

Preliminary Assessment of Water Flows Through the Gulf Intracoastal Waterway and Gulf County Canal

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Paul E. Thurman, PhD

Project History

Project is a collaboration with NWFWMD and DEP

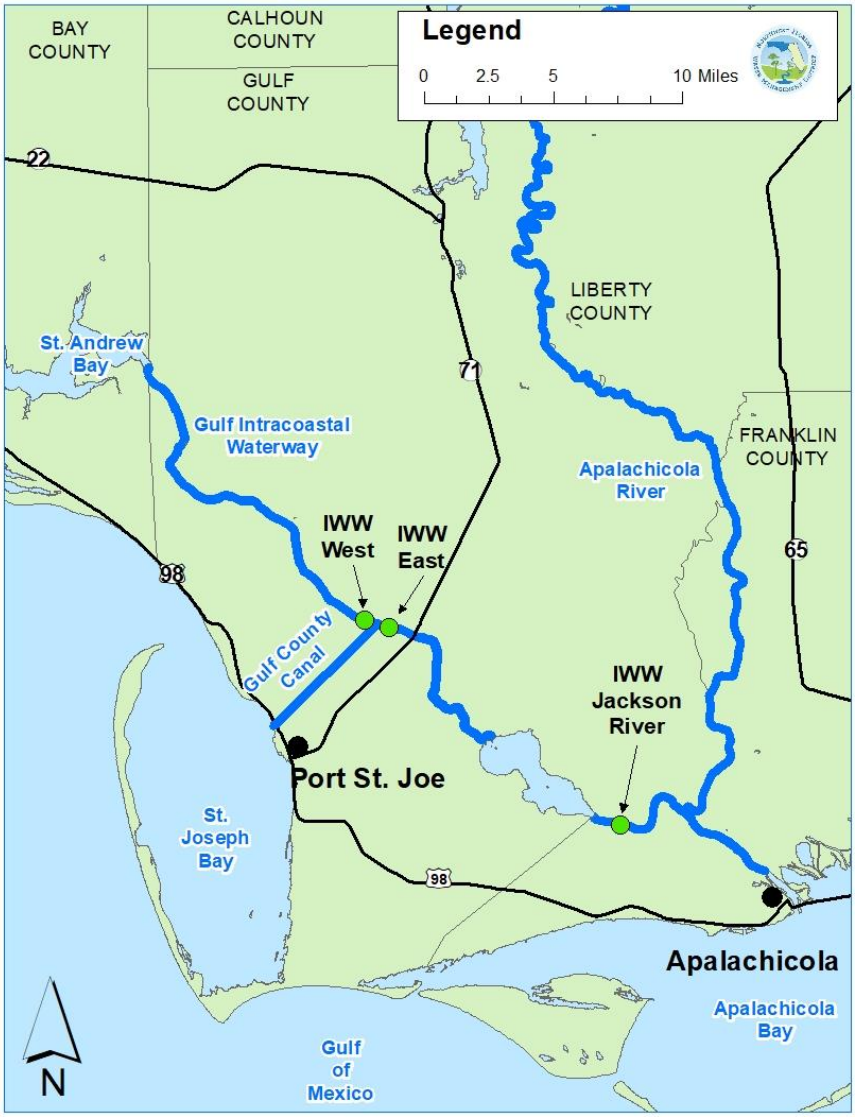
- Began during 2019 as a result of stakeholder concerns of:
  - Changes in ecology and condition of St. Joseph Bay
  - Impacts were undefined
  - Attributed to freshwater flows through the Gulf Intracoastal Waterway (IWW) and Gulf County Canal (GCC)
  - Flows were undocumented and data limited
- Limited historical data on flows throughout the system





Study Area

- St. Joseph Bay
  - Average depth = 21 ft (6.4 m)
  - Few natural surface water inputs
    - Many small tidal creeks
  - Gulf County Canal
    - Unique salinity patterns
- Inland Connections
  - Gulf Intracoastal Waterway
  - Gulf County Canal



History of Gulf Intracoastal Waterway and Gulf County Canal

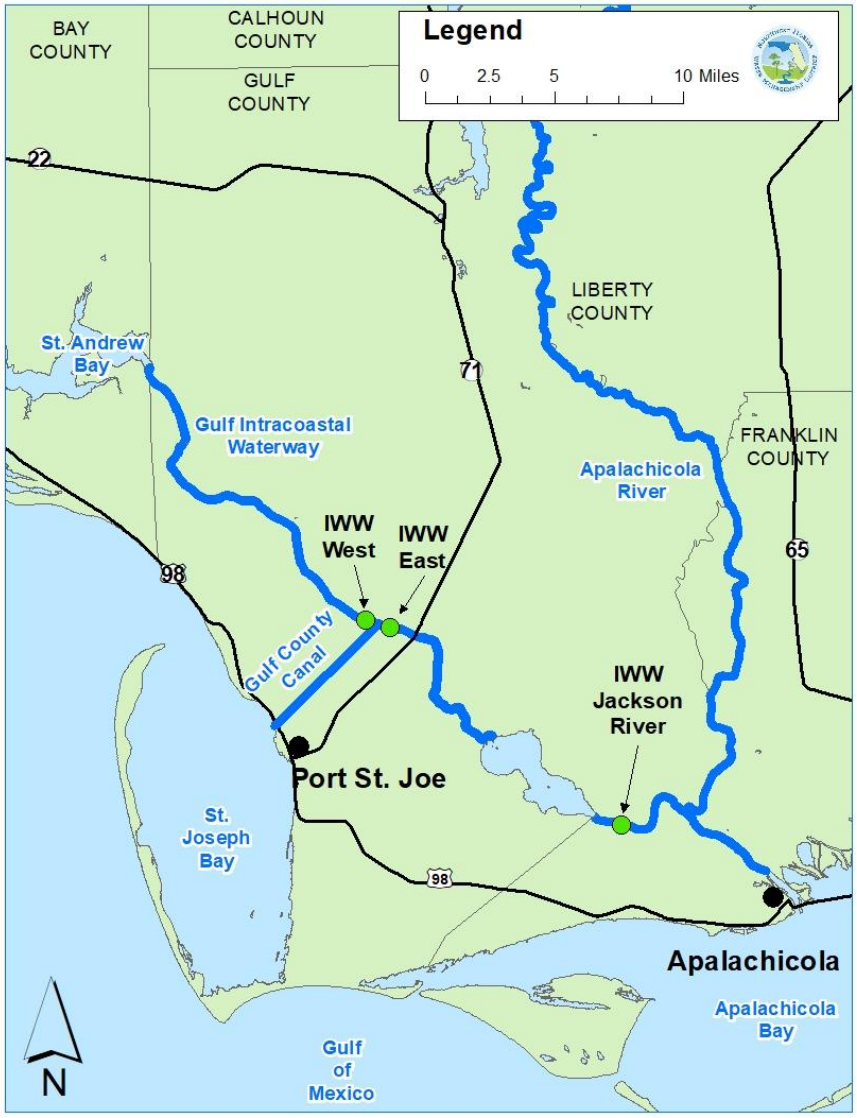
- Provide safe commercial navigation
- Initial construction began in 1938
- Currently, 250 ft wide, 12 ft in depth
- Gulf Intracoastal Waterway
  - From GCC confluence
    - 17 miles to Apalachicola River
    - 16 miles to St. Andrew Bay
- Gulf County Canal - Connects St. Joe Bay to Gulf Intracoastal Waterway
  - Approximately 5 miles long


Gulf County Canal


Gulf Intracoastal Waterway

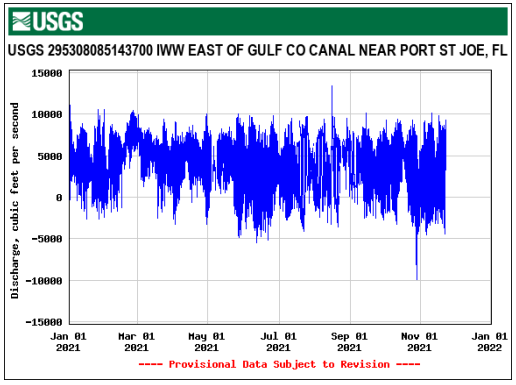
Data Collection Efforts

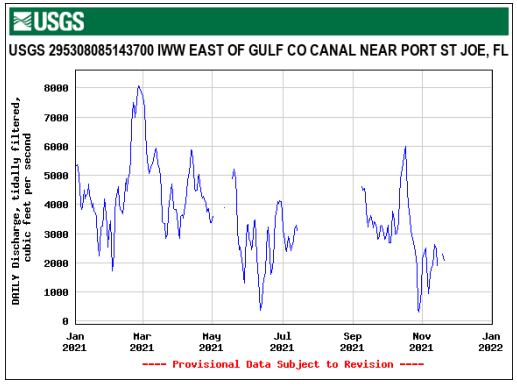
- Data collection began during Sept./Oct. 2020
  - Funded by DEP
  - Constructed three data collection stations in cooperation with USGS
    - Two stations, one on either side of the Gulf County Canal – discharge and water quality
    - One on Gulf Intracoastal Waterway near Jackson River – water quality
- Mass balance approach
  - IWW East Station = Flows towards SJB and SAB
  - IWW West Station = Flows towards SAB
  - IWW East – IWW West = Flows into Gulf County Canal and towards SJB

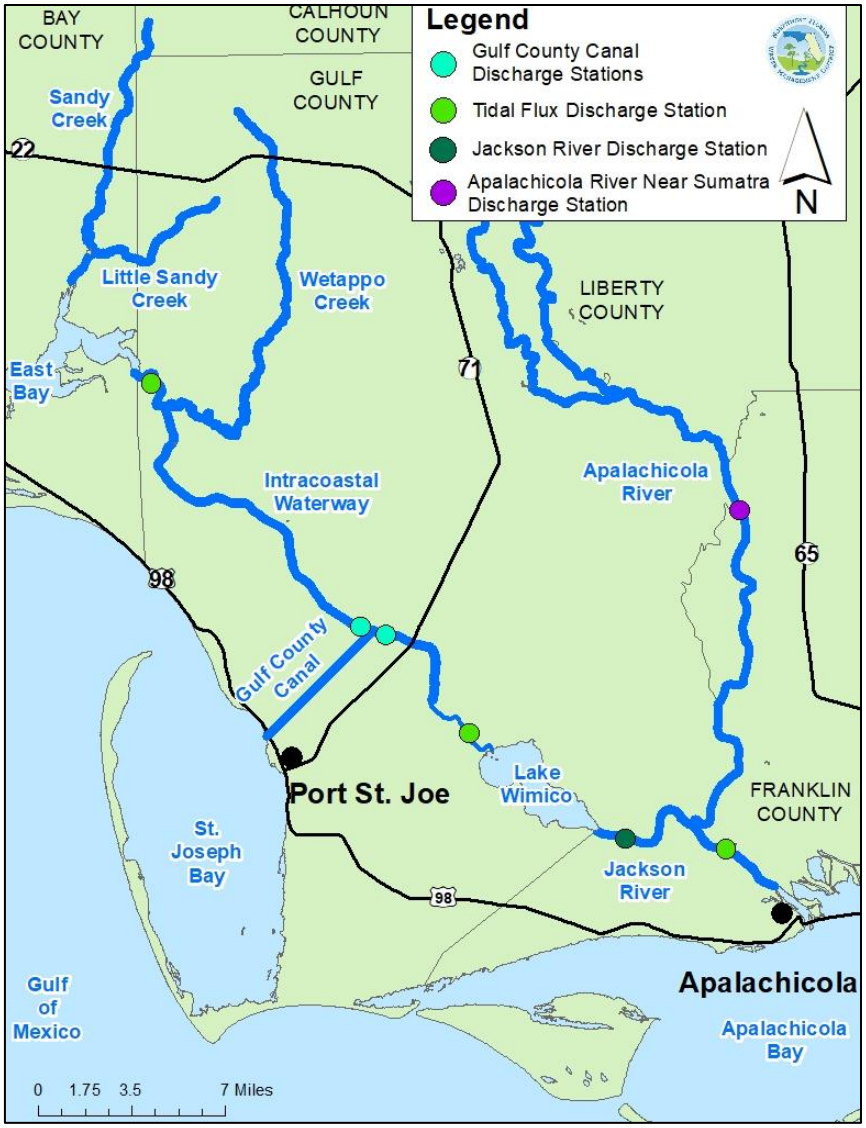


Discharge Data

- Data remains provisional (through November 2022)
- Entire area is tidal and continuous data is very noisy
  - All data has been tidally filtered
  - Discharge data presented is daily average
  - Water can be highly stratified and saline.
- Represents only flows measured at that location
  - From GCC confluence
    - 16 miles to St. Andrew Bay
    - 17 miles to Apalachicola River
    - 31 miles to Apalachicola River Near Sumatra
    - Numerous other sources of flow



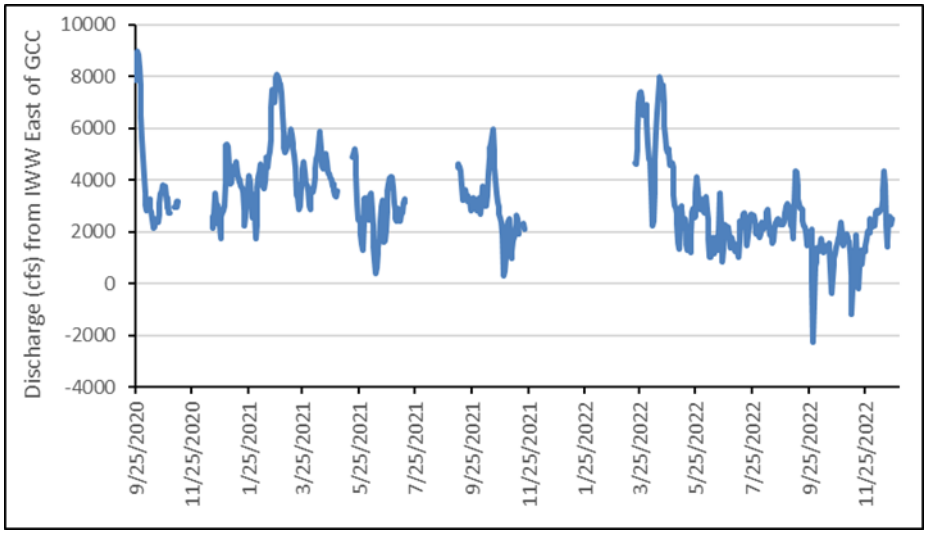




Preliminary Flow Findings

Combined flows toward Gulf County Canal and Intracoastal Waterway towards St. Andrew Bay

- 586 Observations of daily average flow
- Avg. Daily flow = 3,182 cfs
- Highly Variable
  - Range = -2,280 cfs to 8,990 cfs
  - Negative flows are towards Lake Wimico

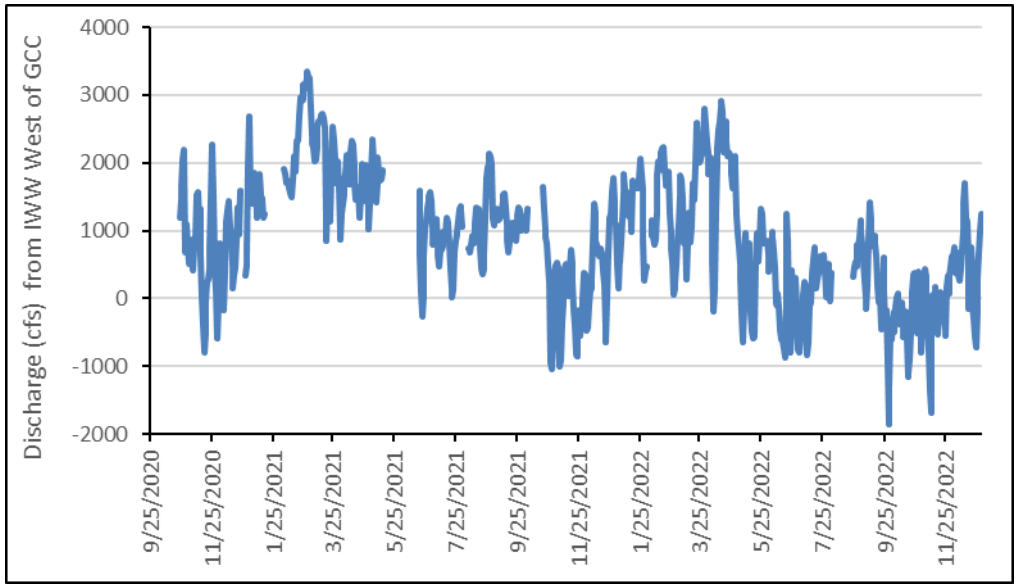




Preliminary Flow Findings

Flows into Intracoastal Waterway Flowing NW of GCC

- Towards St. Andrew Bay
- 697 Observations of daily flow
- Avg. Daily flow = 898 cfs
- Highly Variable
  - Range = -1,850 cfs to 3,350 cfs



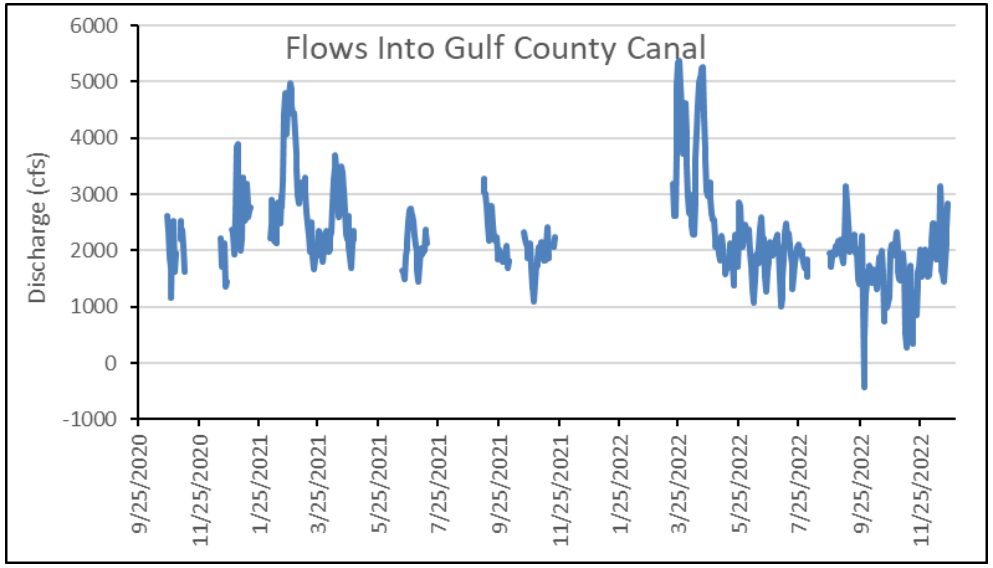


Preliminary Flow Findings

Flows into Gulf County Canal

- Towards St. Joseph Bay
- 467 Observations of daily average flow
- Avg. Daily flow = 2,289 cfs
- Highly Variable
  - Range = -430 cfs to 5,370 cfs

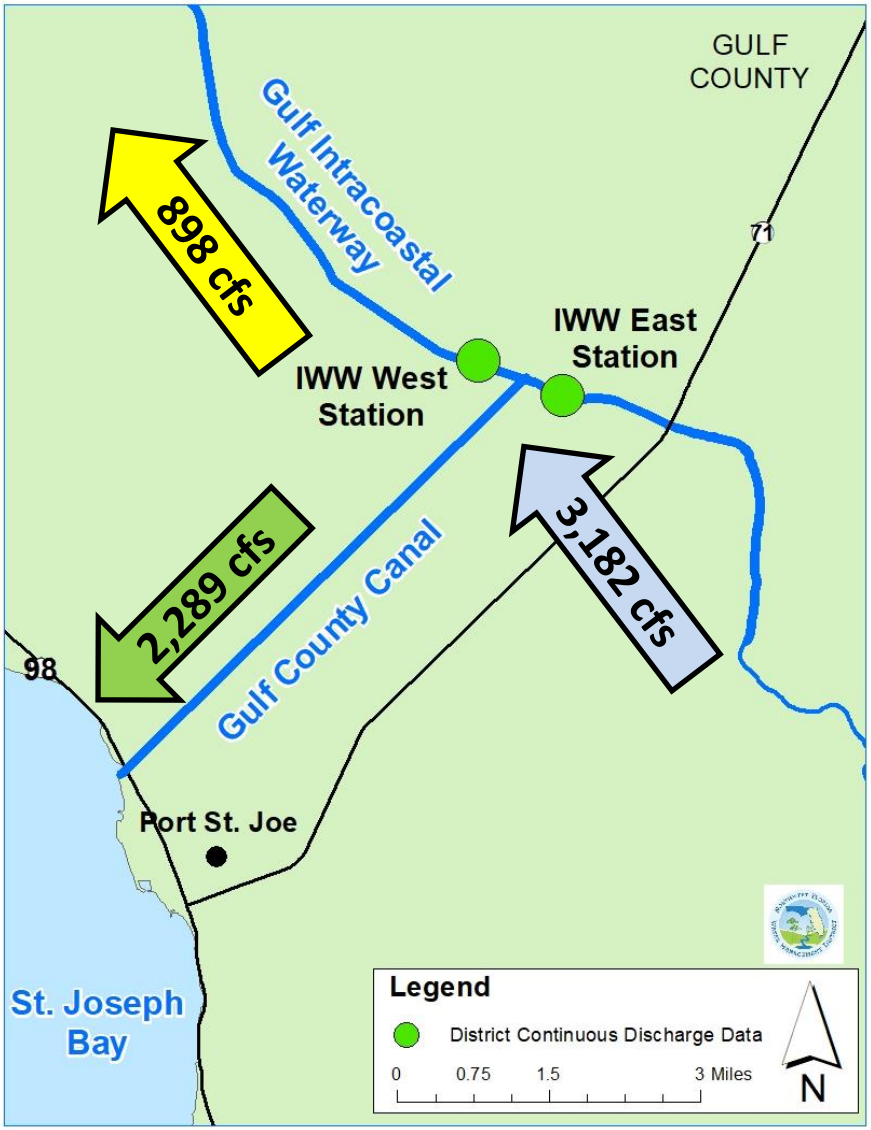






Flow Data Summary

- Presence of Gulf County Canal and Gulf Intracoastal Waterway facilitates flows across surface watersheds
  - Appear to provide relatively large volumes of water to both SJB and SAB
  - Largest known sources of freshwater
- Hydrology of the system(s) is extremely complex and highly variable
  - Discharge volumes, direction, velocities, and seasonality are determined by a complex series of water level interactions
    - Tides, Apalachicola River flows, winds, sea levels, salinity, season



Future Direction of Project

- Continue collecting discharge data and follow the science to determine next steps
  - Important not to rush to conclusions or solutions for unspecified/undocumented problems with incomplete data
- Continuing to discuss with stakeholders their observations, concerns, etc. for the system
  - Identify significant data gaps, bay impairments and causes
- Develop a research plan for St. Joseph Bay
  - Many remaining questions

Remaining Broad Questions About Status of St. Joseph Bay

- Have there been any recent changes in the bay?
  - If so,
    - Why Now?
      - Canals are nothing new – late 1930s
      - Healthy bay ecosystem for 50 years
    - Are they related to changes in fresh-water inflow?
      - Freshwater is essential for estuaries and bays.
      - Ex., have flows into the bay changed?
  - Answer will help determine where future research and resources goes

Remaining Acute Questions

- What are the sources of freshwater measured at the stations relative to each other?
- What happens at extremely high and low flows, different weather/climate conditions, etc.?
- Need to better understand the fate of water flowing into St. Joe Bay, where it goes and what it is doing to the bay
  - Is volume enough to affect St. Joseph Bay?
  - Does the water make it into the lower bay?
- What does this mean for Apalachicola Bay and St. Andrew Bay?

Acknowledgements

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Any Questions?

Paul Thurman, PhD

Paul.Thurman@nwfwater.com

850-539-5999