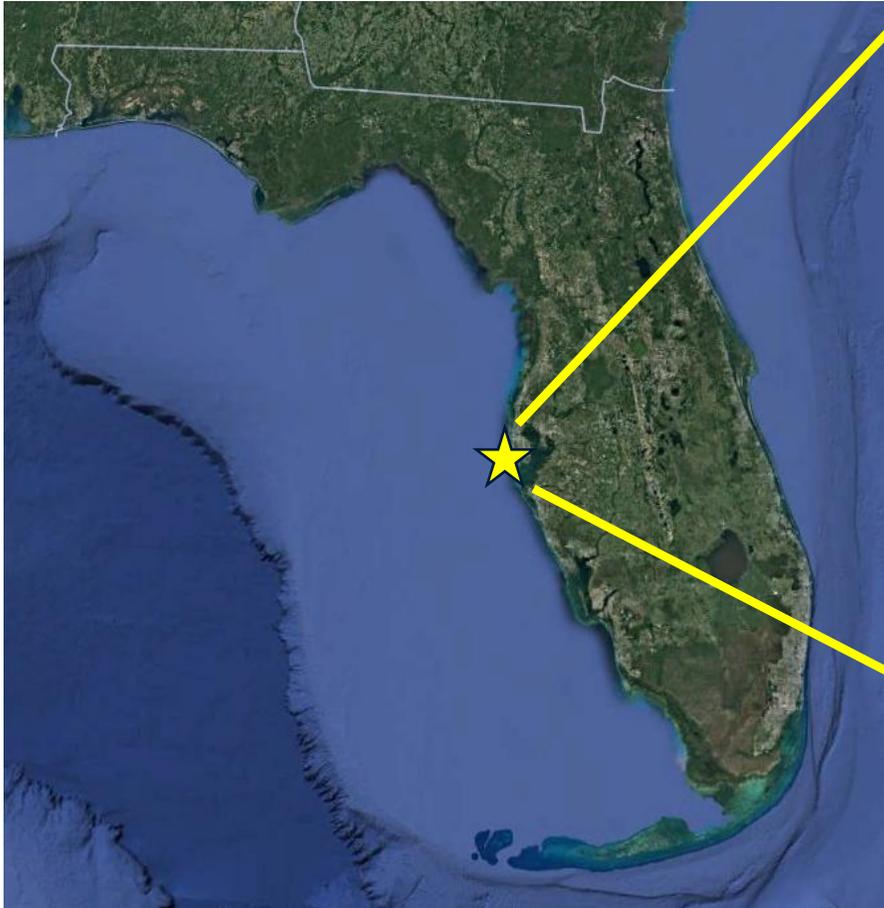




# Assessment of Pinellas County Coastal Erosion Control Structures

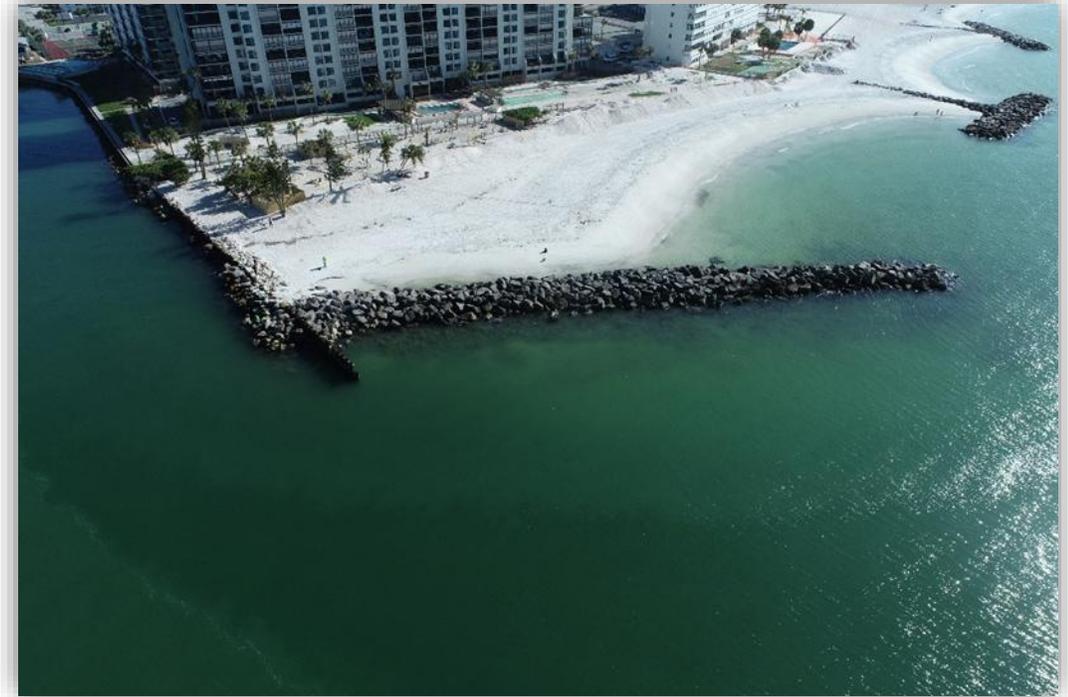
**APTIM:** James Austin, P.E.,  
Douglas Mann, P.E., BC.CE.,  
**Pinellas County:** John Bishop, Ph.D.,  
Zachary Westfall

# PROJECT LOCATION



# OVERVIEW

- 14 of Pinellas County's coastal erosion protection structures were inspected and assessed
  - Part of the Pinellas County Coastal Management Program
  - Last assessed in 2020
- Structures include jetties, groins, revetments, bulkheads, and seawalls
  - Composed of primarily rubble mound or sheet pile



# AGENDA

## Inspection and assessment

- Inspection methodology
- ASCE rating system

## Overview of structures

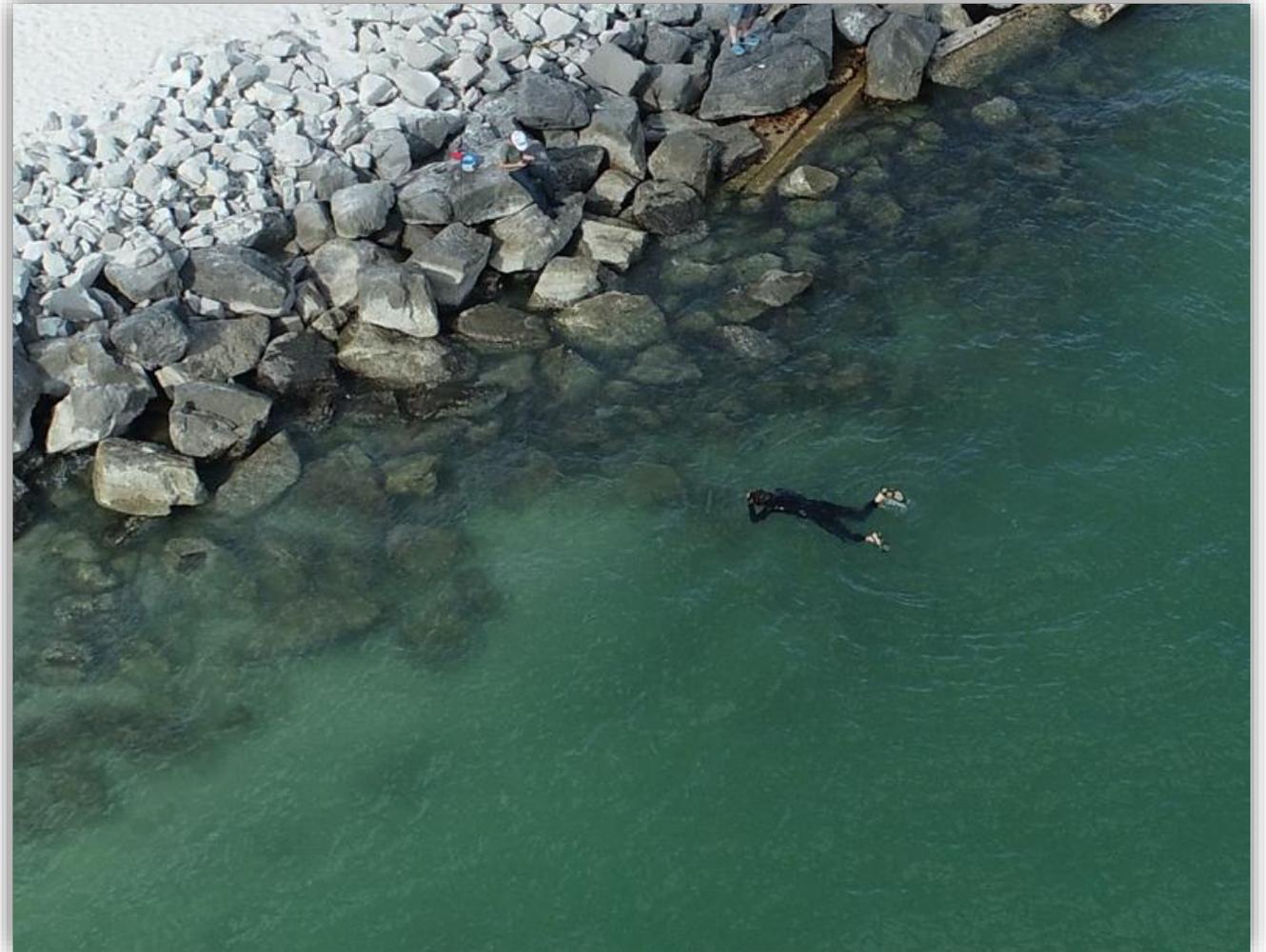
- Different construction and rehab dates
- Different design

## Detailed assessment of each structure

- Background
- Condition
- Rating
- Recommendation

# INSPECTION

- Photo documentation and observations
  - Underwater
  - Ground level
  - Aerial (drone)
- Composition of structure
  - Stone type
  - Sheet pile material
  - Dimensions

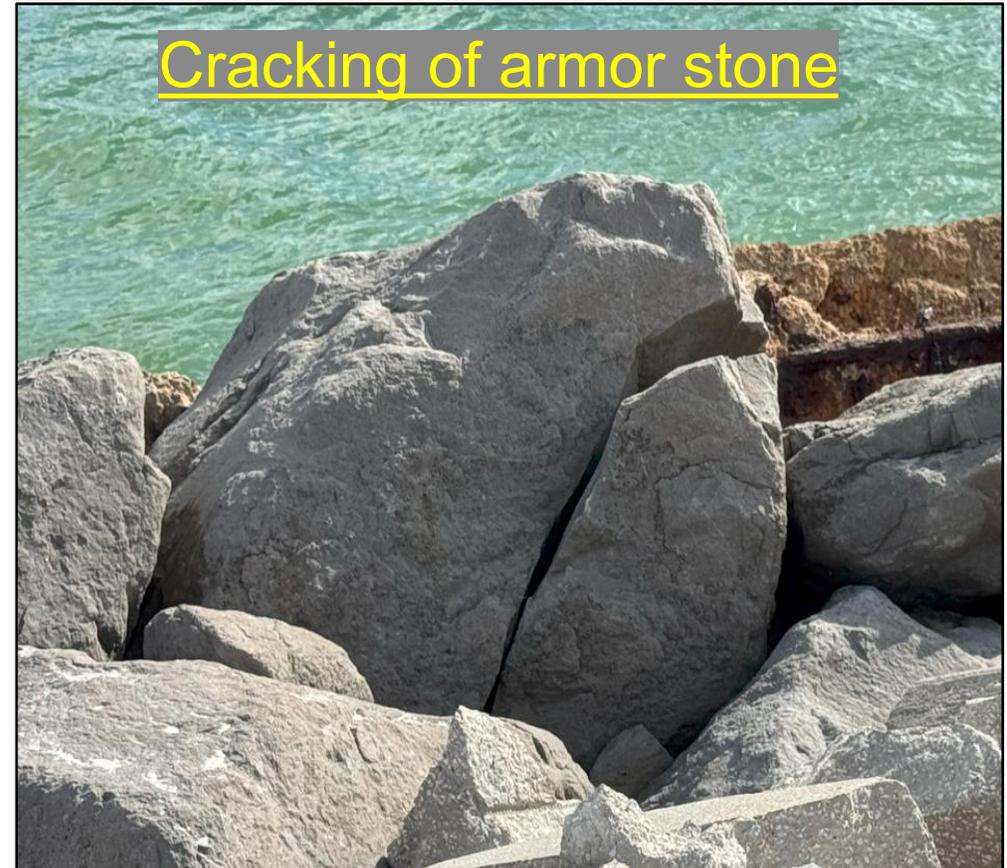


## Routine Subaqueous/Subaerial Condition Assessment Ratings

| Rating   | Description         |
|----------|---------------------|
| <b>6</b> | <b>Good</b>         |
| <b>5</b> | <b>Satisfactory</b> |
| <b>4</b> | <b>Fair</b>         |
| <b>3</b> | <b>Poor</b>         |
| <b>2</b> | <b>Serious</b>      |
| <b>1</b> | <b>Critical</b>     |

- Like new condition
- Very minor deterioration
- Structure functions as originally intended
- Minor to moderate defects or deterioration
- Structure functions as originally intended
- All primary structural elements are sound
- Localized advanced deterioration
- Repairs are recommended with low priority
- Advanced deterioration over widespread portions
- Structure still functions as originally intended
- Potential public safety hazard
- Repairs are recommended with moderate urgency
- Local failures are evident and the structure is not performing as originally intended
- Potential public safety hazard
- Repairs are recommended with high priority
- Critical levels of deterioration and failure mechanisms are evident
- Public safety hazard
- Repairs are recommended with strong urgency

# EXAMPLES OF DETERIORATION



# EXAMPLES OF DETERIORATION

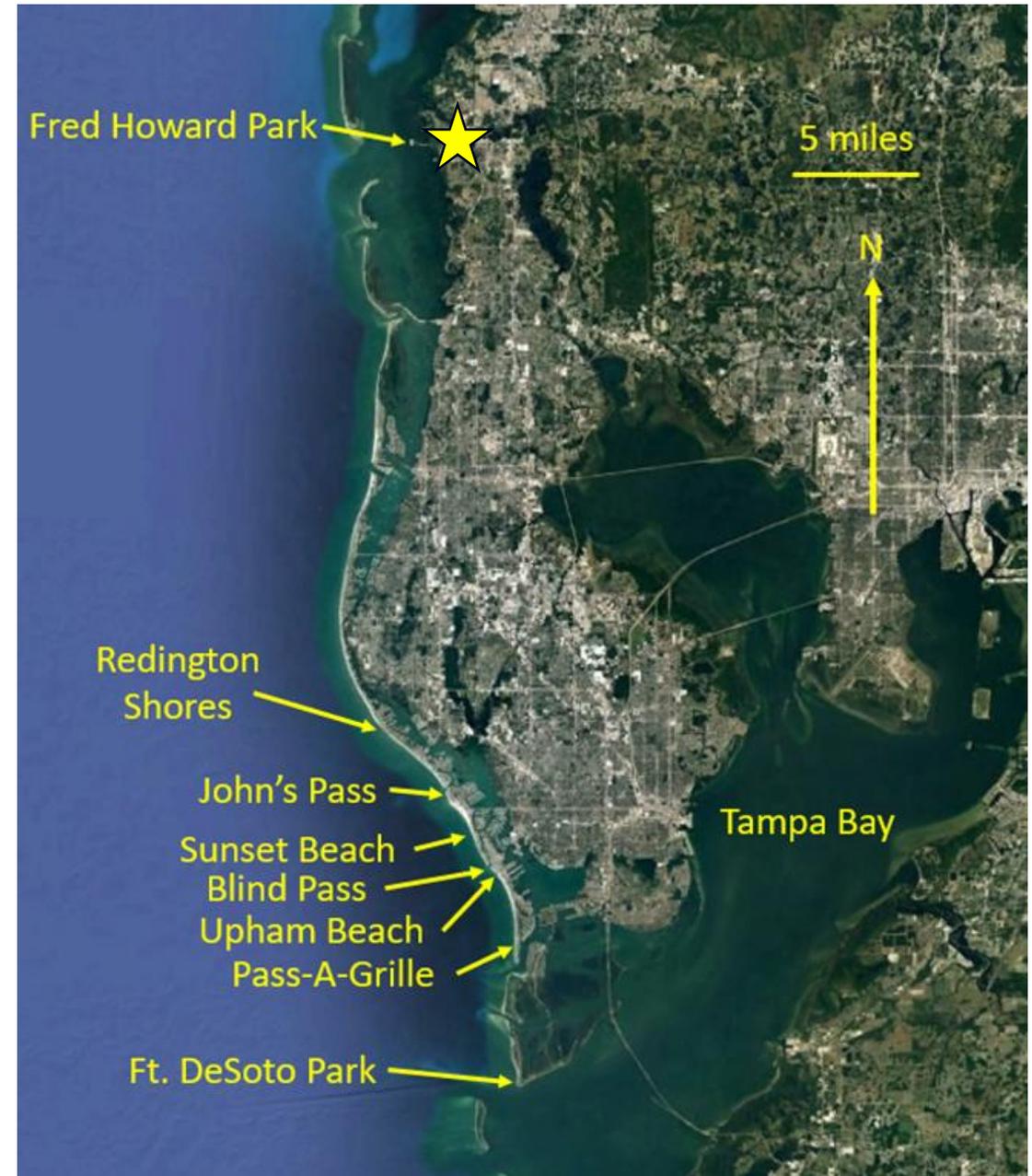
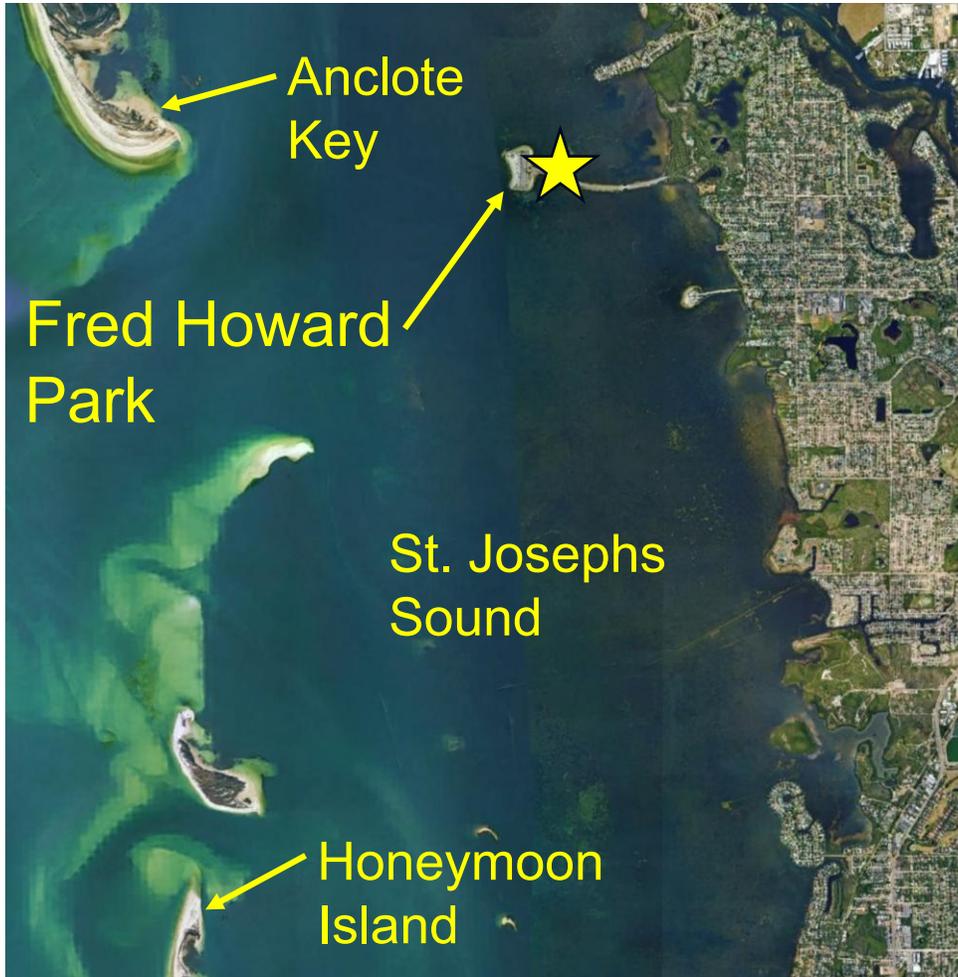


# PINELLAS COUNTY COASTAL STRUCTURES

- Built and maintained over large periods of time
  - Last known maintenance ranging from 1974 to 2018
- Design guidance changes based on year and designer
- Coastal structures tend to fail incrementally over time

| Structure                             | Date of Last Maintenance |
|---------------------------------------|--------------------------|
| Fred Howard Park North Terminal Groin | 1974                     |
| Fred Howard Park South Terminal Groin | 1974                     |
| Redington Shores Breakwater           | 1988                     |
| North John's Pass Jetty               | 1987                     |
| South John's Pass Revetment           | 1966                     |
| South John's Pass Jetty               | 2000                     |
| Treasure Island Sunset Beach Groin    | 1976                     |
| Blind Pass North Jetty                | 1983                     |
| Blind Pass South Jetty                | 1974                     |
| Blind Pass South Breakwater           | 2006                     |
| Upham Beach Groin #1                  | 2018                     |
| Upham Beach Groin #2                  | 2018                     |
| Upham Beach Groin #3                  | 2018                     |
| Upham Beach Groin #4                  | 2018                     |
| Pass-A-Grille Jetty                   | 1984                     |
| Ft. DeSoto L-Groin                    | 2006                     |

# FRED HOWARD PARK TERMINAL GROINS



# FRED HOWARD PARK TERMINAL GROINS

- Park constructed in 1967
- Groins constructed in 1973 during first renourishment
- Primarily granite rubble mound structures
  - Some portions have concrete sheet pile wall



# FRED HOWARD PARK TERMINAL GROINS



South terminal groin



North terminal groin

# FRED HOWARD PARK TERMINAL GROINS

- Observed defects:
  - Displaced stone
  - Minimal cross section
  - Exposed bedding stone
  - Exposed tie backs
  - Rusting and spalling of concrete sheet pile

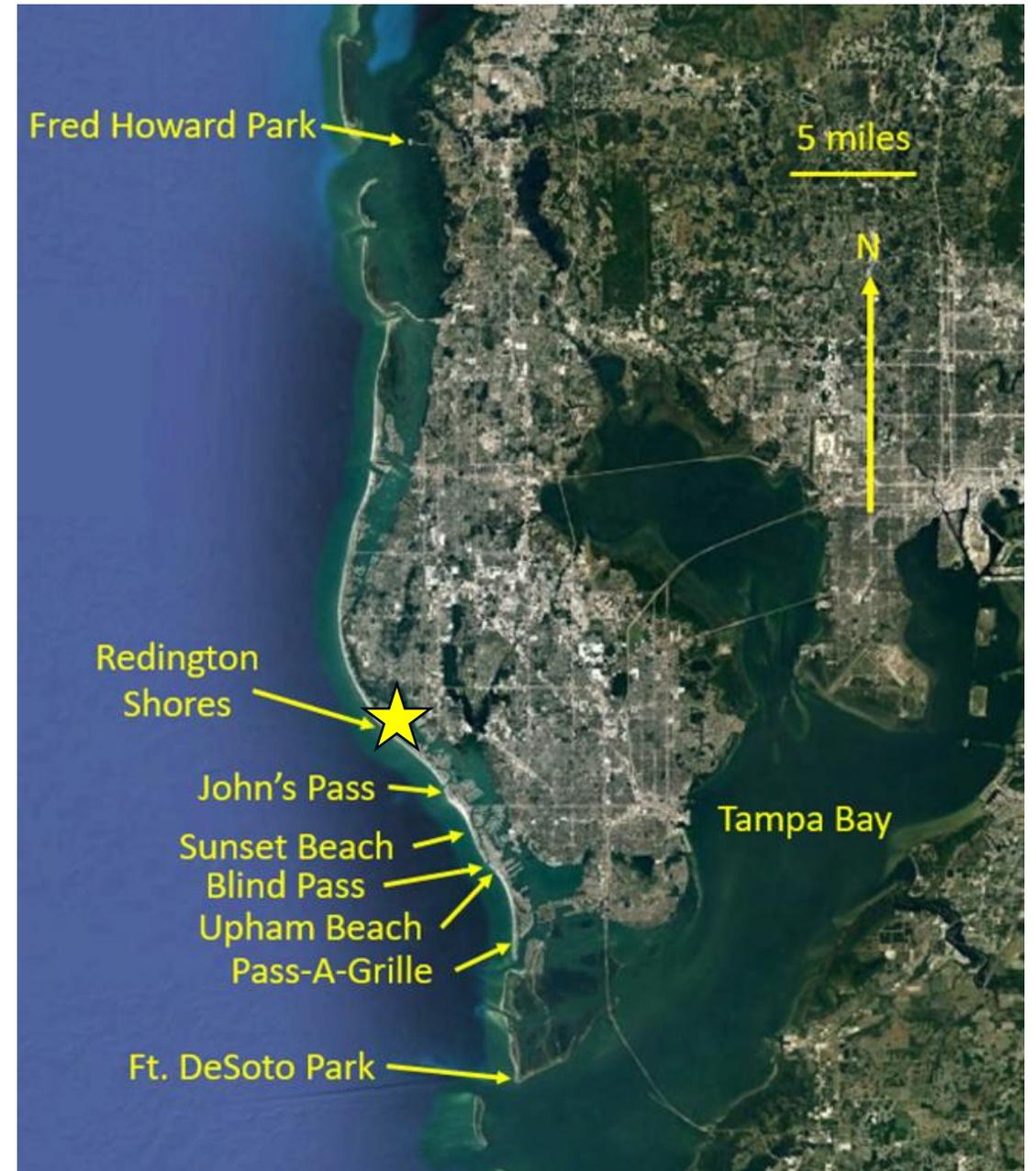


# FRED HOWARD PARK TERMINAL GROINS

- Functionality:
  - Leaking some sand
- Rating:
  - Poor (3)
- Recommendation:
  - Add supplemental stones

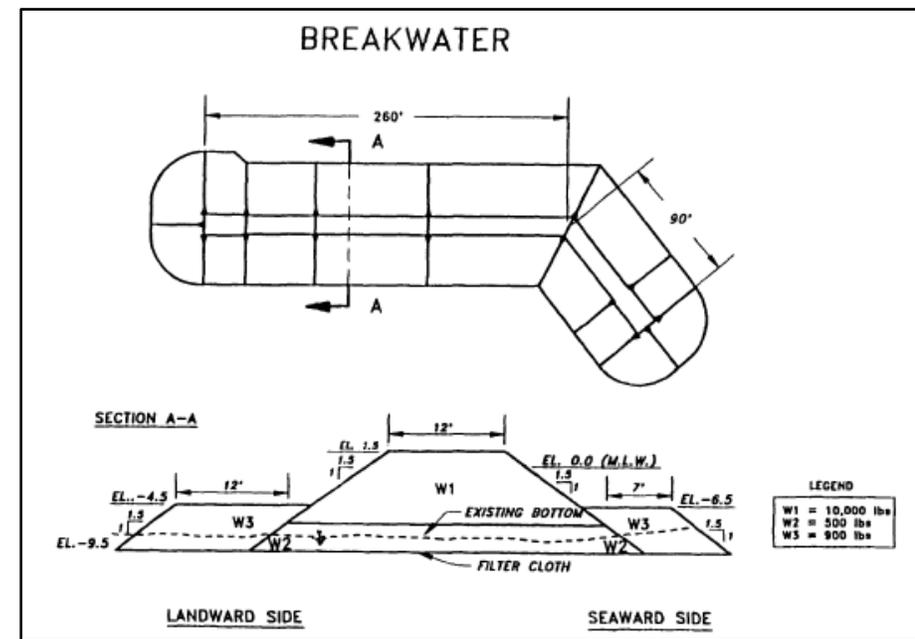


# REDINGTON SHORES BREAKWATER



# REDINGTON SHORES BREAKWATER

- Constructed in 1986 by USACE
- Granite rubble mound structure
- Reduce erosion at public access
- Lowered by 1-foot in 1988 via removal of stones to discourage tombolo



# REDINGTON SHORES BREAKWATER

- Observed defects:
  - Large gaps between stones and proximity to shoreline creates safety hazard

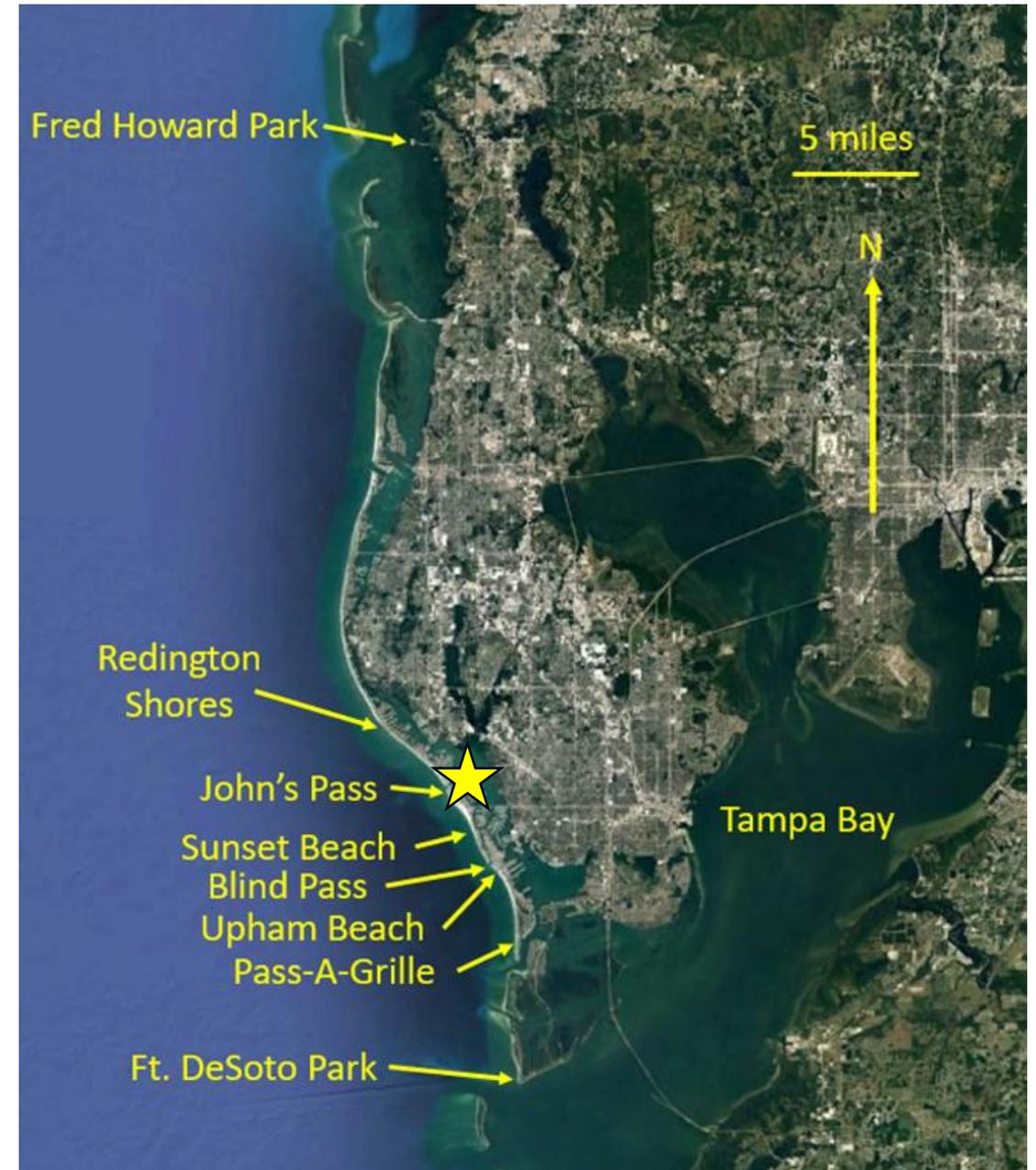


# REDINGTON SHORES BREAKWATER

- Functionality
  - Dissipation of wave energy
  - Formation of slight salient
- Rating:
  - Serious (2)
- Recommendation:
  - Modeling of alternatives



# JOHN'S PASS JETTIES AND ASSOCIATED INFRASTRUCTURE



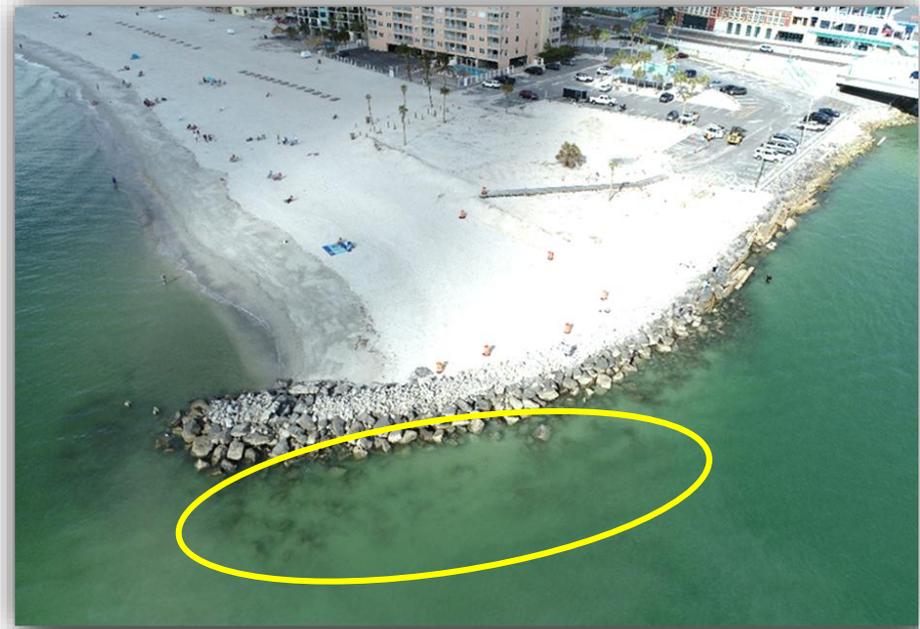
# JOHN'S PASS JETTIES AND ASSOCIATED INFRASTRUCTURE

- North jetty constructed in 1961
  - Reconstructed in 1987
  - Granite rubble mound structure
- South revetment and seawall constructed in 1966 by USACE
  - Concrete sheet pile seawall
  - Granite rubble mound revetment



# JOHN'S PASS NORTH JETTY

- Observed defects:
  - Displacement of armor stone
  - Sloughing of side slopes



# JOHN'S PASS NORTH JETTY

- Functionality:
  - Sand bypasses around jetty
- Rating:
  - Fair (4)
- Recommendation:
  - Continued monitoring



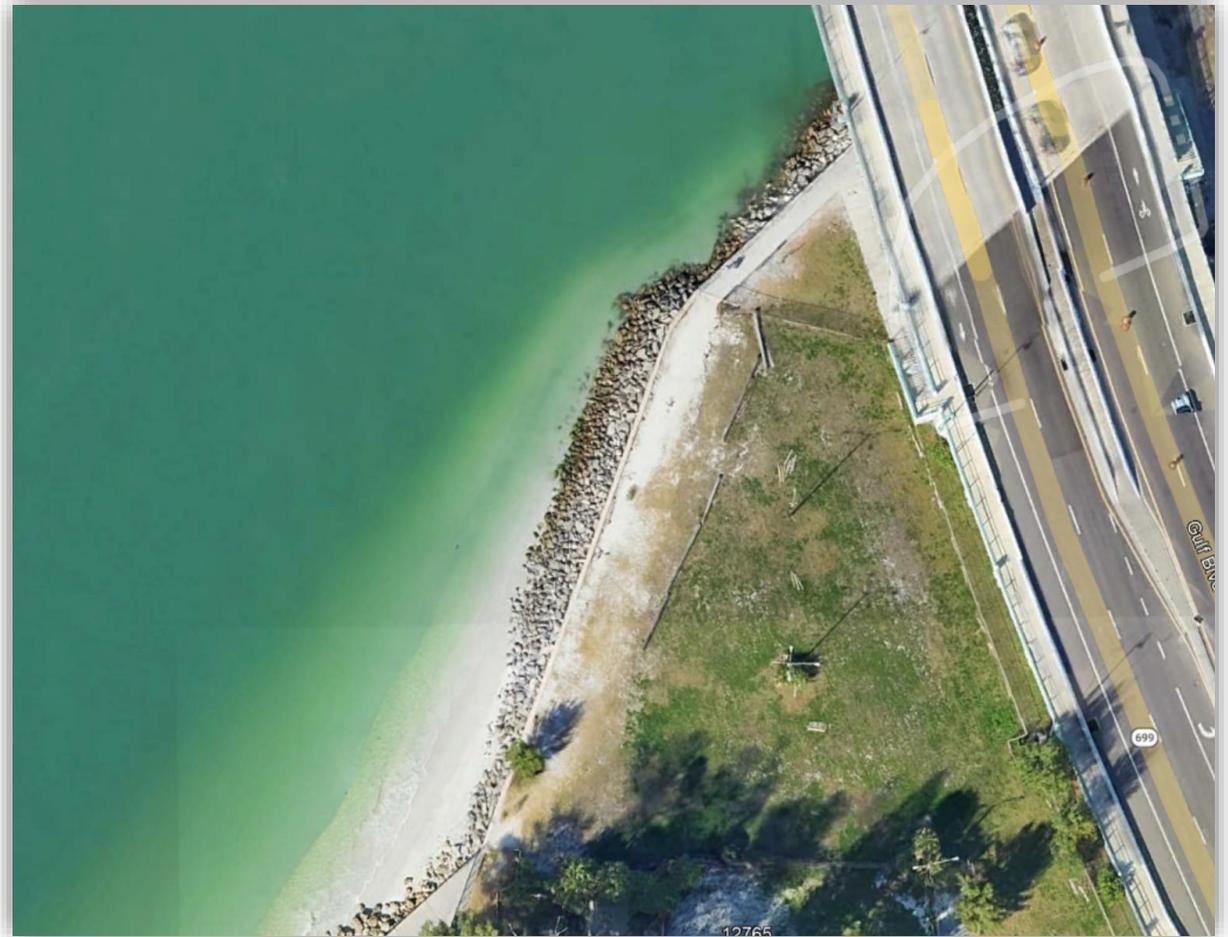
# JOHN'S PASS SOUTH REVETMENT AND SEAWALL

- Observed defects:
  - Exposed tie backs
  - Concrete spalling and rust stains on seawall cap and tie rods

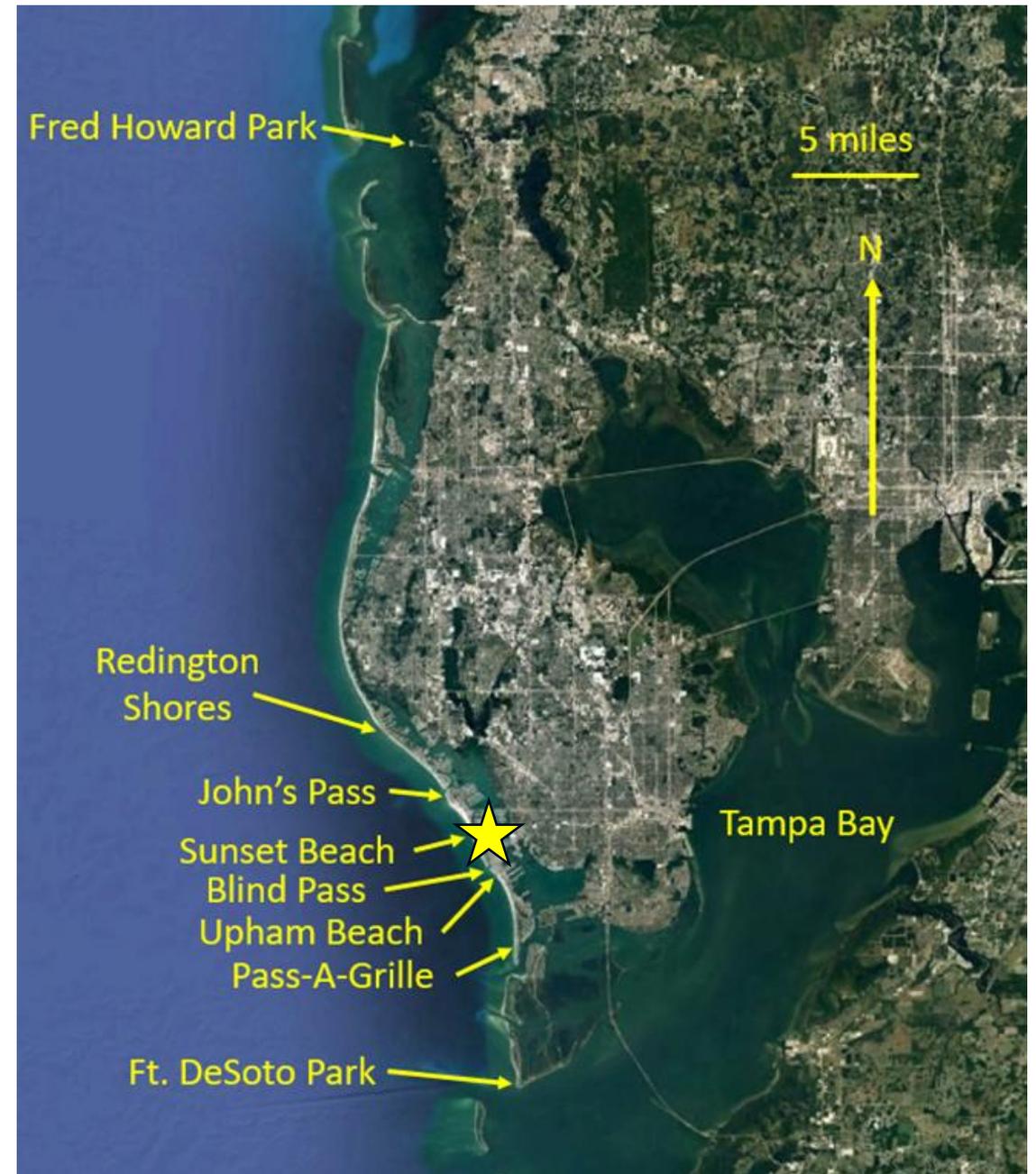


# JOHN'S PASS SOUTH REVETMENT AND SEAWALL

- Functionality:
  - Retaining sand
- Rating:
  - Poor (3)
- Recommendation:
  - Backfill seawall
  - Continued monitoring

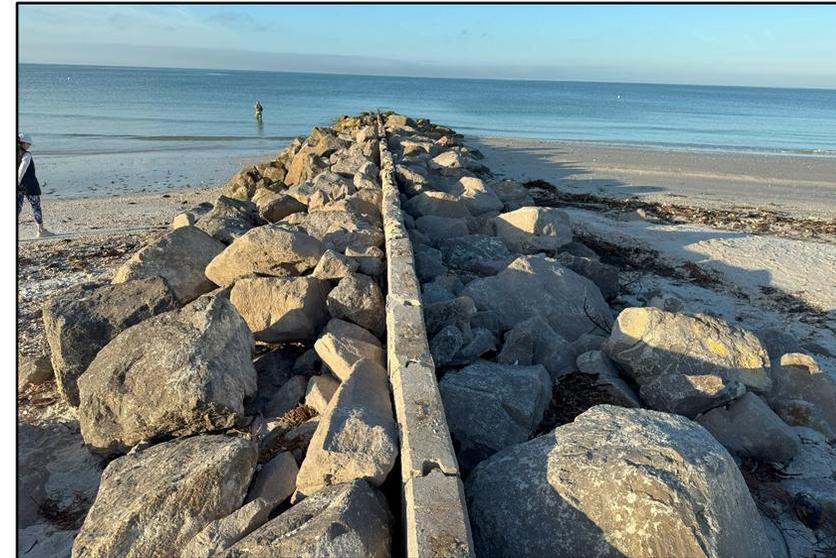
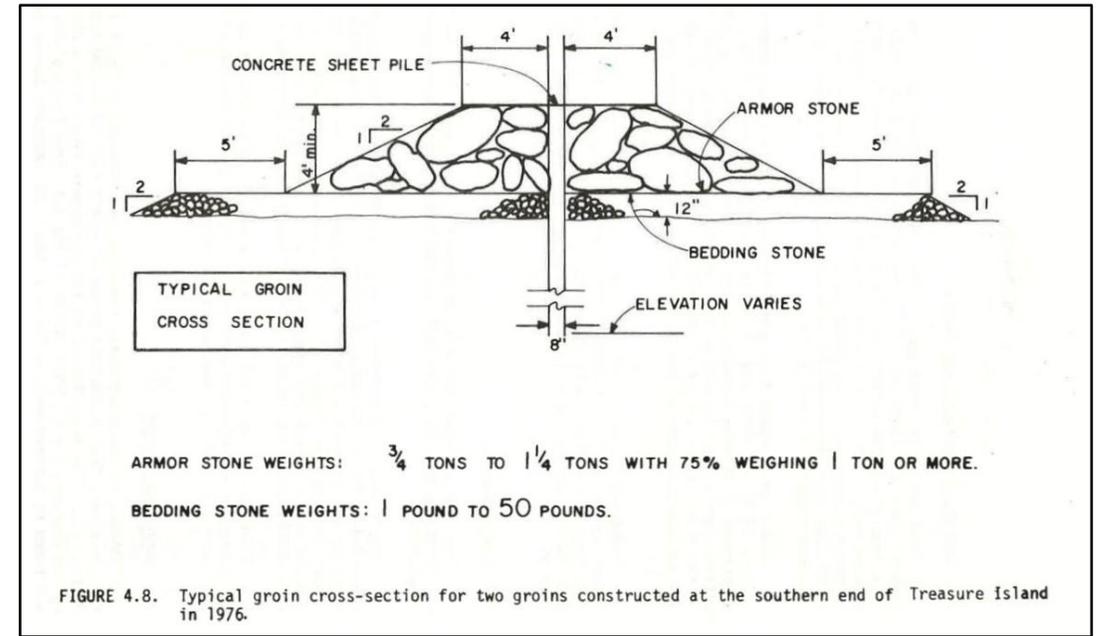
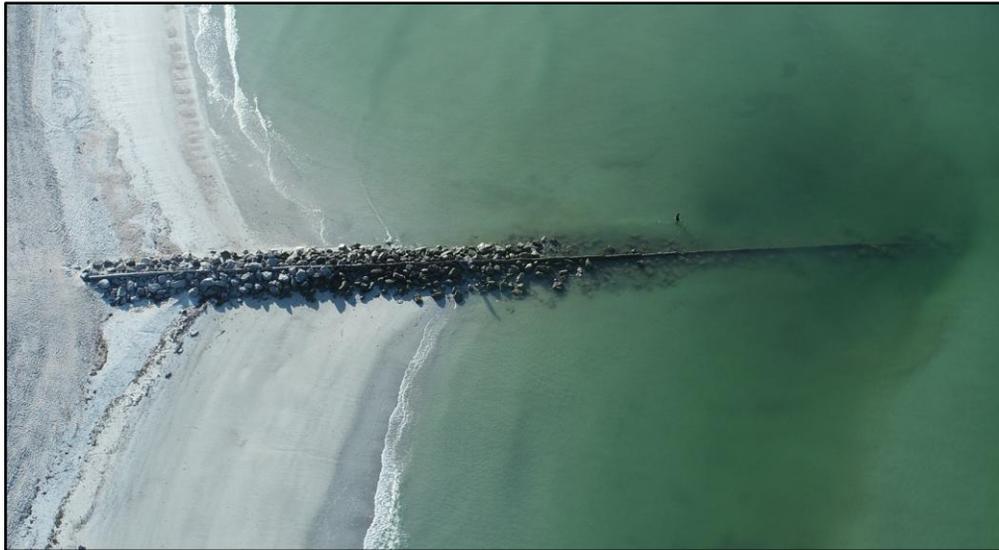


# SUNSET BEACH GROIN



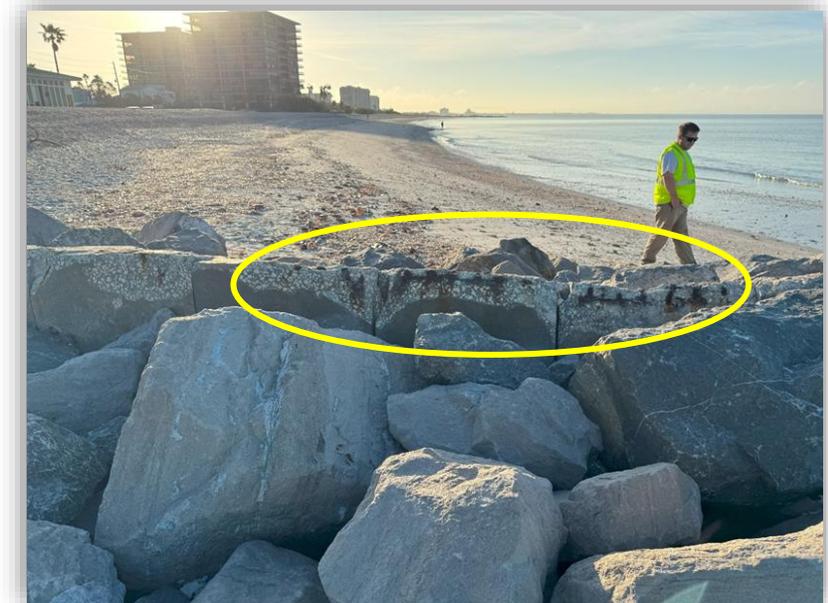
# SUNSET BEACH GROIN

- Constructed in 1976 by USACE
- 285 feet long
- Granite armor stone and reinforced concrete sheet pile core



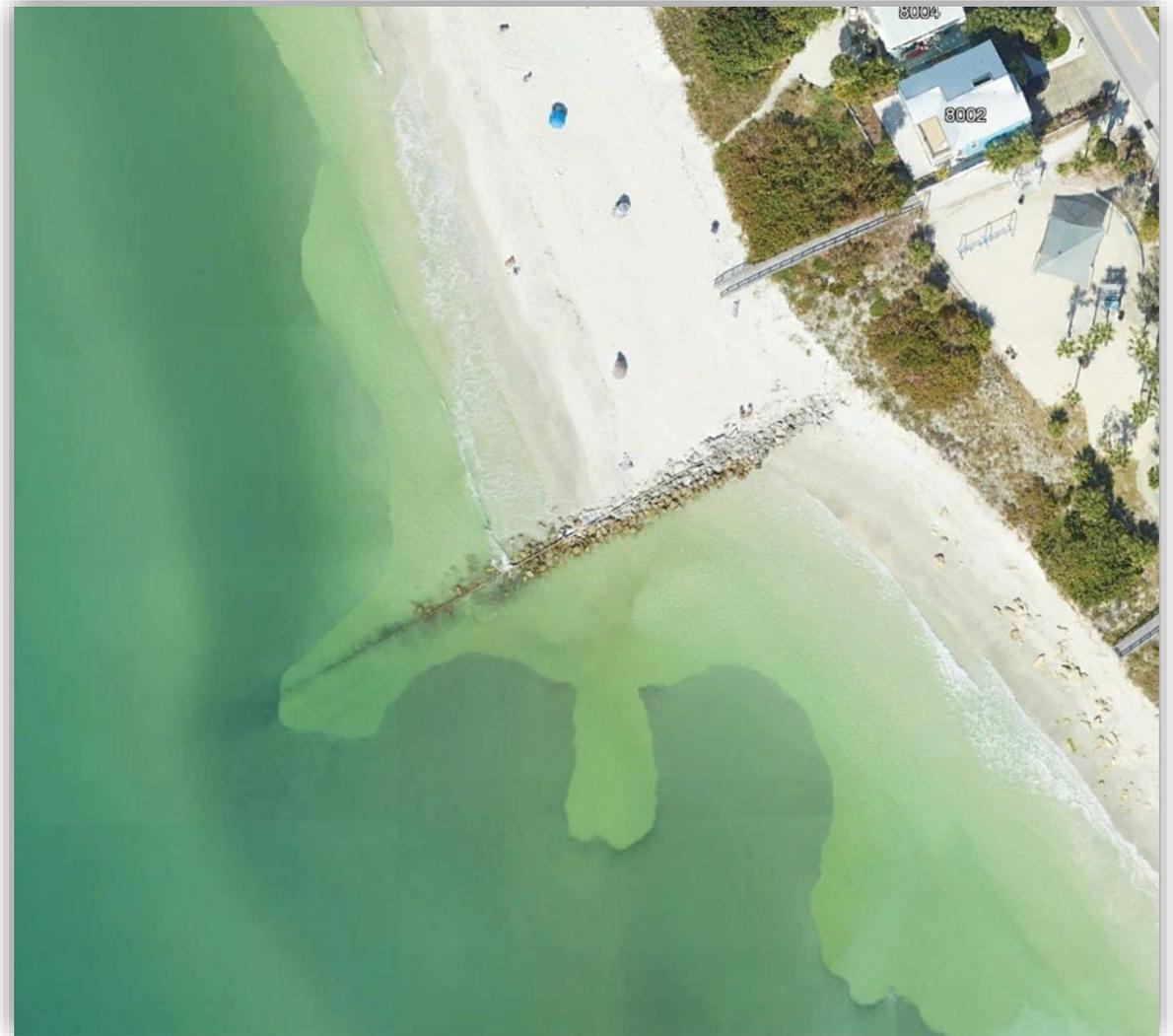
# SUNSET BEACH GROIN

- Observed defects:
  - Displaced armor stones
  - Concrete spalling and rust stains on sheet piles

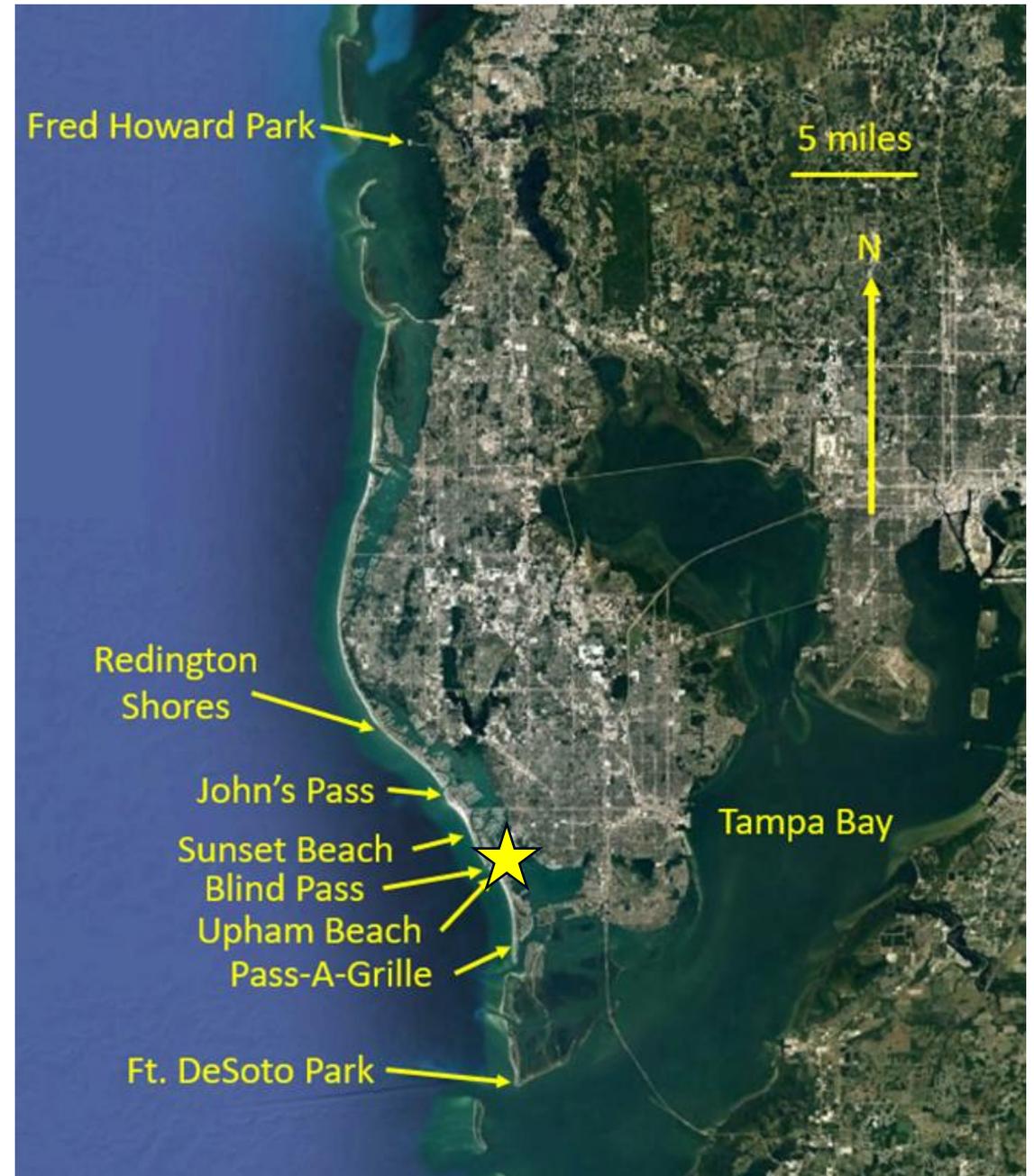
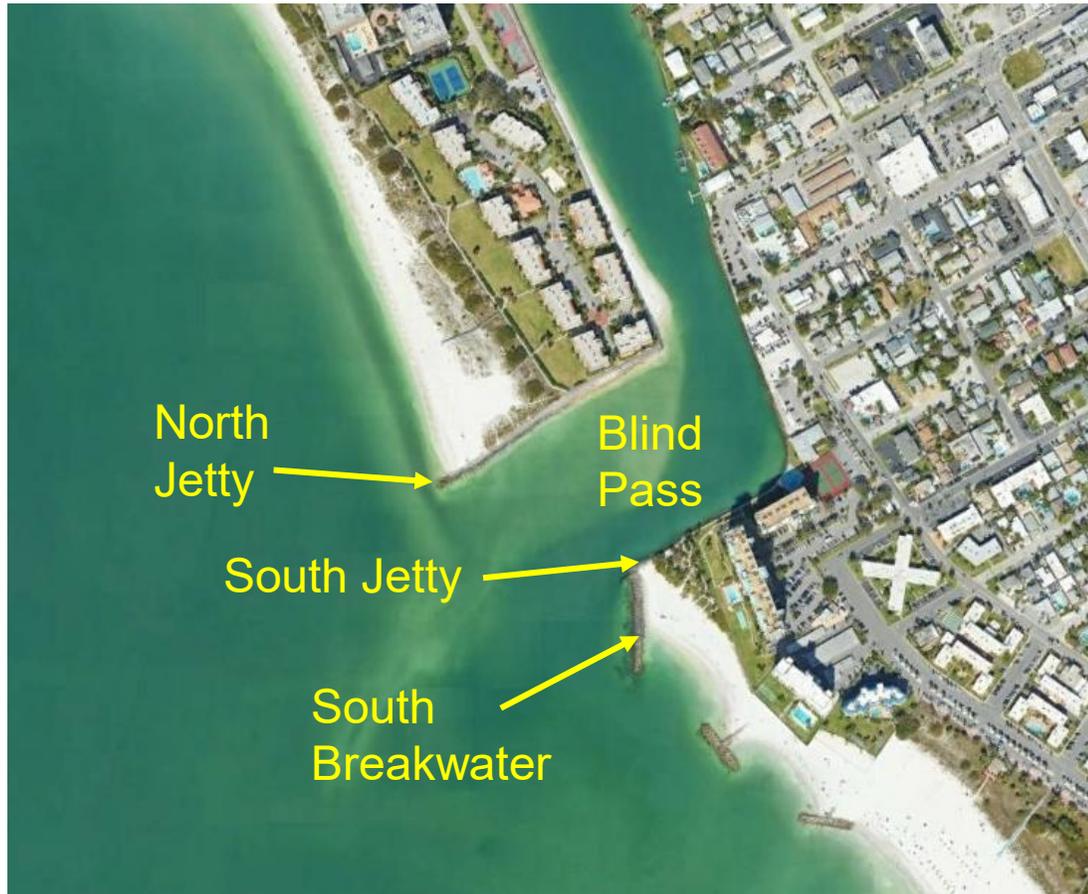


# SUNSET BEACH GROIN

- Functionality:
  - Retaining sand
- Rating:
  - Fair (4)
- Recommendation:
  - Continued monitoring
  - Modeling study performed in 2024

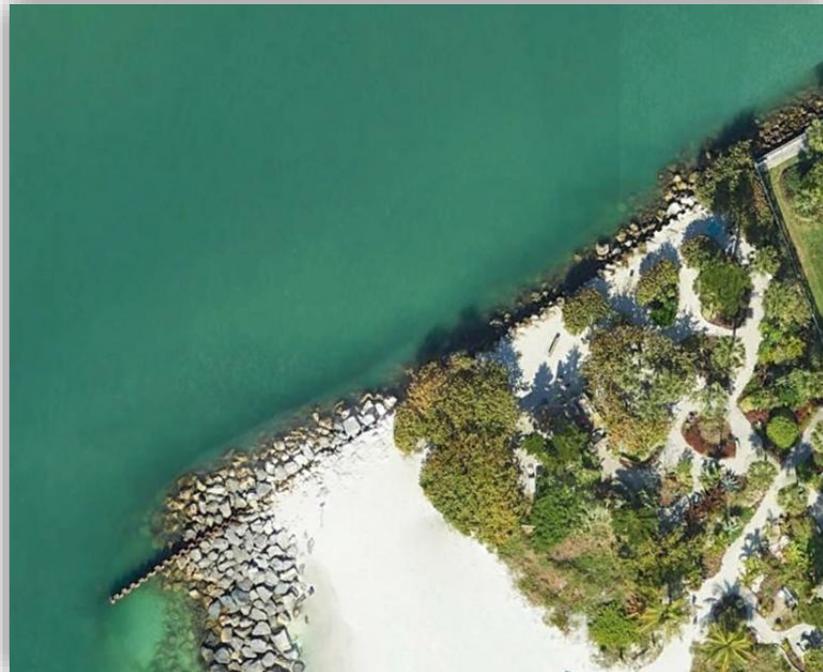


# BLIND PASS JETTIES AND ASSOCIATED INFRASTRUCTURE



# BLIND PASS JETTIES

- Constructed in 1936
- Extended 90 feet in 1974
- Steel sheet pile seawall with limestone revetment



# BLIND PASS SOUTH JETTY

- Observed defects:
  - Sheet pile severely rusted and deteriorated
  - Inconsistent cross section of revetment fronting seawall



# BLIND PASS SOUTH JETTY

- Functionality:
  - Retaining sand
- Rating:
  - Critical (1)
  - Failure of seawall may occur suddenly
- Recommendation:
  - Replace seawall



# CONCLUSIONS

- Structures range from fair (4) to critical (1)
- Ratings decreased since last assessed
- Only one structure in critical condition (1)
- Recommendations vary from monitoring to replacement

| Structure                               | Date of Last Maintenance | 2024 Rating | 2020 Rating |
|---|--------------------------|-------------|-------------|
| Fred Howard Park North Terminal Groin   | 1974                     | 3           | 4           |
| Fred Howard Park South Terminal Groin   | 1974                     | 3           | 4           |
| Redington Shores Breakwater             | 1988                     | 2           | 1           |
| North John's Pass Jetty                 | 1987                     | 4           | 4           |
| South John's Pass Revetment and Seawall | 1966                     | 3           | 5           |
| Treasure Island Sunset Beach Groin      | 1976                     | 4           | 2-4         |
| Blind Pass South Jetty                  | 1974                     | 1           | 3-4         |

# CONCLUSIONS

## Why routine assessments and maintenance matter

- Improves ability to assess structural conditions and plan ahead
- Reduces costs through proactive rather than reactive repairs
- Increases lifespan of structure
- Helps prioritize funding

# QUESTIONS?



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An aerial photograph showing a wide, sandy beach in the upper half, with waves breaking onto the shore. Below the beach is a dense line of trees, and in the foreground, a residential development with several houses and swimming pools is visible. The houses have light-colored roofs and some have blue swimming pools. The overall scene is bright and sunny.

# THANK YOU