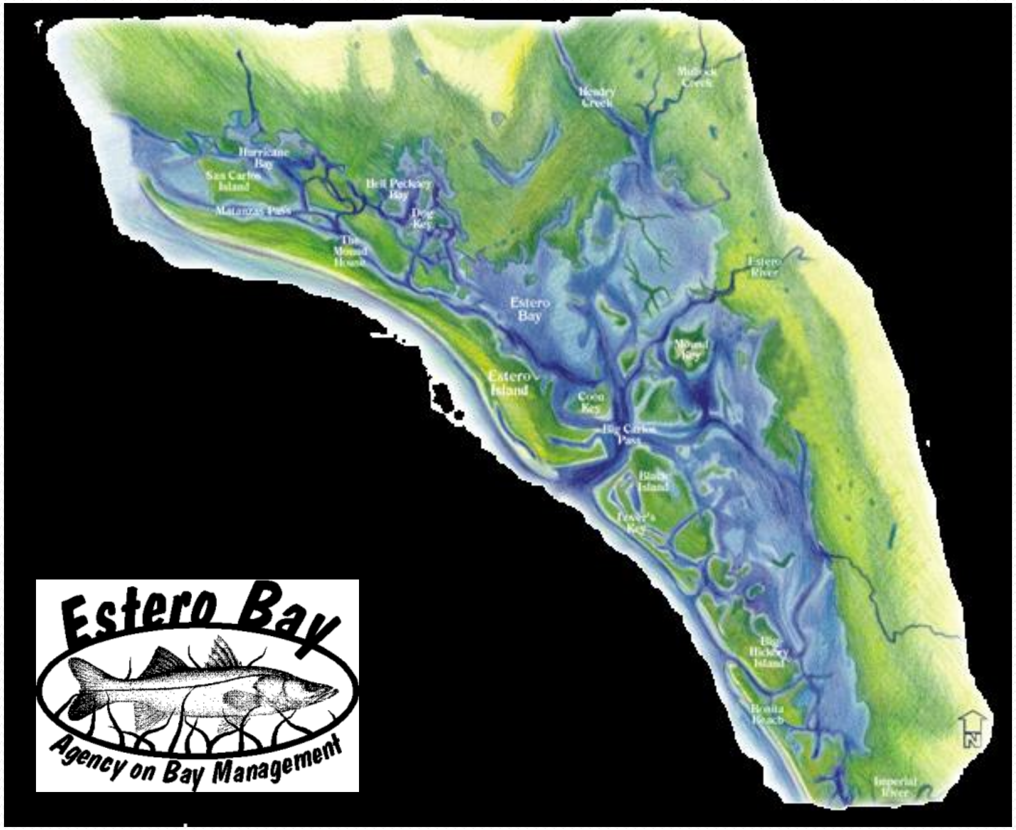
State of the Bay 2019



Funded by the City of Bonita Springs.

Prepared by the Southwest Florida Regional Planning Council

Introduction with Principles
Human History of Estero Bay
Water Quality
Hydrology
Wildlife
Social
Discussion and Conclusions

Major Points

Hurricane Irma had a substantial effect on water quality parameters as it flooded the Estero Bay watershed. There are multiple increases in the number of impaired estuarine water body segments for fecal coliform and nitrogen. Spring Creek is now impaired for Copper. Mullock Creek continues to be impaired for fecal coliform. Dissolved oxygen is slightly declining in both fresh and estuarine waters in association with nutrients and warmer temperatures. Significant areas in improvement in water quality associated principally with the adoption and implementation of strict local government fertilizer ordinances and construction of filter marshes in the headwaters of tributaries leading to nutrient reduction principally in phosphorous and chlorophyll-a; turbidity remains low, increases in acres of conservation lands, and increases in colonial bird nesting.

2013 Water Quality Status

	Chlorophyll-a	DO	Fecal Coliform	Total Nitrogen	Total Phosphorus	Turbidity	Total Met
Estuarine							
Estero Bay							**6**
Hendry Creek		V	V				**4**
Mullock Creek		V					**6**
Estero River		V					**4**
Spring Creek		V					**4**
Imperial River	V	V	V				**4**
Fresh							
6-Mile Cypress		V	V				**4**
10-Mile Canal		V					**5**
Hendry Creek		V					**5**
Mullock Creek		V	V				**4**
Spring Creek		V					**4**
Imperial River		V	V				**3**
Total Met	**12**	**2**	**9**	**10**	**12**	**12**	

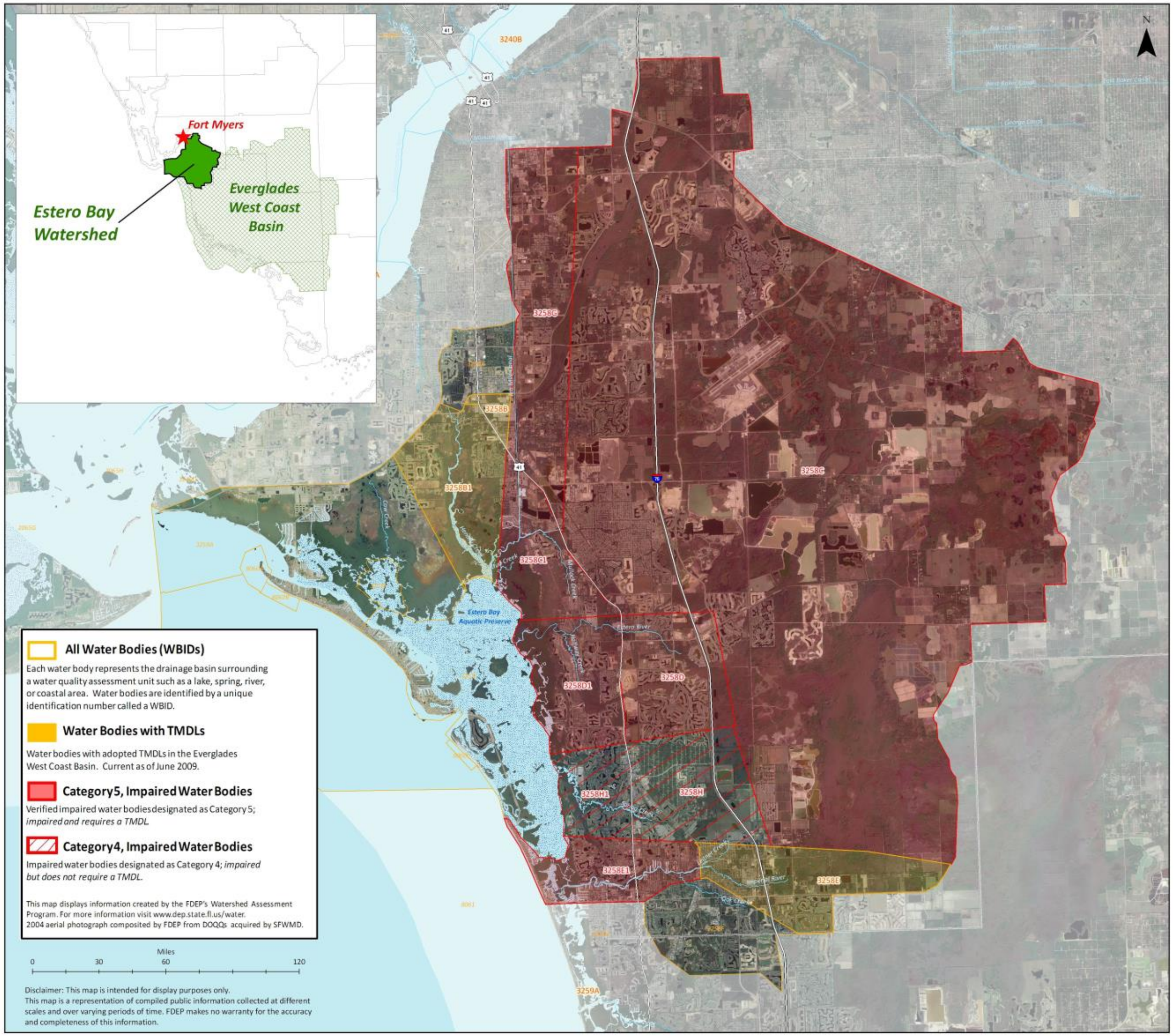
	Appears to have not met standards in 2013, based on Lee County Environmental Lab data*
	Appears to have not met standards in both 2008 and 2013*
	Appears to have not met standards in 2008 but met them in 2013*
V	Verified as Impaired in 2010 by Florida Department of Environmental Protection

2019 Water Quality Status

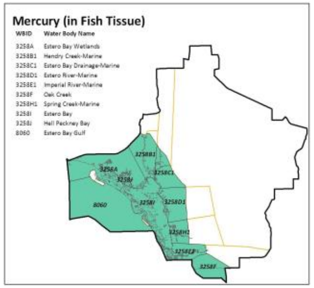
	Chlorophyll-a	DO	Fecal Coliform	Total Nitrogen	Total Phosphorus	Turbidity	Copper	Total Met 2013	Total Met 2018	Level of Improvement
Estuarine										
Estero Bay		V	V18					**6**	6	0
Hendry Creek		V	V					**4**	7	3
Mullock Creek		V	V18	V18				**6**	5	-1
Estero River		V						**4**	7	3
Spring Creek		V	V18	V18			V18	**4**	4	0
Imperial River	V	V18	V18	V18				**4**	4	0
Fresh										
6-Mile Cypress		V	V					**4**	7	3
10-Mile Canal		V						**5**	7	2
Hendry Creek		V						**5**	7	2
Mullock Creek		V	V18					**4**	6	2
Spring Creek		V						**4**	7	3
Imperial River		V						**3**	7	4
Total Met 2018	**12***	**11**	**7**	**9**	**12**	**12**	**11**			

	Appears to have not met standards in 2013 , based on Lee County Environmental Lab data*
	Appears to have not met standards in both 2008 and 2013*
	Appears to have not met standards in 2008 but met them in 2013*
V	Verified as Impaired in 2010 by Florida Department of Environmental Protection
V18	Verified as Impaired in 2018 by Florida Department of Environmental Protection

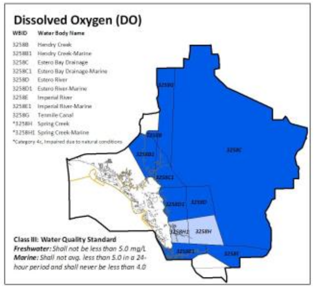
	Chlorophyll-a	DO	Fecal Coliform	Total Nitrogen	Total Phosphorus	Turbidity	Copper	Total Met 2013	Total Met 2018	Level of Improvement
Estuarine										
Estero Bay			V18					6	6	0
Hendry Creek								4	7	3
Mullock Creek			V18	V18				6	5	-1
Estero River								4	7	3
Spring Creek			V18	V18			V18	4	4	0
Imperial River		V18	V18	V18				4	4	0
Fresh										
6-Mile Cypress								4	7	3
10-Mile Canal								5	7	2
Hendry Creek								5	7	2
Mullock Creek			V18					4	6	2
Spring Creek								4	7	3
Imperial River								3	7	4
Total Met 2018	12*	11	7	9	12	12	11			
	Appears to have not met standards in 2013 , based on Lee County Environmental Lab data*									
	Appears to have not met standards in both 2008 and 2013*									
	Appears to have not met standards in 2008 but met them in 2013*									
V	Verified as Impaired in 2010 by Florida Department of Environmental Protection									
V18	Verified as Impaired in 2018 by Florida Department of Environmental Protection									



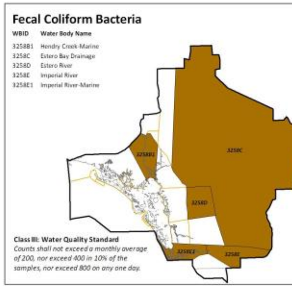
Fort Myers
Estero Bay Watershed
Everglades West Coast Basin
3240B
3258G
3258B
3258B1
3258C
3258C1
3258D
3258D1
3258H1
3258H
3258E1
3258E
3259A
Estero Bay Aquatic Preserve
Estero River
Imperial River
N
All Water Bodies (WBIDs)
Each water body represents the drainage basin surrounding a water quality assessment unit such as a lake, spring, river, or coastal area. Water bodies are identified by a unique identification number called a WBID.
Water Bodies with TMDLs
Water bodies with adopted TMDLs in the Everglades West Coast Basin. Current as of June 2009.
Category5, Impaired Water Bodies
Verified impaired water bodies designated as Category 5; impaired and requires a TMDL.
Category4, Impaired Water Bodies
Impaired water bodies designated as Category 4; impaired but does not require a TMDL.
This map displays information created by the FDEP's Watershed Assessment Program. For more information visit www.dep.state.fl.us/water.
2004 aerial photograph composited by FDEP from DOQQs acquired by SFWMD.
Miles
0
30
60
120
Disclaimer: This map is intended for display purposes only.
This map is a representation of compiled public information collected at different scales and over varying periods of time. FDEP makes no warranty for the accuracy and completeness of this information.



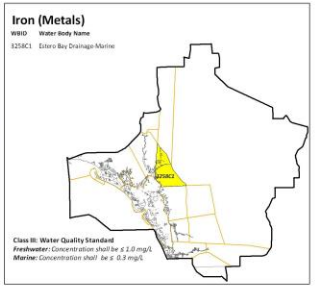
Mercury (in Fish Tissue)
WBID Water Body Name
3258A Estero Bay Wetlands
3258B1 Hendry Creek-Marine
3258C1 Estero Bay Drainage-Marine
3258D1 Estero River-Marine
3258E1 Imperial River-Marine
3258F Oak Creek
3258H1 Spring Creek-Marine
3258I Estero Bay
3258J Hell Peckney Bay
8060 Estero Bay Gulf



Dissolved Oxygen (DO)
WBID Water Body Name
3258B Hendry Creek
3258B1 Hendry Creek-Marine
3258C Estero Bay Drainage
3258C1 Estero Bay Drainage-Marine
3258D Estero River
3258D1 Estero River-Marine
3258E Imperial River
3258E1 Imperial River-Marine
3258G Tenmile Canal
*3258H Spring Creek
*3258H1 Spring Creek-Marine
*Category 4c, Impaired due to natural conditions
Class III: Water Quality Standard
Freshwater: Shall not be less than 5.0 mg/L
Marine: Shall not avg. less than 5.0 in a 24-hour period and shall never be less than 4.0



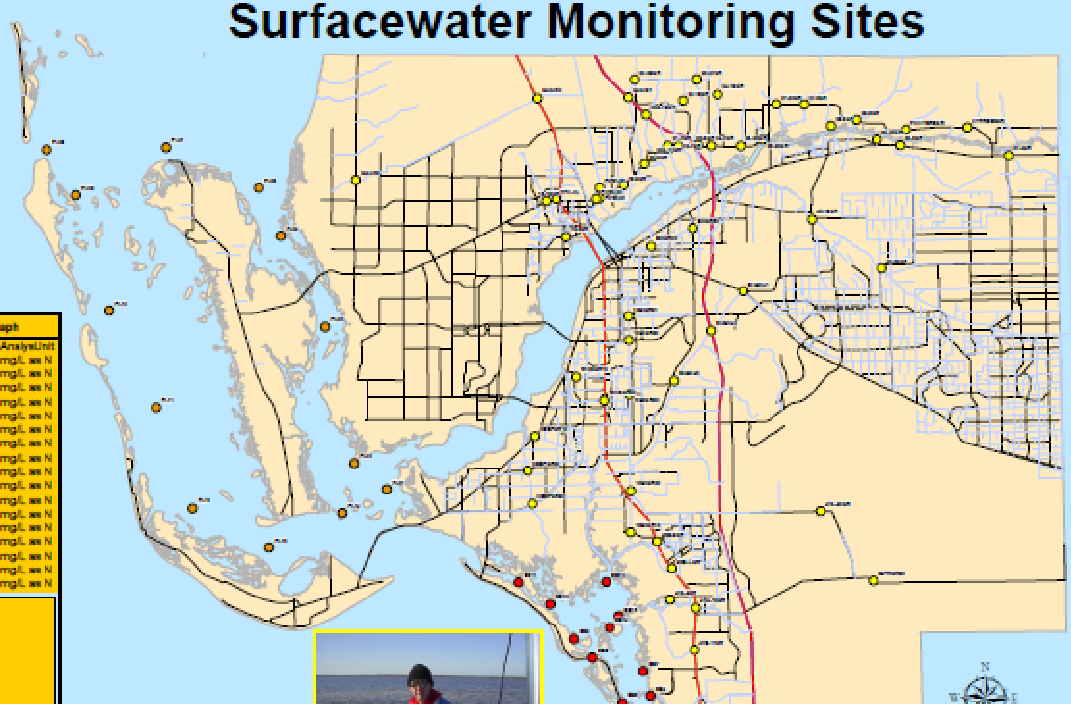
Fecal Coliform Bacteria
WBID Water Body Name
3258B1 Hendry Creek-Marine
3258C Estero Bay Drainage
3258D Estero River
3258E Imperial River
3258E1 Imperial River-Marine
Class III: Water Quality Standard
Counts shall not exceed a monthly average of 200, nor exceed 400 in 10% of the samples, nor exceed 800 on any one day.



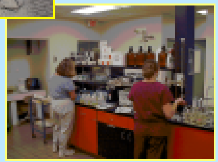
Iron (Metals)
WBID Water Body Name
3258C1 Estero Bay Drainage-Marine
Class III: Water Quality Standard
Freshwater: Concentration shall be ≤ 1.0 mg/L
Marine: Concentration shall be ≤ 0.3 mg/L

Surfacewater Monitoring Sites

TYPICAL TESTS PERFORM MONTHLY IN ESTERO BAY	
Location Code	Test
EB-08	Chlorophyll a, corrected for Pheophytin
EB-08	Biochemical Oxygen Demand 5 day
EB-08	Color, 465nm
EB-08	Specific Conductance, 25oC, Field
EB-08	Oxygen, Dissolved, Electrode
EB-08	Enterococci by Membrane Filter, 50 mL
EB-08	Fecal coliform MF, 50 mL sample
EB-08	Ammonia, Automated Phenate
EB-08	Nitrite
EB-08	Nitrate
EB-08	Nitrate + Nitrite
EB-08	Phosphorus, Ortho
EB-08	Photosynthetically Active Radiation
EB-08	pH, Field (electrometric)
EB-08	Salinity by meter
EB-08	Silica, Dissolved
EB-08	Field Temperature
EB-08	Nitrogen, Kjeldahl, Total
EB-08	Nitrogen, Total
EB-08	Phosphorus, Total
EB-08	Total Suspended Solids
EB-08	Turbidity (Nephelometric)

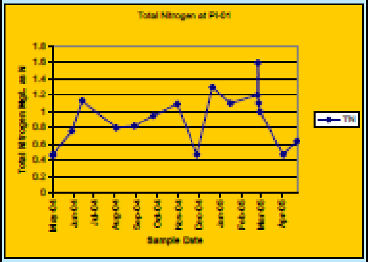


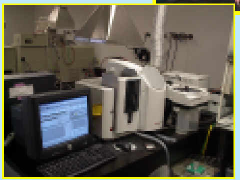
Lee County Division of Natural Resources is developing web enabled user access to surfacewater monitoring information. It will provide the public both graphical and data interface via the world wide web.



Typical Pine Island Sound Site Results as a Table and Graph

Sample ID	Loc Code	Col Date	Anl Code	Result	AnalysUnit
AB58645	PI-01	5/24/2004	TN	0.462	mg/L as N
AB58646	PI-01	5/24/2004	TN	0.47	mg/L as N
AB59675	PI-01	6/21/2004	TN	0.762	mg/L as N
AB60374	PI-01	7/6/2004	TN	1.13	mg/L as N
AB62422	PI-01	8/25/2004	TN	0.8	mg/L as N
AB63458	PI-01	9/20/2004	TN	0.82	mg/L as N
AB64613	PI-01	10/18/2004	TN	0.95	mg/L as N
AB66141	PI-01	11/22/2004	TN	1.09	mg/L as N
AB67414	PI-01	12/21/2004	TN	0.47	mg/L as N
AB68110	PI-01	1/12/2005	TN	1.3	mg/L as N
AB69253	PI-01	2/8/2005	TN	1.1	mg/L as N
AB70087	PI-01	3/19/2005	TN	1.2	mg/L as N
AB70099	PI-01	3/20/2005	TN	1.6	mg/L as N
AB71030	PI-01	3/21/2005	TN	1.1	mg/L as N
AB71077	PI-01	3/23/2005	TN	1	mg/L as N
AB72644	PI-01	4/26/2005	TN	0.47	mg/L as N
AB73627	PI-01	5/16/2005	TN	0.64	mg/L as N





Monthly Watershed Sample Site Tests

Analyte Name	Result	Units
Chlorophyll a, corrected for Pheophytin	10.5	mg/M3
Biochemical Oxygen Demand 5 day	1.2	mg/L
Cadmium, AA furnace technique	0.2	µg/L
Chloride titrimetric Argentometric	52	mg/L
Color, 465nm	41.4	CU
Specific Conductance, 25oC, Field	398	µmhos/cm
Copper, AA furnace technique	0.5	µg/L
Distance from Structure to Water Surface	6.63	Feet
Oxygen, Dissolved, Electrode	5.9	mg/L
Enterococci by Membrane Filter, 10 mL	640	colonies/100mL
Fecal coliform MF, 10 mL sample	110	colonies/100mL
Ammonia, Automated Phenate	0.0065	mg/L as N
Nitrite	0.009	mg/L as N
Nitrate	0.005	mg/L as N
Nitrate + Nitrite	0.01	mg/L as N
Phosphorus, Ortho	0.042	mg/L as P
Lead, AA furnace technique	0.5	µg/L
pH, Field (electrometric)	7.31	units
Silica, Dissolved	2.5	mg/L as SiO2
Field Temperature	25.9	°C
Nitrogen, Kjeldahl, Total	1.1	mg/L as N
Nitrogen, Total	1.1	mg/L as N
Phosphorus, Total	0.19	mg/L as P
Total Suspended Solids	16	mg/L
Turbidity (Nephelometric)	6.9	NTU
Velocity of Stream	0.15	Feet per Sec
Zinc by flame AA	0.002	mg/L

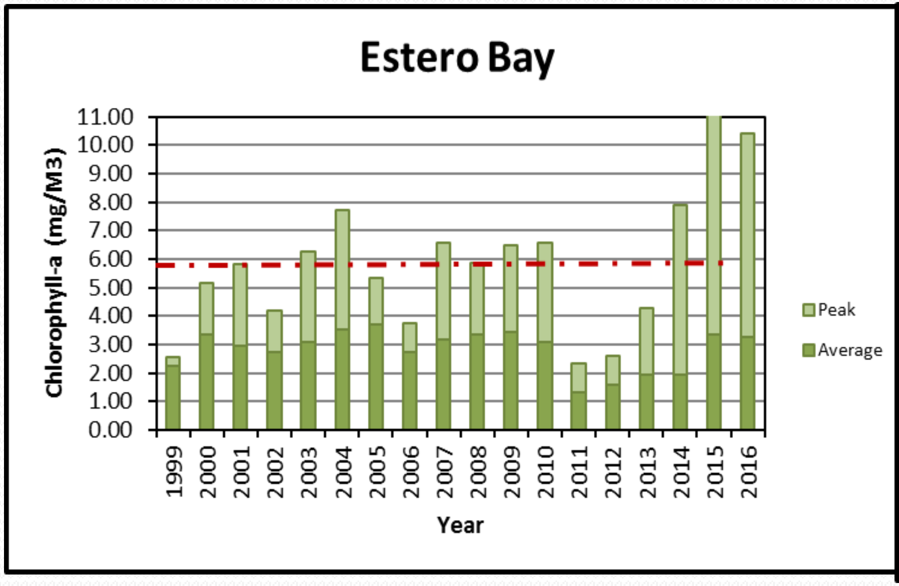
Lee County
Water Quality Monitoring Stations

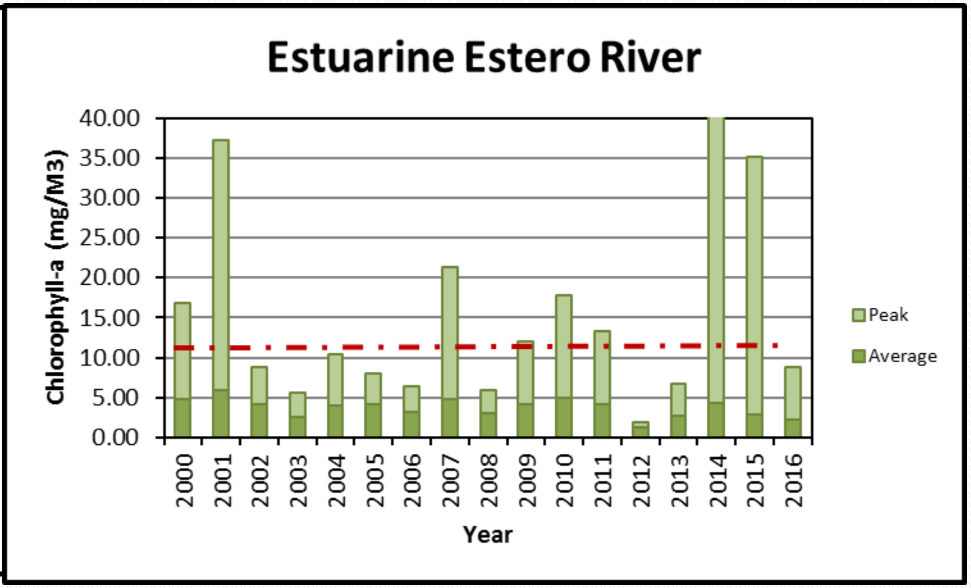
- Estero Bay Sample Sites
- Pine Island Sound Sample Sites
- Watershed Sample Sites

LEE COUNTY
SOUTHWEST FLORIDA
Natural Resources Division

Chlorophyll-a in Estuarine Systems

Between 2014 and 2016, average annual chlorophyll-a increased by 56%.
The peak monthly chlorophyll-a increased, for an average of 97%.
In contrast between 2009 and 2016, average annual chlorophyll-a dropped in Estero Bay. The average reduction was 5.5%. And the peak monthly chlorophyll-a dropped in Estero Bay, for an average of 61% decrease.



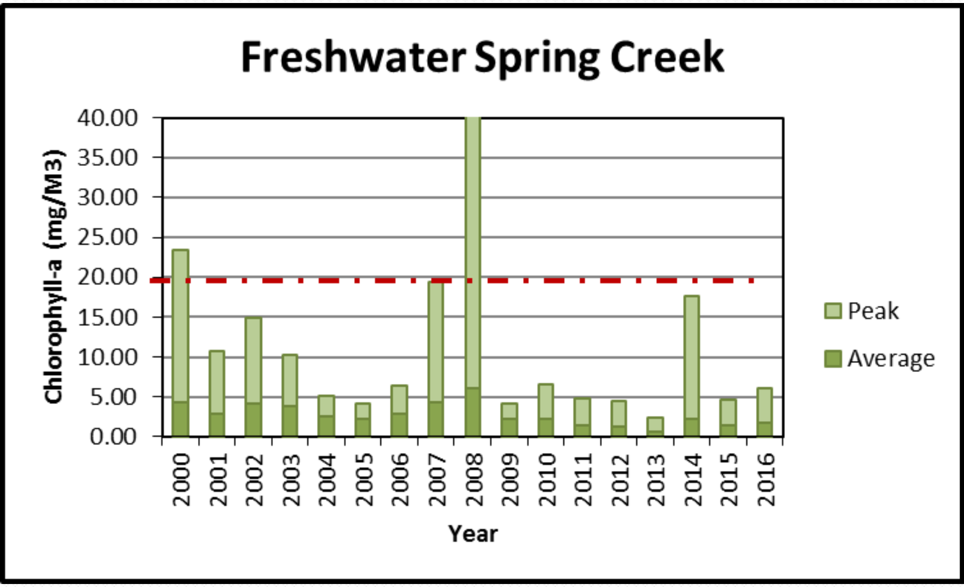


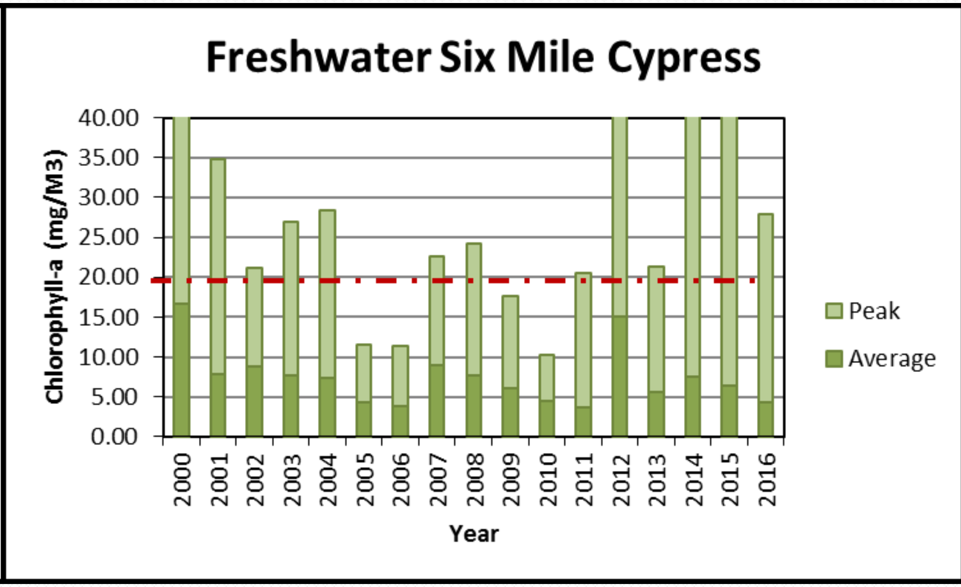
average	68.6%	average	-10%
peak	31.77%	peak	-84.86%

Chlorophyll-a in Fresh Systems

Between 2014 and 2016, average annual chlorophyll-a increase in freshwater segments. The average increase was 8%. The peak monthly chlorophyll-a dropped in all freshwater segments, for an average of 49% reduction.

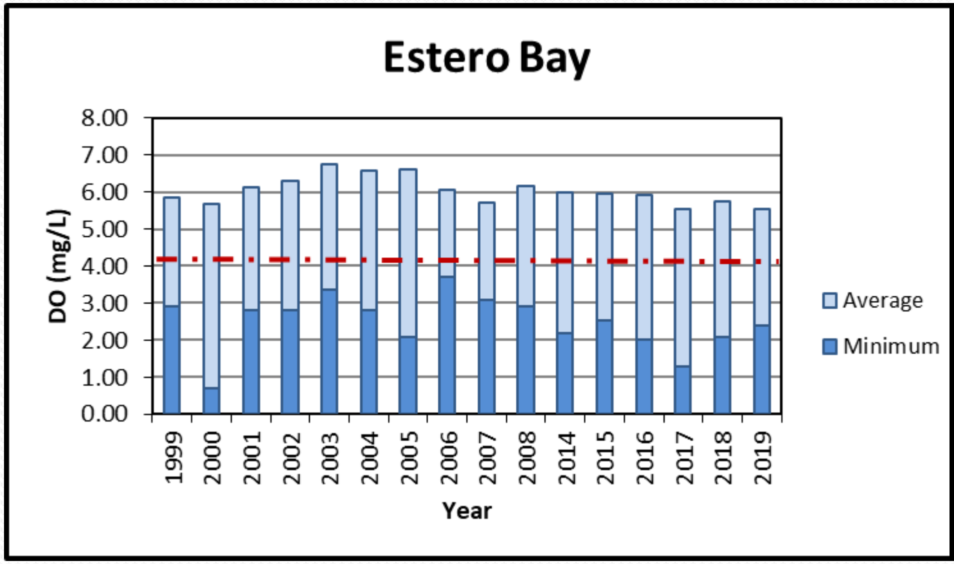
The most common peak months were June and July. These probably represented the end of dry season stagnation and wet season first flush events.

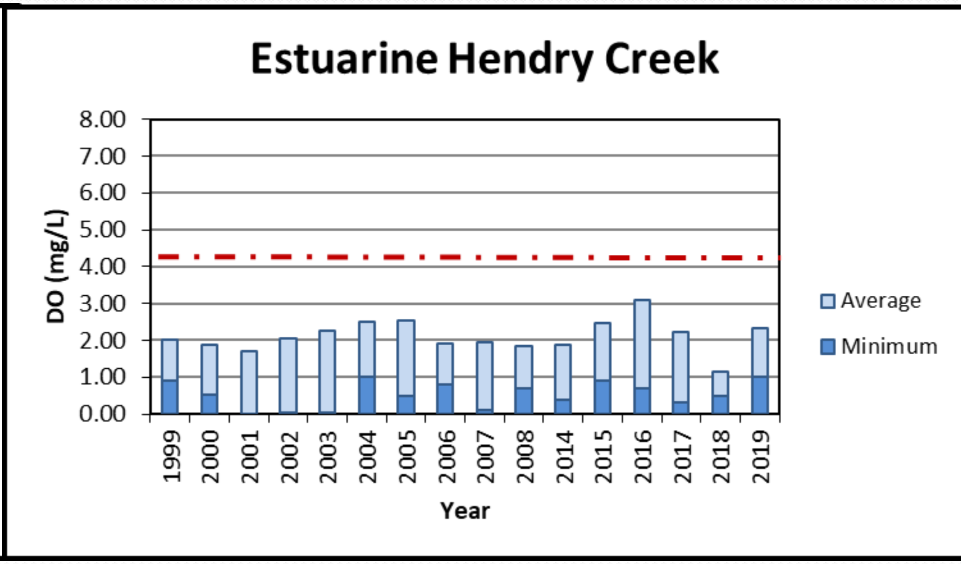




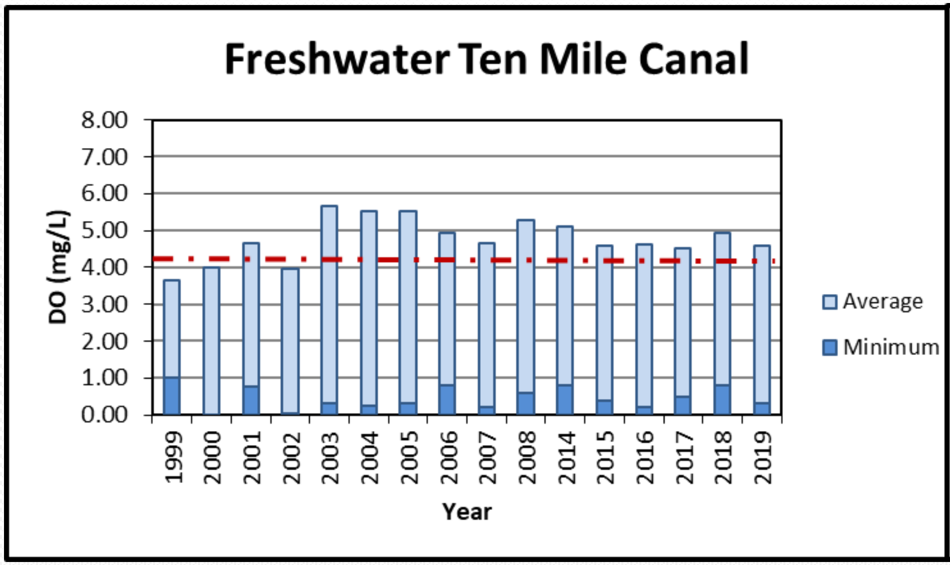
Dissolved Oxygen in Estuarine Systems

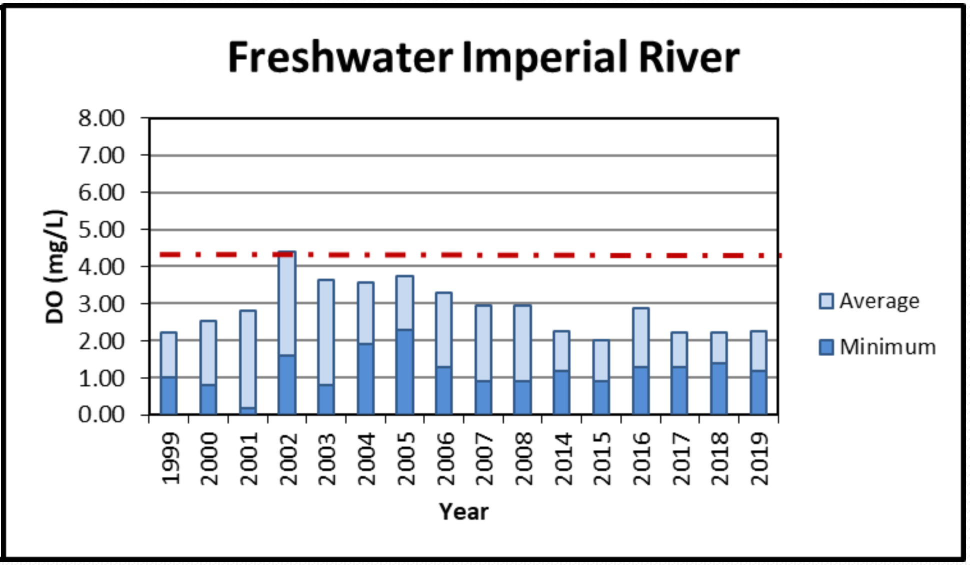
Between 2014 and 2019, average Dissolved Oxygen decreased in Estero Bay, Mullock Creek and Imperial River; and it increased in Hendry Creek, Estero River, and Spring Creek. The average decrease was 5.4%. The monthly minimum Dissolved Oxygen increased in all estuarine segments but Mullock Creek. The most common minimum months were May and June, however, all months except January and December were represented.





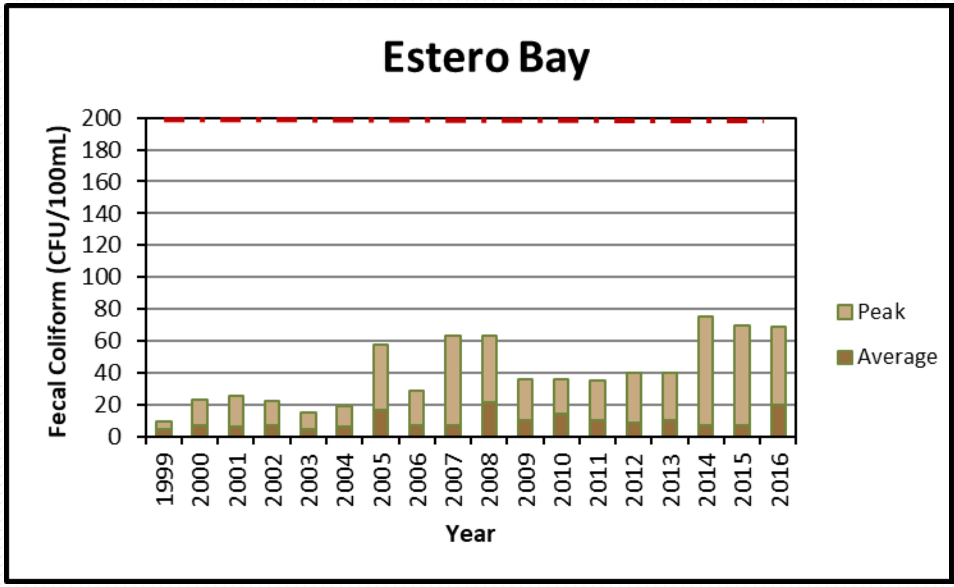
Between 2014 and 2019, average annual Dissolved Oxygen increased in Six-Mile Canal, Hendry Creek, Imperial River, and Estero River; and decreased in Ten-Mile Canal and Spring Creek. Overall the average of all freshwater watersheds increased 5.8%. The monthly minimum Dissolved Oxygen increased in Six-Mile Canal, Hendry Creek, and Estero River; decreased in Ten-Mile Canal and Spring Creek; and stayed the same in the Imperial River. The average increase for the total freshwater watersheds was 9.7%.

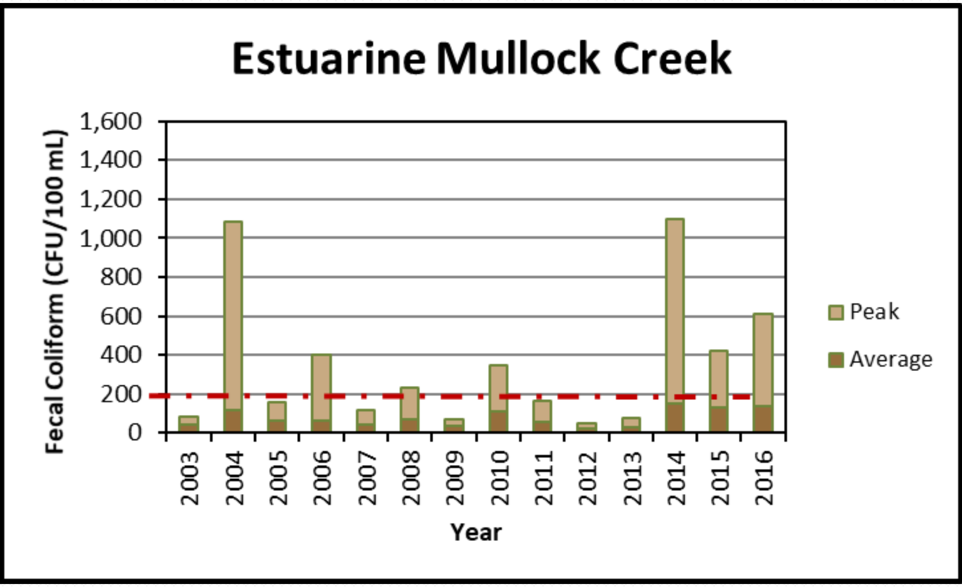




Fecal Coliform in Estuarine Systems

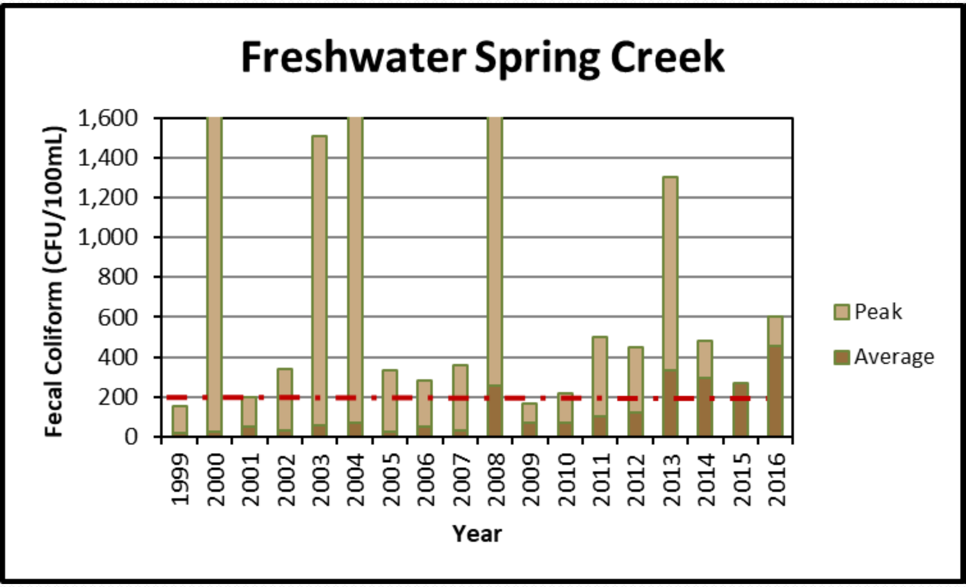
Between 2014 and 2016, average fecal coliform increased in Estero Bay and Estero River and decreased in all the other estuarine tributaries. There was however a major jump in Mullock Creek fecal coliform levels in the year 2014 that has begun to decline. The average estuarine increase was 9.7%. The peak monthly fecal coliform decreased in all estuarine. The average reduction was small at -1%. The most common peak months were January and June.

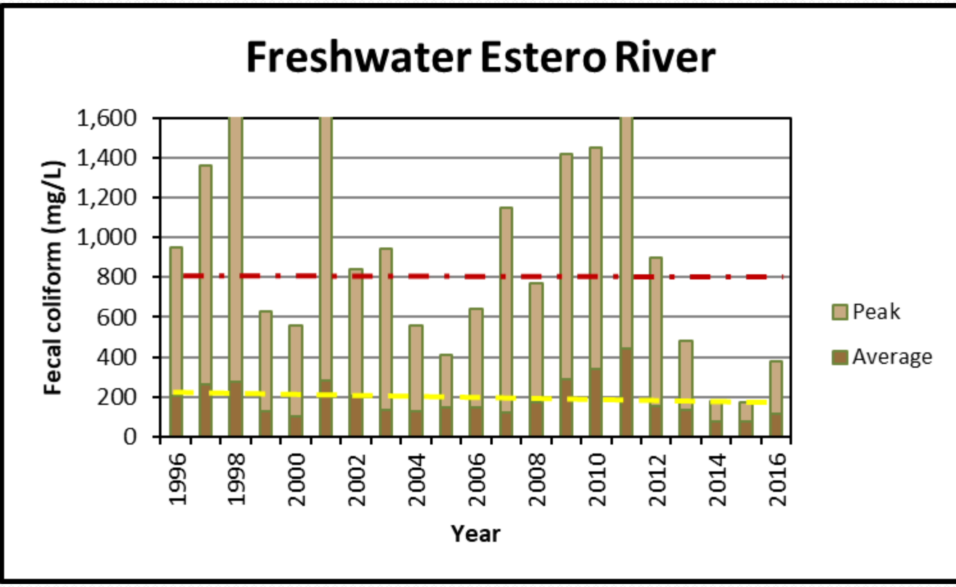




Fecal Coliform in Fresh Systems

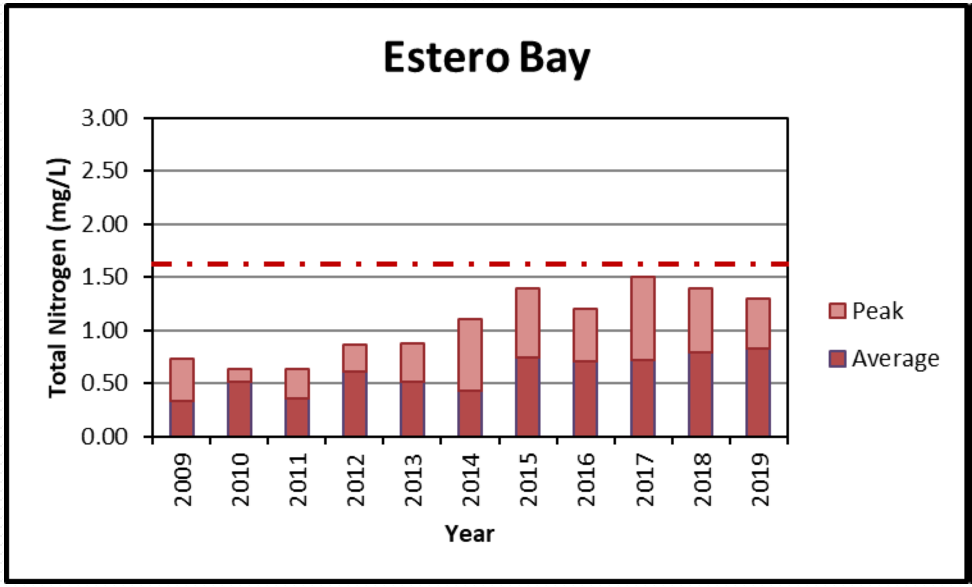
Between 2009 and 2016, average annual fecal coliform decreased in all freshwater segments but threes: Estero River, Mullock Creek and Spring Creek. The average decreased was -22.55%. The peak monthly fecal coliform increased in three of the freshwater segments, including Mullock Creek, Spring Creek and Estero River. The average increase was 125.58%. The most common peak month was June, followed by May and September All months except October were represented.

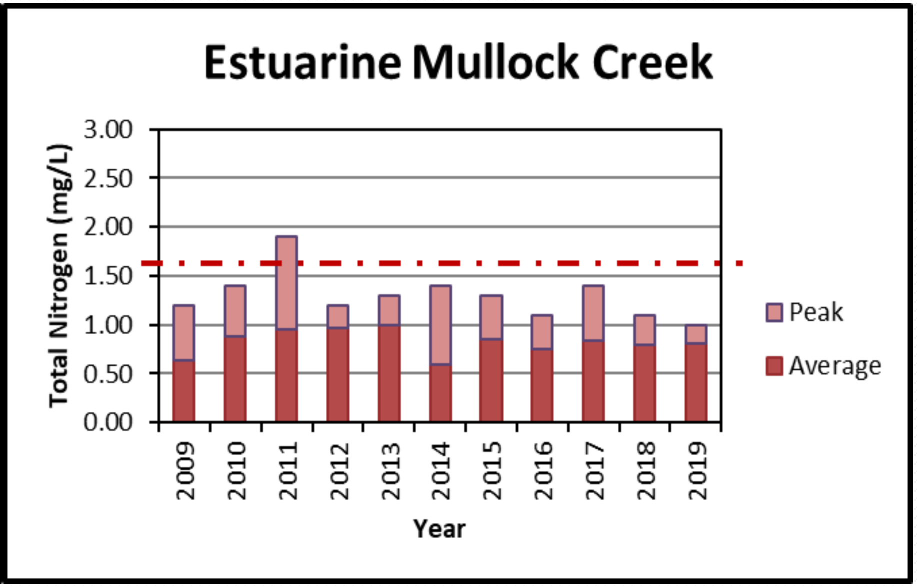




Total Nitrogen in Estuarine Systems

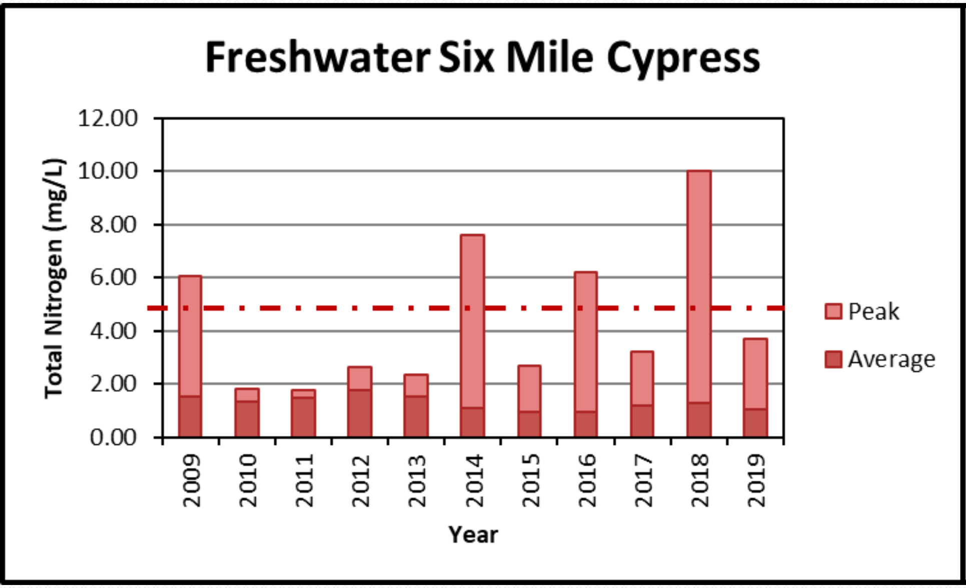
Between 2014 and 2019, average annual total nitrogen increased in estuarine segments, however the geometric mean nitrogen standards were not exceeded. The average increase was overall increase was 44.26 %. The peak monthly nitrogen decreased in Mullock Creek, Hendry Creek, and Imperial River, and increased for Estero Bay and Spring Creek, and stayed the same for Estero River, for an average of -30.63%. The most common peak months were March, April, and June, however, all months except were represented.

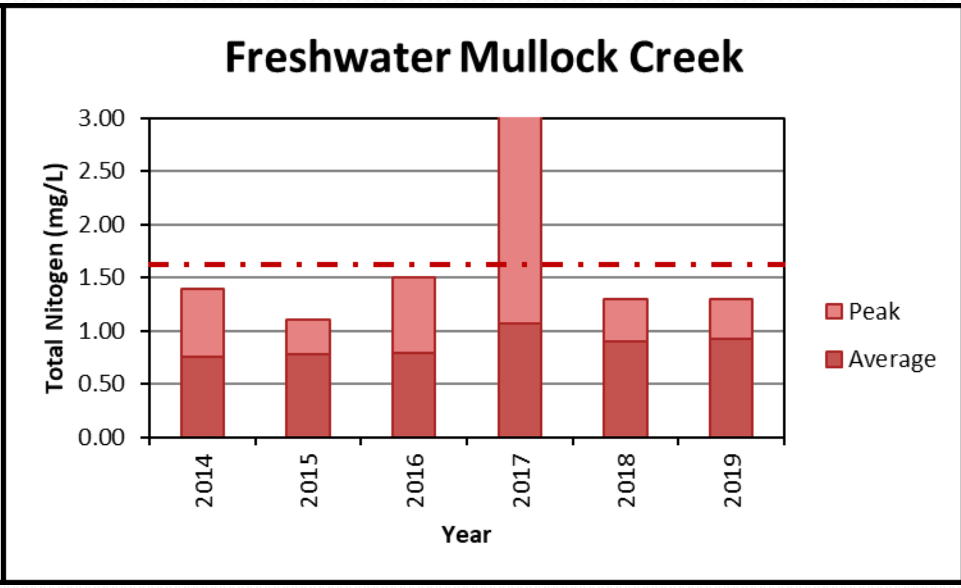




Total Nitrogen in Fresh Systems

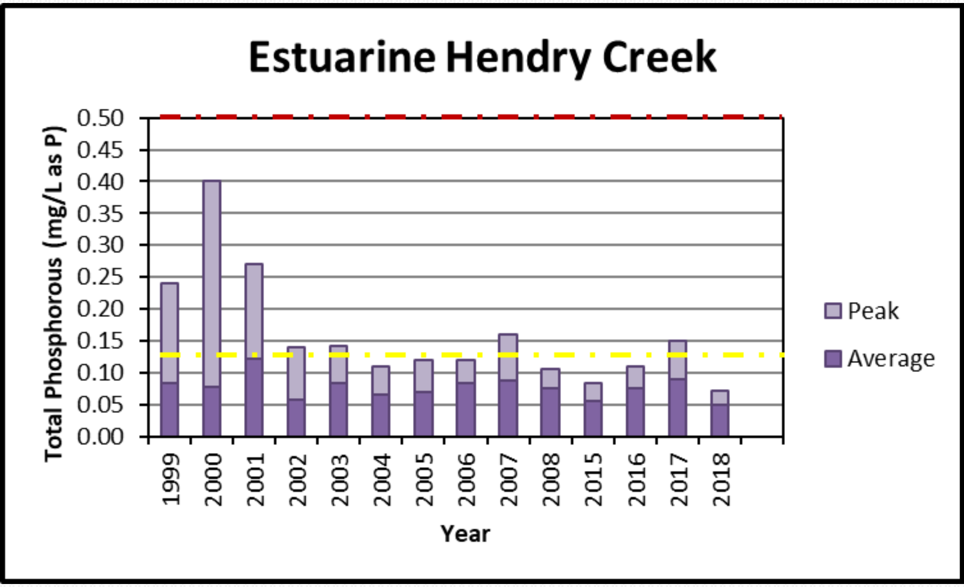
Between 2014 and 2019, average annual total nitrogen increased in Mullock Creek and Spring Creek and decreased in all other freshwater segments. Overall the average increase was 5.51%. The peak monthly total nitrogen decreased in all freshwater segments but had an average of 2.52% increase. The most common peak month were April and May. All months except July and November were represented.

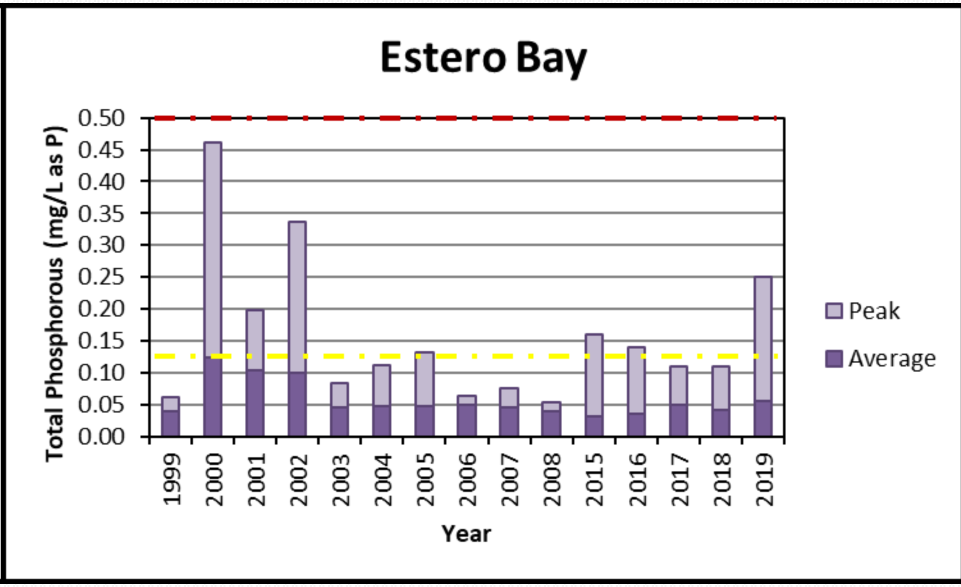




Total Phosphorus in Estuarine Systems

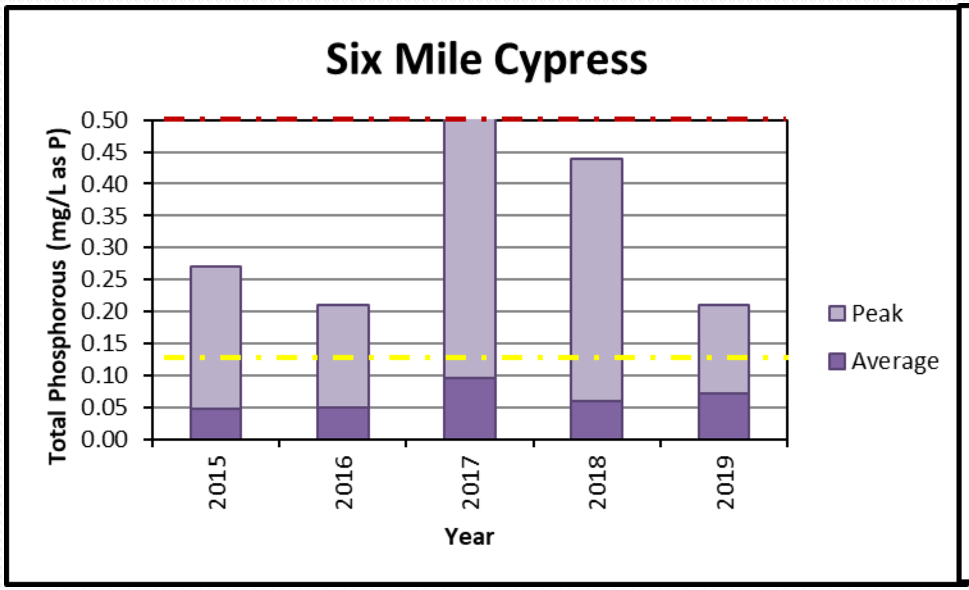
Between 2015 and 2019, average annual total phosphorus increased in all estuarine segments except Hendry Creek. The average increase was 32.45%. The peak monthly total phosphorus increased in all estuarine segments except Imperial River, Mullock Creek, Hendry Creek, and Spring Creek, for an average of 250 % increase. Data for 2014 was not available for all segments. The most common peak month was June, followed by April. February, July was the only month not represented.

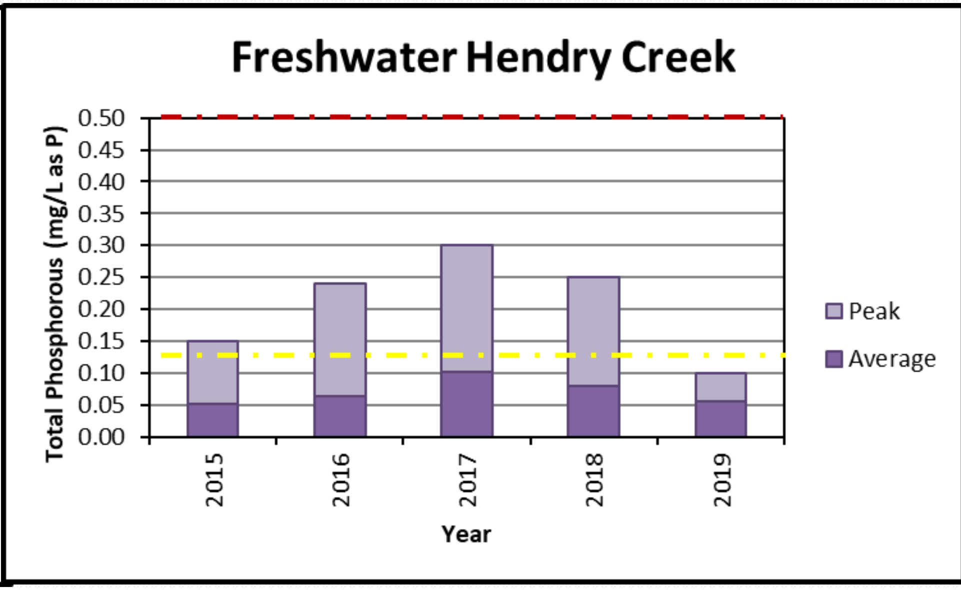




Total Phosphorus in Fresh Systems

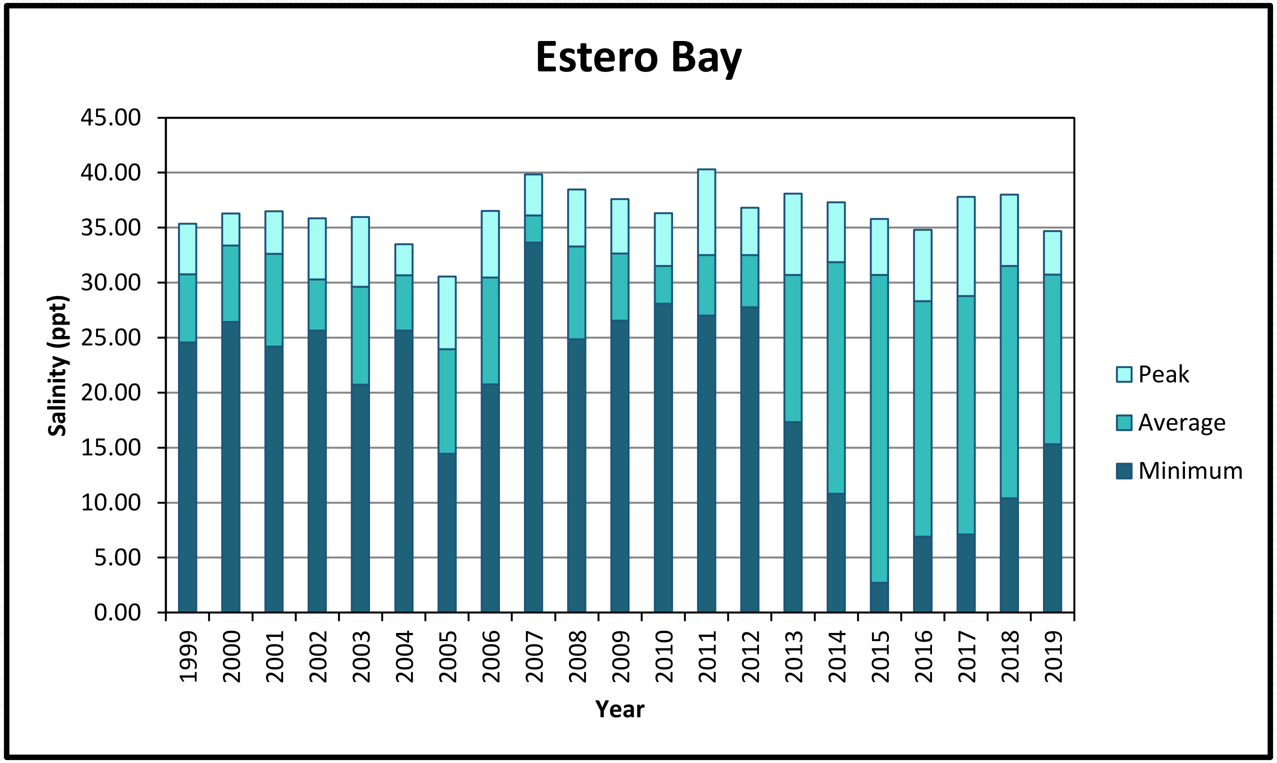
Between 2014 and 2019, average annual total phosphorus dropped in all freshwater segments except Hendry Creek. In all tributaries the geometric mean standard was achieved after adoption of the fertilizer ordinances. The average increase was 15.37%. The peak monthly total phosphorus dropped in all freshwater segments except Ten-Mile Canal and Imperial River, for an average of 21.43% increase. The most common peak month was April, followed by January and June. February, July, and November were not represented.





Salinity

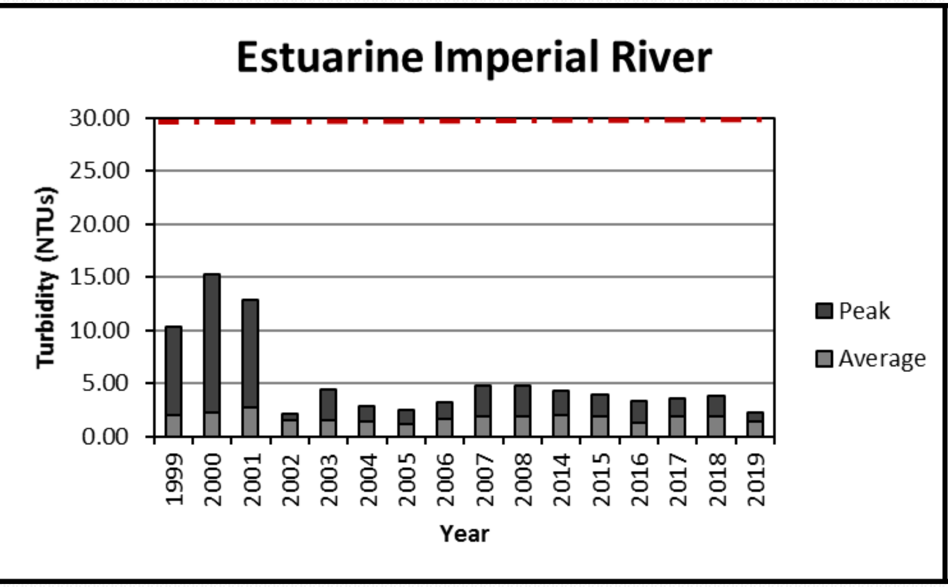
In the period of record, 2005 had the lowest minimum and the lowest peak, while 2007 had the highest minimum and 2011 the highest peak.
In the 2009 - 2019 period, the average salinity dropped by less than 1%, the peak decreased by 1.8%
The signature of large hurricane years can be seen in the lowest minimums of 2014 to 2018.

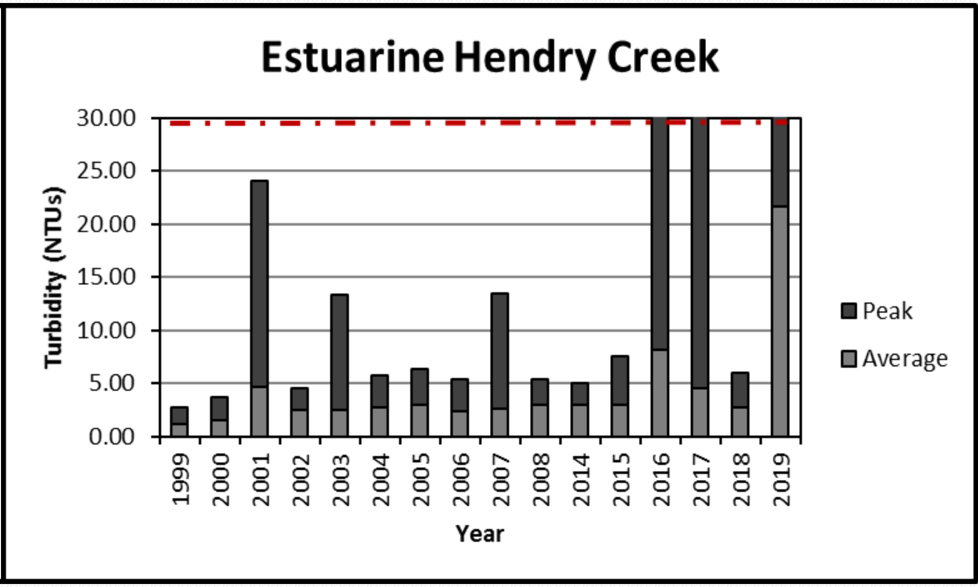


2009-2019 change	
average	-6%
peak	1%
minimum	-35%

Turbidity in Estuarine Systems

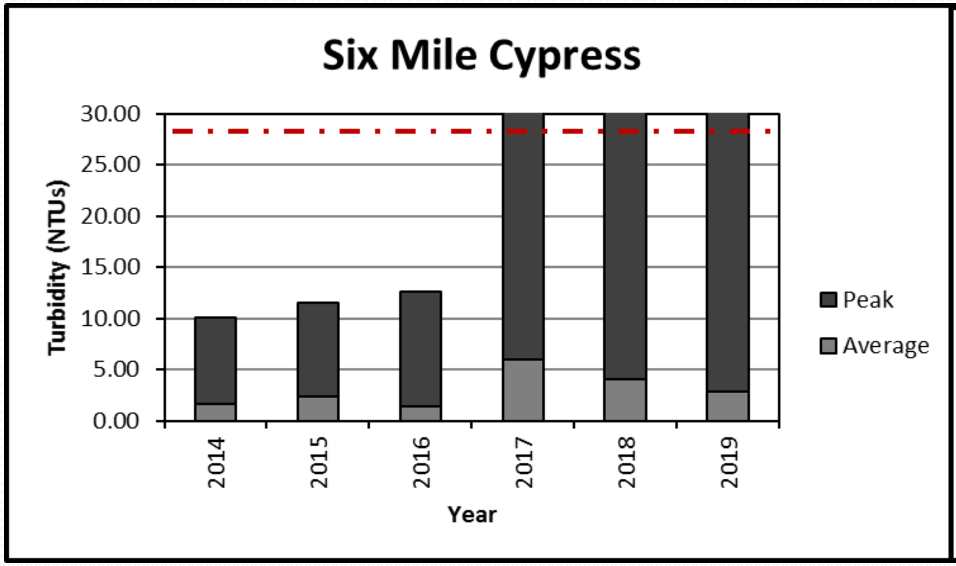
Between 2009 and 2013, average turbidity increased in the 3 most northern segments and decreased in the 3 most southern segments. The average reduction was 10%. The peak monthly turbidity dropped in all estuarine segments but two, for an average of 8% reduction.

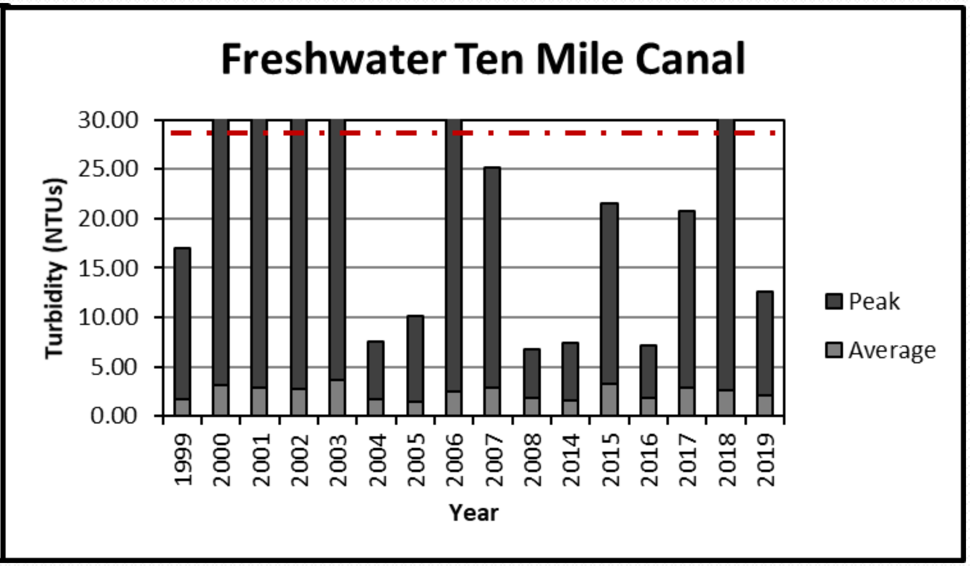


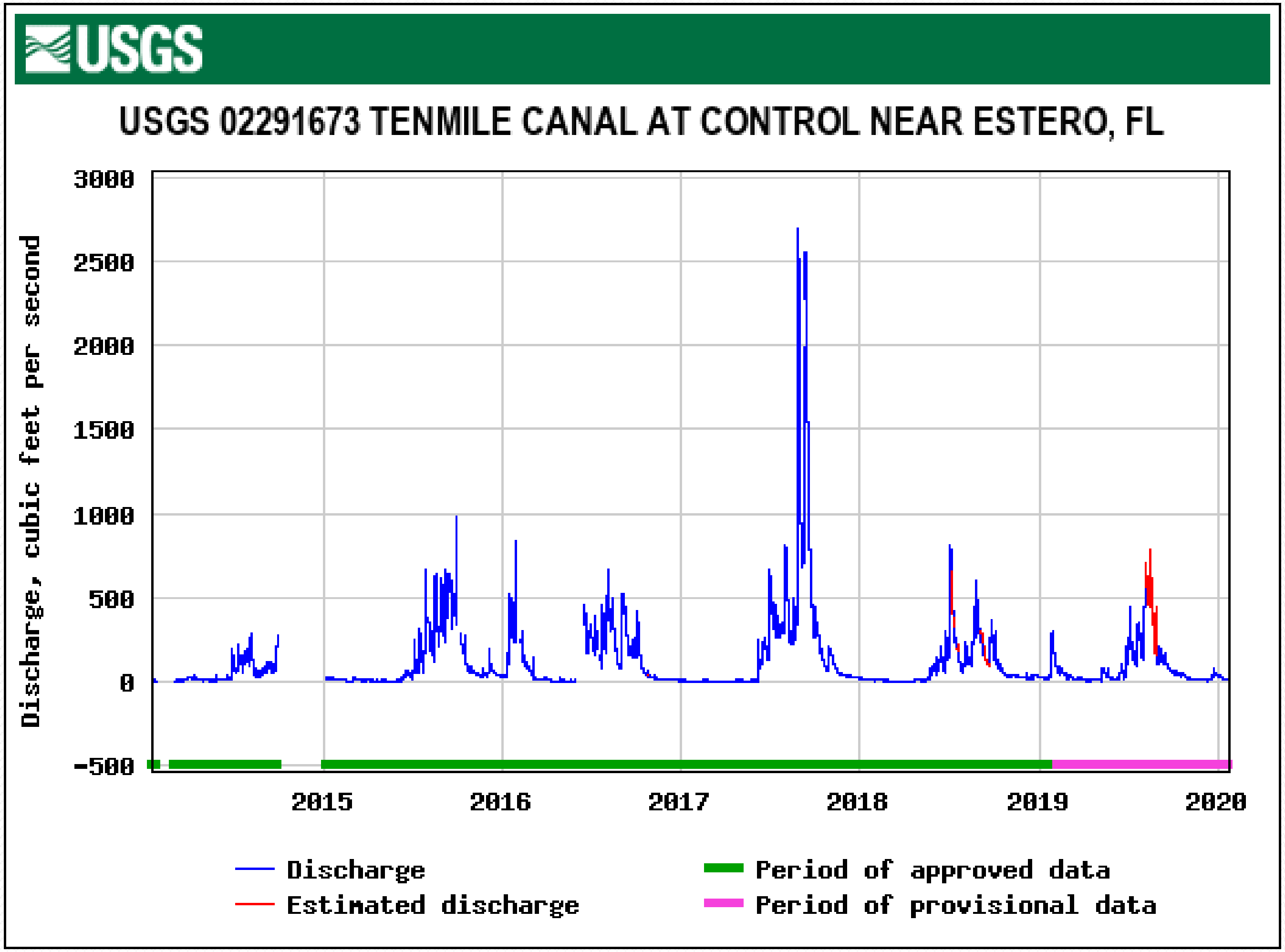


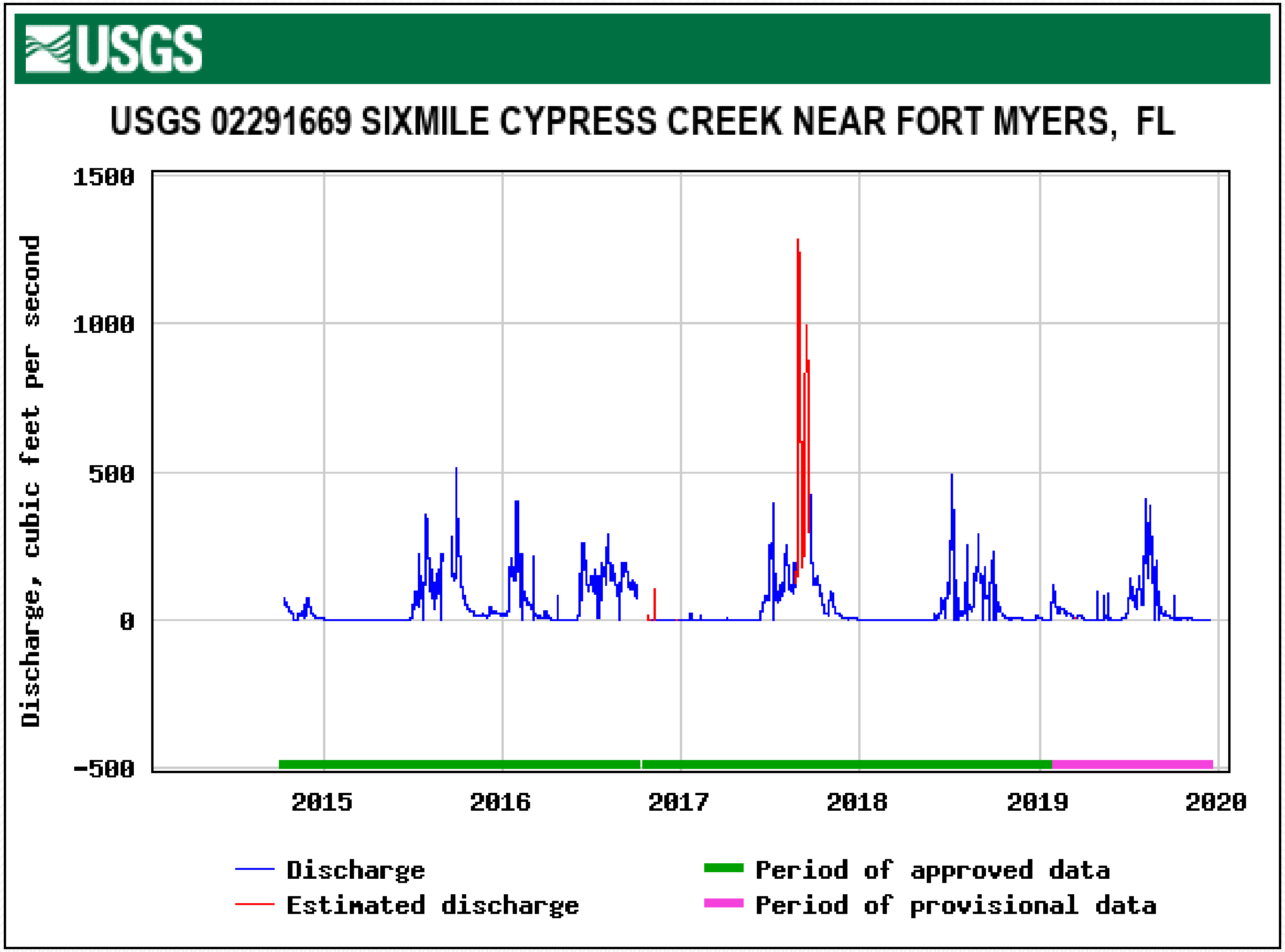
Turbidity in Fresh Systems

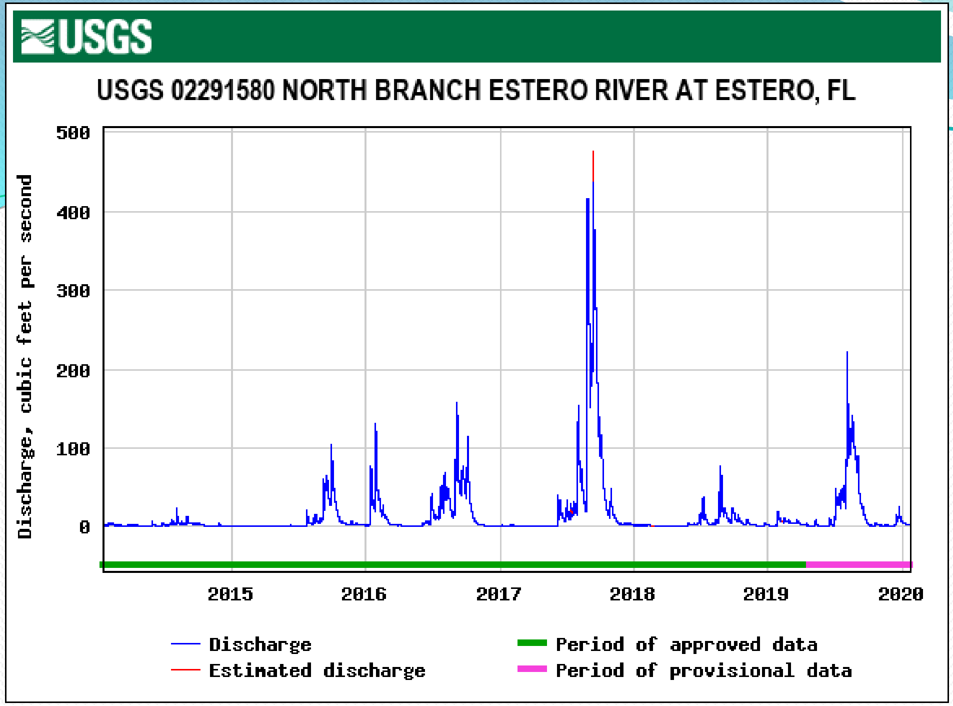
Between 2014 and 2019, average turbidity dropped in all freshwater segments. The average reduction was 29%. The peak monthly turbidity dropped in all estuarine segments but two, for an average of 30% reduction.

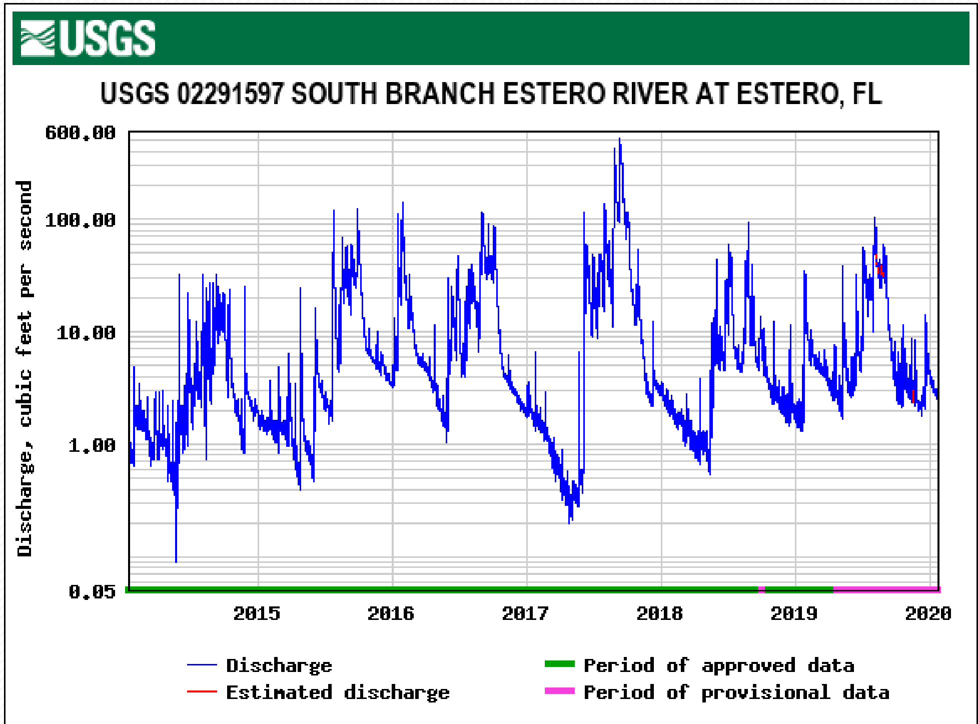


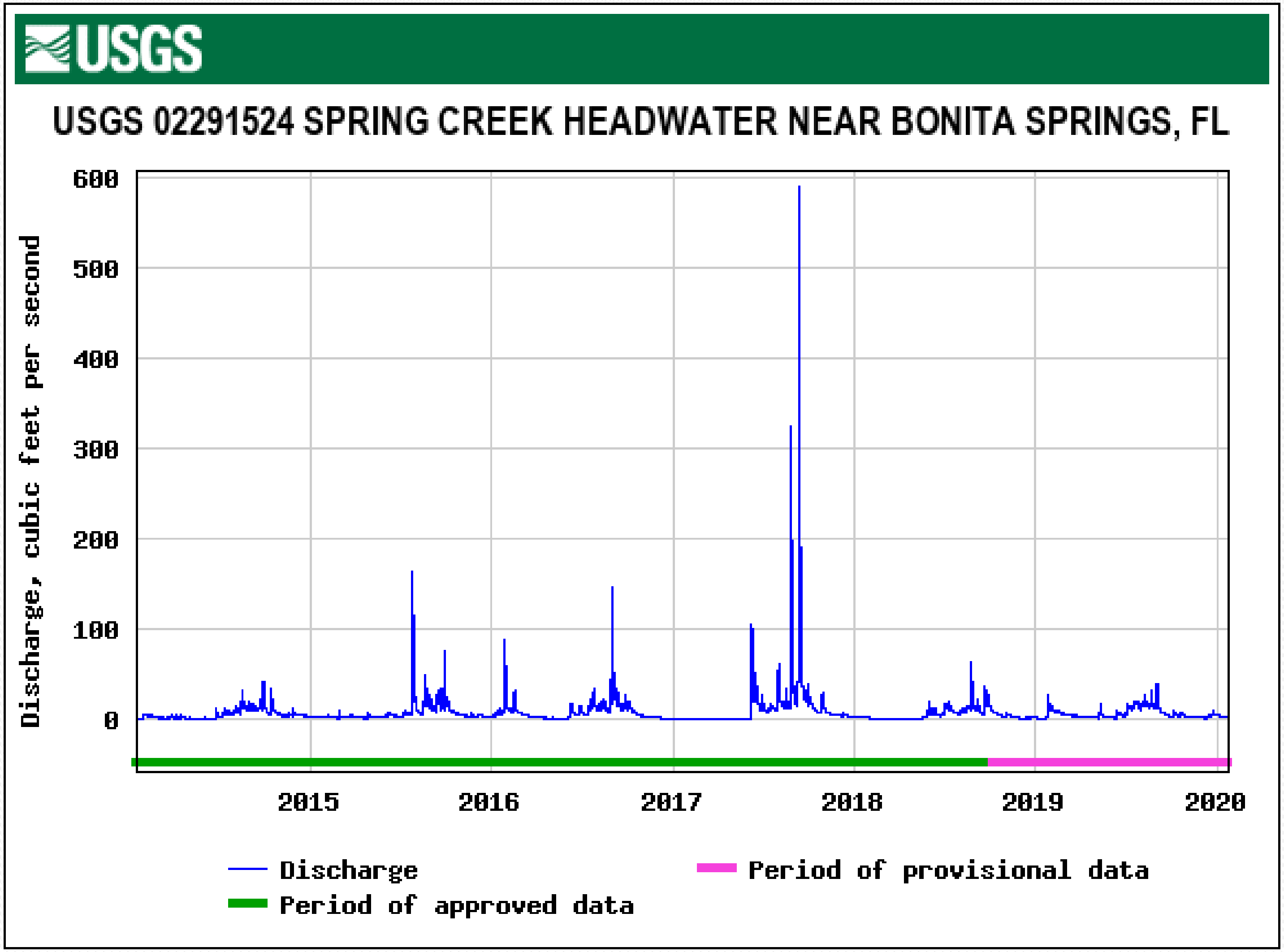


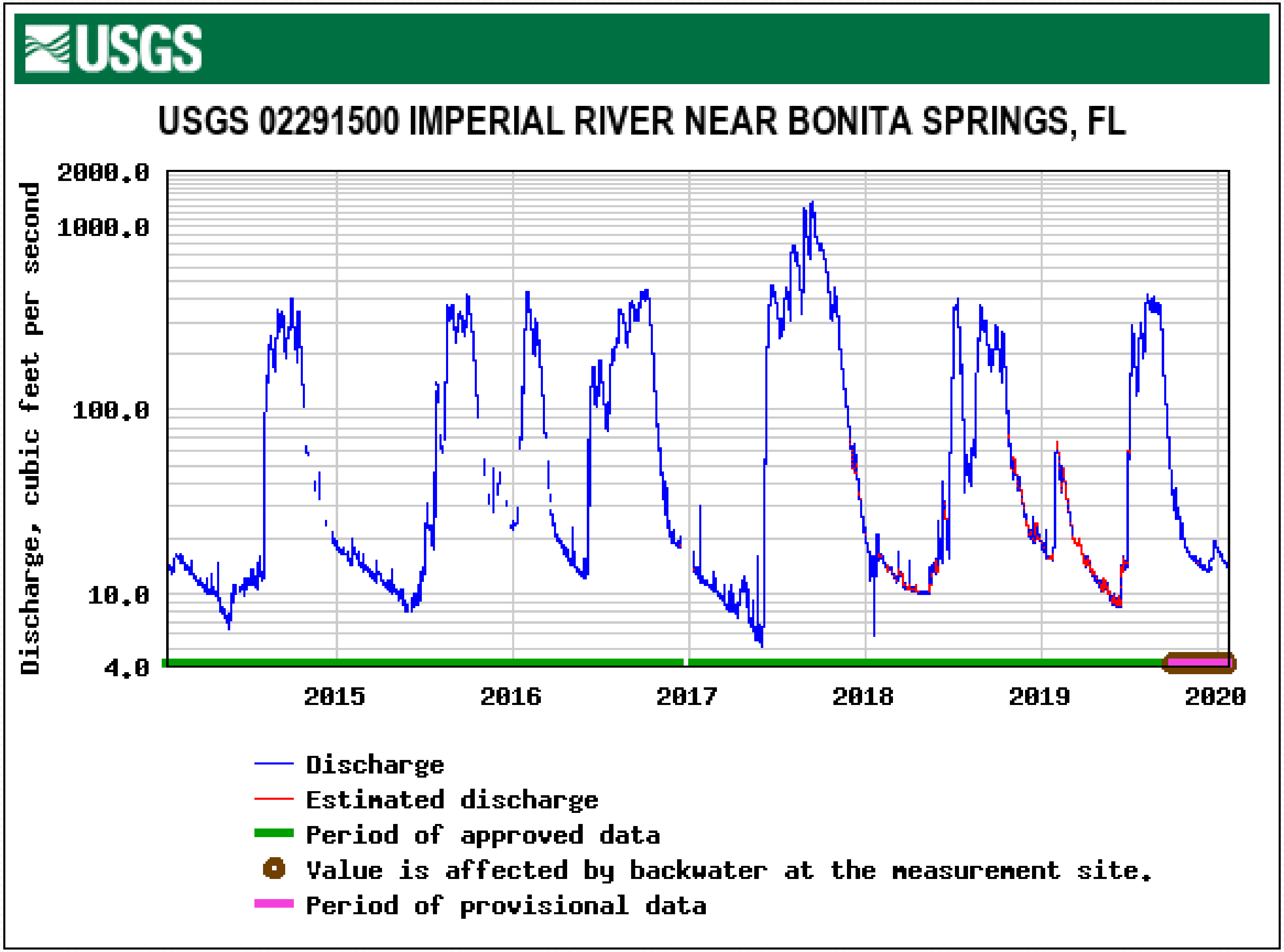

USGS
USGS 02291673 TENMILE CANAL AT CONTROL NEAR ESTERO, FL
Discharge, cubic feet per second
3000
2500
2000
1500
1000
500
0
-500
2015
2016
2017
2018
2019
2020
Discharge
Estimated discharge
Period of approved data
Period of provisional data

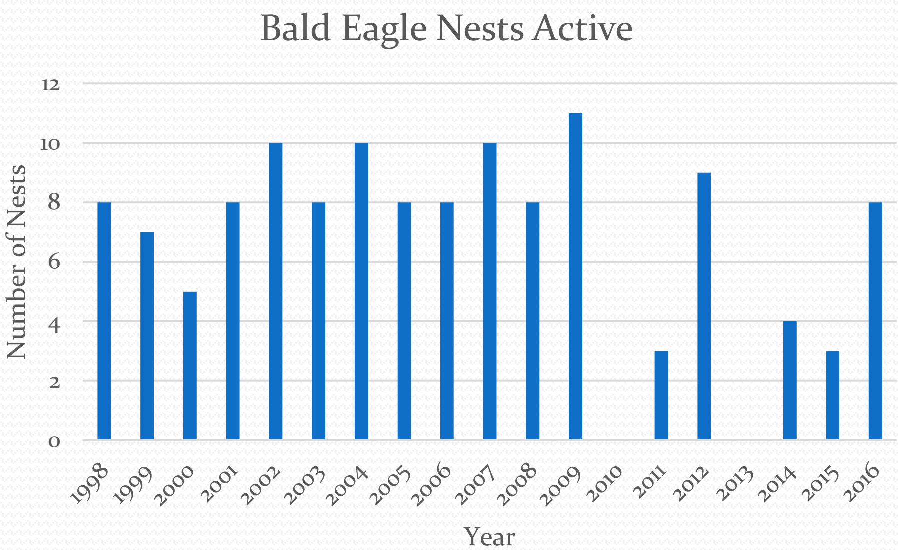

USGS
USGS 02291669 SIXMILE CYPRESS CREEK NEAR FORT MYERS, FL
Discharge, cubic feet per second
1500
1000
500
0
-500
2015
2016
2017
2018
2019
2020
Discharge
Estimated discharge
Period of approved data
Period of provisional data

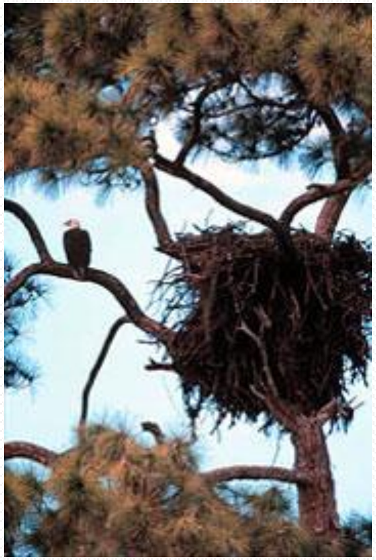

USGS
USGS 02291580 NORTH BRANCH ESTERO RIVER AT ESTERO, FL
Discharge, cubic feet per second
500
400
300
200
100
0
2015
2016
2017
2018
2019
2020
Discharge
Estimated discharge
Period of approved data
Period of provisional data


USGS
USGS 02291597 SOUTH BRANCH ESTERO RIVER AT ESTERO, FL
Discharge, cubic feet per second
600.00
100.00
10.00
1.00
0.05
2015
2016
2017
2018
2019
2020
Discharge
Estimated discharge
Period of approved data
Period of provisional data


USGS
USGS 02291524 SPRING CREEK HEADWATER NEAR BONITA SPRINGS, FL
Discharge, cubic feet per second
600
500
400
300
200
100
0
2015
2016
2017
2018
2019
2020
Discharge
Period of provisional data
Period of approved data


USGS
USGS 02291500 IMPERIAL RIVER NEAR BONITA SPRINGS, FL
Discharge, cubic feet per second
2000.0
1000.0
100.0
10.0
4.0
2015
2016
2017
2018
2019
2020
Discharge
Estimated discharge
Period of approved data
Value is affected by backwater at the measurement site.
Period of provisional data

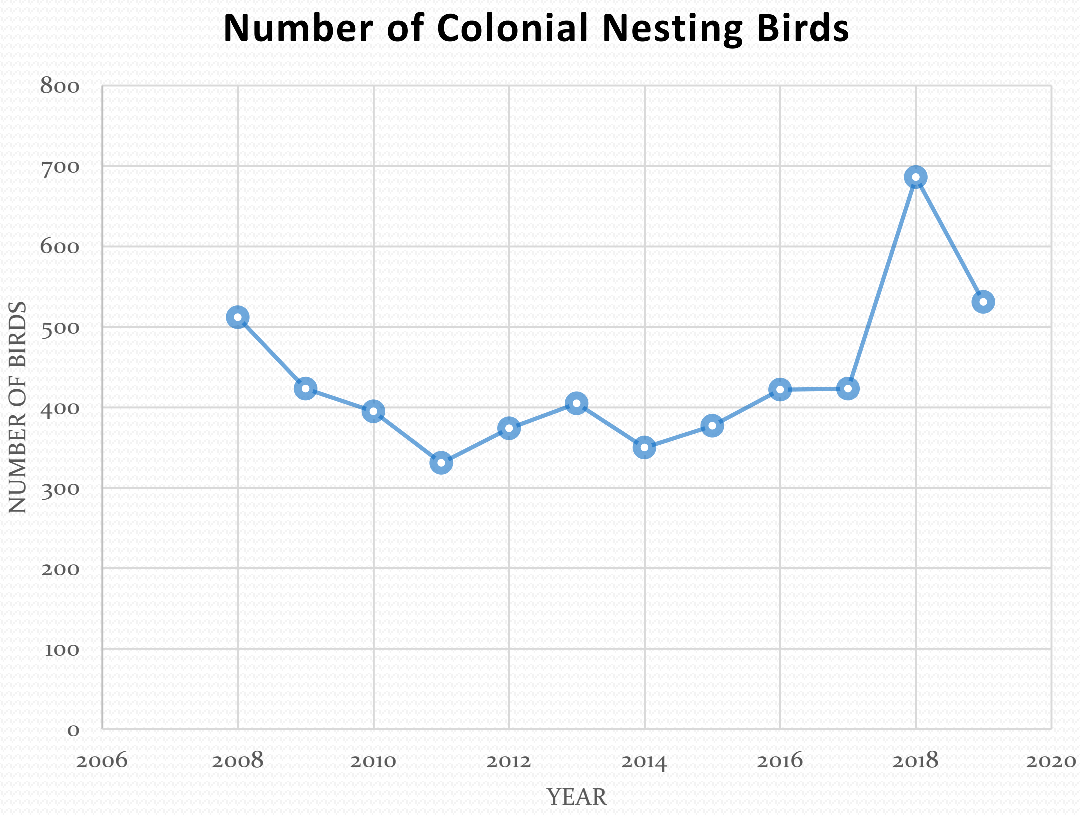




Year	Number of Nests	Success Rate
1995	9	5 (55%)
1996	10	6 (60%)
1997	10	4 (40%)
1998	11	7 (64 %)
1999	11	6 (55 %)
2000	14	?
2001	14	10(71%)
2002	11	2(18%)
2003	9	2(22%)
2004	12	6(50%)
2005	11	?
2006	10	7(70%)
2007	11	4(37%)
2008	9	6(67%)
2009	12	5(42%)
2012	6	?
2013	7	?
2014	4	?
2015	3	?
2016	6	?

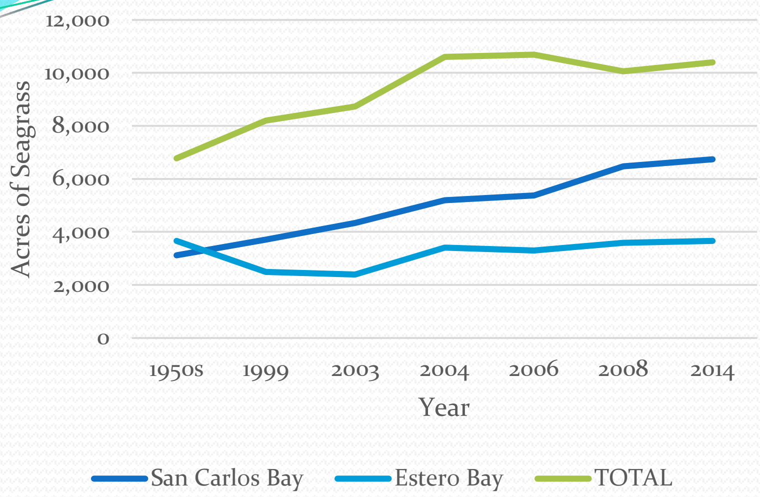
Peak nest counts, by species, for surveys conducted in Estero Bay from 2008 to 2019

+ 11.7% in rookery number and +34% in total nest number since 2014



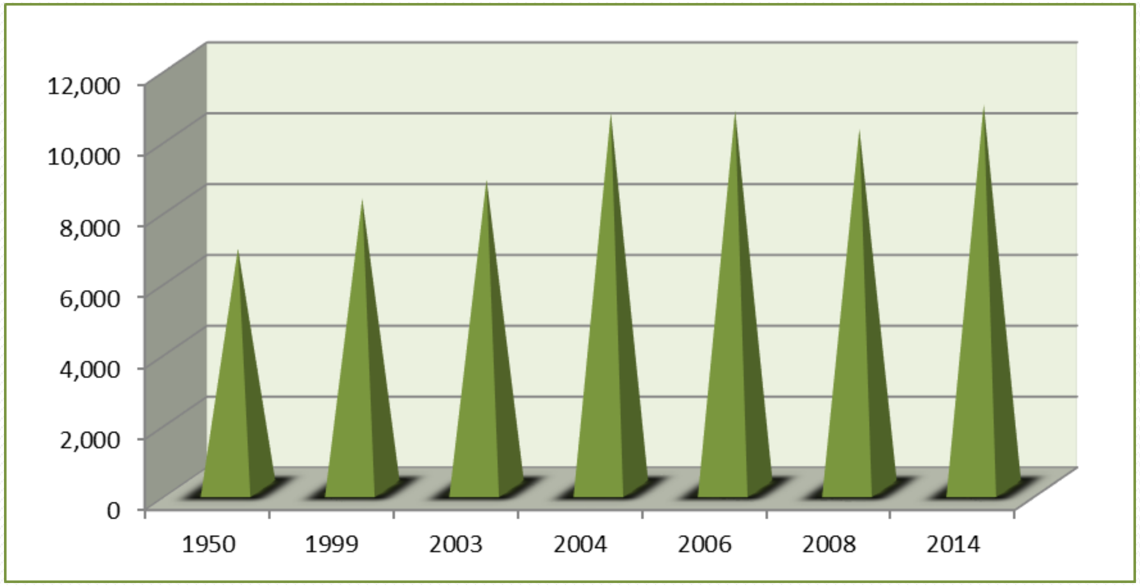
Source: Estero Bay Estuary Program

Seagrasses

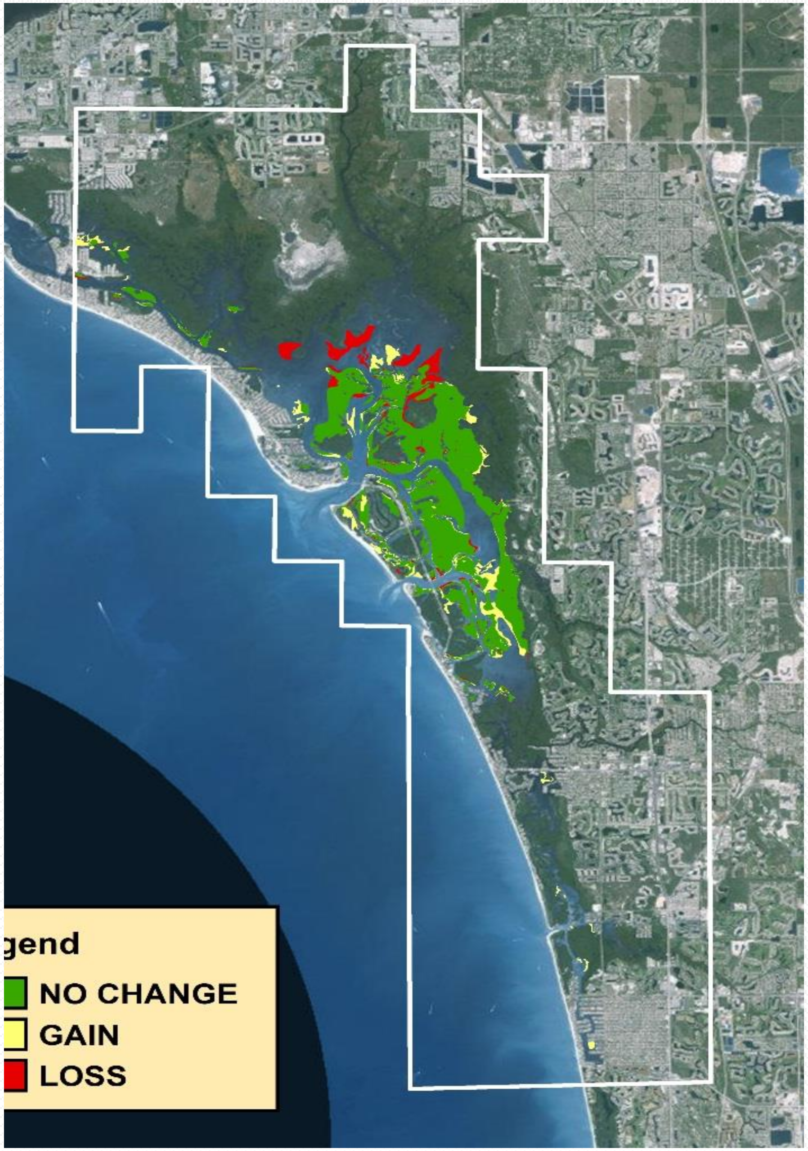


Seagrass Acreages in the Estero Bay Segments of the CHNEP							
Harbor Segment	1950s	1999	2003	2004	2006	2008	2014
San Carlos Bay	3,118	3,709	4,338	5,192	5,376	6,469	6,740
Estero Bay	3,662	2,488	2,393	3,409	3,298	3,590	3,654
TOTAL	6,780	8,196	8,734	10,605	10,680	10,059	10,394

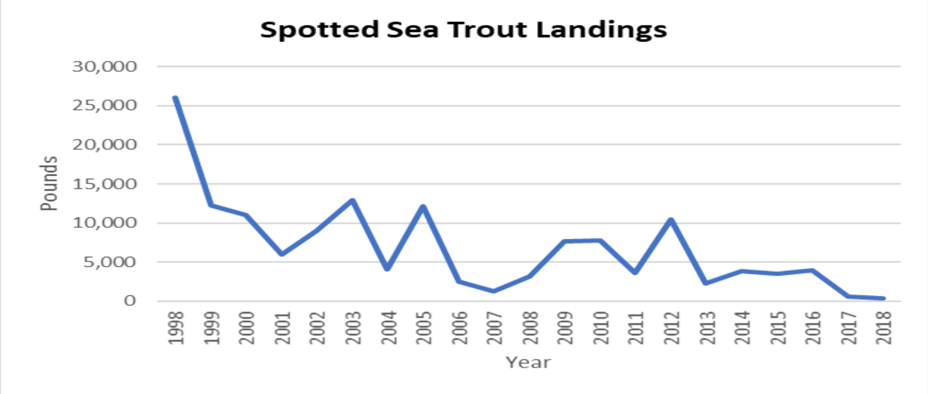
It is estimated that, in 1950, Estero Bay contained 3,769 acres of seagrasses.
While seagrass acreage declined between 1950 and 1999, significant gains have been made since then.
Persistence of seagrass has also been tracked. Persistence appears to be linked to water depth, with the most persistent areas being shallower and near-shore.
It is estimated that Estero Bay contains 107 acres of seagrasses that have been lost and are not restorable.
As of 2014, there were 3,654 acres of seagrasses of all species in Estero Bay and 6,740 acres in San Carlos Bay, which includes Matanzas Pass and the areas south of Bunche Beach, for a total of 10,394 acres. Apparently no surveys have been completed since then.



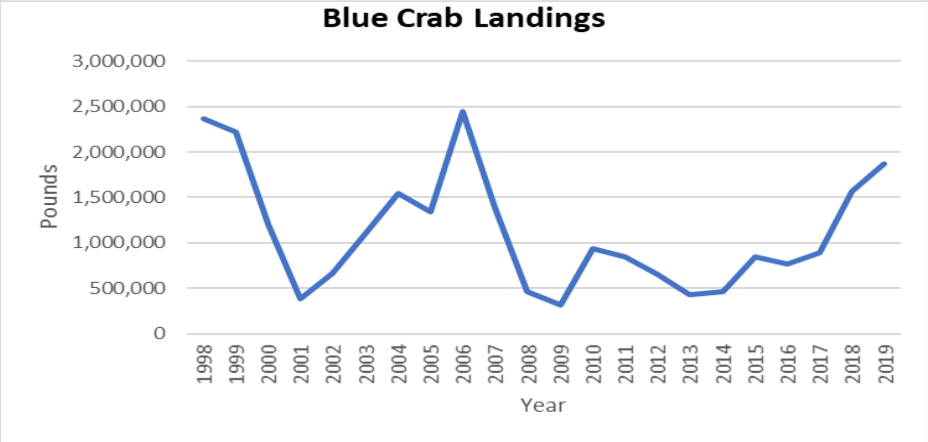
Change in Seagrass Acreages in the Estero Bay and San Carlos Bay Segments of the CHNEP


gend
NO CHANGE
GAIN
LOSS

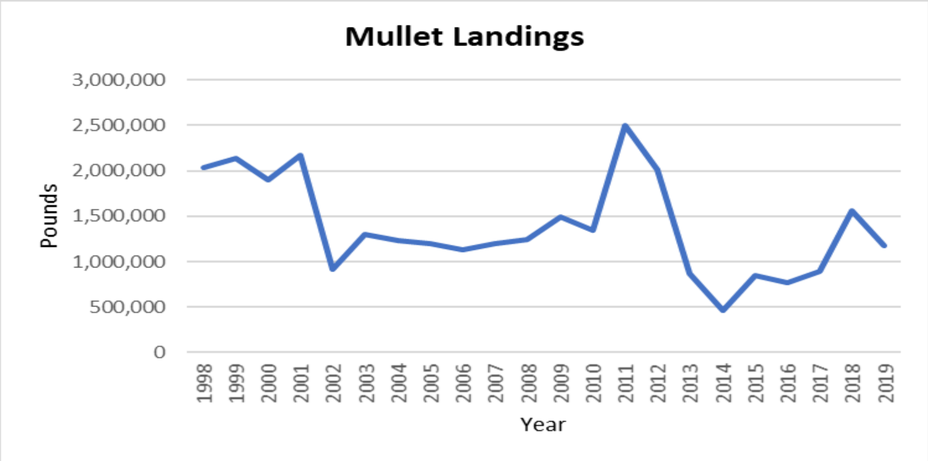
Commercial Fisheries Landings (Lee)



-98.4%

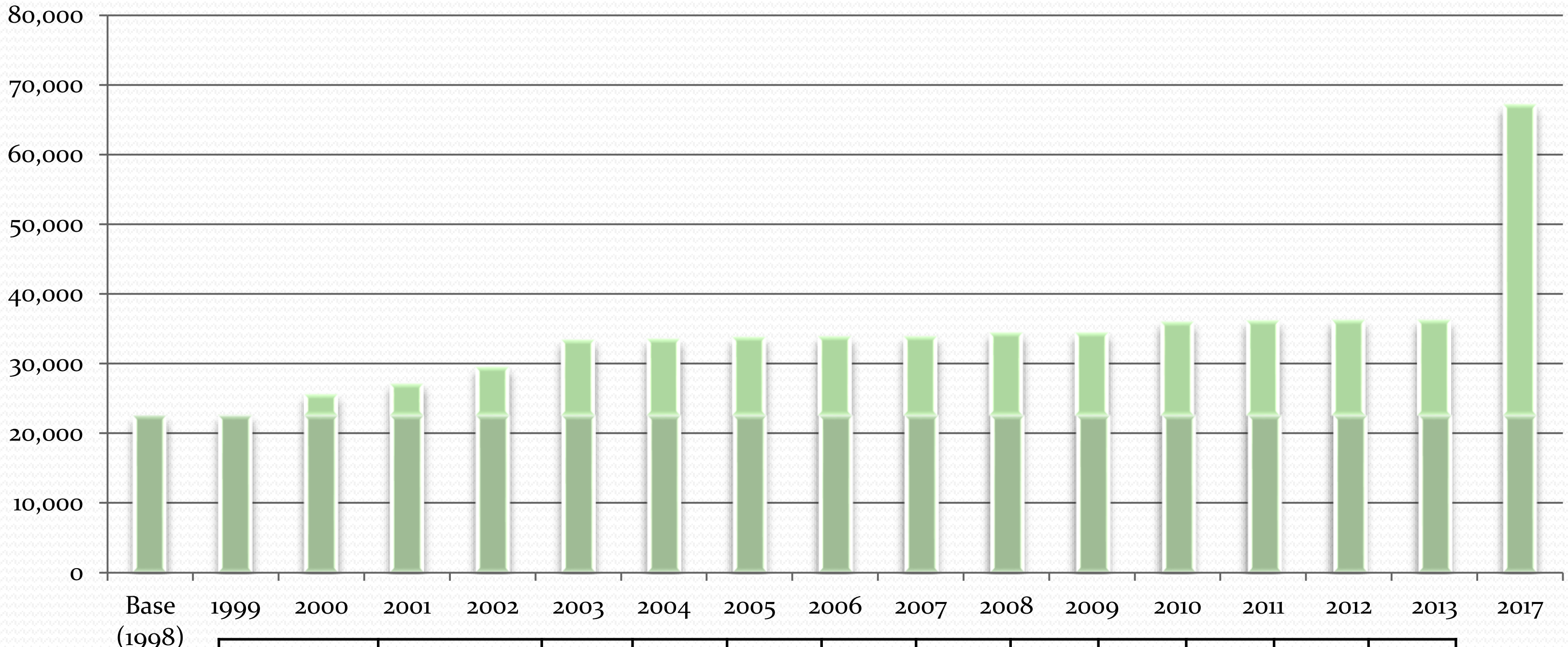


-22.34%



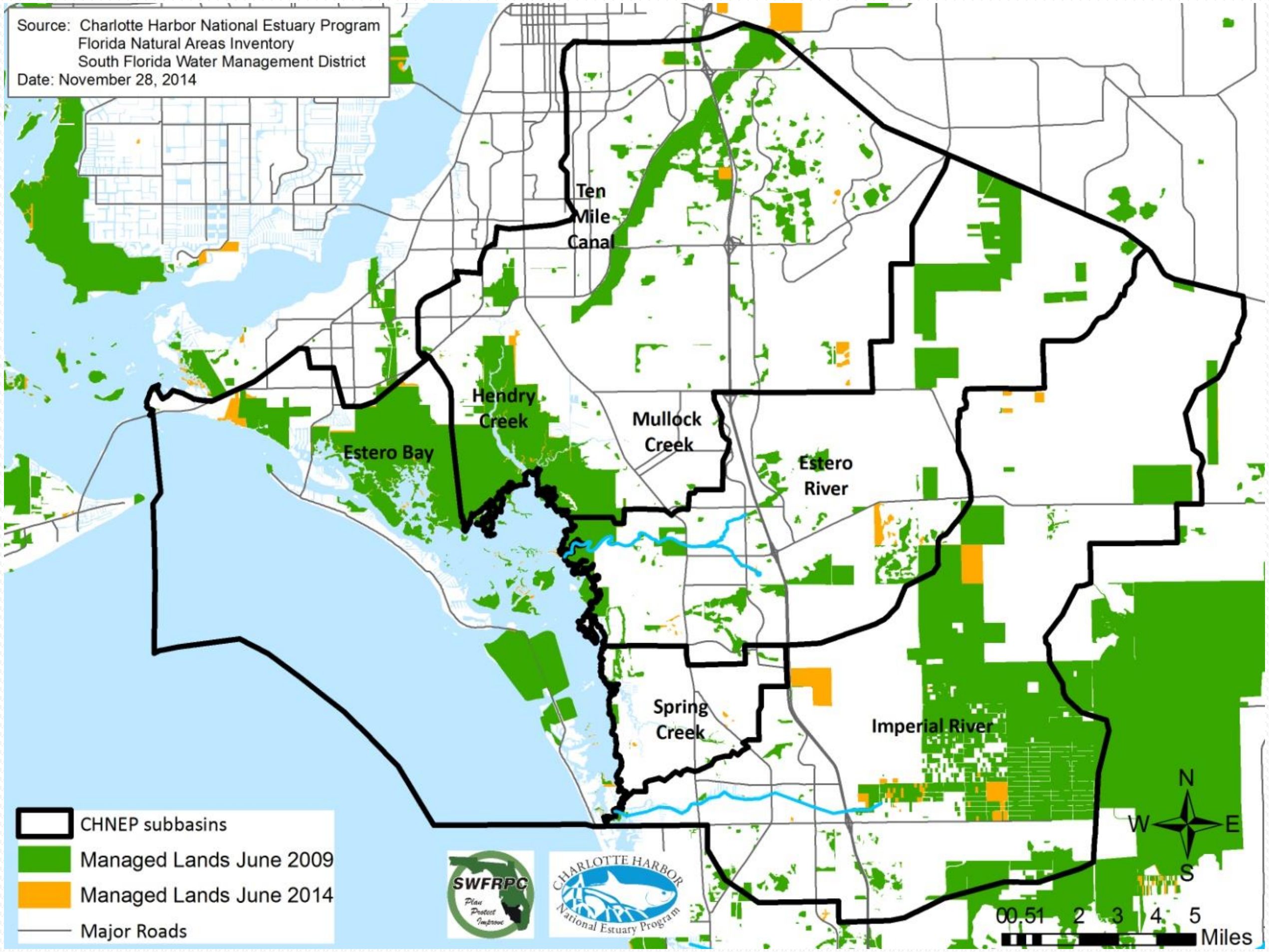
-57.87%

Acres of Land in Conservation/Preservation in the Estero Bay Watershed

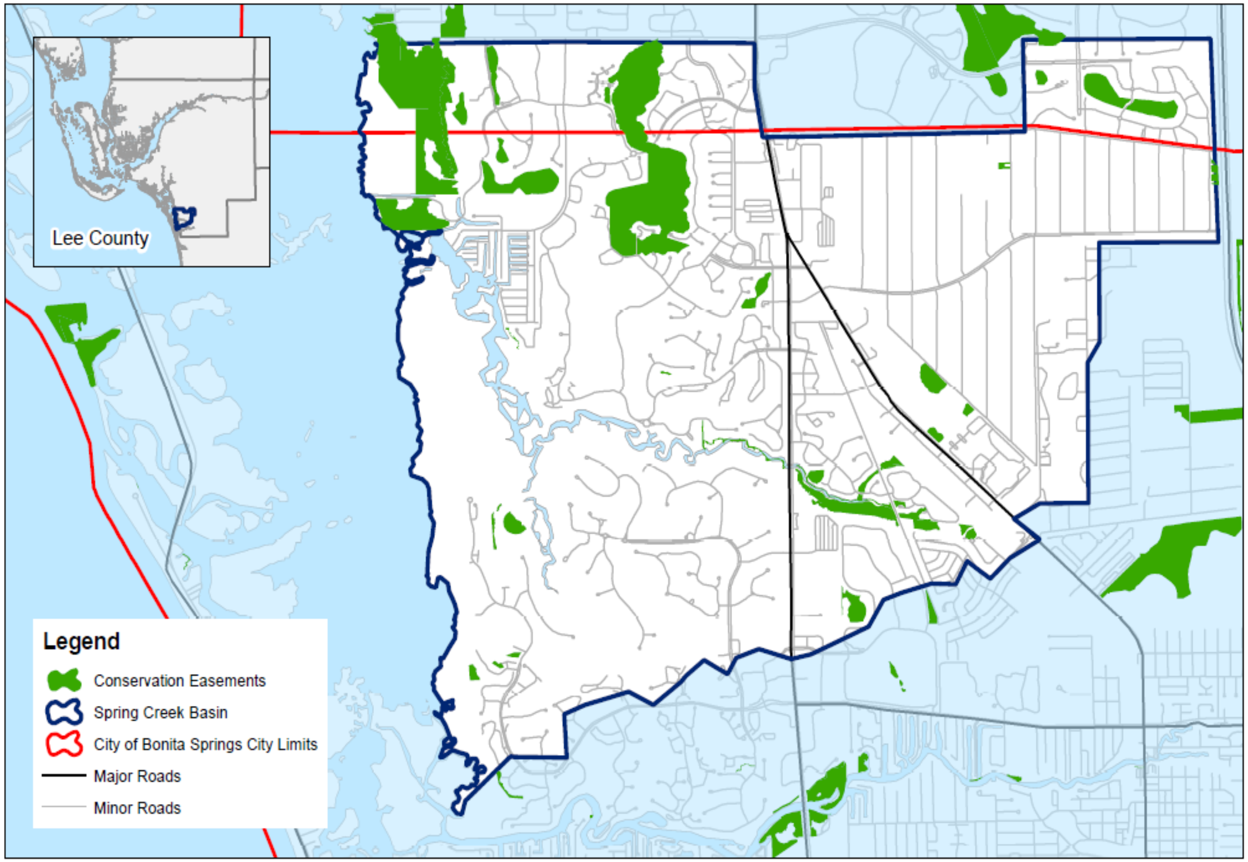


Year	Base (1998)	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Acres	22,502	122	3,032	1,491	2,429	3,887	167	238	109	1,042	511

Year	2009	2010	201 1	201 2	2013	2017
Acres	19	1,523	210	63	0	8425



2014 Conservation Lands of the Estero Bay Watershed with Conservation Easements



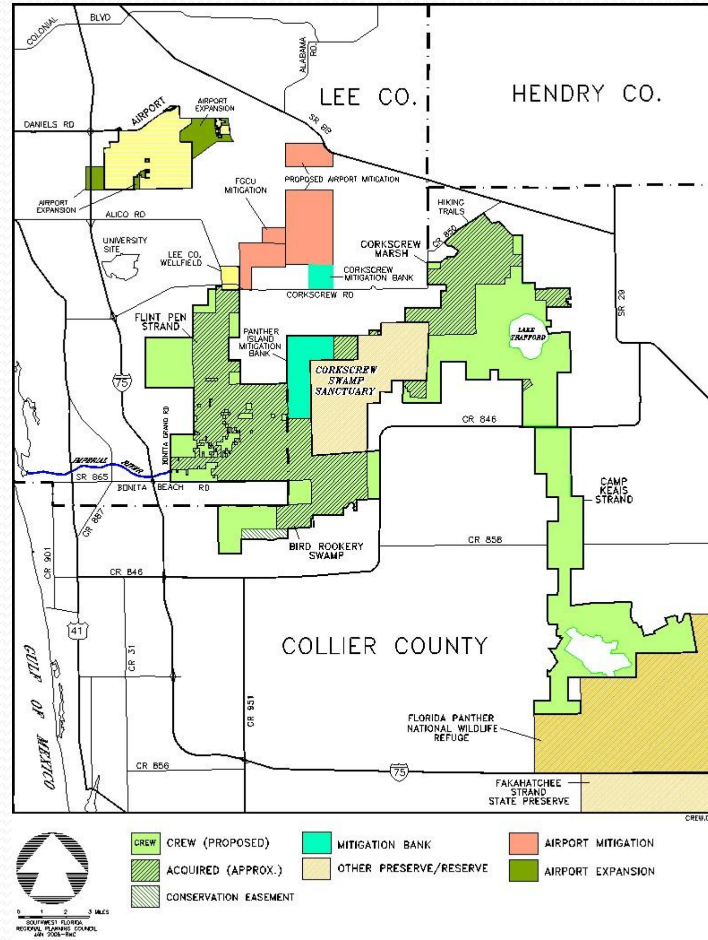
Spring Creek Basin Conservation Easements

0 0.25 0.5 1 Miles

Southwest Florida Regional Planning Council
www.swfrpc.org

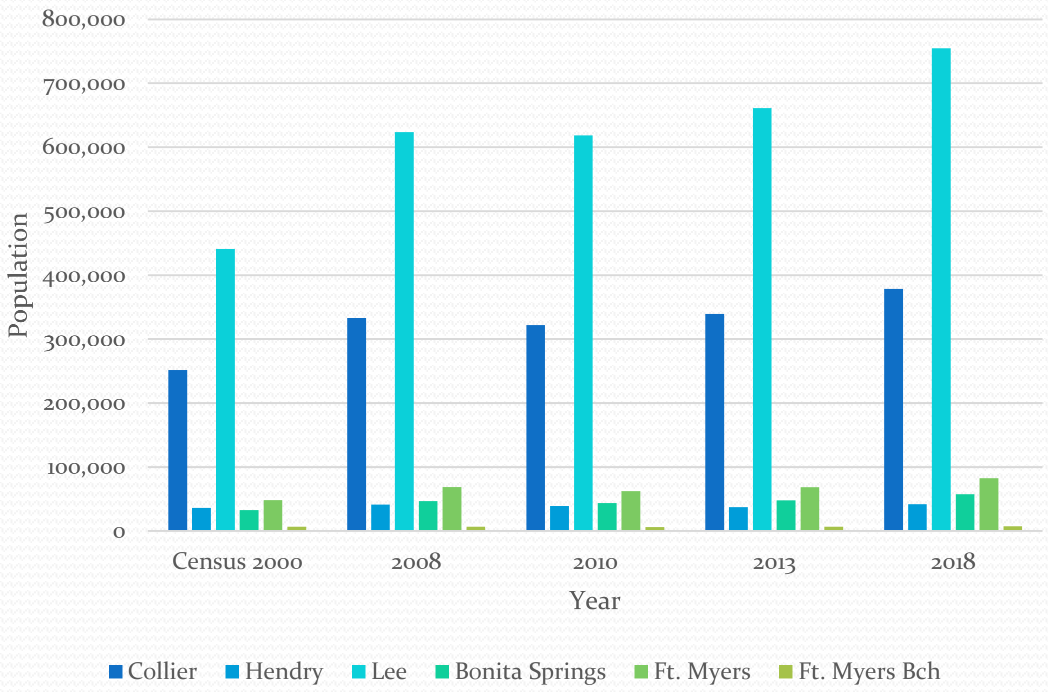
(Name: SpringCreek Watershed Study_conser_ease) Last updated by: twalker on 5/12/2015

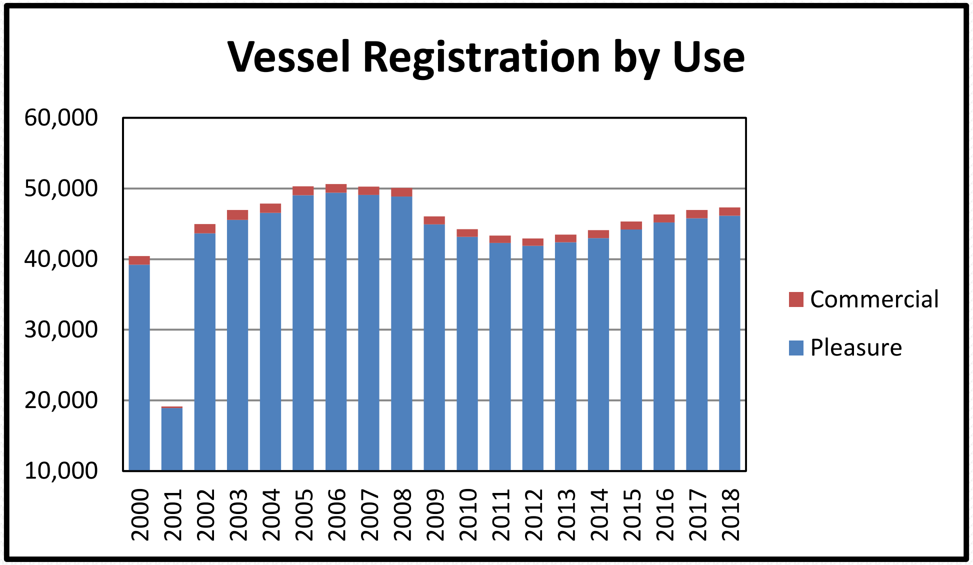

CONSERVATION 20/20 NOMINATIONS
(Revised 1/16/2020)
Gulf of Mexico
Conservation 20/20
NOMINATIONS
ACQUIRED
UNDER REVIEW
ACTIVE ACQUISITION
WITHDRAWN
Existing Other Conservation Lands
Conservation Easements
0
5 Miles
N
S
E
W
Revised: January 16, 2020
LEE COUNTY

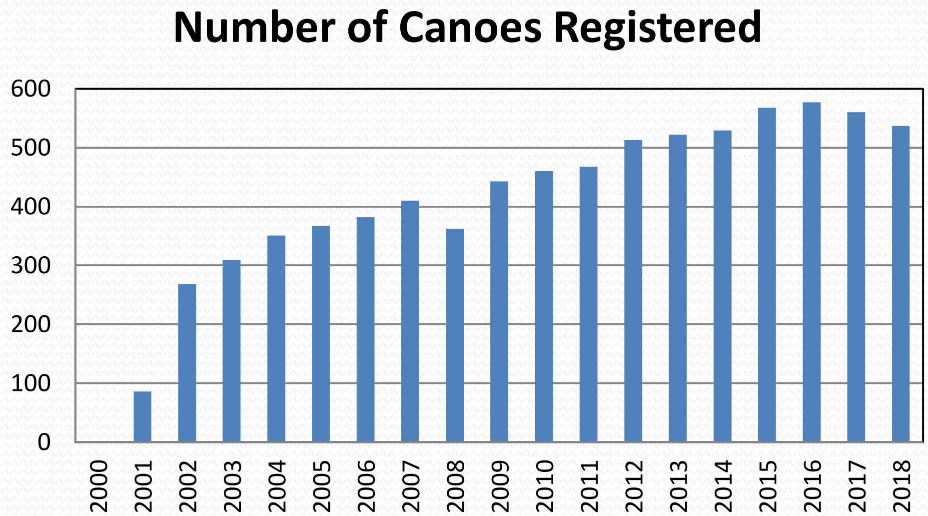


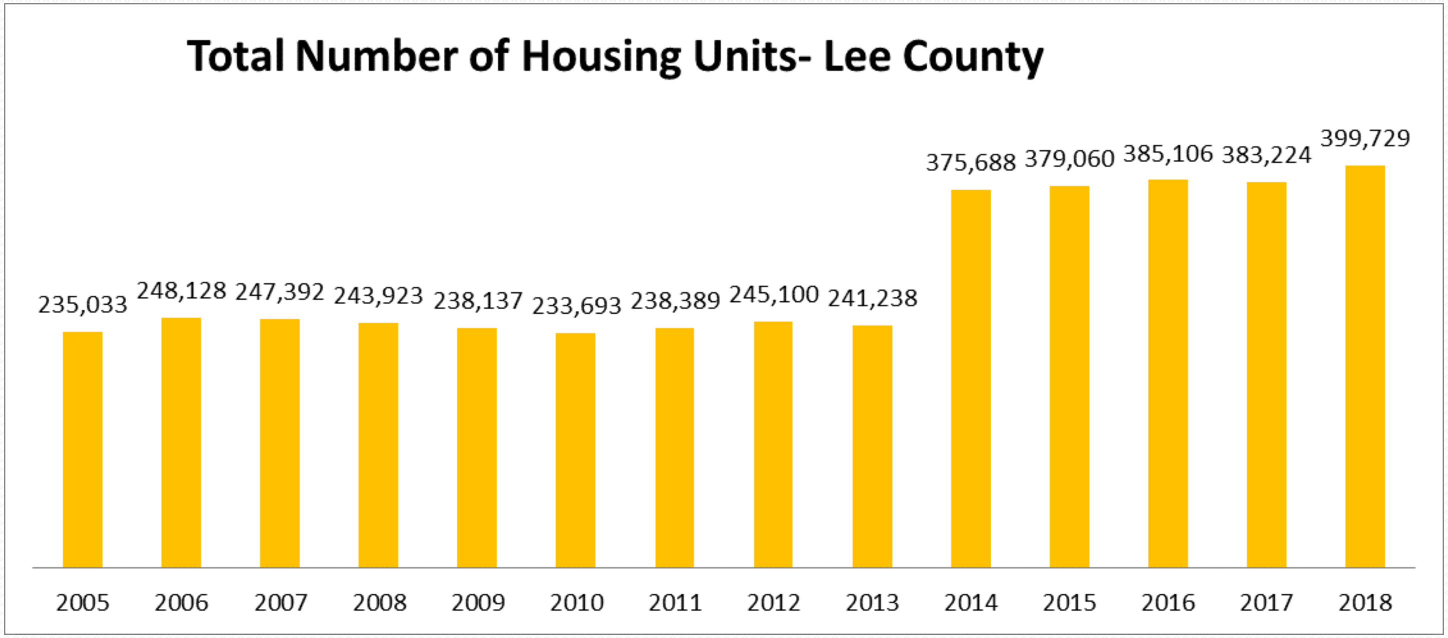
(CREW)
CORKSCREW REGIONAL ECOSYSTEM WATERSHED

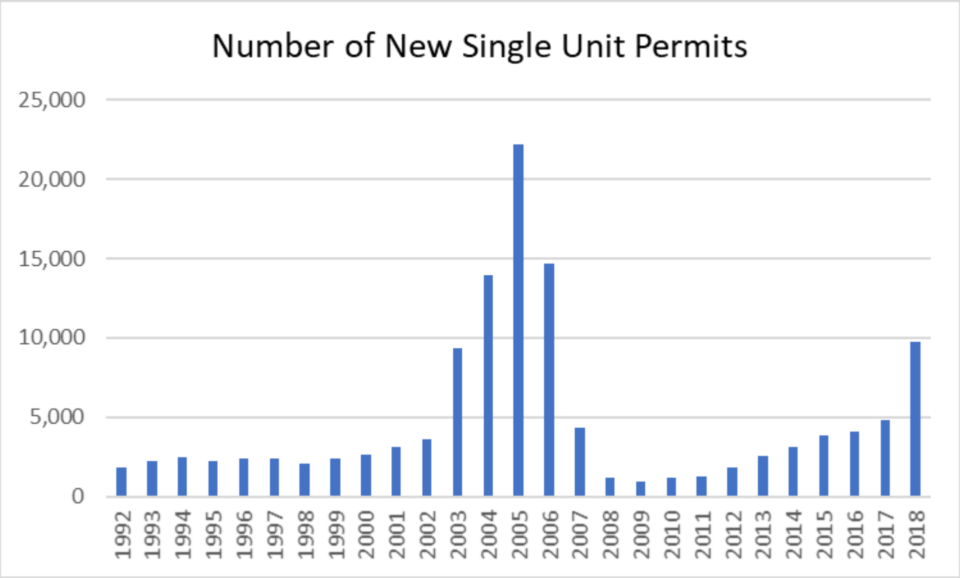
At the time of the 2000 Census, the Estero Bay Basin had nearly 145,000 people living within its boundaries. By 2010, the Estero Bay basin population had grown by a third to over 195,000. By 2018 it is estimated to be 248,000 (25% increase since 2014 and a 71% increase since 2000).




Vessel Registration by Use
60,000
50,000
40,000
30,000
20,000
10,000
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Commercial
Pleasure

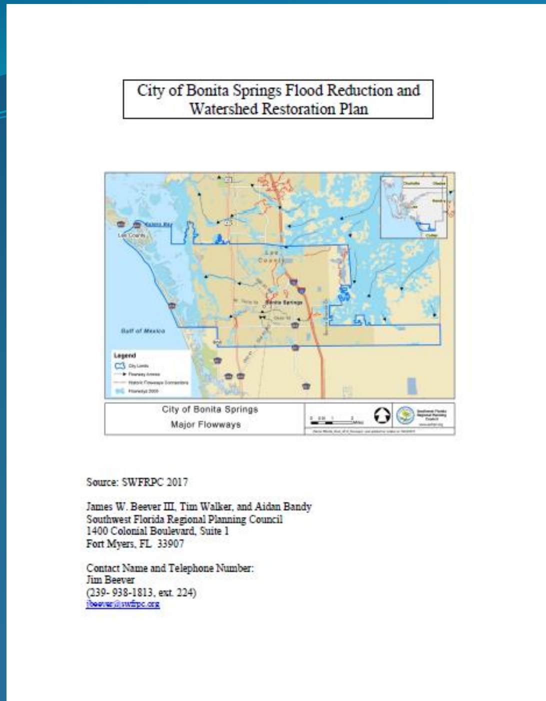

Number of Canoes Registered
600
500
400
300
200
100
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Total Number of Housing Units- Lee County
235,033
248,128
247,392
243,923
238,137
233,693
238,389
245,100
241,238
375,688
379,060
385,106
383,224
399,729
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Number of New Single Unit Permits
25,000
20,000
15,000
10,000
5,000
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018

One solution: Nutrient pollution source reduction at the source.

We know the solutions to the harmful nutrient and human waste problems, and I learned about it when I was in high school and with more detail in college. After I joined State government in 1984, I have advocated this at all the different state agencies I worked at and at the SWFRPC. Many other scientists know this solution and have worked toward it over these many years. It is not just one thing and it is not a technological or man-made chemical fix that allows pollution with impunity and then cleaning up the mess. It is called nutrient source reduction at the source. It involves every nutrient pollution source being responsible for their own pollution and retaining and treating it themselves. It is stricter stormwater management systems than the current basis of review and Harper method standards, it is stricter fertilizer ordinances than the weak State and Federal rules. It provides no exemptions to anyone: not to agriculture; not to government; not to golf course; not to the politically connected. It involves strict monitoring, enforcement, and requires repairs and upgrades to all forms of waste treatment plants (septic, package plants, central systems). It involves moving to Advanced Tertiary Treatment of sewage. It involves not allowing reuse water used for irrigation to flow into adjacent water bodies. It involves full land-based pump-out of all vessels including private boats, cruise liners and commercial shipping with no free discharges to open waters with no exempted open water discharges including grey water. It includes the complete filtering at incinerators and power plants to scrub nitrogen and mercury emissions. It includes native landscaping of public and private landscapes. It includes conservation acquisition and protection of the river and creek floodplains and moving all forms of agriculture, particularly feed lots and land spreading of waste solids, out of those floodplains. Basically, this is sustainable agriculture, land use, and life-style in Florida with proper nutrient management.



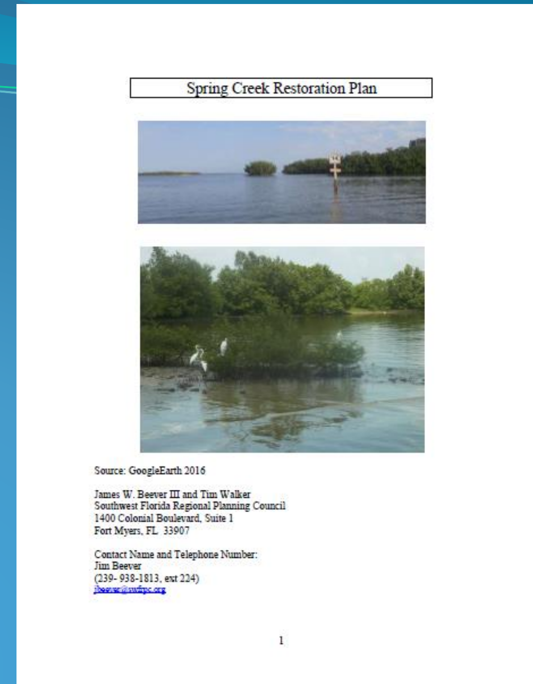
City of Bonita Springs Flood Reduction and Watershed Restoration Plan

City of Bonita Springs
Major Flowways

Source: SWFRPC 2017

James W. Beever III, Tim Walker, and Aidan Bandy
Southwest Florida Regional Planning Council
1400 Colonial Boulevard, Suite 1
Fort Myers, FL 33907

Contact Name and Telephone Number:
Jim Beever
(239- 938-1813, ext. 224)
jbeever@swfrpc.org



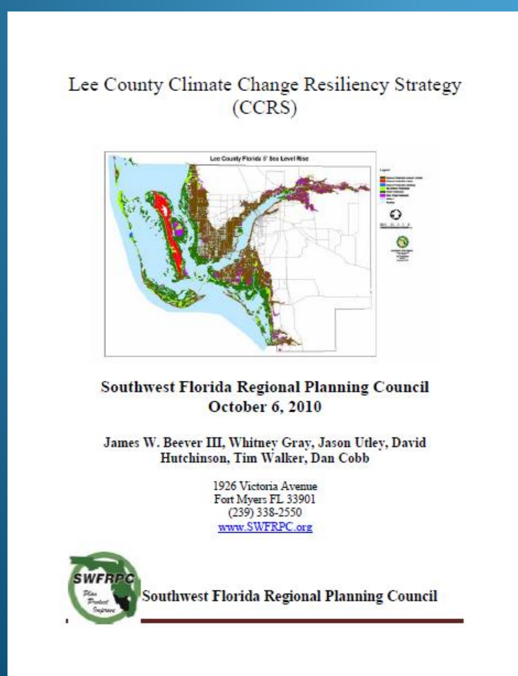
Spring Creek Restoration Plan

Source: GoogleEarth 2016

James W. Beever III and Tim Walker
Southwest Florida Regional Planning Council
1400 Colonial Boulevard, Suite 1
Fort Myers, FL 33907

Contact Name and Telephone Number:
Jim Beever
(239- 938-1813, ext 224)
jbeever@swfrpc.org

1



Lee County Climate Change Resiliency Strategy (CCRS)

Southwest Florida Regional Planning Council
October 6, 2010

James W. Beever III, Whitney Gray, Jason Utley, David Hutchinson, Tim Walker, Dan Cobb

1926 Victoria Avenue
Fort Myers FL 33901
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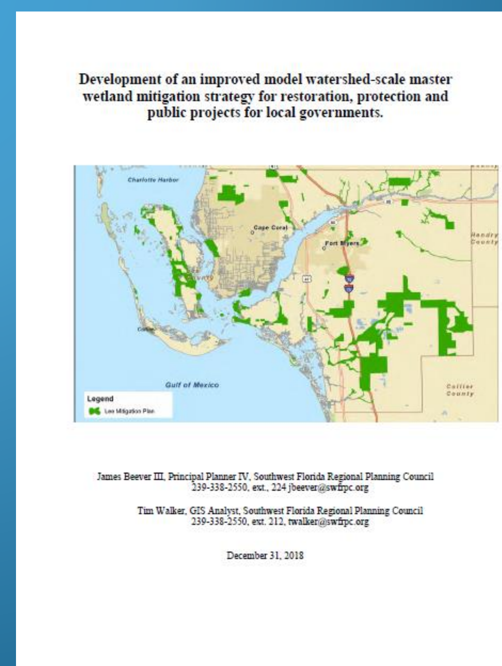
www.SWFRPC.org

Southwest Florida Regional Planning Council



Development of an improved model watershed-scale master wetland mitigation strategy for restoration, protection and public projects for local governments.

James Beever III, Principal Planner IV, Southwest Florida Regional Planning Council
239-338-2550, ext., 224 jbeever@swfrpc.org

Tim Walker, GIS Analyst, Southwest Florida Regional Planning Council
239-338-2550, ext. 212, twalker@swfrpc.org

December 31, 2018

State of the Bay 2019

Funded by the City of Bonita Springs.

Prepared by the Southwest Florida Regional Planning Council