

Ten Thousand Islands Status Report

Period Covered: October 1, 2021 to September 30, 2022

Project: Hydrodynamic and Salinity Characteristics of Rivers and Estuaries of the Ten Thousand Islands

Agency: U.S. Geological Survey (USGS)

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Agreement: USGS IA#31 under MOA between USGS and USACE

This annual status update for 2022 summarizes the major accomplishments, lists deliverables and reports, outlines the work plan for 2023 for the Ten Thousand Islands project, and summarizes the data collected in WY 2021.

I. Major Accomplishments

- Real-time, provisional, and final data are being produced and posted to USGS National Water Information System web-
 1. Pumpkin River -
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255534081324000
 2. Faka Union River -
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255432081303900
 3. Faka Union Boundary Near Panther Key, FL-
https://waterdata.usgs.gov/nwis/uv?site_no=255138081321701
 4. East River -
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255327081275900
 5. Faka Union Canal Boat Basin –
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255726081303700
- Data collection for Faka Union Canal Boat Basin was seasonally operated from December 2021 to April 2022.
- Report summarizing data from 2007 to 2019 was published.
Booth, A.C., and Knight, T.M., 2021, Flow characteristics and salinity patterns in tidal rivers within the northern Ten Thousand Islands, southwest Florida, water years 2007–19: U.S. Geological Survey Scientific Investigations Report 2021–5028, 21 p., <https://doi.org/10.3133/sir20215028>.

II. SUPPORT FROM OTHER PROGRAMS AND FUNDING SOURCES

- Additional monitoring stations in the area. The site below is funded by Greater Everglades Priority Ecosystems Science (GEPES).

1. Blackwater River –
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255654081350200&PARAMeter_cd=00010,00480

III. SIGNIFICANT MEETINGS/WORKSHOPS/CONFERENCES

- Provided a presentation on 11/18/2021 to ACOE Recover group titled, “Hydrodynamic and Salinity Characteristics of Rivers and Estuaries of the Ten Thousand Islands (TTI).”

IV. Administrative (Contractual and Budgetary)

- Funding for the Faka Union Canal Boat Basin Station for winter 2022-2023 has not been received. See additional details below on potential issues with this station.
- Funding was received March 2022 for a 12-month period for Pumpkin River, Faka Union Canal near the mouth, Faka Union Boundary near Panther Key and East River. The agreement includes funding through March 2026.

V. FY 2022 DELIVERABLES/REPORTS

- NWISweb has been updated throughout the year to provide data and all data was finalized prior to April 2022 deadline.
- Quarterly status updates have been submitted to the RECOVER MAP coordinators.
- Annual status update submitted herein.

VI. FY 2023 WORKPLAN

- Continued monitoring stations under this agreement. Data available at web links provided.
 1. Pumpkin River -
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255534081324000
 2. Faka Union River -
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255432081303900
 3. Faka Union Boundary Near Panther Key, FL-
https://waterdata.usgs.gov/nwis/uv/?site_no=255138081321701
 4. East River - http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255327081275900
 5. Faka Union Canal Boat Basin –
http://waterdata.usgs.gov/fl/nwis/uv/?site_no=255726081303700
- Continued QA/QC of field data, ADCP discharge measurements for rating verification, computed stage, discharge, temperature, and salinity at monitoring stations. Water year 2022 data will be finalized by April 1, 2023.
- Quarterly status reports will be submitted every 90 days, and the annual report will be submitted in September 2023.
- Meetings will be attended as appropriate.

VII. ANTICIPATED NEEDS OR ISSUES

- Covid-19 restrictions are not expected to delay data collection.
- All monitoring stations stopped recording after they were inundated by storm surge on September 28, 2022 by Hurricane Ian.
- A reconnaissance trip was completed on October 4, 2022 to assess the damage from Hurricane Ian. Water damage to wiring and cables occurred at all stations.
- The only structural damage that occurred was at Faka Union River near the mouth, where the main platform is tilted. The station will be repaired temporarily, however the station will be fully rebuilt during the next year.
- Pumpkin River, Faka Union Canal near the mouth, East River, and Faka Union Boundary Near Panther Key, FL were all repaired by October 12, 2022.

VIII. FUNDING STATUS

- Funding was received March 2022 for a 12-month period for Pumpkin River, Faka Union Canal near the mouth, Faka Union Boundary near Panther Key and East River. The agreement includes funding through March 2026.
- Funding for Port of the Islands needs to be received prior to installation in October 2022.
- Greater Everglades Priority Ecosystem Science funding allocation to monitor salinity and temperature at Blackwater River will continue for as long as funds are available.

IX. Water Year 2021 Data Summary

Stage, discharge, salinity and temperature are collected under this agreement at Pumpkin River, Faka Union River and East River. Additionally, salinity and temperature data are collected at the Faka Union Boundary station and Faka Union Boat Basin (fig. 1). Salinity and temperature data at Blackwater River is currently collected and funded through GEPES.

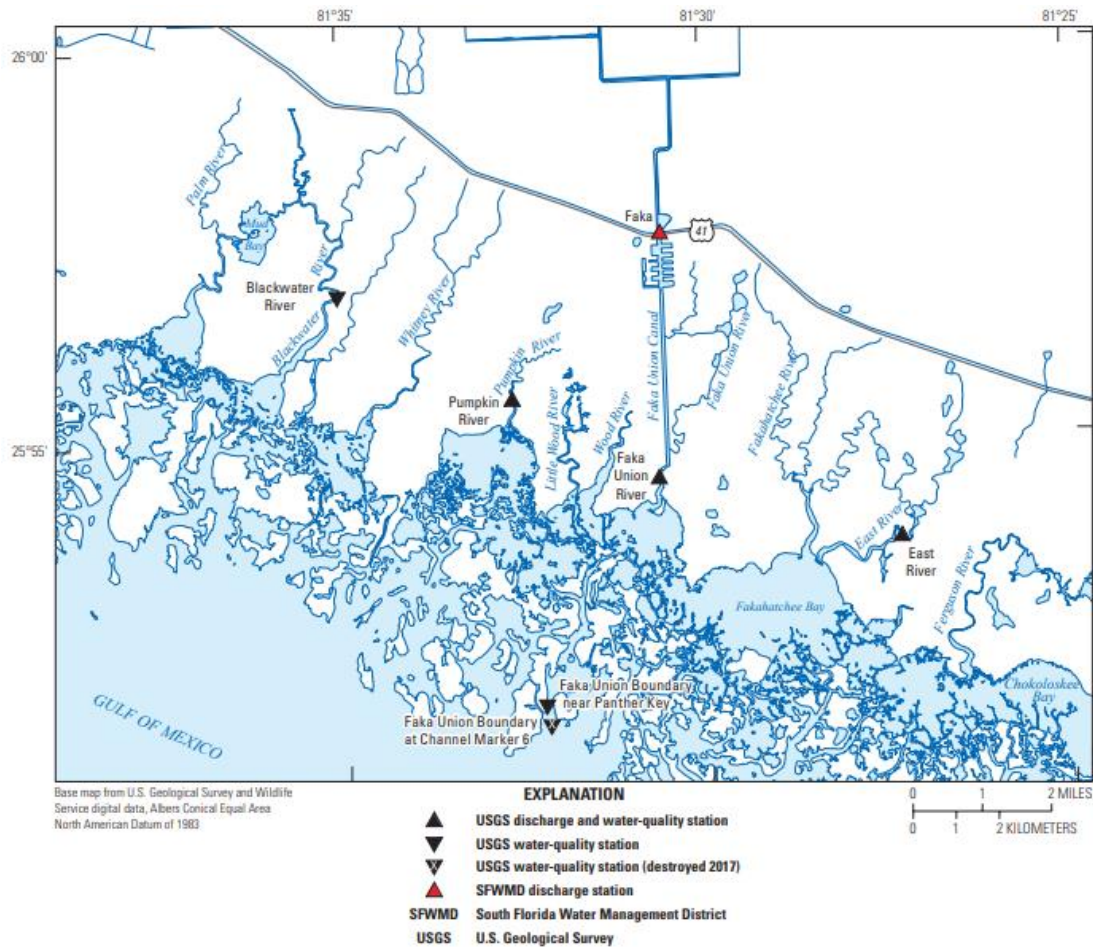
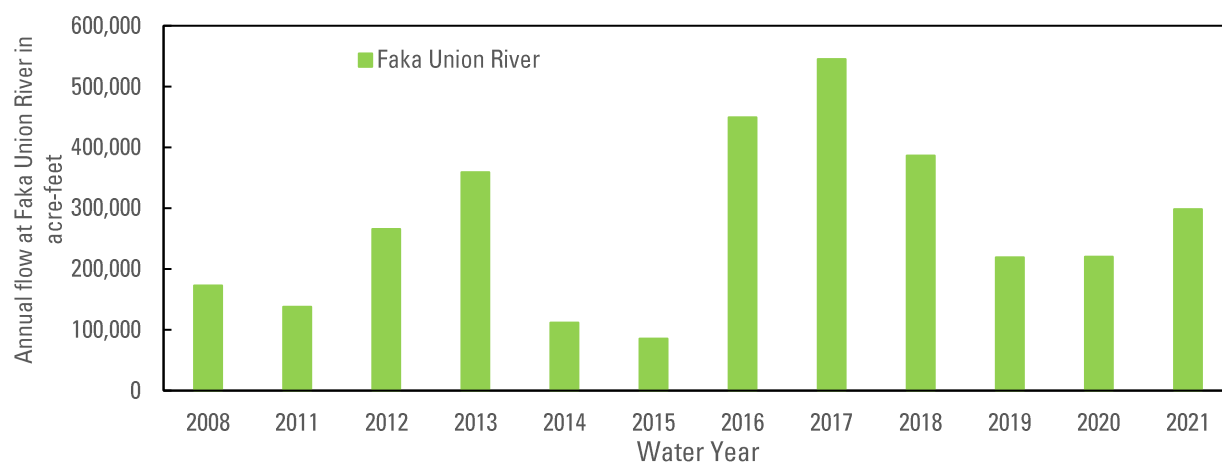


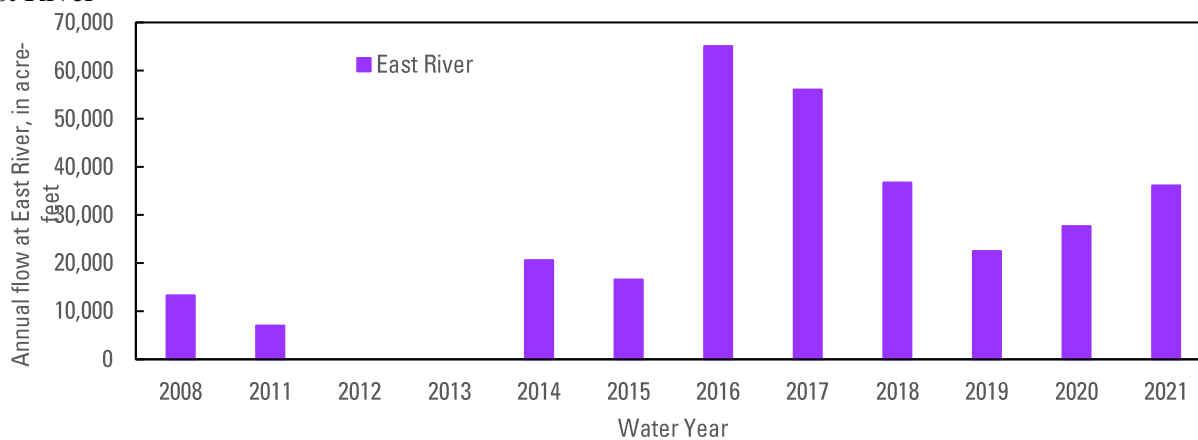
Figure 1. Map of streamflow and water-quality stations in the northern Ten Thousand Islands estuary.

A water year spans from October to September, and is defined by the year it ends in. In water year 2021 the annual total flows were 298,500 acre-feet at Faka Union River (fig. 2A) 36,140 acre-feet at East River (fig. 2B) and 6,510 acre-feet at Pumpkin River (fig. 2C). During water year 2021 the monthly flow volume at Faka Union River ranged from -2,710 acre-feet in May to 66,530 acre-feet in September. At Pumpkin River the monthly flow volume ranged from 33 acre-feet in March to 1,280 acre-feet in November. At East River the monthly flow volume ranged from -360 acre-feet in May to 8,465 acre-feet in November.

A. Faka Union River



B. East River



C. Pumpkin River

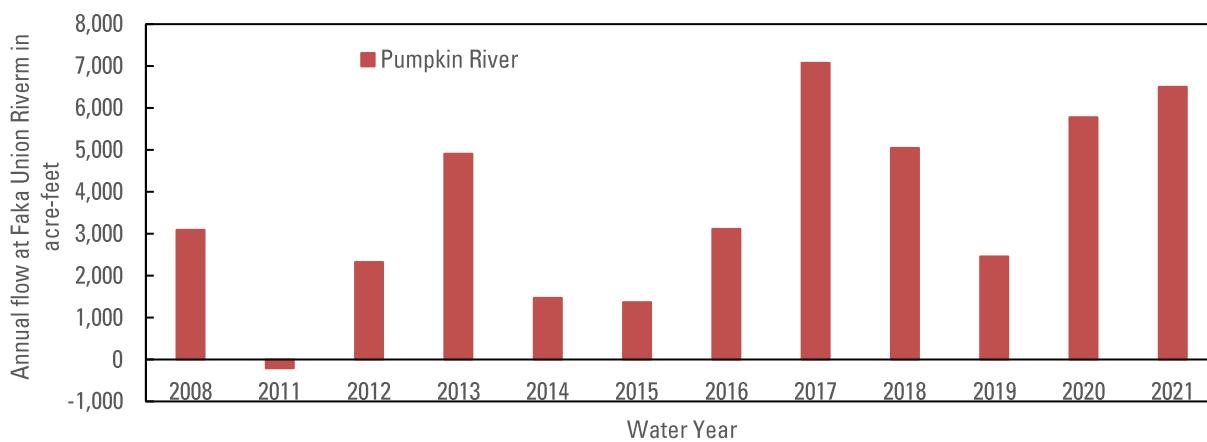


Figure 2. Annual flow at tidal tributaries, water years 2007, 2008 and 2011-2021: A, Faka Union River; B, East River; C, Pumpkin River.

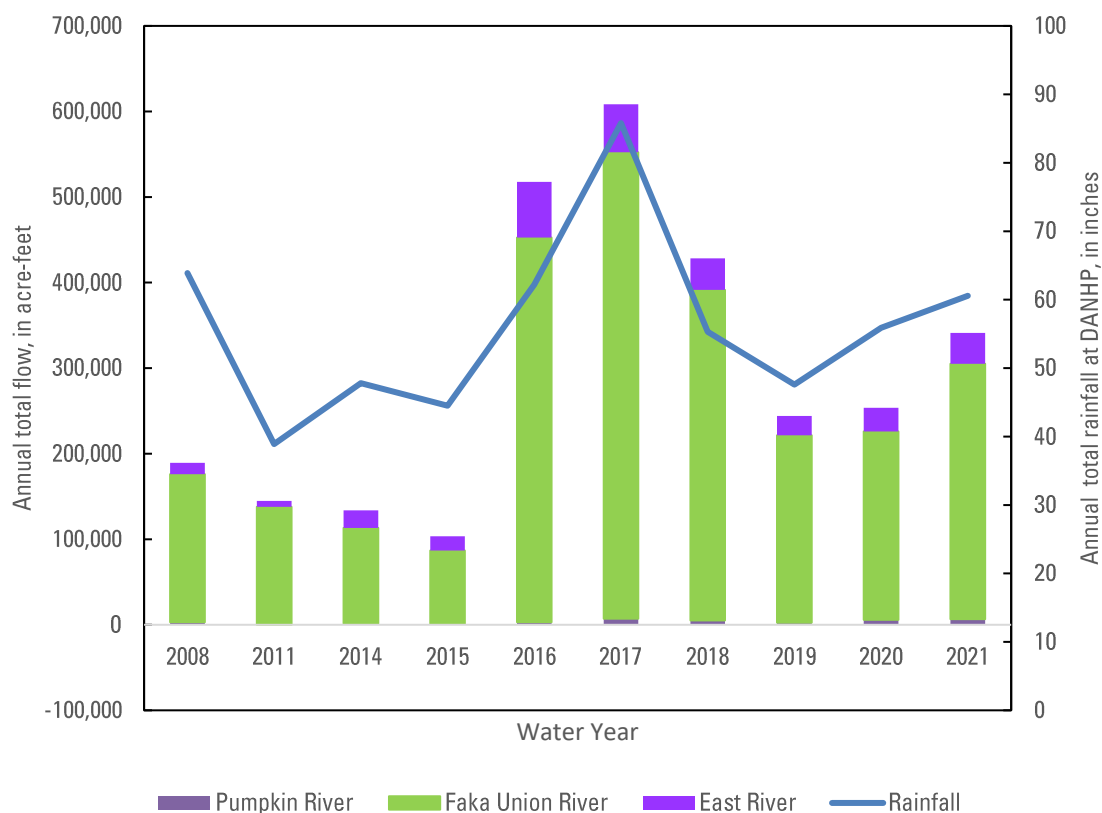
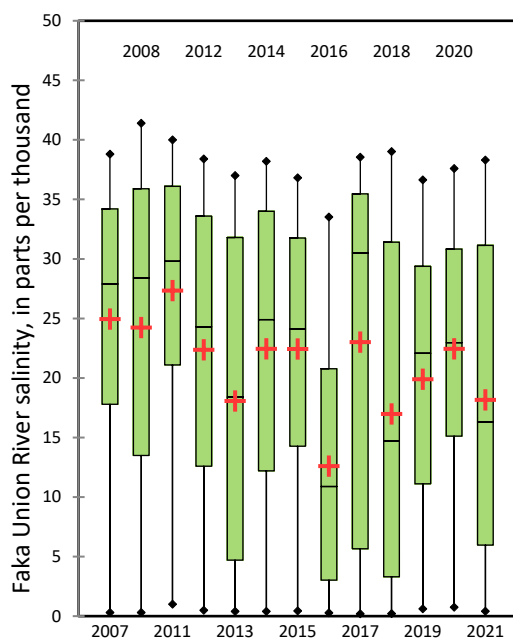


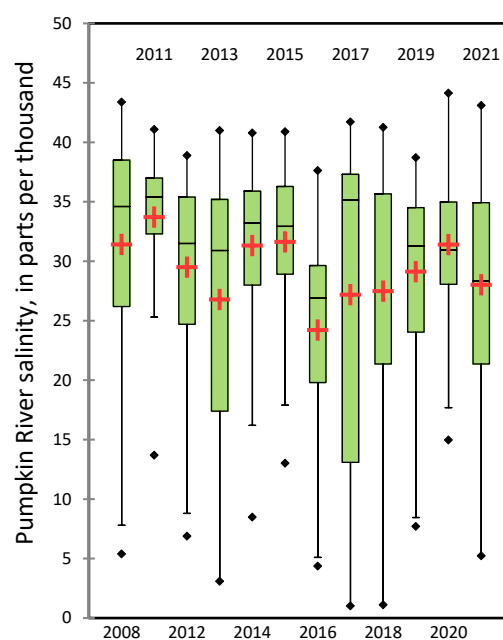
Figure 3. Annual flow volumes at Pumpkin River, Faka Union River and East River, Water Years, 2008 and 2011, 2014–2021 and annual rainfall in inches at DANHP, Dan House Prairie rainfall station.

During water year 2021 salinity ranged from 0.4 to 38.3 ppt, with a mean salinity of 18.2 ppt at Faka Union River (fig. 4A). Salinity at Faka Union River exceeded 35 ppt 14% of the 2021 water year. During water year 2021 salinity ranged from 5.2 to 43.1 ppt, with a mean of 28.0 ppt at Pumpkin River (fig. 4B). Salinity at Pumpkin River exceeded 35 ppt 24% of the 2021 water year. During water year 2021 the salinity ranged from 1.2 to 40.8 ppt, with a mean of 19.0 ppt at East River (fig. 4C). Salinity at East River exceeded 35 ppt 14% of the 2021 water year. During water year 2021 salinity ranged from 1.9 to 40.1 ppt, with a mean salinity of 25.9 at Blackwater River (fig. 4D). Salinity at Blackwater River exceeded 35 ppt 28% of the 2021 water year. During water year 2021 salinity ranged from 9.9 to 38.1 ppt, with a mean salinity of 29.0 at Faka Union Boundary station (fig. 4E). Salinity at Faka Union Boundary Station exceeded 35 ppt 12% of the 2021 water year.

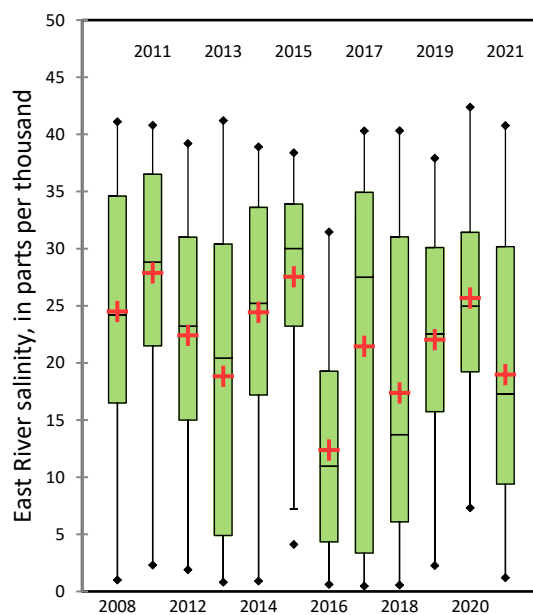
A. Faka Union River



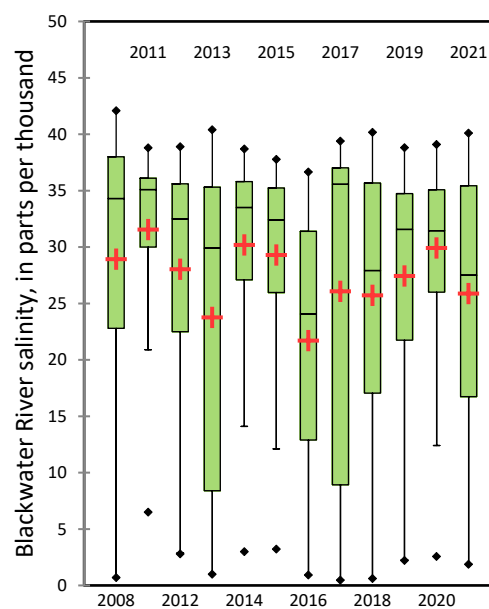
B. Pumpkin River



C. East River



D. Blackwater River



E. Faka Union Boundary**

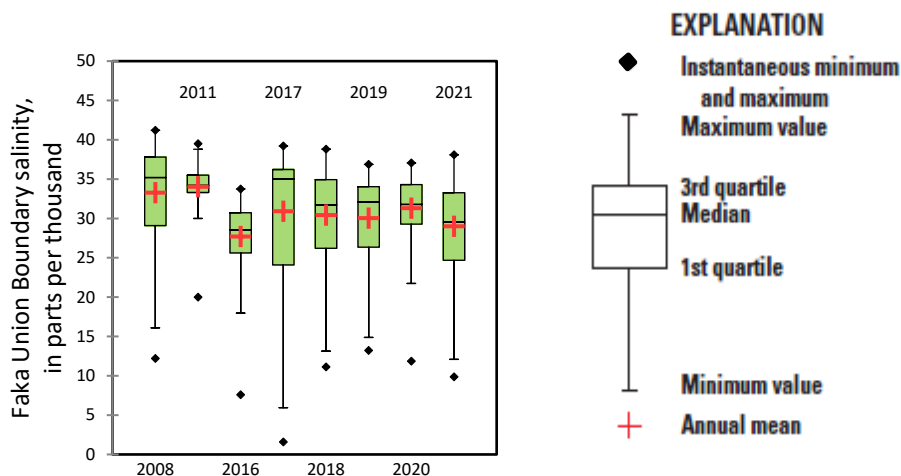


Figure 4. Boxplots showing salinity data by site and water year. A, Faka Union River; B, Pumpkin River; C, East River; D, Blackwater River; E, Faka Union Boundary.**Faka Union Boundary station was moved from channel Marker 6 to off of Panther Key after Hurricane Irma in 2018 water year.

The Faka Union Canal Boat Basin at Port of the Isles, Florida has been identified as a warm water refuge for manatees during winter months. Salinity monitoring equipment was deployed from October 28, 2020 to April 1, 2021 (fig. 5). Surface salinity at Faka Union Canal Boat Basin ranged from 0.2 ppt to 29.9 ppt, with a mean of 6.5 ppt. Bottom salinity ranged from 0.8 ppt to 29.0 ppt, with a mean of 18.7 ppt.

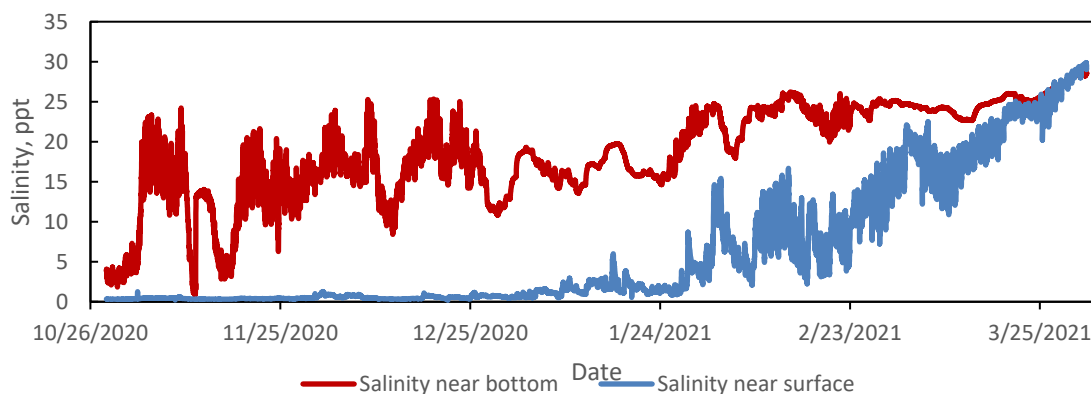


Figure 5. Surface salinity and salinity near the bottom at Faka Union Canal Boat Basin, October 28, 2020 to April 1, 2021.

The air temperature sensor and 7 water column thermistors were deployed from October 28, 2020 to April 1, 2021 (fig. 6). Air temperature at Faka Union Canal Boat Basin ranged from 5.1 to 34.5 degrees Celsius. Water temperature ranged from 18.0 to 29.1 degrees Celsius 5.5 ft above the substrate. Water temperature ranged from 19.6 to

28.3 degrees Celsius 0.5 ft above the substrate. The temperature 0.5 ft below the substrate ranged from 23.0 to 27.1 degrees Celsius.

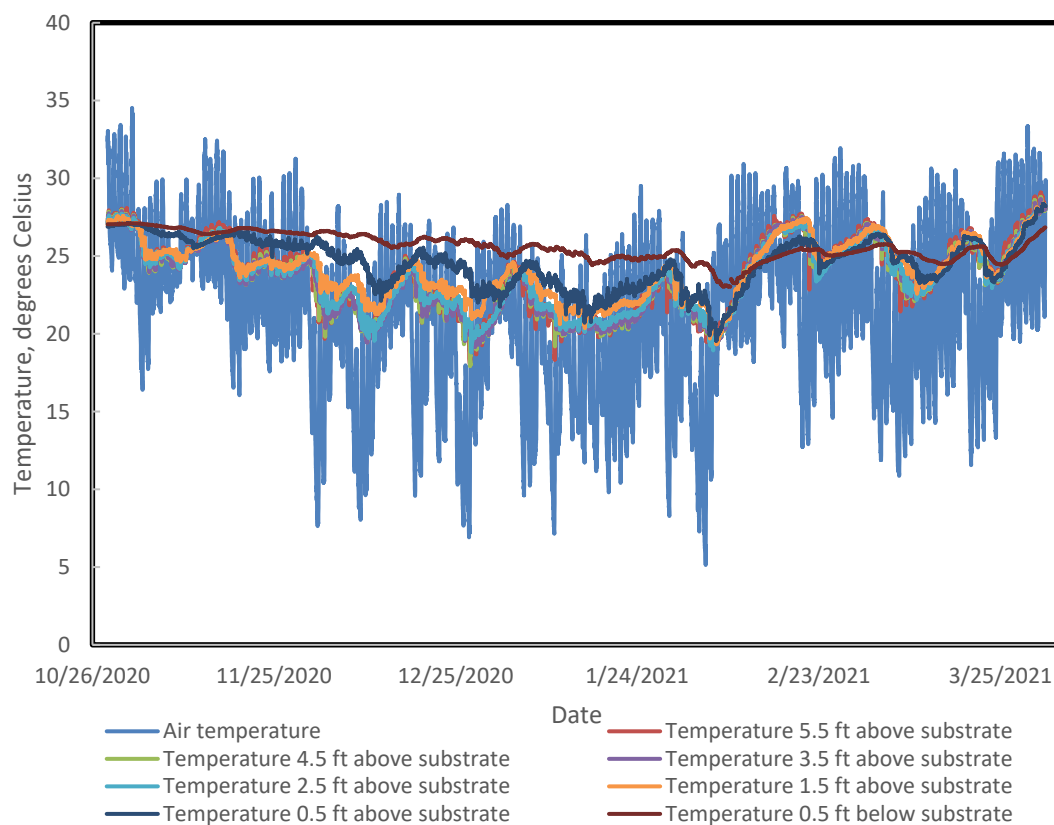


Figure 6. Air and water temperature at Faka Union Canal Boat Basin, October 28, 2020 to April 1, 2021.