



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

May 25, 2023

Paul E. Thurman, PhD



Project History

Project is a collaboration with NFWMD 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





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

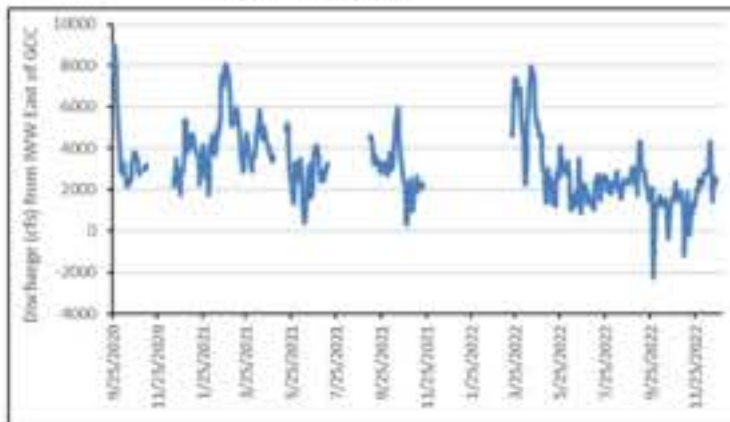




Preliminary Flow Findings

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

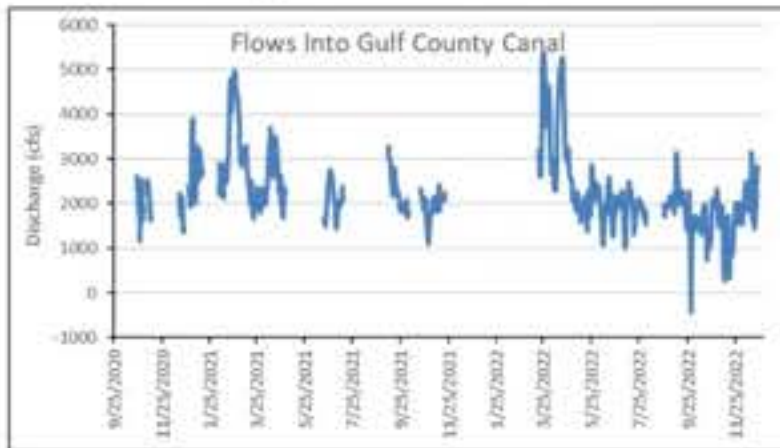




Preliminary Flow Findings

Flows into 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

- This Grant is being funded in part by the Florida Department of Environmental Protection
- Florida DEP – Dr. Mark Rains, Sara Davis, Kristine Morris, Linda Powell, Jon Brucker
- USGS – Ron Knapp
- NFWWMD – Lyle Seigler, Caitlin Brongel, Carlos Herd, Kathleen Coates



Any Questions?

Paul Thurman, PhD

Paul.Thurman@nwfwater.com

850-539-5999