

COORDINATED MONITORING OF THE PINEY POINT WASTEWATER DISCHARGE INTO TAMPA BAY

DATA SYNTHESIS AND REPORTING



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Florida Water Stewardship Program
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TAMPA BAY

TAMPA BAY WATERSHED

SIZE:

TAMPA BAY PROPER: 400 SQUARE MILES

TAMPA BAY WATERSHED: 2,200 SQUARE MILES

AVERAGE DEPTH: 11 FEET

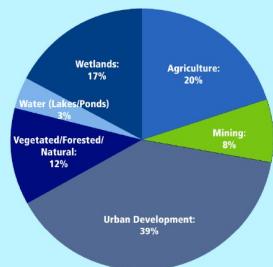
MAXIMUM DEPTH: 43 FEET (MAIN SHIPPING CHANNEL)

SALINITY RANGE: >20–35 PARTS PER THOUSAND IN BAY PROPER;
<1–25 PARTS PER THOUSAND IN TIDAL TRIBUTARIES

POPULATION IN WATERSHED: 2.7 MILLION (2010 CENSUS)

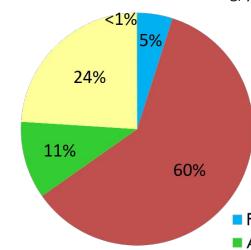
MAJOR TRIBUTARIES: HILLSBOROUGH, ALAFIA, LITTLE MANATEE AND MANATEE RIVERS

Land Use in the Watershed

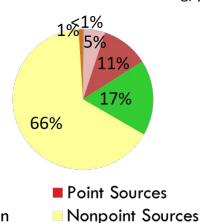


Nitrogen reductions

1970s: TN Load $\sim 9 \times 10^6$ kg/yr

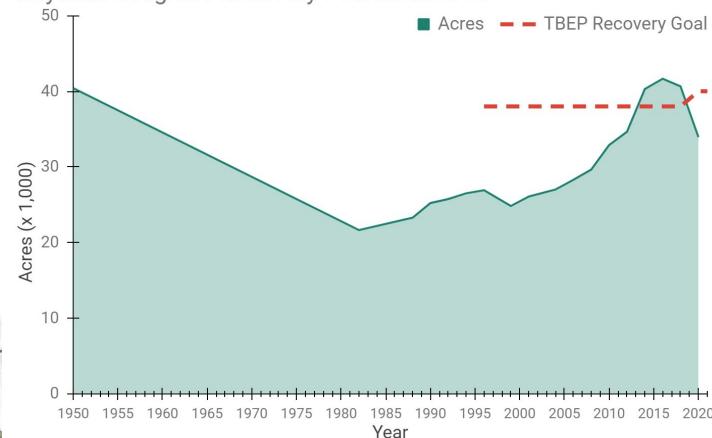


2010s: TN Load $\sim 3.4 \times 10^6$ kg/yr



Seagrass recovery

Baywide Seagrass Recovery Peaked in 2016



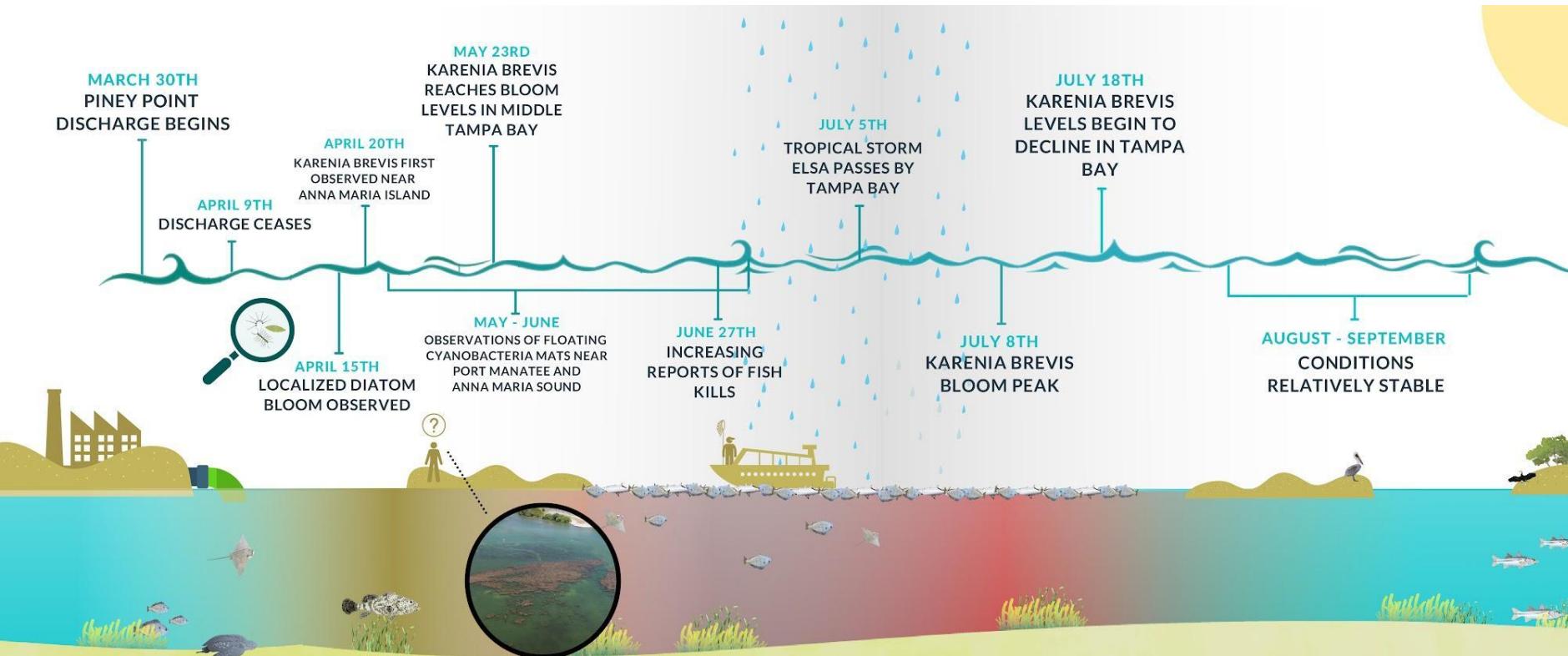
PINEY POINT

- Legacy phosphate mining facility, inactive since the 1990s
- Storage of mining wastewater and other dredged materials in “gypstacks”
- History of discharge events surrounding closure of the facility
- 2021 Event = 205 Tons TN



Tiffany Tompkins/The Bradenton Herald via AP

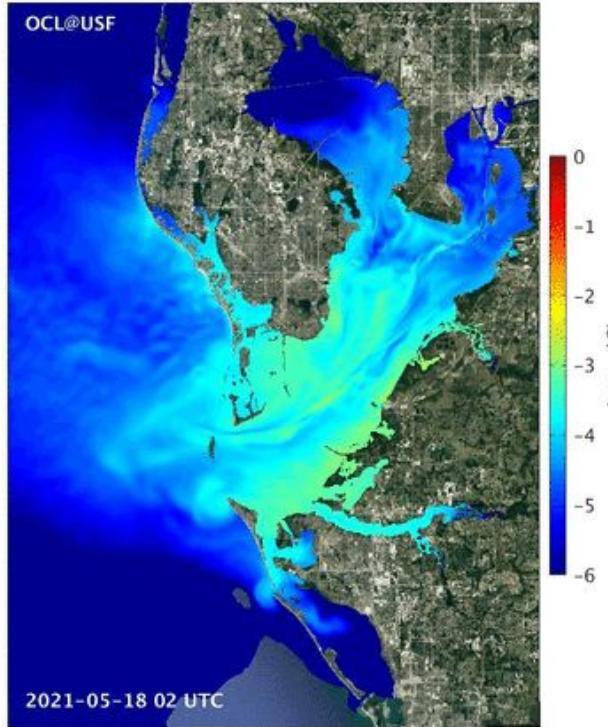




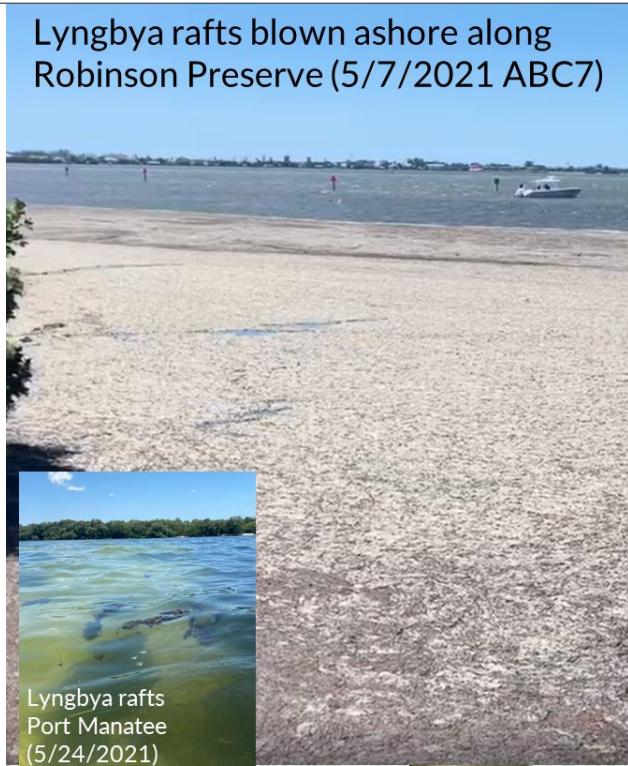
Diatom Illustration Attributions: Tracey Saxby, Integration and Application Network (ian.umces.edu/media-library)

Algal & Macroalgal (Seaweed) Blooms

Trichodesmium ashore on Indian Rocks Beach (5/12/2021)



Lyngbya rafts blown ashore along Robinson Preserve (5/7/2021 ABC7)



Lyngbya rafts
Port Manatee
(5/24/2021)

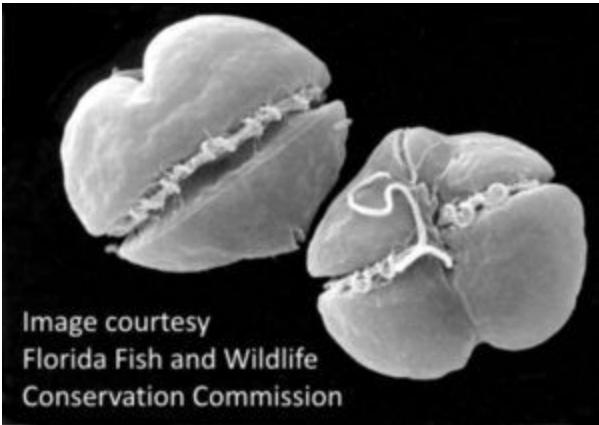


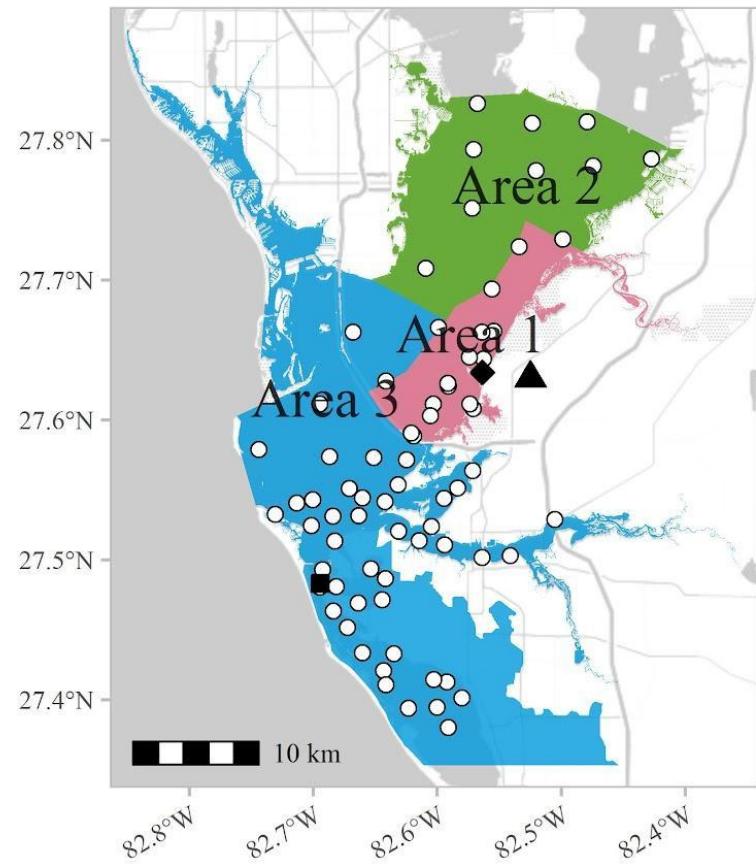
Image courtesy
Florida Fish and Wildlife
Conservation Commission



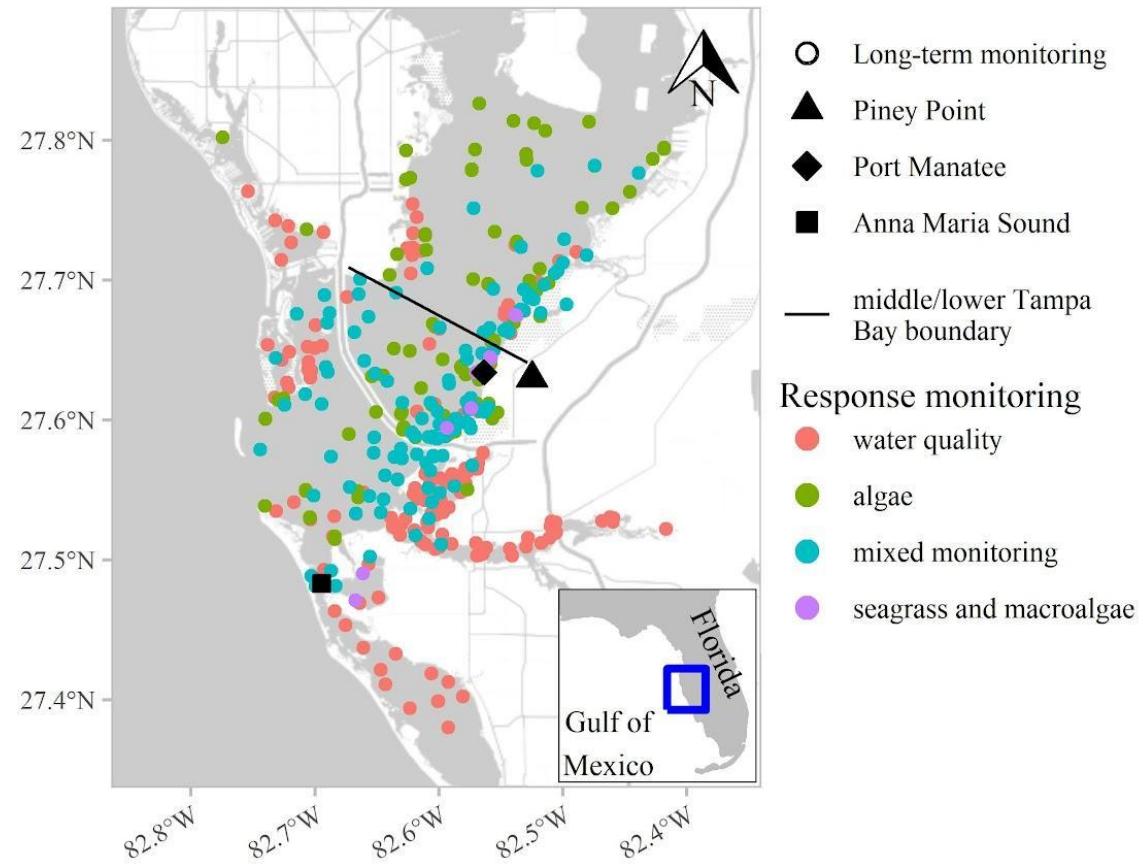
Red Tide (*Karenia brevis*)

COORDINATED MONITORING

(a) Areas of interest



(b) Sample locations



○ Long-term monitoring

▲ Piney Point

◆ Port Manatee

■ Anna Maria Sound

— middle/lower Tampa Bay boundary

Response monitoring

● water quality

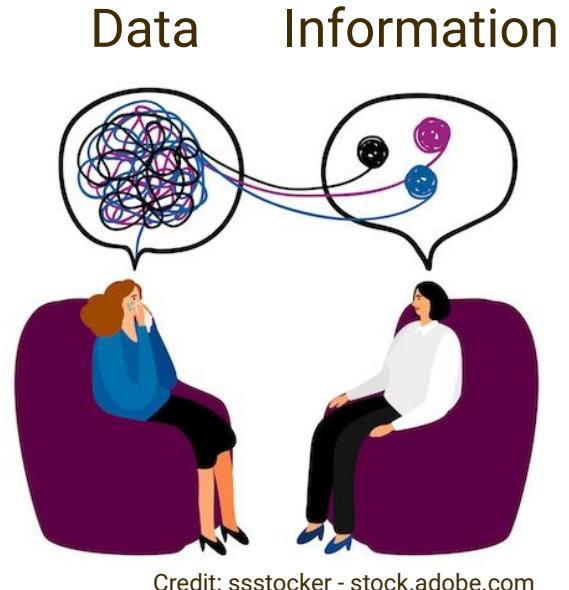
● algae

● mixed monitoring

● seagrass and macroalgae

|DATA NEEDS

- Can we **organize** data from dozens of partners, locations, types in a timely manner?
- How do we **contextualize** this data as information?
- What venue can we use to rapidly **communicate** environmental impacts?



Credit: ssstocker - stock.adobe.com





PROBLEM 1: DATA MANAGEMENT

|SOLUTION 1: OPEN SOURCE AND TIDY DATA

File drops

- └ CONTAMINANTS
- └ WQ_MONITORING_DATA
- └ PHYTOPLANKTON
- └ SATELLITE_CHLA_ESTIMATES
- └ SEAGRASS_MACROALGAE_RAPID_SURVEYS
- └ WQ_MONITORING_LOCATIONS
- └ BENTHIC_RANDOM_SAMPLE_POINTS



Data synthesis



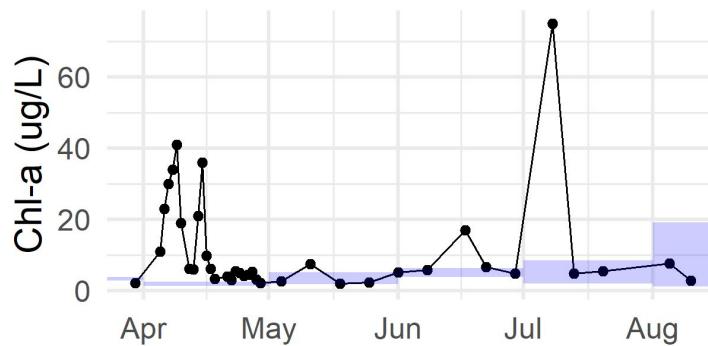
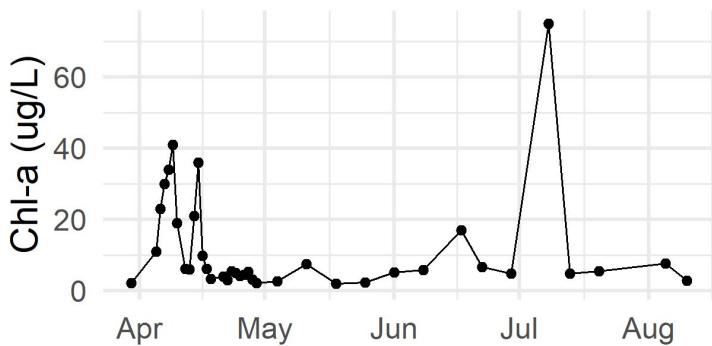
Testing and sharing



App deployment

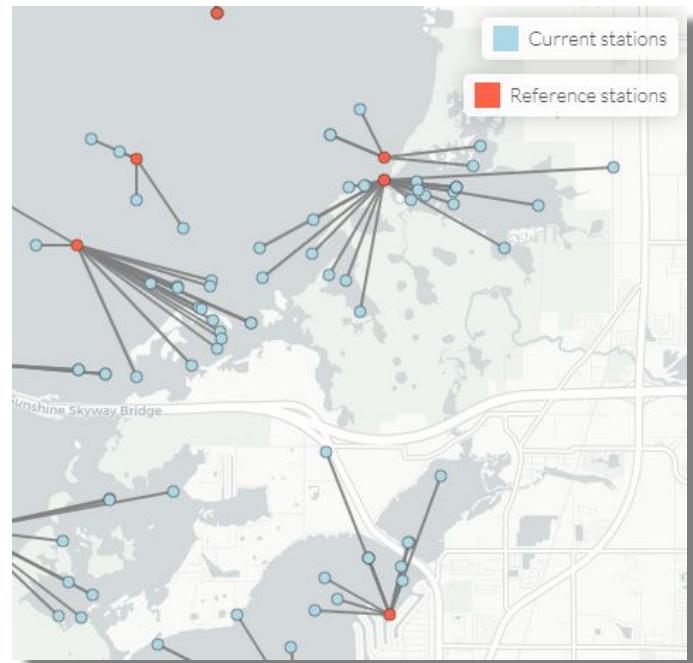


PROBLEM 2: CONTEXT



|SOLUTION 2: LONG-TERM MONITORING

- Nearly 50 years of long-term monitoring data
- Find nearest reference station
- Calculate mean $+/- 1$ SD
- Compare current to reference

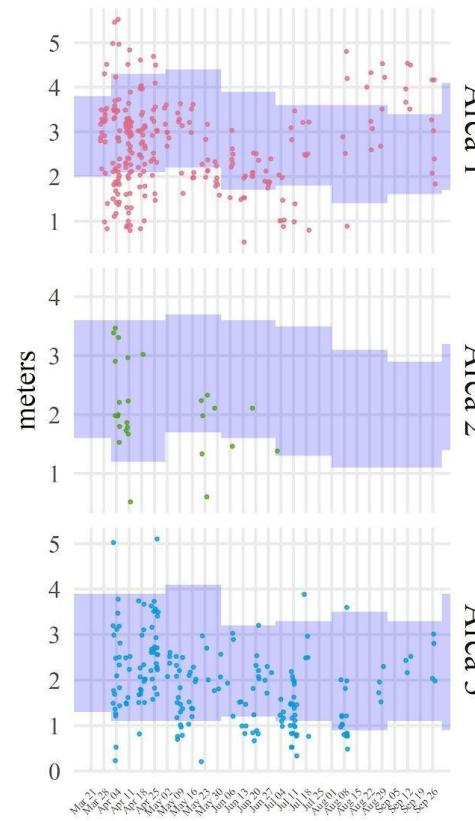
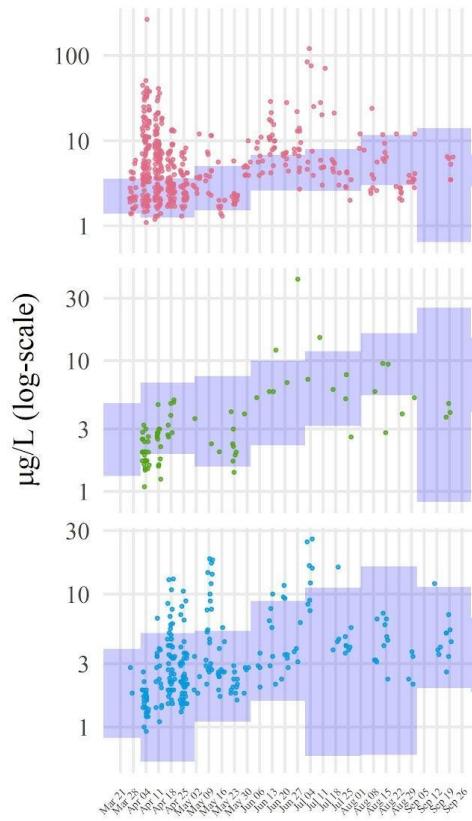
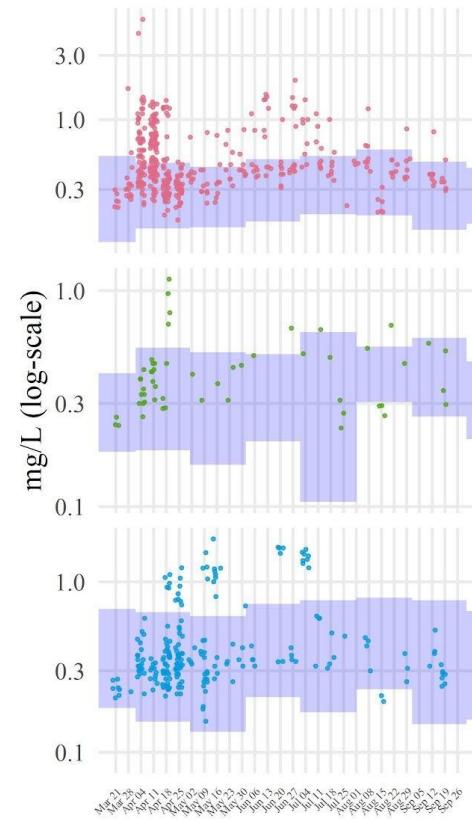


(a) Total Nitrogen

(b) Chlorophyll-a

(c) Secchi

Monthly baseline (mean +/- 1 sd)



Week of

Area 1

Area 2

Area 3

PROBLEM 3: COMMUNICATION



|SOLUTION 3: shiny.tbep.org/piney-point

 PINEY POINT ENVIRONMENTAL MONITORING DASHBOARD

OVERVIEW CURRENT DATA ▾ BASELINE DATA ▾

Source Code

DASHBOARD INFORMATION

Piney Point ENVIRONMENTAL MONITORING DASHBOARD



JUMP TO LATEST DATA, last water quality update 2021-09-20 08:26:28 Eastern

From March 30th to April 9th, approximately 215 million gallons of wastewater from Piney Point were released into Tampa Bay. The Tampa Bay Estuary Program is working with regional partners to coordinate and synthesize water quality, benthic, seagrass, and fisheries monitoring data. We are also consulting with USF to model forecasted plume trajectory from the Piney Point discharge.

The primary pollutants of concern for this discharge are phosphorus and nitrogen (primarily ammonia nitrogen), which may stimulate an algae response and cause adverse effects on seagrass, fish, and other wildlife.

The dashboard is a synthesis of data that can be used to assess baseline conditions prior to discharge and to evaluate changing water quality conditions as new data become available. All data are provisional and subject to revision. The dashboard is arranged as follows:

1. CURRENT DATA: Current water quality, algal surveys, seagrass/macroalgae, and contaminant results are presented. Sediment (biology and chemistry) samples have also been collected, but the data are being processed.
2. BASELINE DATA: Long-term water quality and seagrass data over a 25 year period.

Additional resources

- Florida DEP Piney Point regional notification: [link](#)
- USF Piney Point circulation modeling: [link](#)

12 Agencies reporting

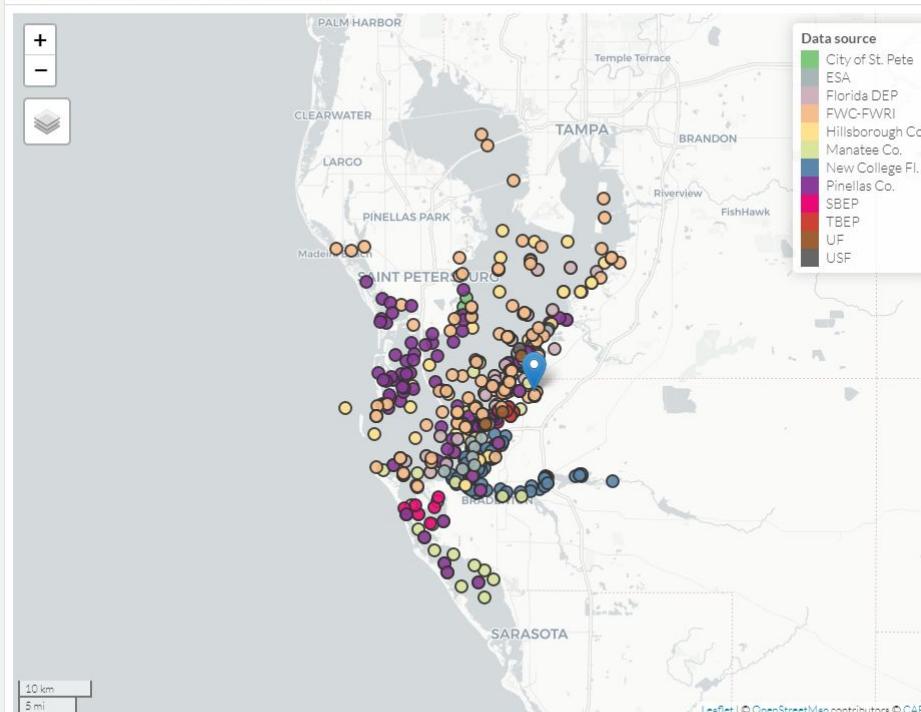
17 Parameters monitored

73 Days with samples

488 Sites with data

10178 Measurements available

LOCATIONS WITH DATA - PINEY POINT AT MARKER

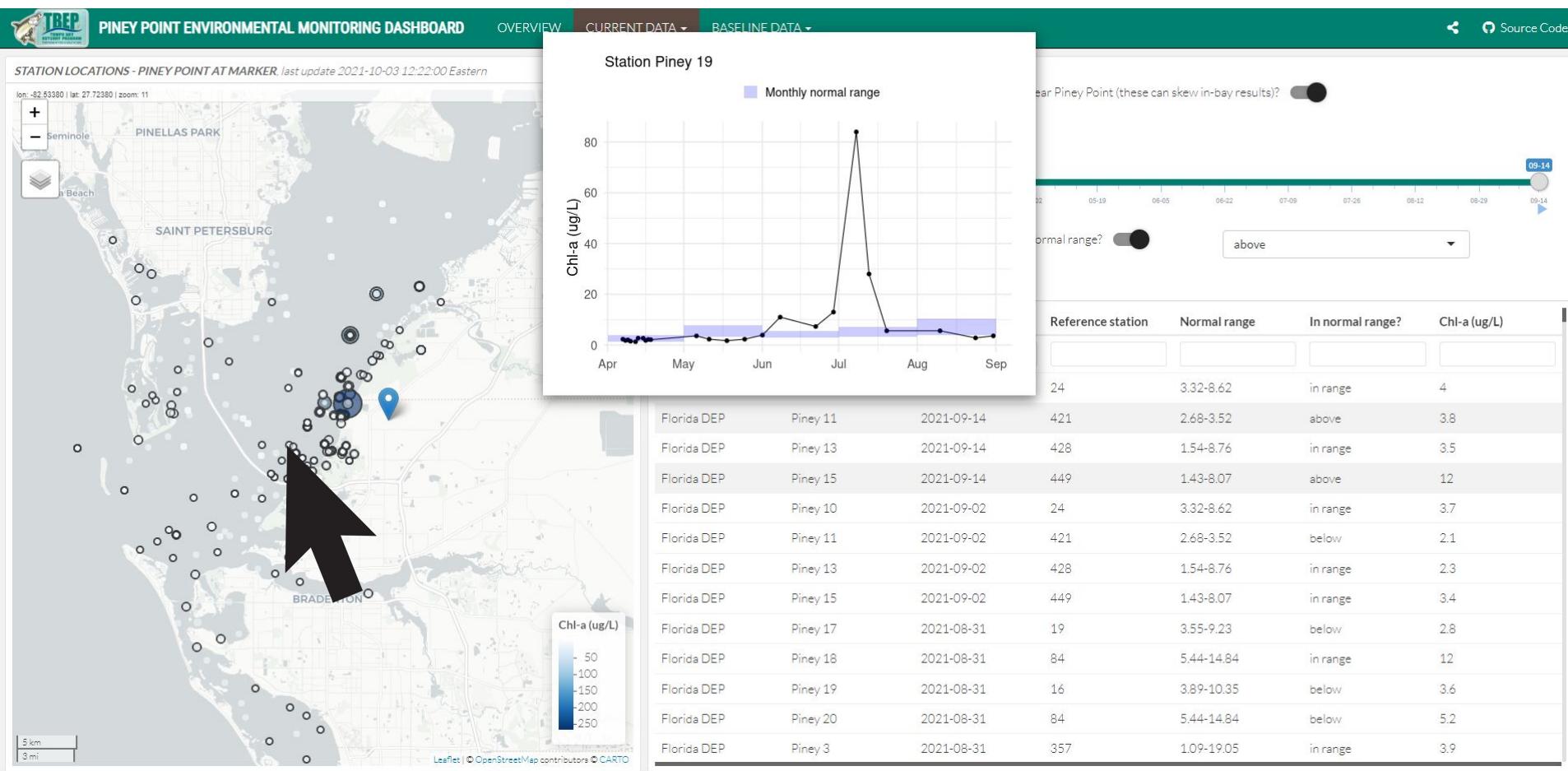


Data source

- City of St. Pete
- ESA
- Florida DEP
- FWC-FWRI
- Hillsborough Co.
- Manatee Co.
- New College Fl.
- Pinellas Co.
- SEEP
- TBEP
- UF
- USF

Leaflet | OpenStreetMap contributors | CARTO

SOLUTION 3: shiny.tbep.org/piney-point



Monthly Monitoring Briefs + Social Media

Piney Point Monitoring Summary April 24, 2023

Background
On March 2016, 2016, EPA (Region 4) issued a permit to the Tampa Bay Estuary Program (TBEP) authorizing the discharge of treated effluent from the new gas plant waste water (NGWW) treatment facility at the Piney Point facility into Tampa Bay. The permit required TBEP to monitor the water quality of Tampa Bay near the discharge location during the first year of operation. Approximately 400,000 gallons of treated effluent were to be discharged daily into Tampa Bay. The permit was to be valid for 10 years, with a 10-year extension. On December 1, 2022, the 10-year extension of the permit was granted, allowing the effluent discharge to continue through 2036.

Initial Response
TBEP initiated environmental monitoring activities immediately following the permit issuance, and over the course of the discharge to Tampa Bay, TBEP has conducted extensive state, federal, academic, and private monitoring programs to evaluate the environmental monitoring needs since the emergency discharge began. This included monitoring for potential impacts to Tampa Bay and the surrounding waters of the estuary, and the impact of the discharge on Tampa Bay.

Future Efforts
TBEP will continue to monitor discharges to Tampa Bay and will review the future needs of the discharge location to determine the most effective monitoring strategy. The treated effluent from the new gas plant facility is currently being used to dilute the treated effluent from the old gas plant facility. Monitoring locations are targeted to be located near the discharge location, and the impact of the discharge on Tampa Bay will be evaluated.

Additional References
[Tampa Bay Estuary Program Environmental Monitoring Plan](#)
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Figure 1 Coverage of water quality samples in Tampa Bay on April 24, 2023.

Piney Point Monitoring Results End of April 2023

Background
A. **Background:** The environmental effects of the Piney Point effluent discharge to Tampa Bay have been monitored by TBEP and partners since the end of April 2016. Enhanced water quality monitoring results show no significant adverse effects on Tampa Bay water chemistry, benthic community health, or aquatic life. However, additional monitoring is needed to fully understand the long-term effects of the discharge. B. **Monitoring:** The Piney Point facility has been monitoring water quality since the end of April 2016. The facility has installed continuous monitoring equipment to monitor water quality parameters such as pH, temperature, dissolved oxygen, and conductivity. C. **Monitoring:** The Piney Point facility has been monitoring water quality since the end of April 2016. The facility has installed continuous monitoring equipment to monitor water quality parameters such as pH, temperature, dissolved oxygen, and conductivity.

Key Observations
From April 20–26, 2023, near Piney Point, water quality monitoring results show no significant adverse effects on Tampa Bay water chemistry, benthic community health, or aquatic life. However, additional monitoring is needed to fully understand the long-term effects of the discharge. B. **Monitoring:** The Piney Point facility has been monitoring water quality since the end of April 2016. The facility has installed continuous monitoring equipment to monitor water quality parameters such as pH, temperature, dissolved oxygen, and conductivity.

Future Effects
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Key Observations
No significant adverse discharges from the Piney Point facility have been observed during the first year of operation. Enhanced water quality monitoring results show no significant adverse effects on Tampa Bay water chemistry, benthic community health, or aquatic life. However, additional monitoring is needed to fully understand the long-term effects of the discharge. C. **Monitoring:** The Piney Point facility has been monitoring water quality since the end of April 2016. The facility has installed continuous monitoring equipment to monitor water quality parameters such as pH, temperature, dissolved oxygen, and conductivity.

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RED TIDE AMA 34W

Red Tide AMA

"ASK MAYA ANYTHING"

LIVE Q&A ON OUR FB AND INSTAGRAM STORY

Maya Burke
ASSISTANT DIRECTOR
TAMPA BAY ESTUARY PROGRAM

THURSDAY, JULY 15TH @ 6:30 PM EST

Send Message

Like

Share



HOW TO USE THE
Piney Point Environmental Monitoring Dashboard

TBEP
TAMPA BAY ESTUARY PROGRAM
30th Anniversary

Piney Point Monitoring Results End of July 2023

Key Observations
In general, enhanced monitoring, continued sampling, and the addition of both new and existing monitoring locations have shown no significant adverse effects on Tampa Bay water chemistry, benthic community health, or aquatic life. However, additional monitoring is needed to fully understand the long-term effects of the discharge on Tampa Bay.

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Piney Point Monitoring Results End of July 2023

Key Observations
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Key Observations
From July 1–7, 2023, near Piney Point, water quality monitoring results show no significant adverse effects on Tampa Bay water chemistry, benthic community health, or aquatic life. However, additional monitoring is needed to fully understand the long-term effects of the discharge. B. **Monitoring:** The Piney Point facility has been monitoring water quality since the end of April 2016. The facility has installed continuous monitoring equipment to monitor water quality parameters such as pH, temperature, dissolved oxygen, and conductivity.

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Key Observations
Sustained organic matter concentrations during the month of July 2023 were higher than normal, which may indicate increased biological activity or increased organic matter inputs. Although no significant adverse effects on Tampa Bay water chemistry, benthic community health, or aquatic life have been observed, additional monitoring is needed to fully understand the long-term effects of the discharge. C. **Monitoring:** The Piney Point facility has been monitoring water quality since the end of April 2016. The facility has installed continuous monitoring equipment to monitor water quality parameters such as pH, temperature, dissolved oxygen, and conductivity.

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Piney Point

What Have Researchers Seen So Far?

| LESSONS LEARNED

- Response-based monitoring requires an ***open tools*** for rapid synthesis
- Make full use of ***historical data*** to inform context
- Use appropriate ***web-based platforms*** to share widely





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github.com/tbep-tech/piney-point



shiny.tbep.org/piney-point



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