

Restoring Estero Bay and Its Tributaries A Community Commitment



Presentation Outline

- **Underlying causes related to water quality decline in southwest Florida with emphasis on the Estero Bay Watershed**
- **Nutrient pollution as a driver of harmful algal blooms and outcomes for human health**
- **Lax regulatory enforcement and ineffective restoration**
- **Proposed plan of action to begin restoring water quality for Estero Bay and its tributaries**

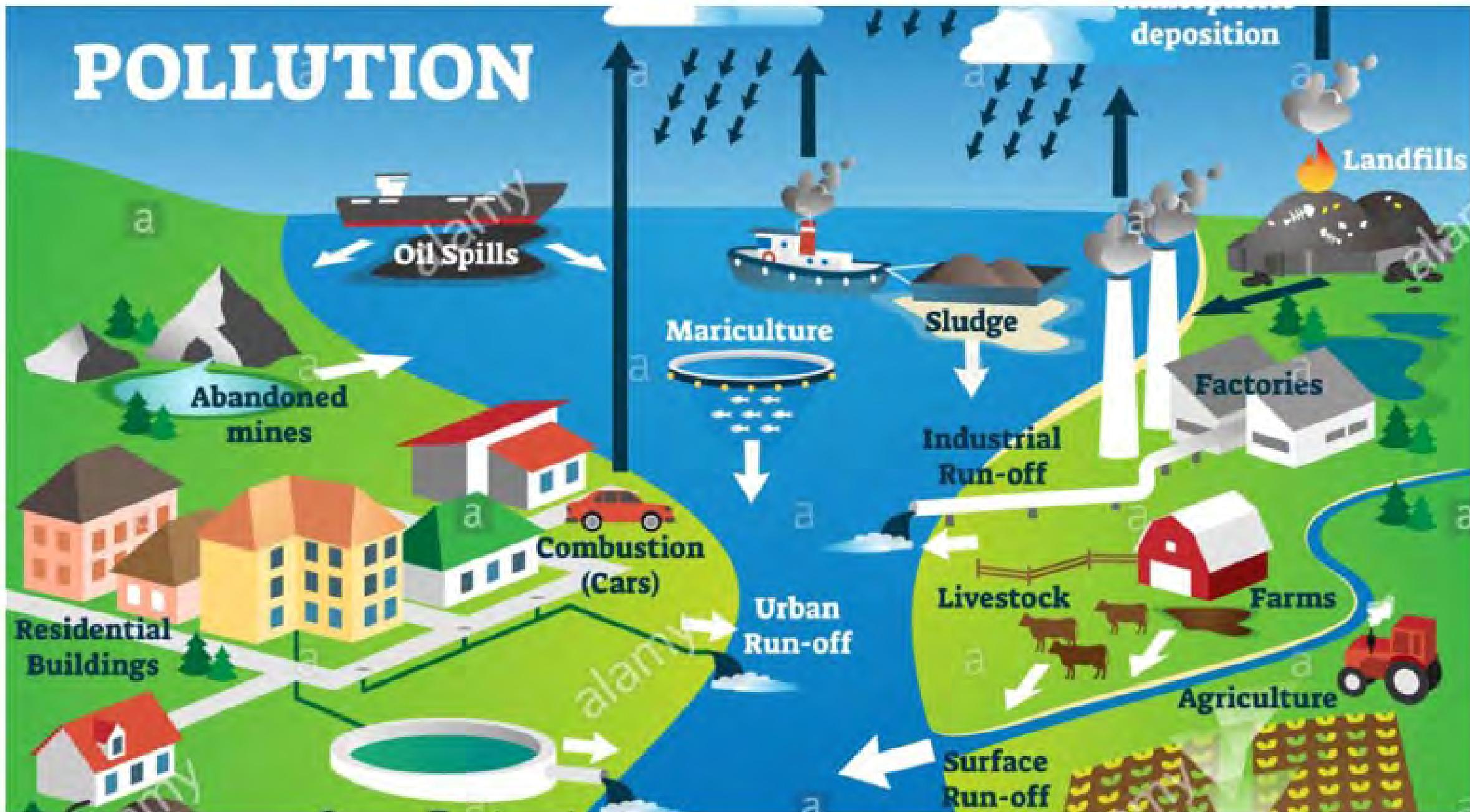


What is the Current Situation?

- Southwest Florida's waterways are screaming for "help". Water quality impairment is widespread
- A catastrophic combination of red tide & blue-green algae blooms on the west coast
- These headline-making events are causing significant public health concerns:
 - Tarnishing southwest Florida's reputation for world-class beaches
 - Affecting property values



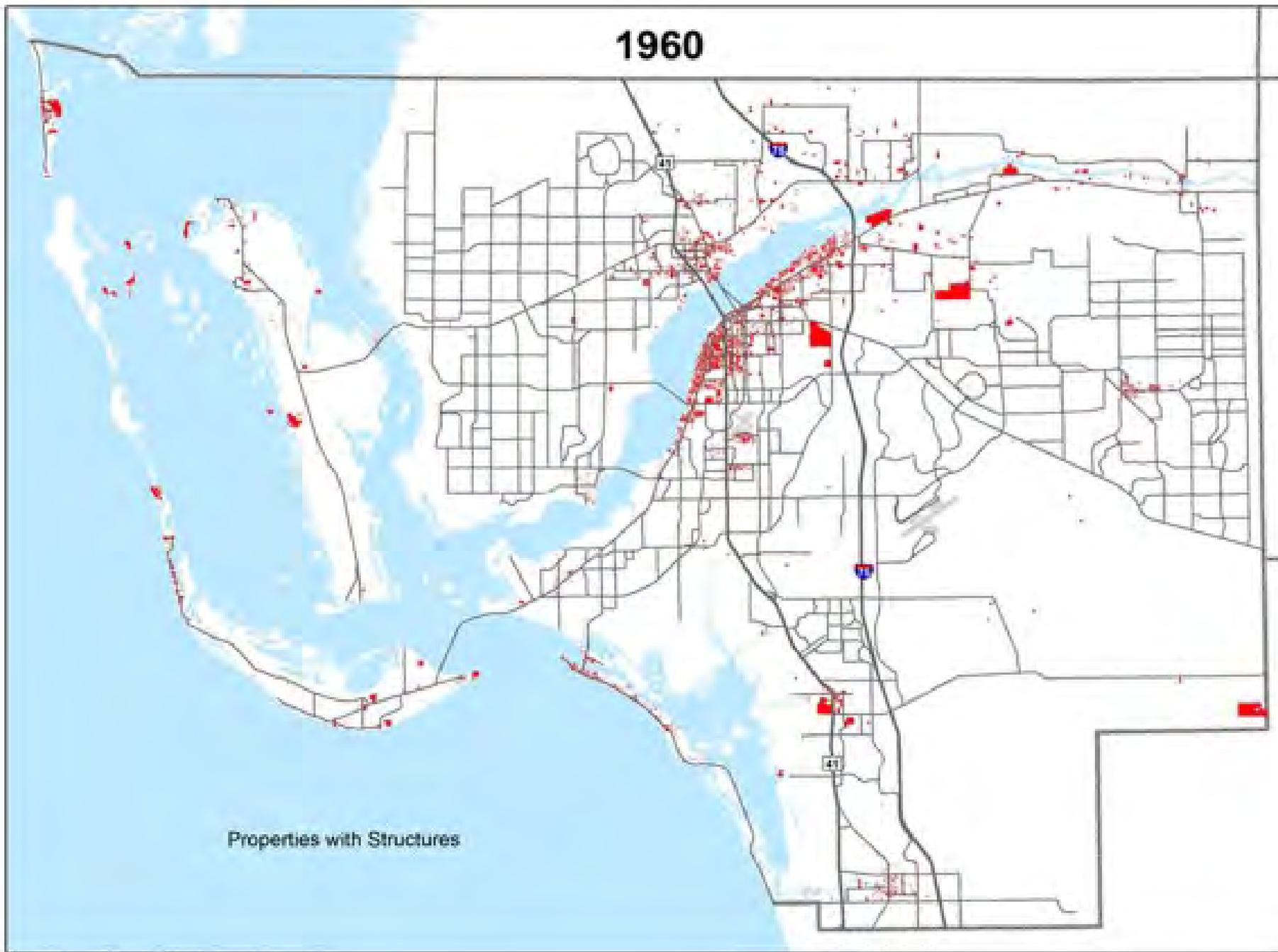
POLLUTION



An aerial photograph of a suburban residential neighborhood. The houses are arranged in a grid pattern with green lawns. A dark canal or waterway runs diagonally through the lower right portion of the image. In the upper right, a larger body of water, possibly a lake or bay, is visible. The overall scene is a typical suburban landscape.

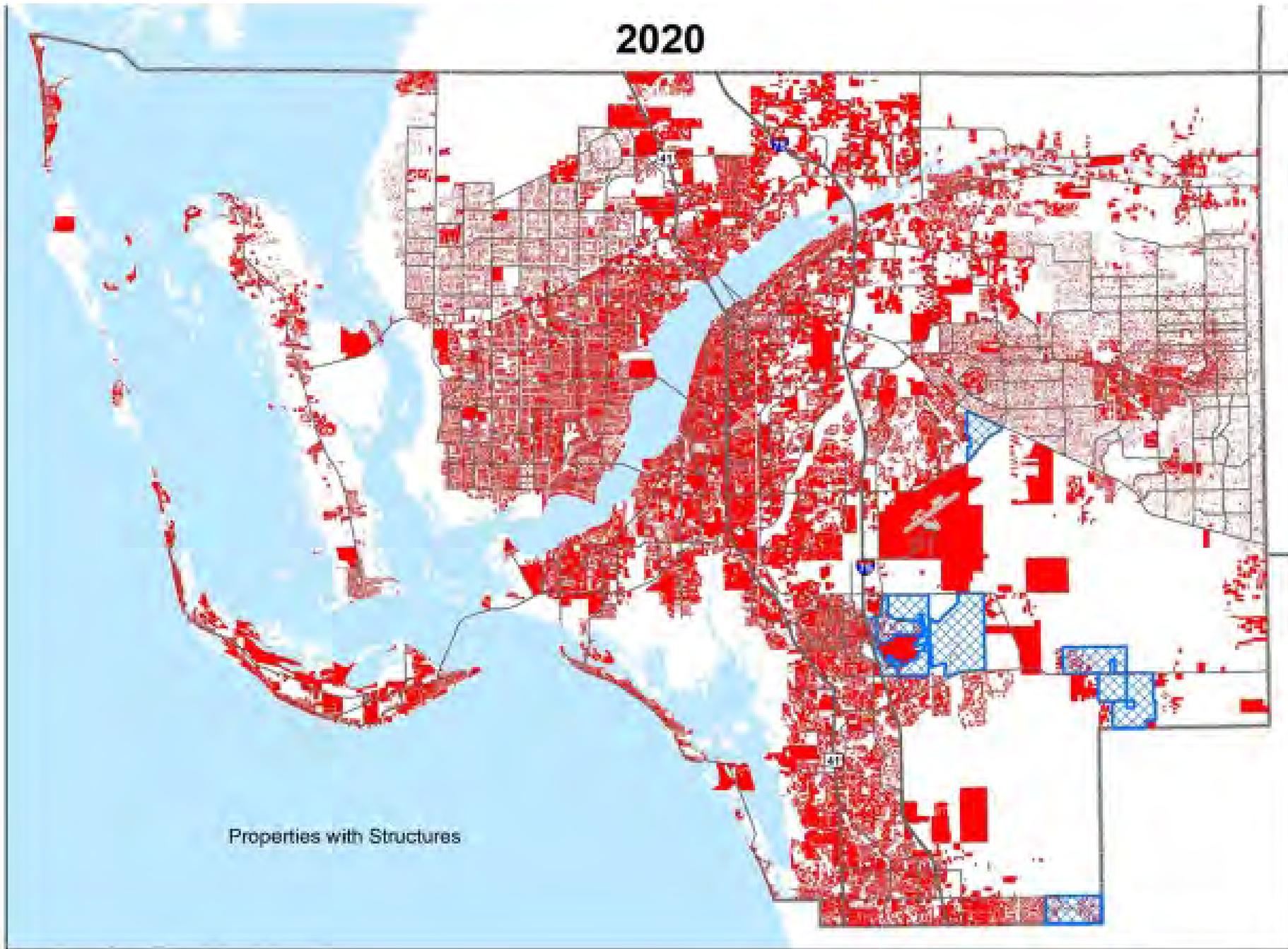
Landscape Change Impacts Water Quality

1960



Properties with Structures

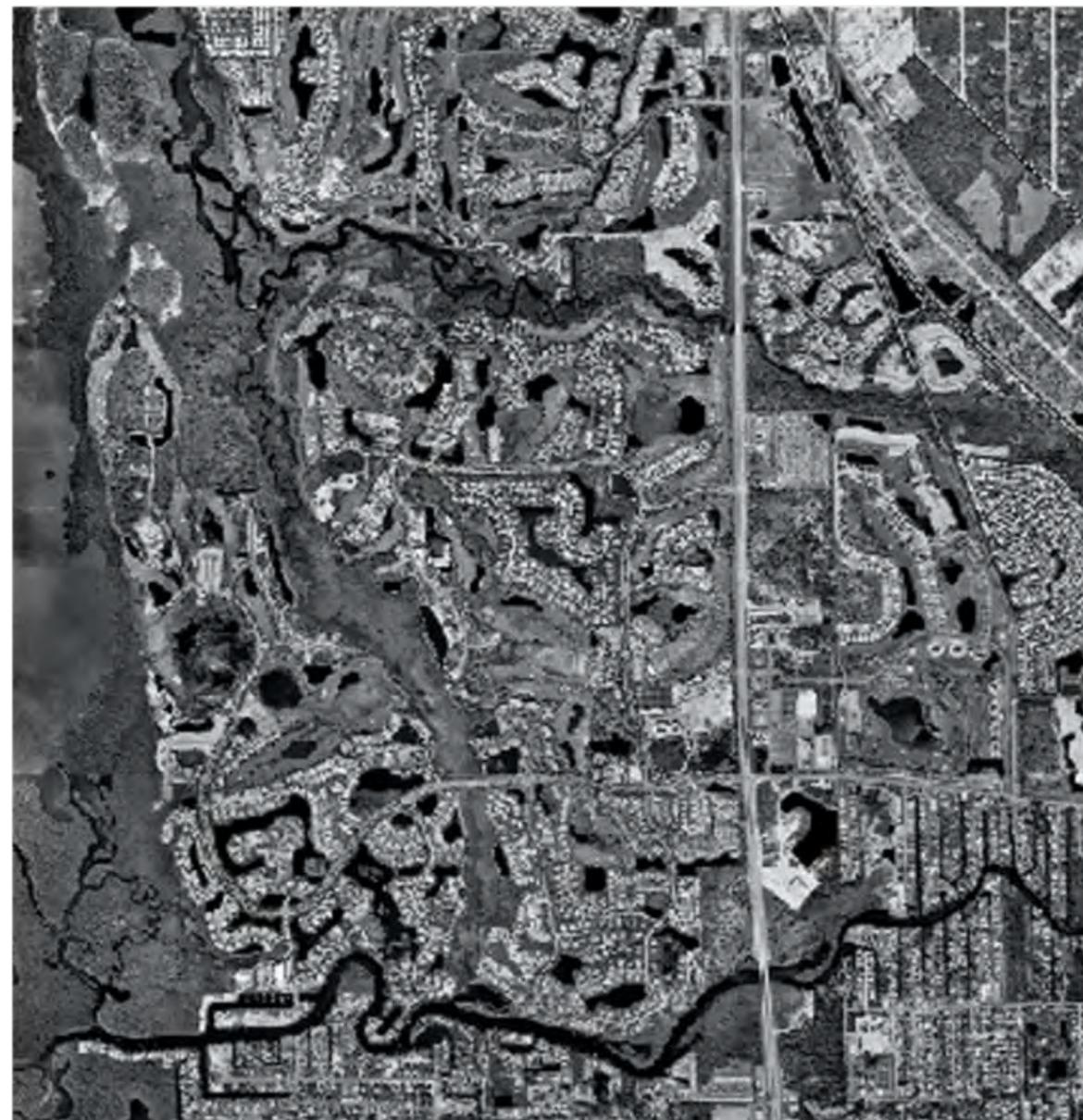
2020



Properties with Structures

1944

1998





Hertz deems competing bid for reorganization plan 'superior'

LOCAL 3A

SERVING CAPE CORAL, NORTH FORT MYERS, FORT MYERS, LEHIGH, ESTERO AND BONITA



THE NEWS-PRESS

FRIDAY, MAY 7, 2021 / NEWS-PRESS.COM

PART OF THE USA TODAY NETWORK

2020 CENSUS

Report: SWFL growing fast



In the Know

Ed Hernandez
Naples Daily News
USA TODAY NETWORK - FLORIDA

Earlier this week, we reported that Southwest Florida led the state with its migration during the pandemic.

Now, new U.S. Census data shows that two of our metro areas are among the nine fastest growing in the nation, at least partly fueled by the surge of residents moving from larger cities during the coronavirus crisis.

Lee County slotted fifth by swelling 2.5% in 2020 from 2019, and Sarasota placed ninth with 2%, according to a New York Times analysis.

The Austin, Texas, area's 3% led the nation, followed by Boise City, Idaho

(2.7%) and Polk County (2.7%), the only other Florida spot in the Top 10, among metro areas with at least 500,000 people in 2019.

Collier County, which based on this week's fresh census state now has 392,973 inhabitants, falls short of that minimum threshold. However, its 1.7% growth compares to the Charleston, South Carolina, area that landed 10th on the list with the same percentage. Working off a smaller base, Charlotte County had about a 2.7% pop.

Lee topped Southwest Florida with an increase of 18,409 for a total of 790,767. Here's information for the region, which with its 49,700 addition — larger than two cities of Naples — was responsible for about 21% of the state's overall jump in population, based on 10

See CENSUS, Page 6A



Residents leaving New Jersey, New York and other states have helped drive the growth in Southwest Florida and the rest of the state's peninsula during the pandemic. In the Know previously reported 19,000 moved from Manhattan to the Sunshine State in that time. GREG LOVETT/THE PALM BEACH POST

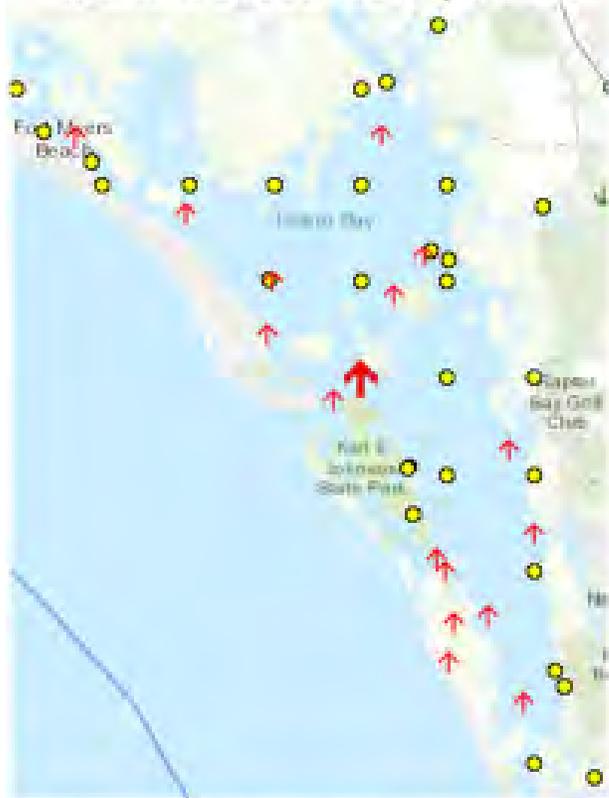
Outcomes of Growth, Landscape Change and Wetlands Loss



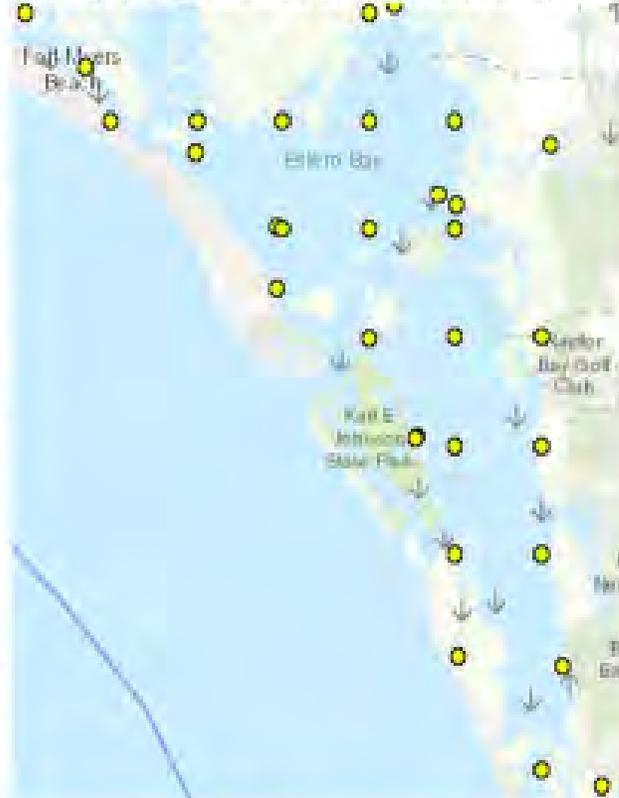
Changes to Estero Bay from 2010-2019

signal that the Bay is in trouble

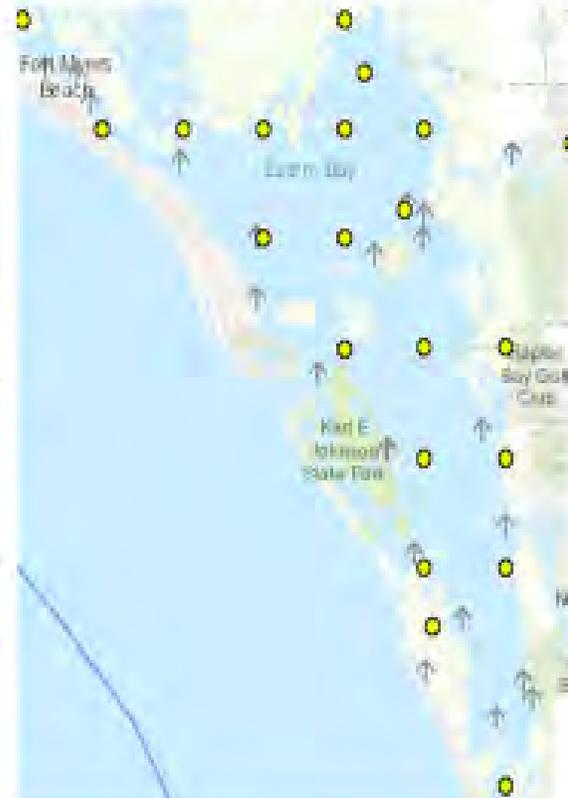
Nutrients (Total Nitrogen)
has Increased nearly 250%



pH has Decreased
(it's getting more acidic)



Average Temperature has
Increased 5 degrees F



Dissolved Oxygen has
decreased



- ↑ Increasing Trend, Larger Rate **Improving**
- ↑ Increasing Trend, Smaller Rate **Improving**
- No Trend
- ↓ Decreasing Trend, Smaller Rate **Declining**
- ↓ Decreasing Trend, Larger Rate **Declining**

Source: <https://chnep.wateratlas.usf.edu/water-quality-trends/>
Certified governmental sampling and testing

Problems With Nutrient Pollution

- **More severe and frequent algal blooms that create health risk**
- **Ecosystem changes that favor algae vs. seagrass**
- **Changes to the fishery**
- **Economic impacts to tourism and property values**

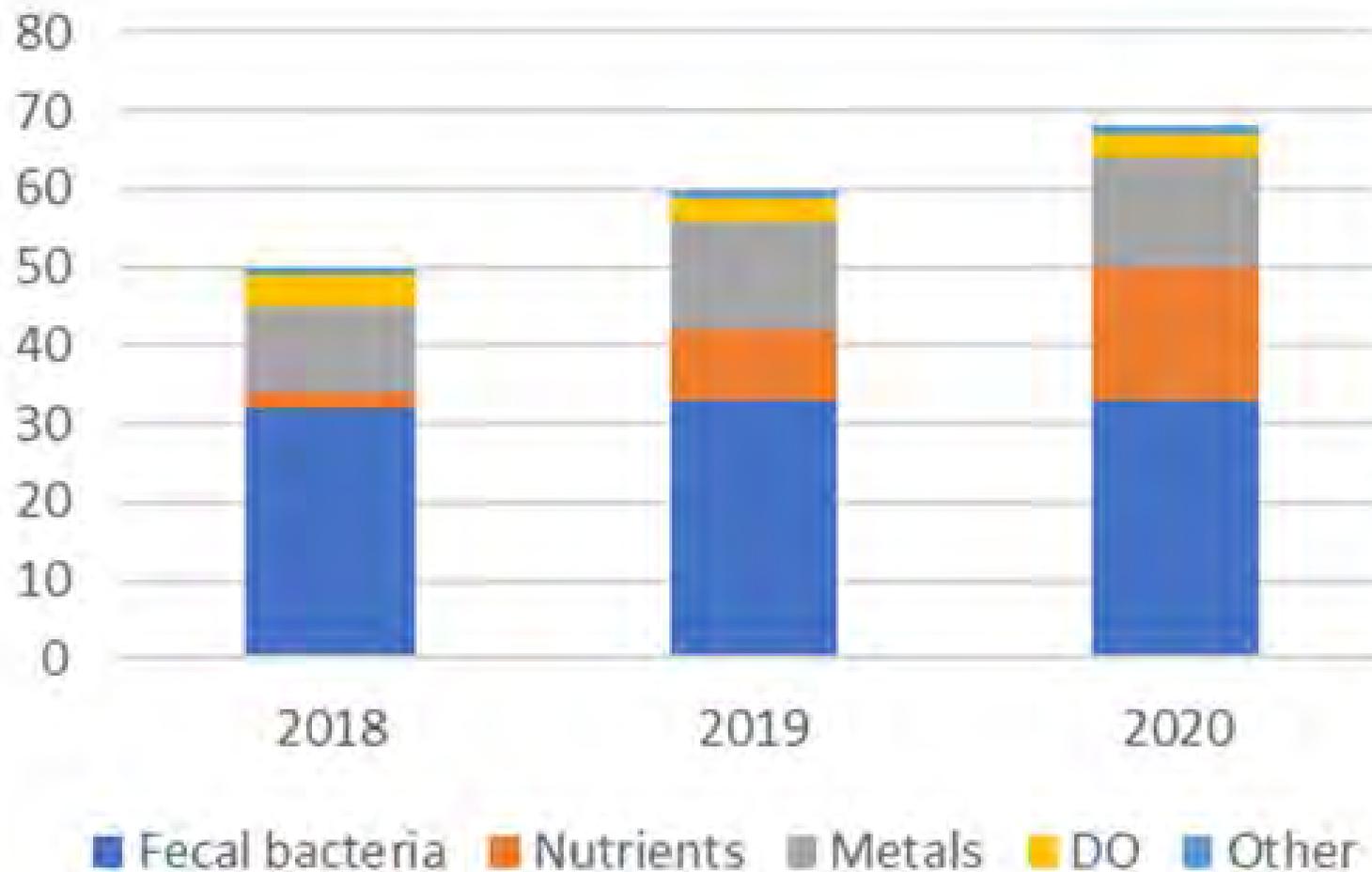


How is it Happening?

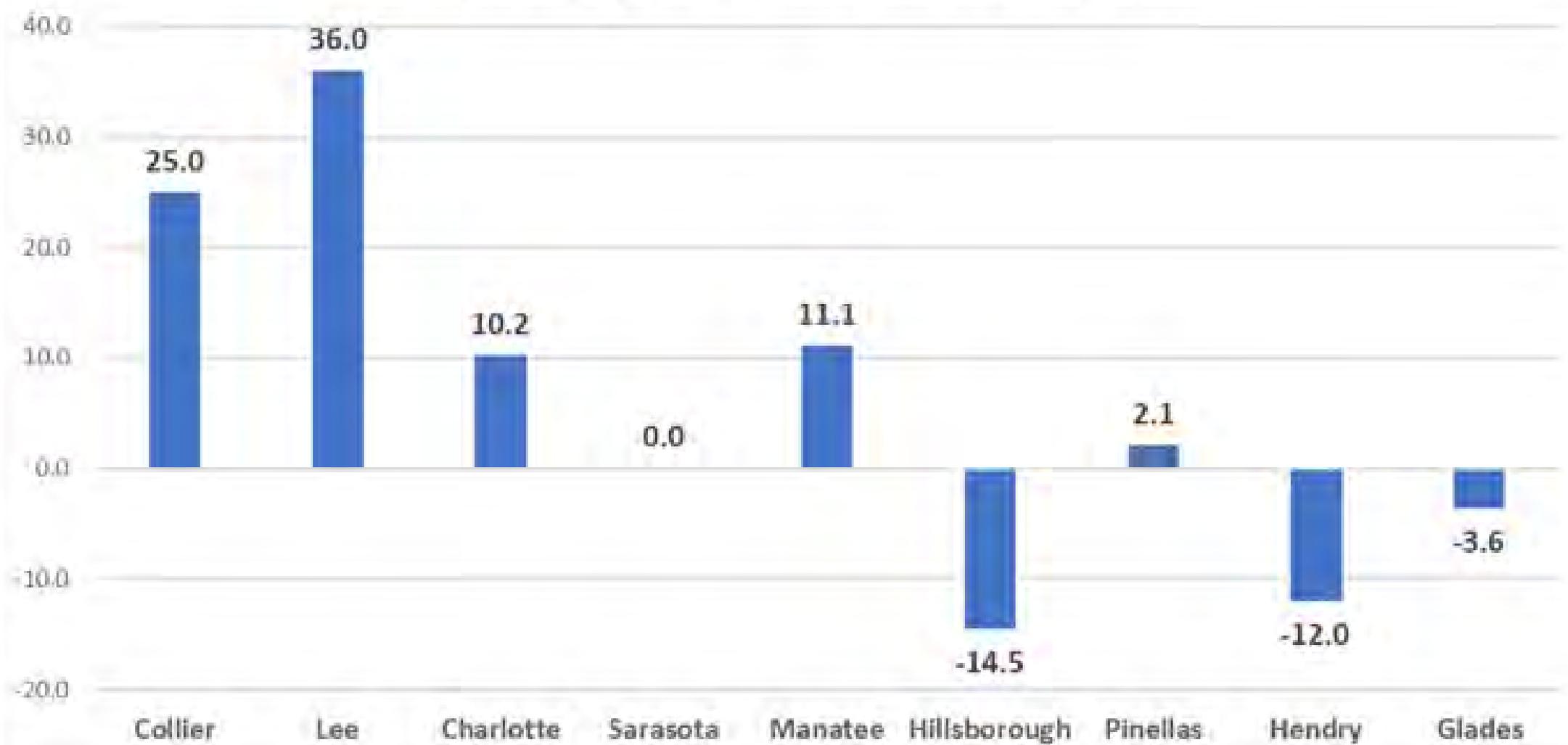
- **The sources of nutrient pollution include:**
 - agricultural runoff manure from cattle
 - septic tanks
 - treated sewage used for watering lawns
 - sewage sludge spread on fields
 - residential & urban runoff
 - local wastewater & stormwater runoff



Lee County, FDEP Parameters Verified Impaired



Percent Change in Total Impairments 2018-2020



Outstanding Florida Waters Impaired for Nutrient or Fecal Pollution

- **Upper and Lower Pine Island Sound**
- **Matlacha Pass Aquatic Preserve**
- **Estero Bay Aquatic Preserve**
- **Tributaries to Estero Bay Widely Impaired**

Nutrient Pollution Changes Ecosystem Community Structure

- **Shifts from seagrass to macroalage**
- **Diminishes important habitat for the fishery
and throughout the foodchain**

Rate of Primary Productivity: Seagrasses vs. Macroalgae



Thalassia testudinum: leaf productivity
~ 3.4 grams dry wt/m²/day
~ 1.1 gC/m²/day



Gracilaria tikvahiae productivity
~ 36 grams dry wt/m²/day
~ 9 gC/m²/day

Eutrophication: an increase in the rate of supply of organic matter to an ecosystem (Nixon, 1995)

Estero Bay Seagrass is Disappearing

Manatees dying in droves as poor water quality, sea grass losses lead to starvation

Chad Gillis Fort Myers News-Press

Published 9:00 a.m. ET Feb. 25, 2021 | Updated 9:19 p.m. ET Feb. 25, 2021



- Seagrass in levels in Estero Bay are low and getting worse
- Decline is most likely due to nutrient pollution from stormwater runoff

- Benefits of Seagrass:

- Stabilizing the sea bottom
- Providing food and habitat for other marine organisms
- Maintaining water quality by filtering water
- Create buffers for wave action and weather events
- Supporting local economies (Economic value of over \$12K/acre/yr)
- Accounts for 10% of the ocean's capacity to store carbon

- The decline from 2006-2016 had a loss rate of ~2.4% cover per year (22% over 10 years)
- 1950s = 36% coverage
- Today = less than 4% coverage

- Characteristics of Seagrass:

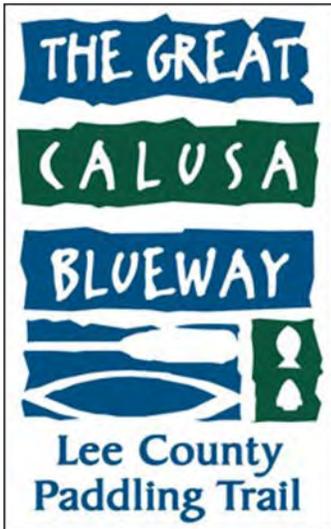
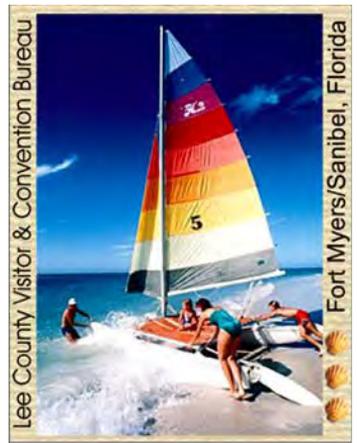
- Highly dependent on light reaching the bottom (high turbidity is negative impact)
- Highly dependent on water temperature (higher temp is a negative impact)
- Negatively impacted by boat traffic and possibly high copper levels

More than 70 percent of Florida's recreationally and commercially important fishes, crustaceans, and shellfish are estuarine dependent.



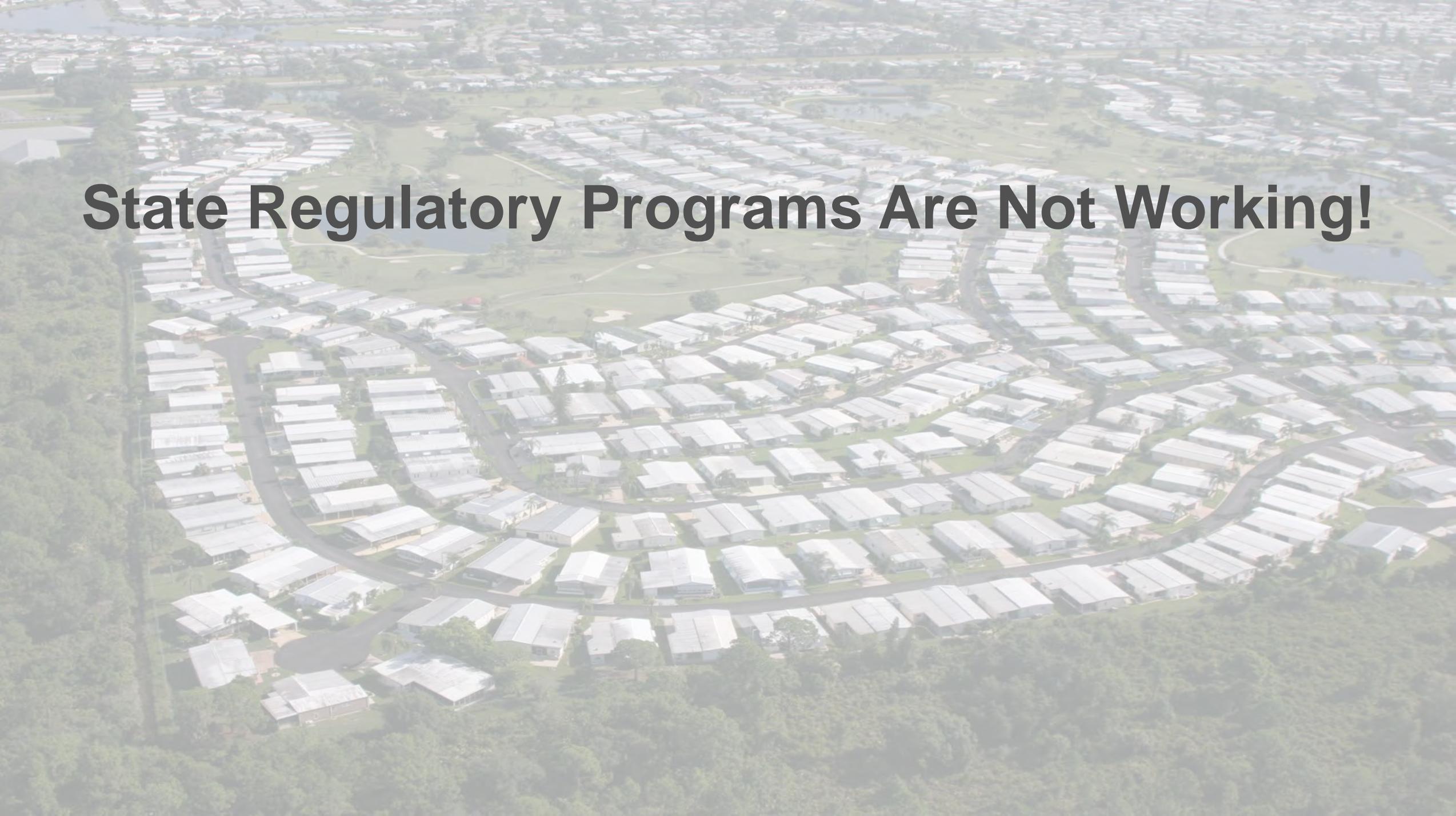


Yacht Basin



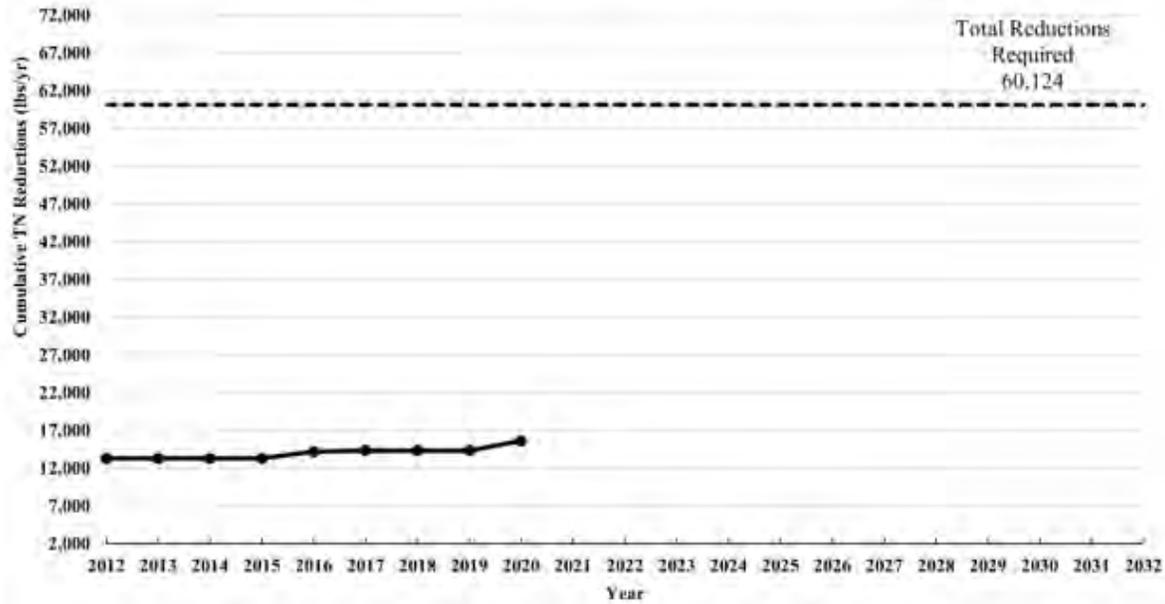
- Tourism \$3.2 billion
- Commercial Fish and Shellfish harvest
- Sportfishing



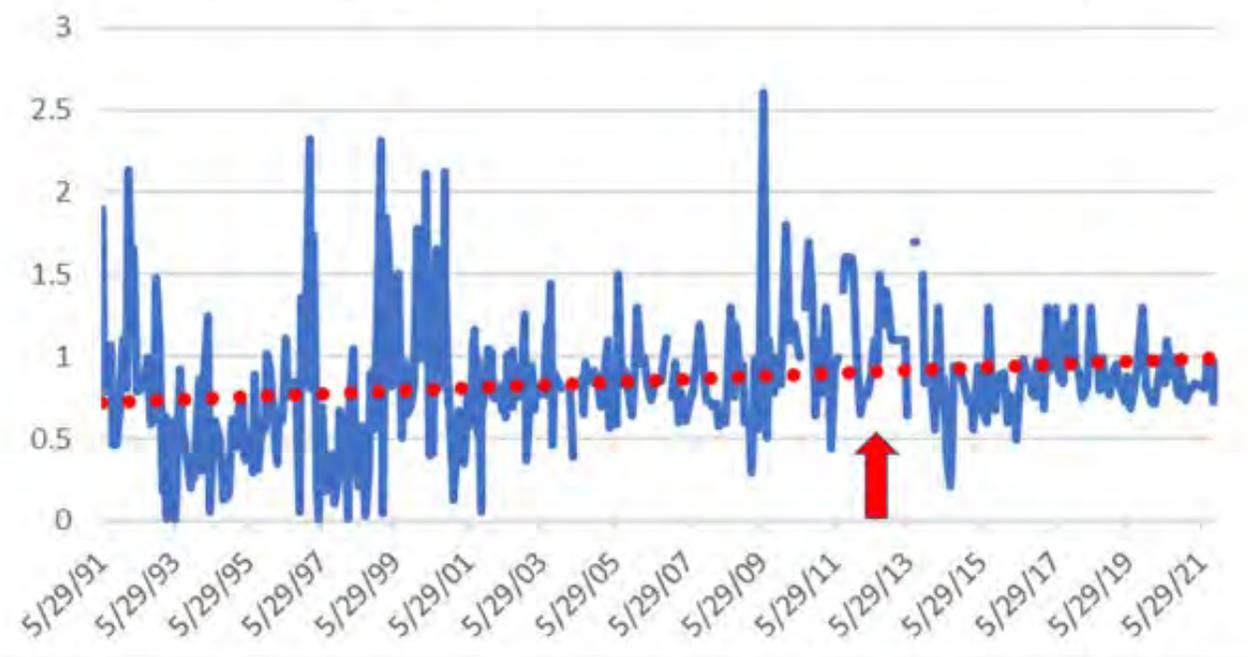
An aerial photograph of a large mobile home park. The park is densely packed with numerous mobile homes, each with a light-colored roof. The units are arranged in a somewhat grid-like pattern, with winding roads and small green spaces between them. The park is surrounded by lush green trees and vegetation. In the background, there are some larger buildings and what appears to be a golf course or a large open field. The overall scene is a typical mobile home community.

State Regulatory Programs Are Not Working!

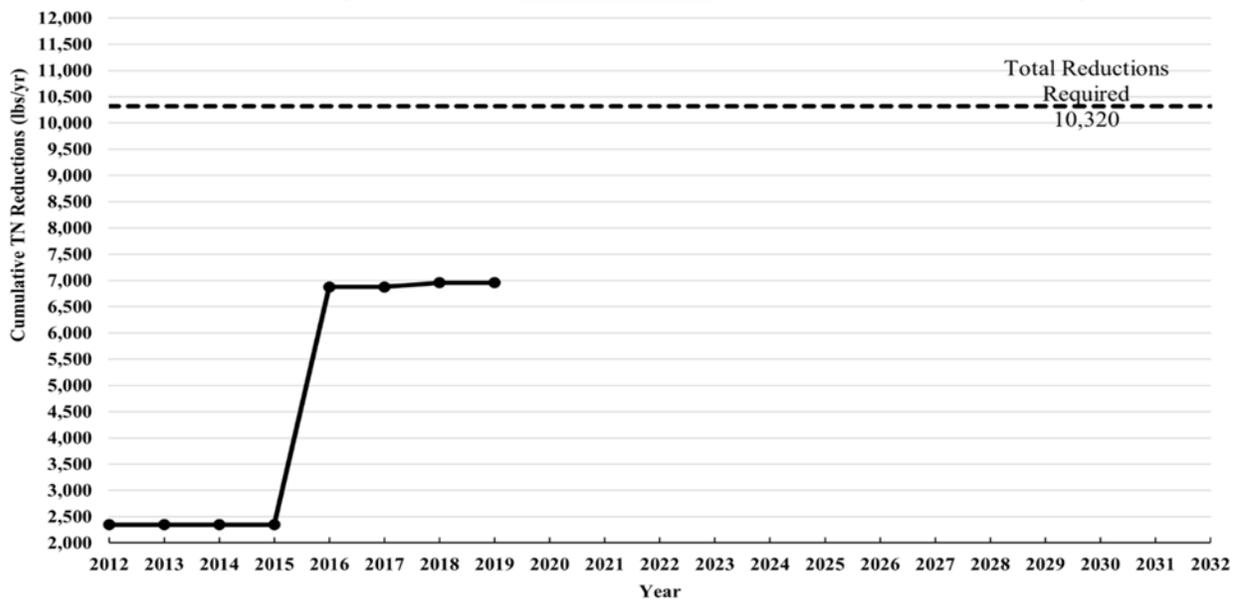
Everglades West Coast BMAP Imperial River TN Reductions - cumulative lbs/yr



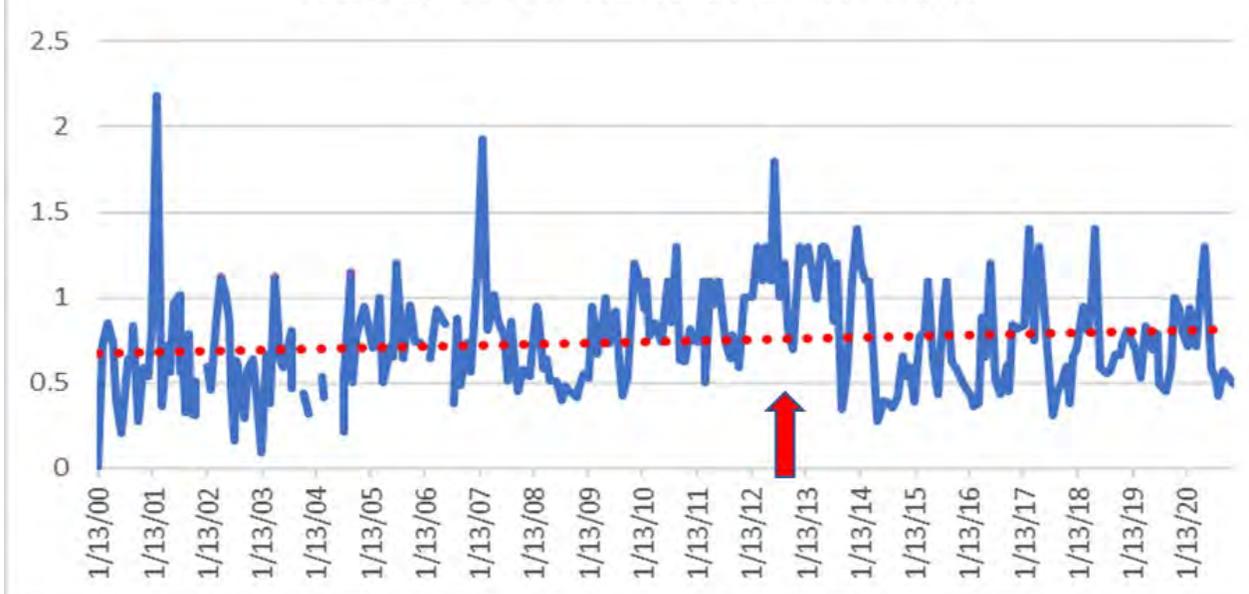
Total Nitrogen mg/l at Imperial R. Boat Ramp



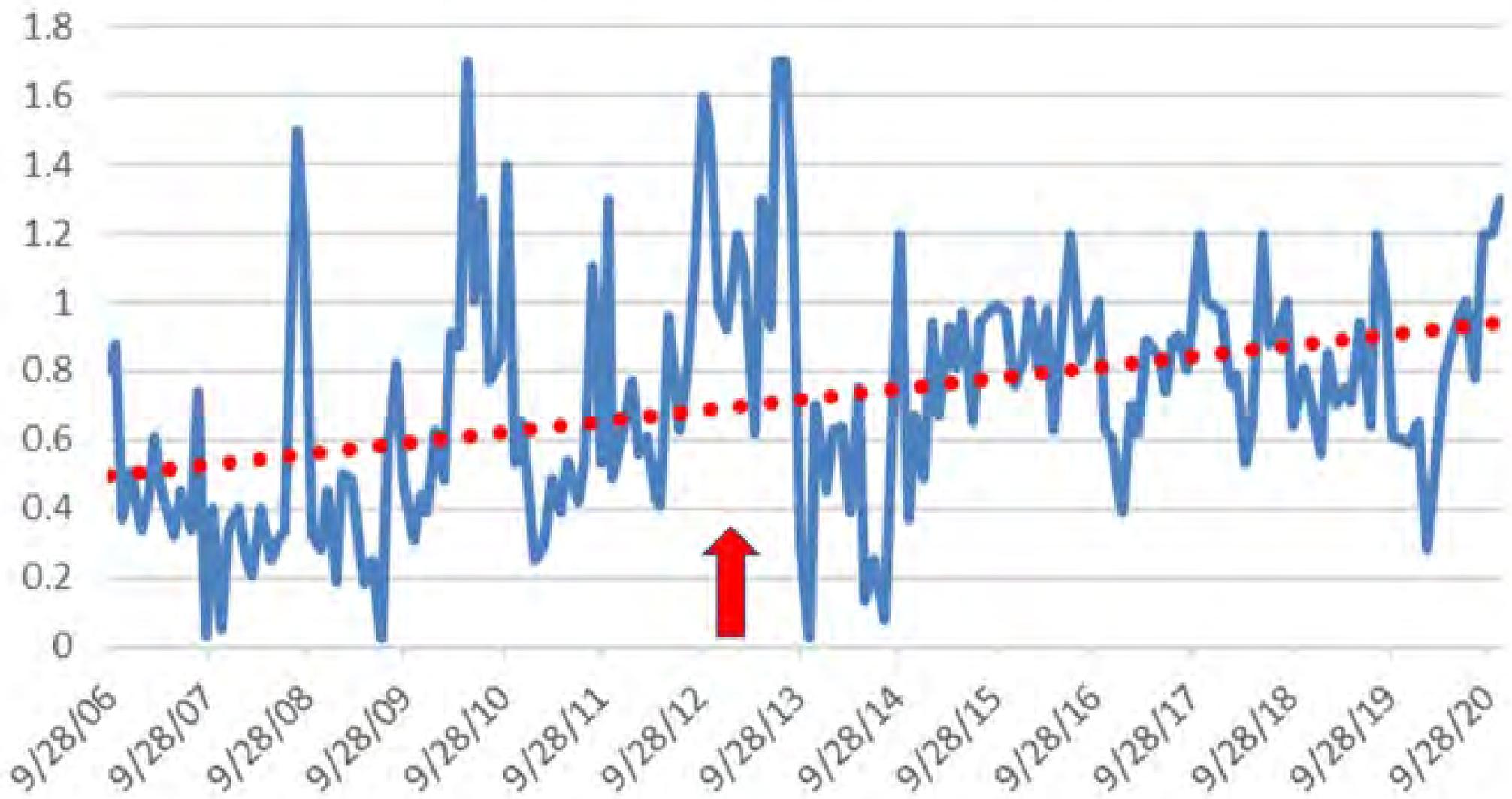
Hendry Creek – cumulative TN reduced lbs/yr



Hendry Creek HENDGR20 TN mg/l



CES10 SUR Caloosahatchee TN mg/l





Broadcast EARTH DAY on

WGCU



HENDRY CREEK • MULLOCK CREEK • MUD CREEK • ESTERO RIVER



Eternal Vigilance

FIGHTING TO RESTORE THE ESTERO BAY TRIBUTARIES

HALFWAY CREEK • SPRING CREEK • LEITNER CREEK • OAK CREEK • IMPERIAL RIVER

ETERNAL VIGILANCE - FIGHTING TO RESTORE THE ESTERO BAY TRIBUTARIES

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What Can Your Community Do?

CREATE A DEMONSTRATION PROJECT NUTRIENT REMOVAL FROM RESIDENTIAL STORMWATER TREATMENT SYSTEMS

for potentially broader application in the Estero Bay Watershed

- Manage nutrient runoff that has caused the impairment of Estero Bay & its tributaries
- Many residential communities in Estero Bay's watershed adding to the higher nutrient loads
 - Promotes harmful algal blooms, declines in seagrass coverage, & impacts property values
- Stormwater systems in the Estero Bay watershed permitted a decade ago & often exceeds state water quality standards
- Must reduce impacts from residential stormwater treatment systems

What Can Your Community Do?

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Priorities for the demonstration project include:

- No detracting from a community's natural aesthetics
- Minimizes annual operations & maintenance
- Nutrient reductions are measurable for defining success & meeting eventual regulatory compliance
- Project has the potential for external funding
- Project is overall cost-effective





What Can Your Community Do?

Several alternatives for nutrient removal from residential stormwater systems:

1. Alum treatment (coagulation of nutrients in offline lagoons or within storage reservoir)
 2. Sand filtration
 3. Constructed treatment wetlands or hybrid wetland treatment
 4. Aeration (air diffuser systems)
 5. Bio-reactor (wood chip) technology
- Other smaller-scale measures available



Recent Local Success Story



1/18/2021

- Iowa State University has developed a “Bioreactor” solution that removes nutrients (Nitrogen) from water
- It uses wood chips in “cells” to hold beneficial bacteria that convert nitrate in water to nitrogen gas
- The first application of this Bioreactor technology in South Florida was constructed by the City of Bonita Springs in 2017
- One acre of Bioreactor equals 221 acres of wetlands in terms of nutrient reduction
- The average Cost per Pound of Nitrogen Removal for 40 other FDEP Projects = \$638/lbs
- The estimated Total Cost per Pound of Nitrogen Removal for Bonita Springs Bioreactor Phase I & II = \$84/lbs
- The Florida League of Cities recently named the City of Bonita Springs as the 2020 Environmental Stewardship Award winner for its Bioreactor. Phase II of the project is about to get underway.
- Phase II could remove up to 1,100 pounds of nitrates from the Imperial River per year

Your Role in the Process

- Share what you've learned with association (HOA) leadership
- Advocate for your community to take action to become a leader in cleaning our public waters
- Invite the Calusa WaterKeeper to present the truth about the pollution of our waters
- Speak at the Village of Estero Council Meetings advocating action
- Speak to Lee County Officials to encourage action



Community Partnerships Can Make A Difference



