

Data, data everywhere ... information distillation for Lake Okeechobee and Caloosahatchee River condition assessment

TBEP Open Science Subcommittee

*Sanibel-Captiva Conservation Foundation
Conservancy of Southwest Florida*

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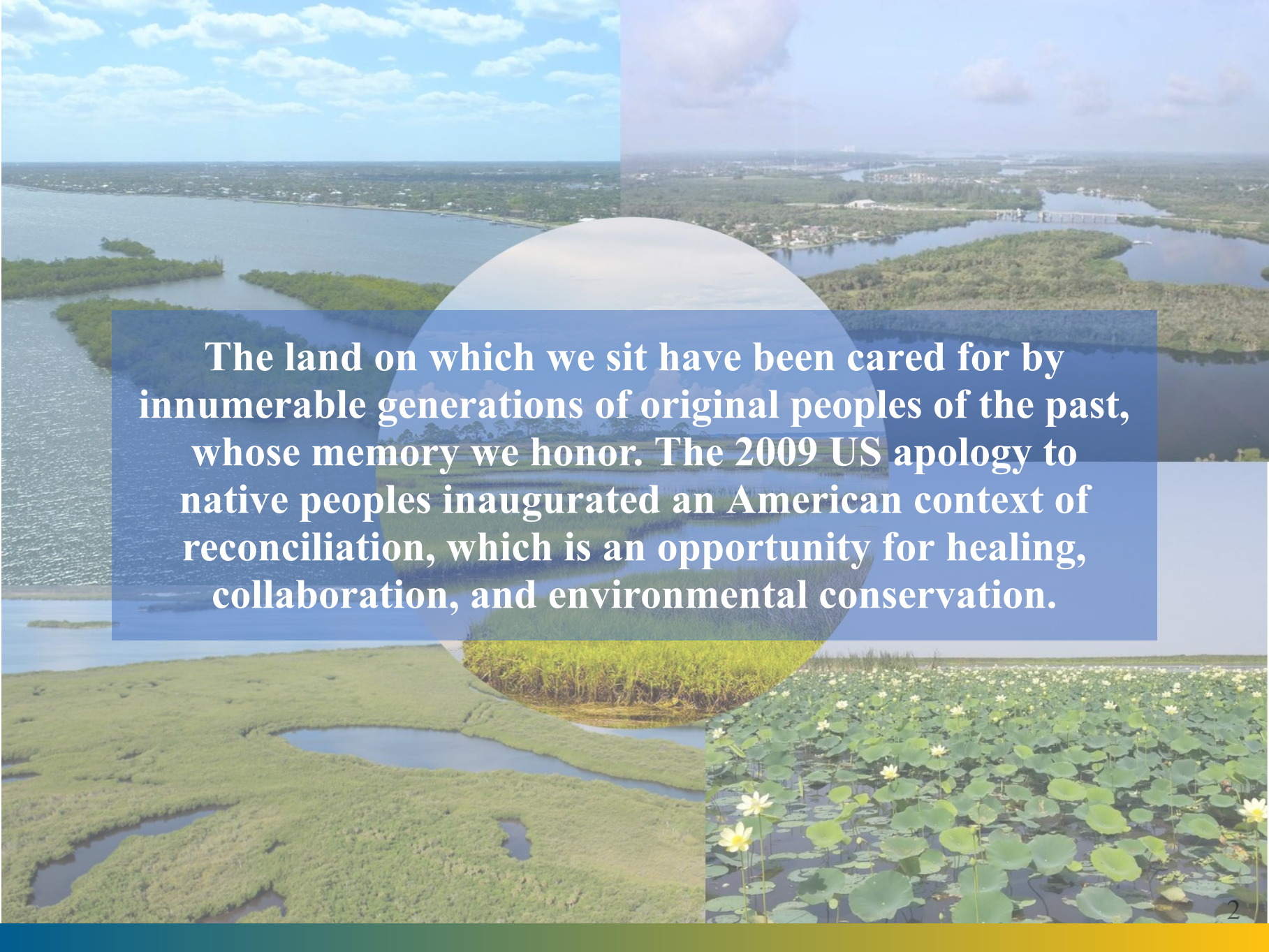
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February 01, 2022

Use cursor keys for navigation, press "O" for a slide Overview

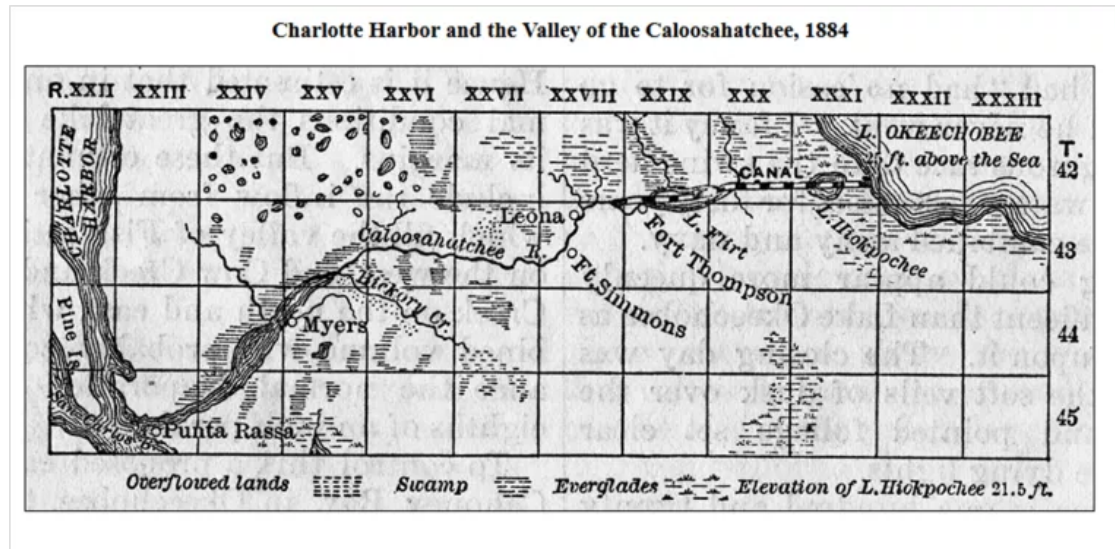
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The background of the slide is a collage of nature photographs. The top left shows a wide river or bay under a blue sky with white clouds. The top right shows a marshy area with a small bridge and distant buildings. The bottom left shows a green, winding waterway through a marsh. The bottom right shows a pond filled with green lily pads and white flowers. A large, semi-transparent blue circle is centered over the text.

The land on which we sit have been cared for by innumerable generations of original peoples of the past, whose memory we honor. The 2009 US apology to native peoples inaugurated an American context of reconciliation, which is an opportunity for healing, collaboration, and environmental conservation.

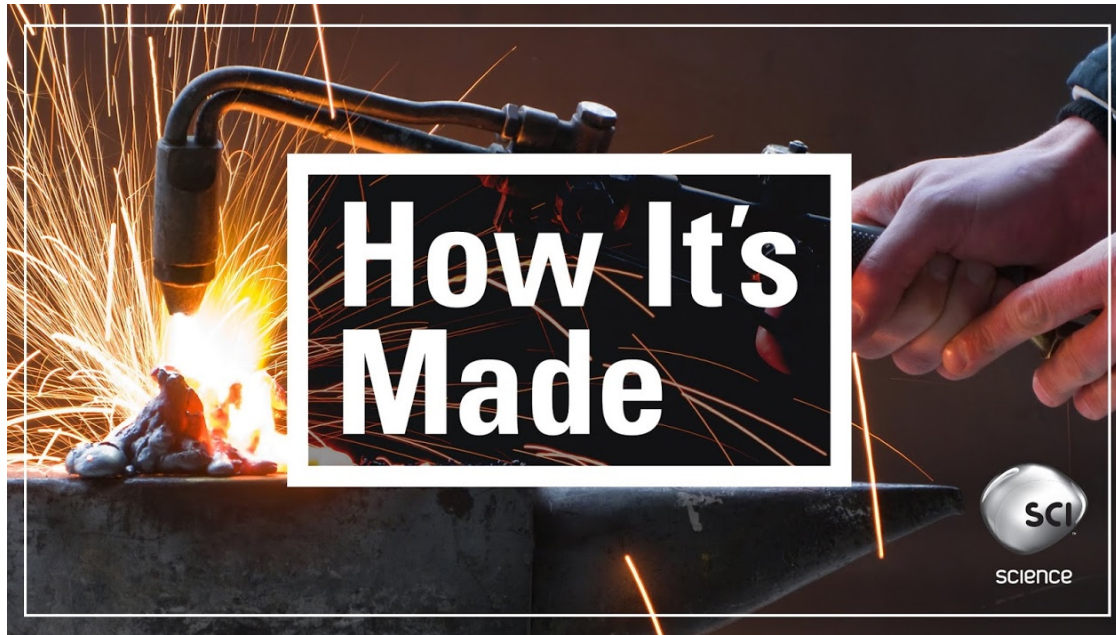
Caloosahatchee River



- Historically the river was not connected to Lake Okeechobee
- Channelized river and estuary are challenged by extremes of too much or too little water
- In 2011, SCCF policy staff developed a weekly report of Caloosahatchee, estuary and coastal conditions to provide real time conditions to water managers at USACE and SFWMD

Caloosahatchee River

- Great reports that consolidated a lot of information into 1 - 2 pages
 - Jan 18th report



pre 2021

How It's Made (pre-2021)

1. visit [USACE](#) Daily Reports webpage

- Check Lake Okeechobee Net Inflows - [link](#)
- Check Lake Okeechobee Net Outflows - [link](#)
- Check Lake Okeechobee & Vicinity - [Link](#)
- Verify spillway volumes (S77, S78, S79, etc.) & Check rainfall values

2. Copy all data into spreadsheet to summarize and convert data

3. Check HAB update -

- Red Tide (*Karina brevis*) Check FWC Red tide update - [link](#)
 - If in bloom period (Sept to December) check bloom map/remote sensing info
- Freshwater Blue-Green Algae - Lee County Environmental Lab/FDEP information

4. Receive various other data from SCCF Marine Lab and other Stakeholders

5. ...other valuable information (i.e. Shellfish advisory, Beach Conditions, Wildlife Impacts, USACE water management, etc.)

6. Consolidate info into word document, pdf and post

...and now

Steps 1 -3 and 6 can all be done via webscraping, API access to data, consistent calculations and consolidation via Open Science applications.

A rudimentary example in R:

```
library(rvest)

LO.url="https://w3.saj.usace.army.mil/h2o/reports/r-oke.html"
webpage <- read_html(LO.url)
node.val <- html_nodes(webpage,"pre")

LO.text.vals <- html_text(node.val)

strsplit(as.character(LO.text.vals),"\n")[[1]][2:11]
```

```
## [1] "          U. S. Army Corps of Engineers, Jacksonville District"
## [2] "          Lake Okeechobee and Vicinity Report"
## [3] "          ** Preliminary Data - Subject to Revision **"
## [4] " "
## [5] "Data Ending 2400 hours    27 JAN 2022"
## [6] "
## [7] "-----"
## [8] "Okeechobee Lake Regulation      Elevation      Last Year      2YRS Ago"
## [9] "      (ft-NGVD)      (ft-NGVD)      (ft-NGVD)"
## [10] " *Okeechobee Lake Elevation      15.07      15.57      12.80 (Official El
```

...and now

- Using reproducible open science information gathering can be stream-lined
- Removing time-constraint, more information can be also be included
- Short term trends, weekly water budgets, etc.
- One stop shop for information - [link](#)
- If hosted through github (or other platforms) you can automate to auto-update (to some extent)

Caloosahatchee and Okeechobee Conditions Report

- Purpose
- USACE Data Summary
- Lake Okeechobee
 - Stage Elevation
 - Regional Rainfall
 - Relative Algae Condition
 - Blue-Green Algae Sampling Results
- Caloosahatchee River Estuary
 - Discharge
 - Chlorophyll, Phycocyanin & IDOM
 - Estuary Salinity
 - Red Tide Abundance
 - Red Tide Forecast
- Charlotte Harbor
 - Discharge



Updated: 2022-01-26 08:28:00 EST

Purpose

This webpage/report is intended to aggregate information from different agencies (i.e. USACE, SFWMD, FWC, USGS and NOAA) into one spot to help inform local government agencies and stakeholders on conditions within Lake Okeechobee, the Caloosahatchee River and Estuary and Coastal southwest Florida. The data provided here should be considered preliminary and are subject to change.

... confession



The final conditions report is not 100% reproducible but is constructed using the daily Regional Conditions report

The Regional Conditions report is also used to propagate the Weekly Water Conditions Tracker.

Slowly evolving our process

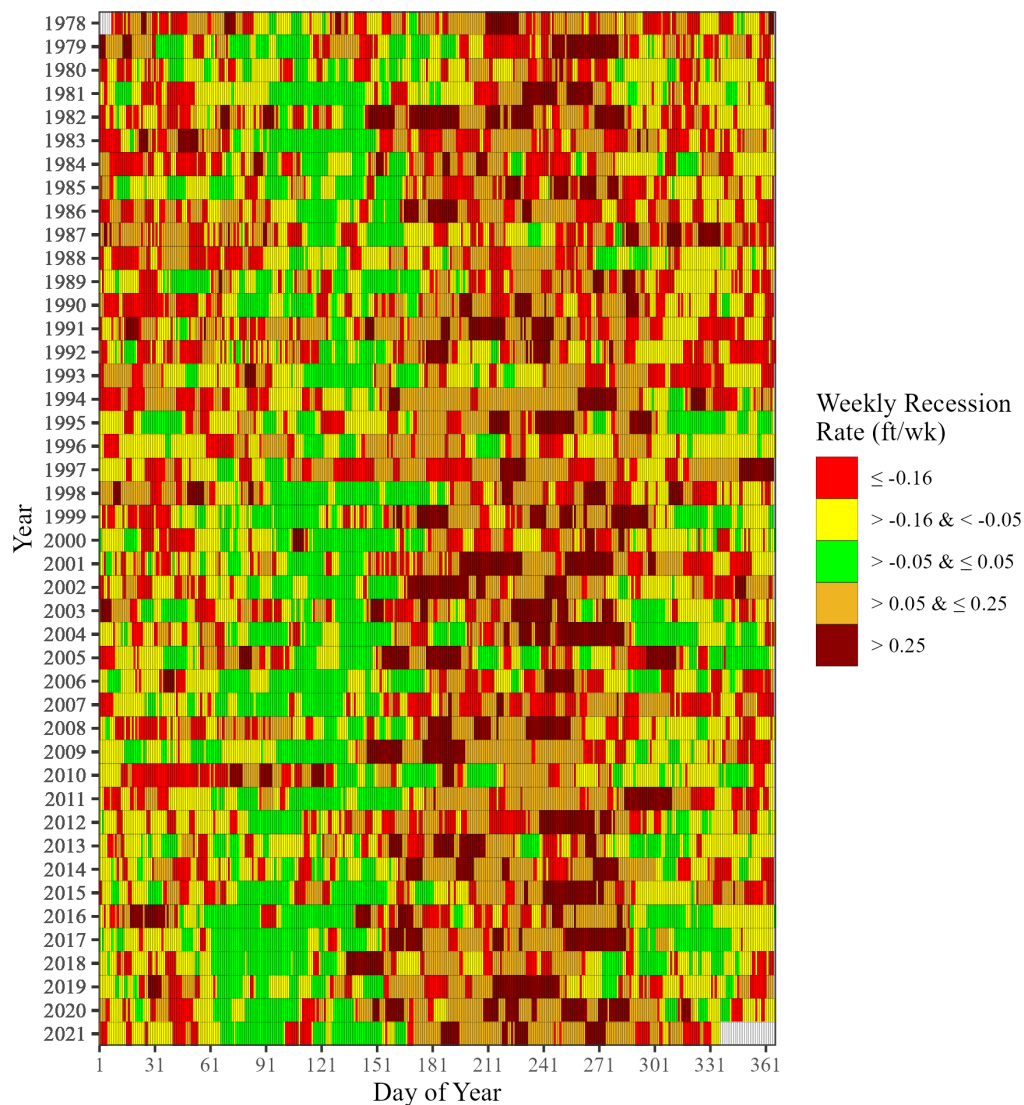
- External sources of data (light attenuation, salinity, etc.)
- As available or if suitable information is added such as drone images (SCCF Drone), Wildlife, Algae conditions, etc.

Other tools/reports

- Caloosahatchee Water Quality Dashboard - [link](#)
- Lake Okeechobee WBID Evaluation - [link](#)
- Caloosahatchee River Rainfall and Discharge - [link](#)


Lake Okeechobee Recession/Accession Rate

Observed Weekly Recession/Accession Rates



Produced: 03 Dec 2021

Sharing is caring

- Open science is a continuum (not open vs closed)
 - As code and tools are tested and put through its paces they can be shared (via GitHub, etc.)
 - Its not all or nothing
- How do I share my reports, cool data visualizations or tools?
 - GitHub Pages
 - Build your own website hosted through Github (simple to fancy)
 - Here is our <https://sccf-tech.github.io/>... looks familiar? Because its based on <https://tbep-tech.github.io/>
 - RStudio Connect
 - Server product from RStudio for secure sharing of applications, reports and plots.
 - Social Media
 - : Strong [#rstat](#) community
 - [Example](#)
 - [Example](#)

Conclusion

- Gone is the dark times of spreadsheets and countless folders of maps, graphs, etc.
- Data aggregation across multiple agencies provides a clearer look at conditions
 - National Oceanic and Atmospheric Administration
 - United States Geological Survey
 - United States Army Corps of Engineers
 - South Florida Water Management District
 - Florida Fish and Wildlife Conservation Commission
 - Florida Department of Environmental Protection
 - Lee County Environmental Lab
 - Sanibel-Captiva Conservation Foundation Marine Lab
 - ...
- Integrating spatial data and data visualizations has also improved how information is evaluated and conveyed
- ...also occasionally we get to put together interesting ways to look at large datasets to get a historical perspective on the system.