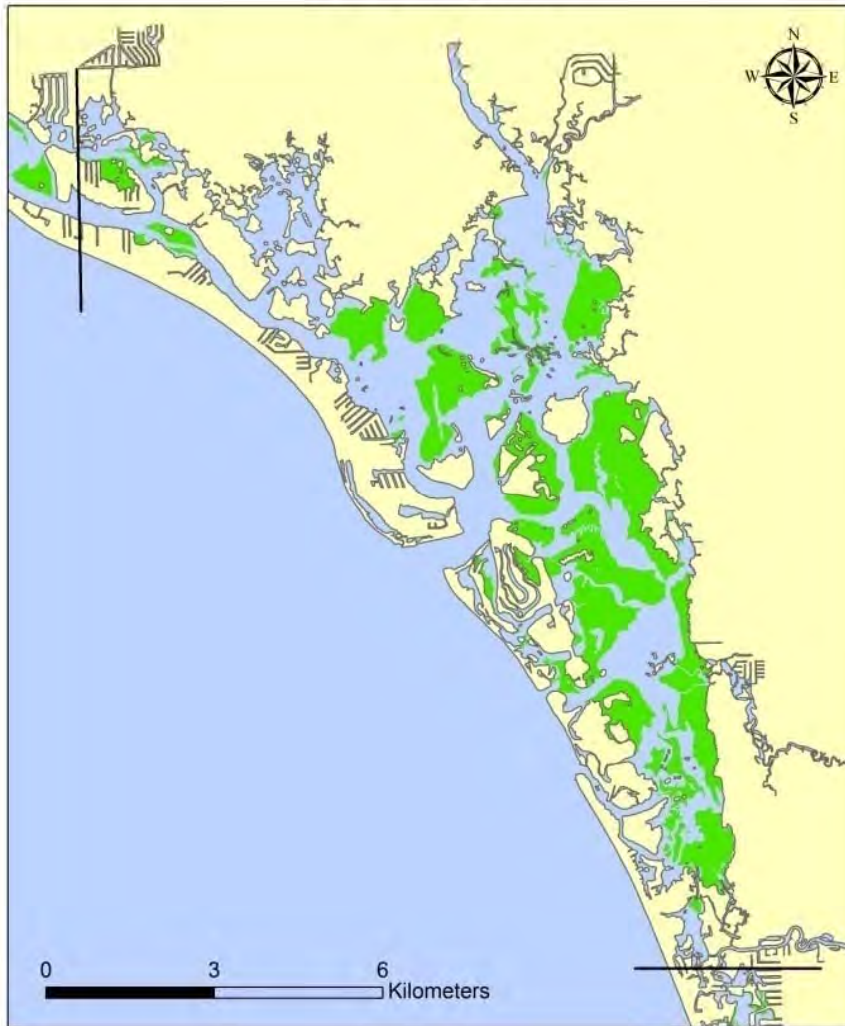


Seagrass Acres in Estero Bay

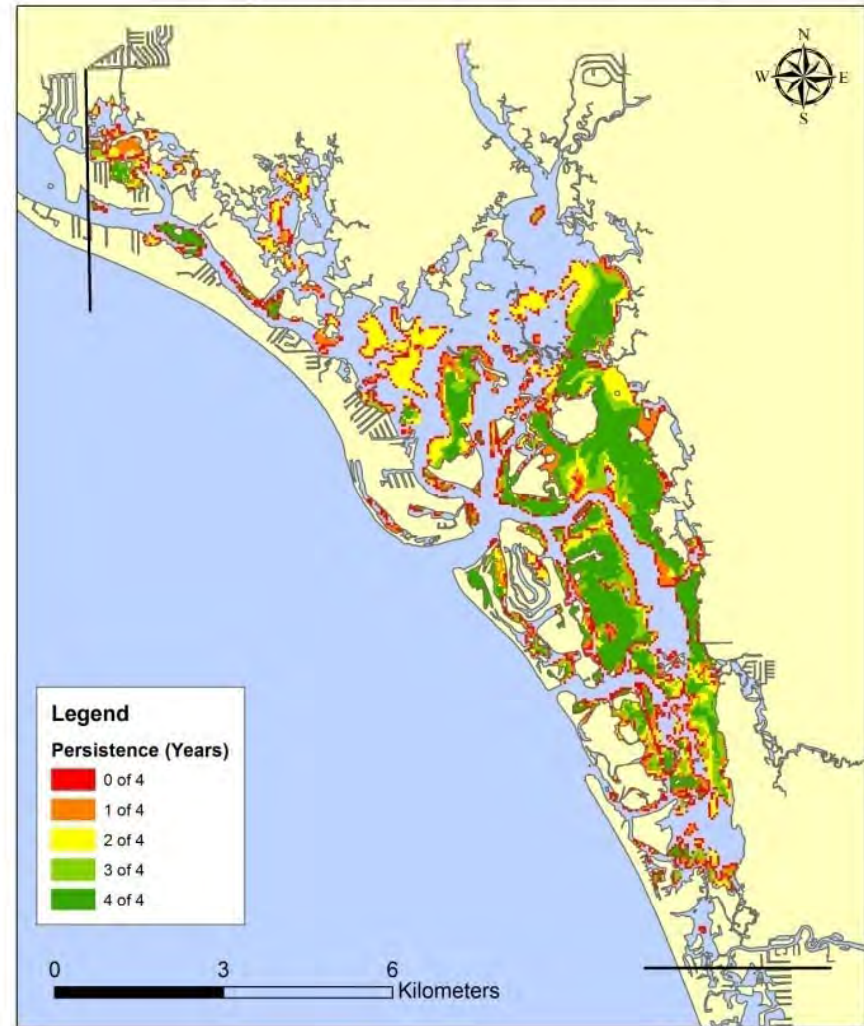
2009 State of Estero Bay Update



Estero Bay
1950 Seagrass



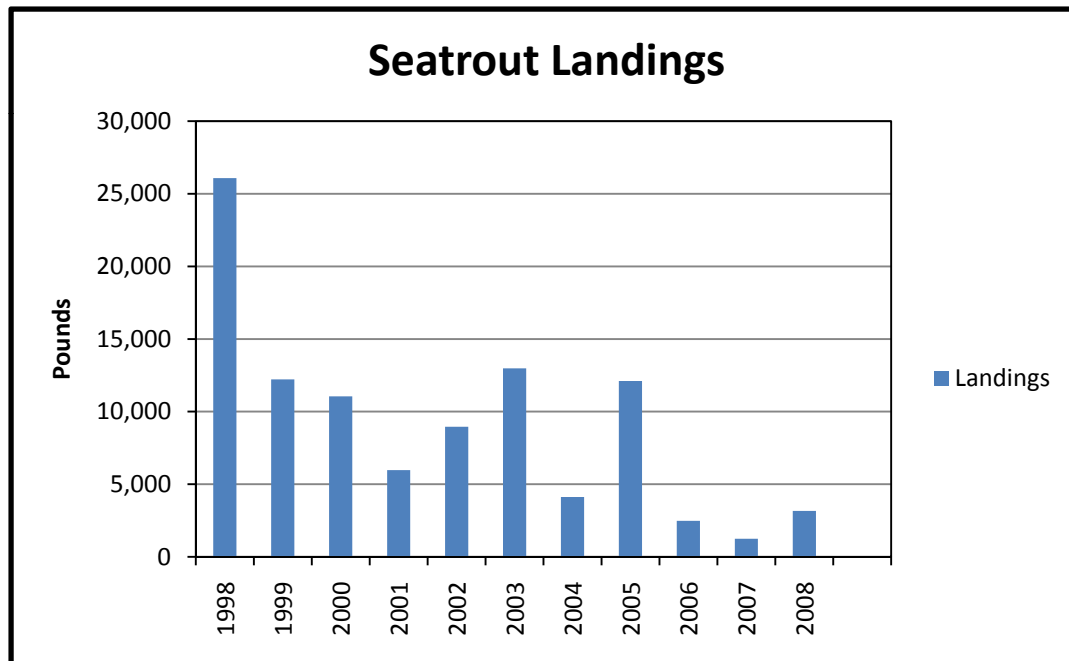
Estero Bay
Seagrass Persistence 1999-2006



2009 State of Estero Bay Update



<http://www.captcliff.com/pdfimages/seatrout.jpg>



Year	Landings (pounds)	Trips	Landings/Trip
1998	26,085	949	27
1999	12,224	566	22
2000	11,054	636	17
2001	5,975	369	16
2002	8,963	358	25
2003	12,985	392	33
2004	4,120	198	21
2005	12,113	359	34
2006	2,479	149	17
2007	1,248	95	13
2008	3,166	142	22
1998-2008 change	-88%	-85%	-19%

Spotted Seatrout *Cynoscion nebulosus*

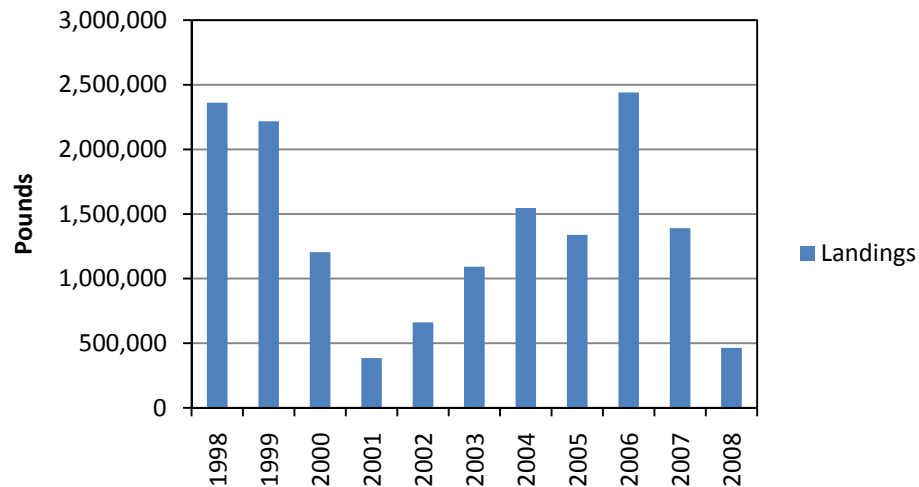
2009 State of Estero Bay Update





<http://www.dnr.state.md.us/fisheries/oxford/publications/bluecrabpub.html>

Blue Crab Landings

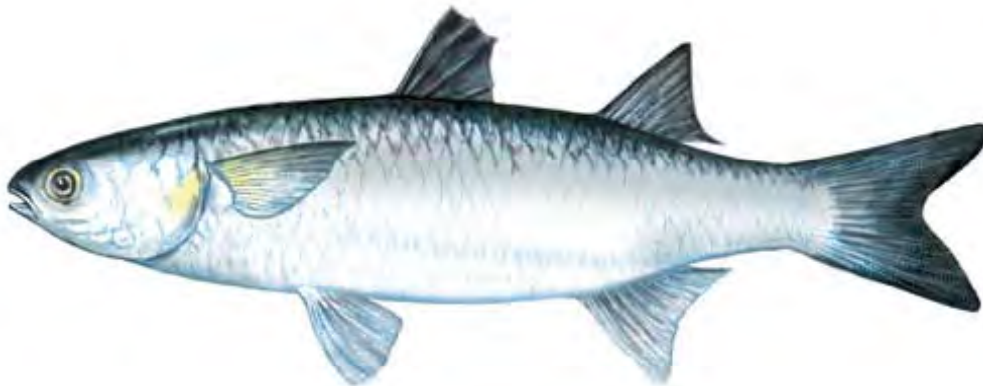


Year	Landings (pounds)	Trips	Landings/Trip
1998	2,361,740	8,889	266
1999	2,217,971	8,549	259
2000	1,205,304	6,194	195
2001	384,724	3,075	125
2002	661,615	3,914	169
2003	1,092,288	4,967	220
2004	1,547,053	4,606	336
2005	1,338,285	4,708	284
2006	2,441,143	6,343	385
2007	1,390,276	5,087	273
2008	463,839	2,879	161
1998-2008 change	-80%	-68%	-39%

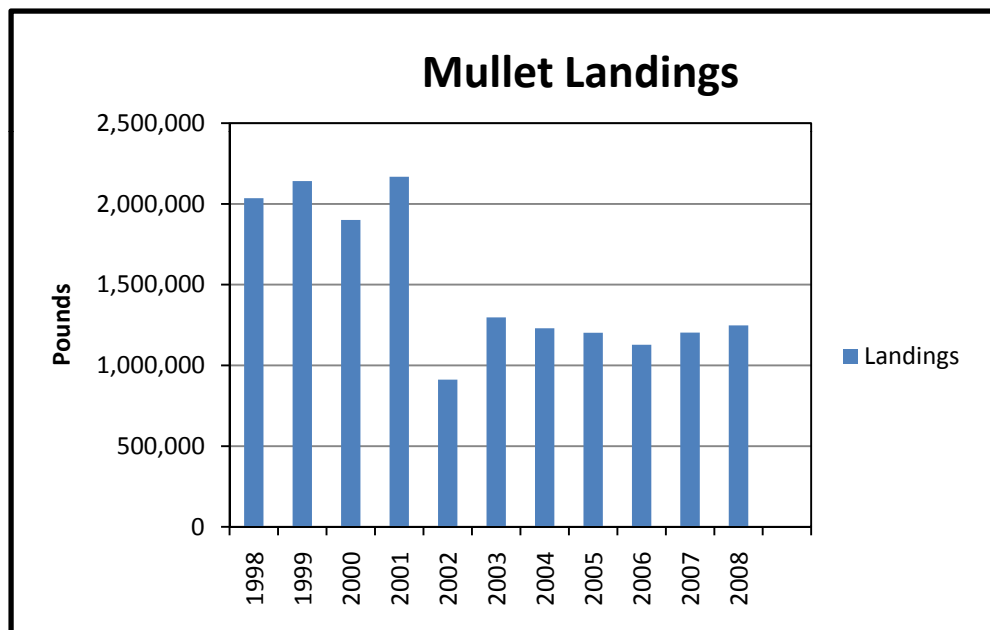
Blue Crab *Callinectes sapidus*



2009 State of Estero Bay Update



<http://www.fl-seafood.com/i/mullet.jpg>

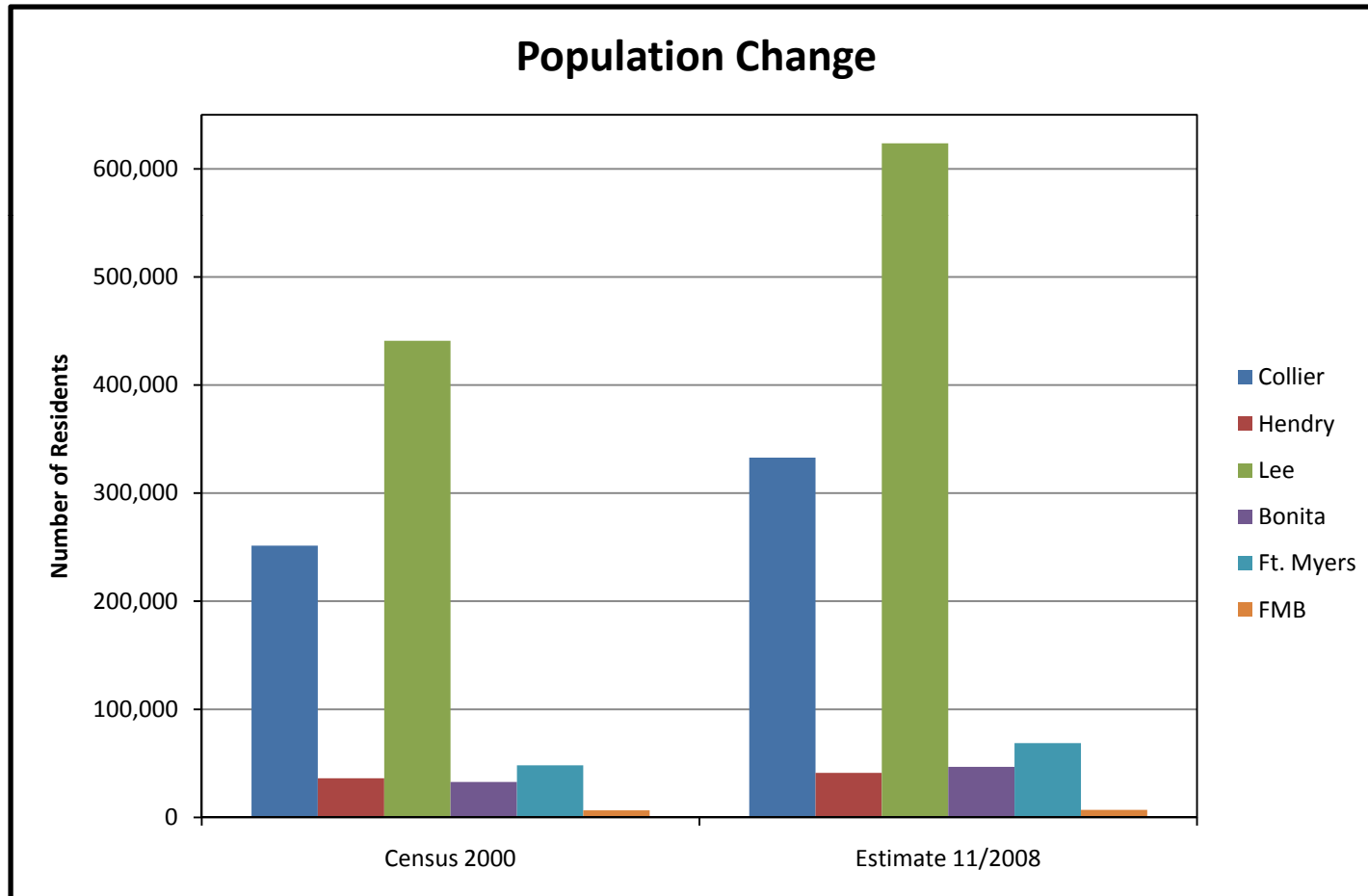


Year	Landings (pounds)	Trips	Landings/Trip
1998	2,035,783.0	6,755.0	301.4
1999	2,141,311.0	5,904.0	362.7
2000	1,900,655.0	5,586.0	340.3
2001	2,168,389.0	5,045.0	429.8
2002	912,046.0	3,118.0	292.5
2003	1,296,915.0	3,828.0	338.8
2004	1,229,949.0	4,123.0	298.3
2005	1,202,347.0	3,888.0	309.2
2006	1,127,618.0	3,669.0	307.3
2007	1,202,984.0	3,643.0	330.2
2008	1,247,834.0	3,392.0	367.9
1998- 2008 change	-39%	-50%	22%

Mullet *Mugil cephalus*



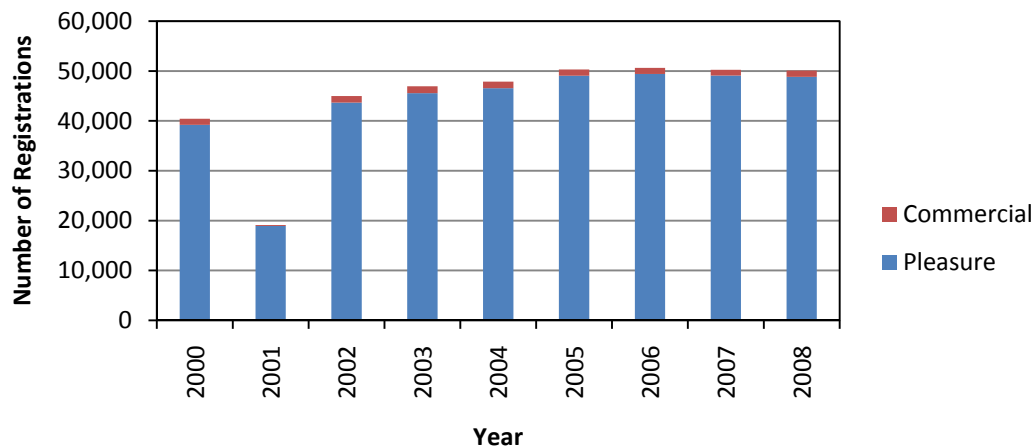
2009 State of Estero Bay Update



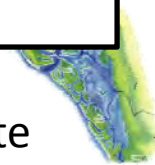
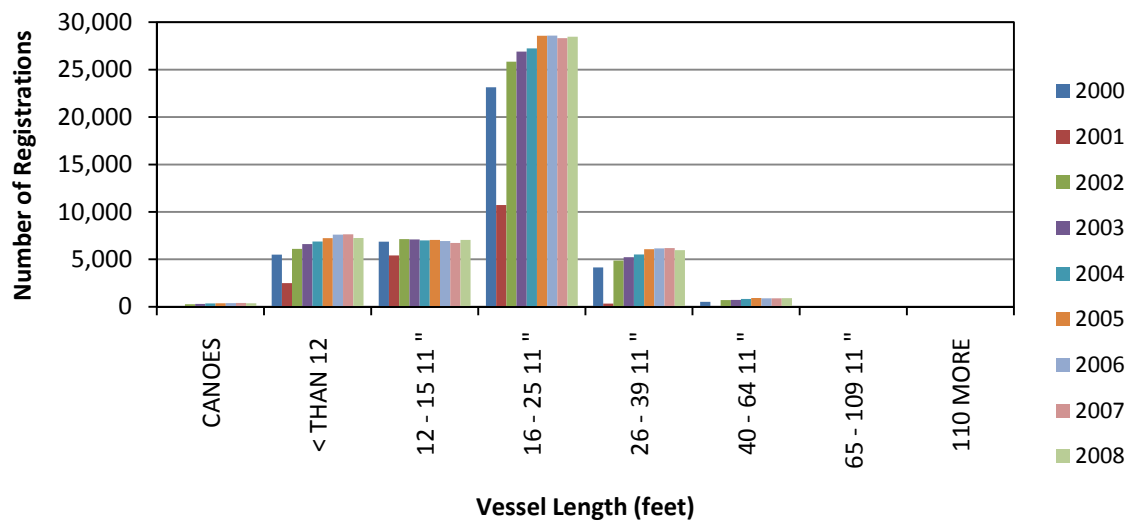
2009 State of Estero Bay Update

Vessels

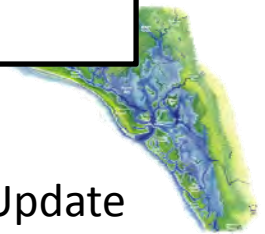
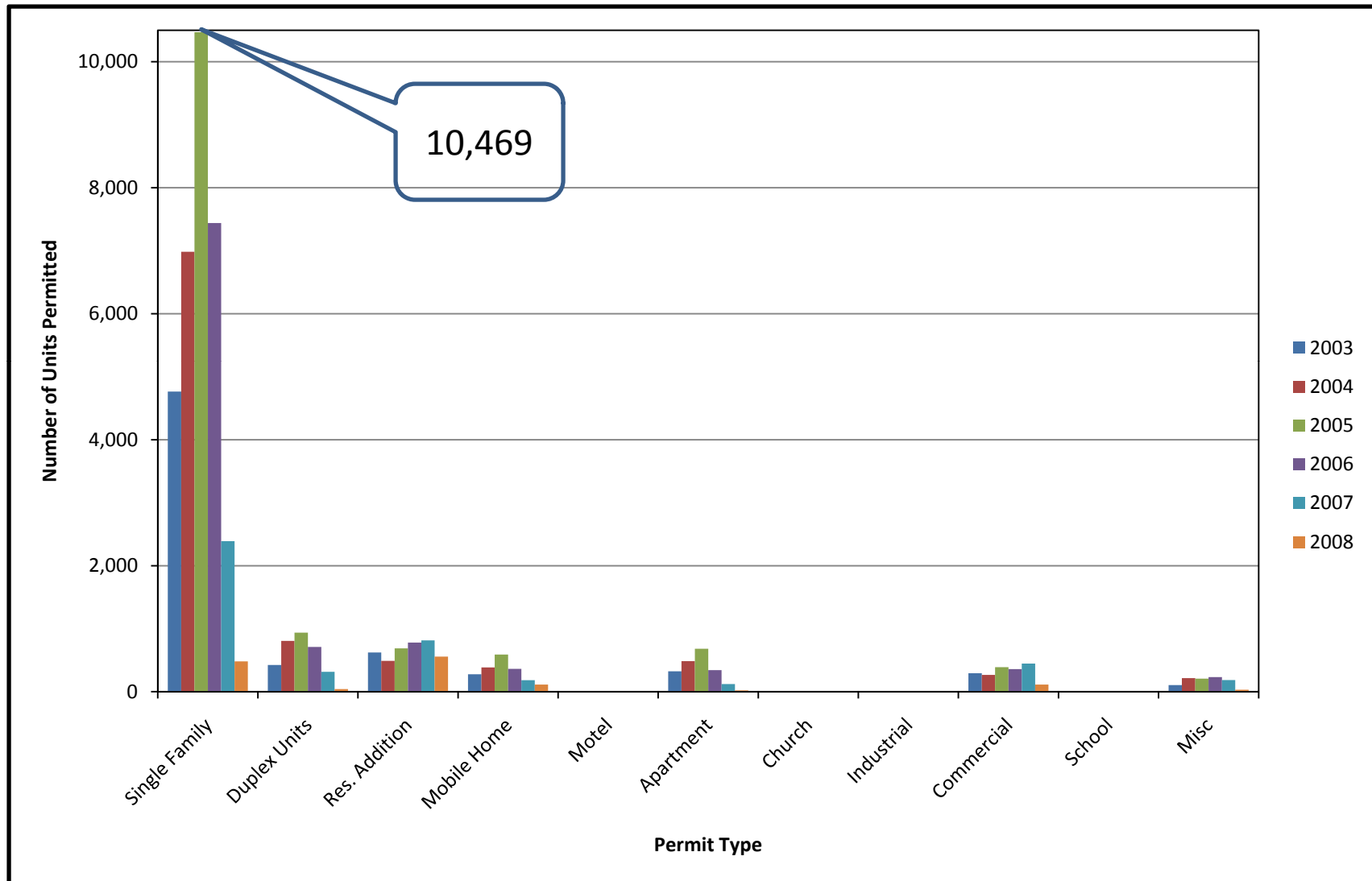
Vessel Registrations by Use



Vessel Registrations by Size



Building Permits



Conclusions

Water Quality

- Parameters and Standards
 - Mixed Results – standards are changing; DO looking good; TN looking bad.

Hydrology

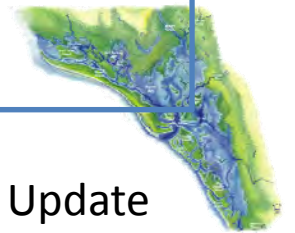
- Flows and Salinity
 - Imperial River dominates flows and shows most influence from runoff.

Wildlife

- Listed Species, Seagrass, and Fisheries
 - Loss of habitat affecting listed species; seagrass holding steady; fisheries in decline.

Social

- Population, Recreation, and Building Permits
 - All indicators reflect the recent economic downturn following a boom.



Acknowledgements

- Judy Ott – CHNEP
- Lisa Beever – CHNEP
- Keith Kibbey – Lee County Laboratory
- Karen Bickford – Lee County Natural Resources
- FWC

