Datasets: Field Assessment data, hydrologic monitoring data, habitat maps, and mangrove interannual change maps for Jobos Bay and Rookery Bay NERRs associated with the Mangrove Coast Collaborative Project

This document provides detailed information about fourteen datasets that were generated through two projects, including a Collaborative Research project titled *Mangrove Coast Collaborative / Colaboración en Mangles Costeros: Understanding Links between Degradation, Recovery, and Community Benefits* and a Catalyst project titled *Limits of Resilience: Uncertain Recovery in Mangrove Ecosystems Following Repeated Hurricane Disturbance*

These projects were supported by the National Estuarine Research Reserve System (NERRS) Science Collaborative, which is funded by the National Oceanic and Atmospheric Administration. All Science Collaborative supported projects that collect new data adhere to federal data sharing and archiving requirements.

About the Associated Collaborative Research Project

Title: Mangrove Coast Collaborative / Colaboración en Mangles Costeros: Understanding Links between Degradation, Recovery, and Community Benefits
Project page: https://nerrssciencecollaborative.org/project/Ogurcak20
Grant Type: Collaborative Research
Focus Area(s): Ecosystem Service Valuation, Habitat Restoration, Climate Change
Keyword(s): mangrove, ecosystem services, habitat mapping, wetland resilience
Reserve(s): Jobos Bay, PR; Rookery Bay, FL
Project Duration: November 2020 - September 2024
Grant Amount: $599,966.00
Project Contacts:

- Project Lead and Co-Technical Lead:
  - Danielle Ogurcak, Florida International University
- Collaborative Leads:
  - Marissa Figueroa, Rookery Bay NERR
  - Jessica McIntosh, Rookery Bay NERR
  - Aitza Pabon, Jobos Bay NERR
- Technical Leads:
  - Brita Jessen, South Carolina Sea Grant Consortium
  - Sarah Mason, Duke University
  - Digna Rueda Roa, University of South Florida

Project Partners
Florida International University Institute of Environment, Duke University Nicholas School of Environment, University of South Florida Institute for Marine Remote Sensing

Collaborative Research Project Description

Within the NERR system, Rookery Bay and Jobos Bay are unique in being the only reserves with coastlines historically dominated by mangrove habitats. These reserves also experience a higher frequency of Category 3-5 hurricanes. While mangrove forests are adapted to frequent hurricane disturbance, the resilience of mangrove ecosystems is challenged by the cumulative effects of climate change, urbanization, and water management. Against these background stressors, major hurricanes may serve as tipping points for rapid ecosystem transformation of mangrove forests.

The Mangrove Coast Collaborative project began in the aftermath of Hurricanes Maria and Irma as Jobos Bay and Rookery Bay National Estuarine Research Reserves (NERRs) jointly recognized the need to understand and enhance the resilience of their mangrove ecosystems and the surrounding communities in southeastern Puerto Rico and southwest Florida, respectively. The project's multi-disciplinary team achieved four main objectives, including:

1. Identifying the spatial extent of the post-hurricane loss and recovery of mangrove habitat using satellite imagery;
2. Assessing the relationships between hurricane impact and recovery in mangrove forests using field sampling;
3. Representing the socio-ecological mangrove system at both reserves by generating a conceptual model of ecosystem services (ES) and an associated ES evidence library; and,
4. Creating increased understanding of how managers make information-based decisions by conducting manager focus groups and semi-structured interviews.

Collaborative engagements were a cornerstone of the project, with over 70 engagements conducted. User input was integrated into the development of products and was critical to the improvement of mapping products, the design of the field sampling campaign, and the development of a conceptual model of ecosystem services. Not only is the science generated during this project being used to aid management decisions and continued recovery efforts for the two reserves, the relationships and trust built among project participants serves as a platform for continued collaboration.

About the Associated Catalyst Project

Title: Limits of Resilience: Uncertain Recovery in Mangrove Ecosystems Following Repeated Hurricane Disturbance
Project page: https://nerrssciencecollaborative.org/project/Ogurcak23
Grant Type: Catalyst
Focus Area(s): Ecosystem Service Valuation, Habitat Restoration
Keyword(s): mangrove, ecosystem services, habitat mapping, resilience
Reserve(s): Jobos Bay, PR; Rookery Bay, FL
Project Duration: October 2023 - March 2025
Grant Amount: $150,274.00
Project Contacts:

- Project and Co-Technical Lead:
  - Danielle Ogurcak, Florida International University, dogurcak@fiu.edu
- Collaborative Leads:
  - Marissa Figueroa, Rookery Bay NERR, Marissa.B.Figueroa@FloridaDEP.gov; Aitza Pabon, Jobos Bay NERR, apabon@drna.pr.gov
- Co-Technical Lead:
  - Digna Rueda-Roa, University of South Florida, druedaro@usf.edu

Project Partners
Florida International University Institute of Environment, University of South Florida Institute for Marine Remote Sensing

Catalyst Project Description

Mangrove ecosystems of the greater Caribbean region face increasingly frequent tropical cyclones. In 2017, mangrove ecosystems at Jobos Bay NERR and Rookery Bay NERR sustained major impacts from Hurricanes Maria and Irma respectively. Just five years later, both reserves were again impacted by tropical cyclones (Hurricanes Fiona and Ian). To evaluate how mangrove recovery and resilience is impacted by repeated disturbances, this project mapped habitat change and assessed hydrological regimes.

This project's approach was adapted from an earlier initiative, the Mangrove Coast Collaborative (MCC). The MCC project had previously shown substantial recovery of the mangrove forest in both reserves after Hurricanes Maria and Irma, but had found persistent areas of minimal regeneration perhaps due to hydrological stress. Drawing on the strong collaborative foundation established by the MCC, this project team was able to mobilize quickly to assess the impacts of Hurricanes Fiona and Ian on ongoing mangrove recovery.

Project users collaborated with the project team via three project advisory committees (PACs) which had previously been established as part of the MCC project. The project advisory committees, two local and one technical, helped guide the project's methods, which included generating habitat and mangrove change maps for each reserve through 2024. Additionally, the team collected data on water depth and porewater salinities in locations of mangrove forest having minimal recovery compared to reference sites to assess the impact of hydrological stress.

Overview of Datasets
Fourteen datasets are described in this document:

1. Post-hurricane Maria mangrove forest structure data, Jobos Bay NERR (Mar - Aug 2022)
2. Post-hurricane Irma mangrove forest structure data, Rookery Bay NERR (Feb 2022 - Mar 2023)
3. Post-hurricane Maria mangrove forest understory data, Jobos Bay NERR (Mar - Aug 2022)
4. Post-hurricane Irma mangrove forest understory data, Rookery Bay NERR (Feb 2022 - Mar 2023)
5. Down woody debris data in mangrove forests, Jobos Bay NERR (Mar - Aug 2022)
6. Down woody debris data in mangrove forests, Rookery Bay NERR (Feb 2022 - Mar 2023)
7. Hydrologic monitoring data in mangrove forests, Jobos Bay NERR (Apr - Dec 2024)
8. Hydrologic monitoring data in mangrove forests, Rookery Bay NERR (Apr - Dec 2024)
9. Habitat maps for Jobos Bay NERR (2014 - 2020)
10. Habitat maps for Jobos Bay NERR (2021 - 2024)
11. Habitat maps for Rookery Bay NERR (2014 - 2020)
12. Habitat maps for Rookery Bay NERR (2021 - 2024)
13. Mangrove interannual change maps for Jobos Bay NERR (2014 - 2024)
14. Mangrove interannual change maps for Rookery Bay NERR (2014 - 2024)

Archival and access:
All datasets are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologic-monitoring-data-habitat-maps-and-mangrove-interannual-change

Note:
Datasets 1 - 6, 9, and 11 are associated with the MCC Science Collaborative Project https://nerrssciencecollaborative.org/project/Ogurcak20

Datasets 7, 8, 10, and 12 - 14 are associated with the MCC Science Catalyst project https://nerrssciencecollaborative.org/project/Ogurcak23

Datasets 13 and 14 are derived from datasets created during both projects.

Questions about these datasets can be directed to:
Danielle Ogurcak (dogurcak@fiu.edu), Digna Rueda Roa (druedaro@usf.edu), Tylar Murray (tylarmurray@usf.edu)

1. **Post-Hurricane Maria mangrove forest structure data, Jobos Bay NERR**

General description of data:
The dataset describes the structure, composition, and condition of mangrove forests in Jobos Bay NERR assessed approximately 5 years after disturbance from Hurricane Maria (2017). The dataset includes information on each stem greater than or equal to 1 cm DBH (diameter at breast height) rooted within 64 100 m^2 circular plots. Information collected includes site ID, location, species, DBH, status (live or dead), damage associated with the hurricane, presence/absence of regrowth, presence/absence of adventitious roots, whether or not stem is part of a multi-stemmed individual, and the canopy conditions (whether the tree has a canopy or is only sprouting at the base of the tree or trunk). This dataset is associated with the Mangrove Coast Collaborative project (2020 - 2024).

Search keywords:
Disturbance; field assessment; Hurricane Maria; Jobos Bay; mangrove forest; permanent plot sampling; Puerto Rico

More about the data:
- A stratified random sampling design combined with 1 targeted site suggested by Reserve staff (JBNERR Wetlands and Water Levels site) was used for plot selection. Stratification considered the geographic area of the reserve and dominant forest type (red mangrove, black mangrove, mixed mangrove, white mangrove) prior to Hurricane Maria.
- Dead stems were categorized as likely having died prior to Hurricane Maria (Dead Before - DB), attributable to the hurricane (Dead Hurricane - DH), or having died more recently from other causes (Dead Recent - DR).
- Data for each plot was collected during 1 or 2 days for each site.
- Plots were permanently marked in the center with a PVC pipe and coordinates of the center point were obtained with a Trimble GeoExplorer 6000 GeoXT unit with horizontal accuracy typically within 1 meter. Under the densest tree canopies, horizontal accuracy may be reduced to 7 - 10 m.

Data collection period:
March, 2022 to August, 2022

Geographic extent:
Jobos Bay National Estuarine Research Reserve and adjacent lands including Aguirre Forest.
Latitude Limits [17.91385218, 17.96614999]
Longitude Limits [-66.16764795, -66.26663533]

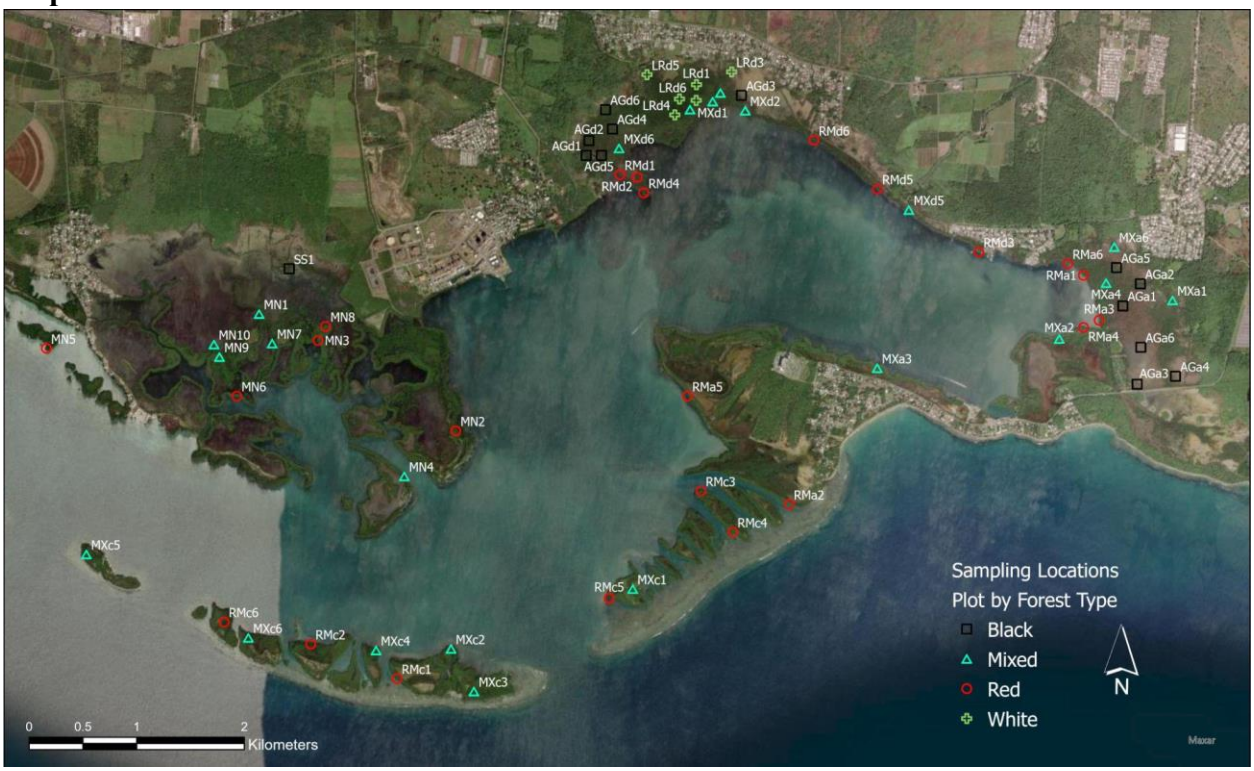
File format:
CSV

File name(s):
JobosBay_MangroveStructure_2022.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D., K. Colón Lozada, and A. Ramirez-Jiménez. 2025. Mangrove Coast Collaborative Project, Post-hurricane Maria mangrove forest structure data, Jobos Bay NERR, March 2022 - August 2022 ver 1. Environmental Data
Initiative. https://doi.org/10.6073/pasta/e440c83479e331b622d040e8afa5d03d

Maps and schematics for data collection



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2. Post-Hurricane Irma mangrove forest structure data, Rookery Bay NERR

General description of data:
The dataset describes the structure, composition, and condition of mangrove forests in Rookery Bay NERR assessed approximately 5 years after disturbance from Hurricane Irma (2017). The

dataset includes information on each stem greater than or equal to 1 cm DBH (diameter at breast height) rooted within 69 100 m^2 circular plots. Information collected includes site ID, location, species, DBH, status (live or dead), damage associated with the hurricane, presence/absence of regrowth, presence/absence of adventitious roots, whether or not stem is part of a multi-stemmed individual, and the canopy conditions (whether the tree has a canopy or is only sprouting at the base of the tree or trunk). This dataset is associated with the Mangrove Coast Collaborative project (2020 - 2024).

Search keywords:
disturbance; ecosystem resilience; field assessment; Hurricane Irma; mangrove forest; permanent plot sampling; Rookery Bay; southwest Florida

More about the data:

- A stratified random sampling design combined with 5 targeted sites suggested by Reserve staff and collaborators was used for plot selection
- Sites were stratified by dominant species (red mangrove, black mangrove, and mixed mangrove forest) and geographic location (eastern reserve, central reserve, northern reserve).
- Hurricane Ian passed to the north of Rookery Bay in September 2022 during the middle of the field assessment with one third of the plots remaining to be sampled. As the effects to Rookery Bay were primarily from the associated storm surge, it was possible to differentiate effects from Hurricane Irma and Ian.
- Dead stems were categorized as likely having died prior to Hurricane Irma (Dead Before - DB), attributable to the hurricane (Dead Hurricane - DH), or having died more recently from other causes (Dead Recent - DR).
- Data for each plot was collected during 1 or 2 days for each site.
- Plots were permanently marked in the center with a PVC pipe and coordinates of the center point were obtained with a Trimble GeoExplorer 6000 GeoXT unit with horizontal accuracy typically within 1 meter. Under the densest tree canopies, horizontal accuracy may be reduced to 3 - 5 m.

Data collection period:
February, 2022 to March, 2023

Geographic extent:
Rookery Bay National Estuarine Research Reserve
Latitude Limits [25.8417446899999, 26.0966649]
Longitude Limits [-81.4978423099999, -81.7938469]

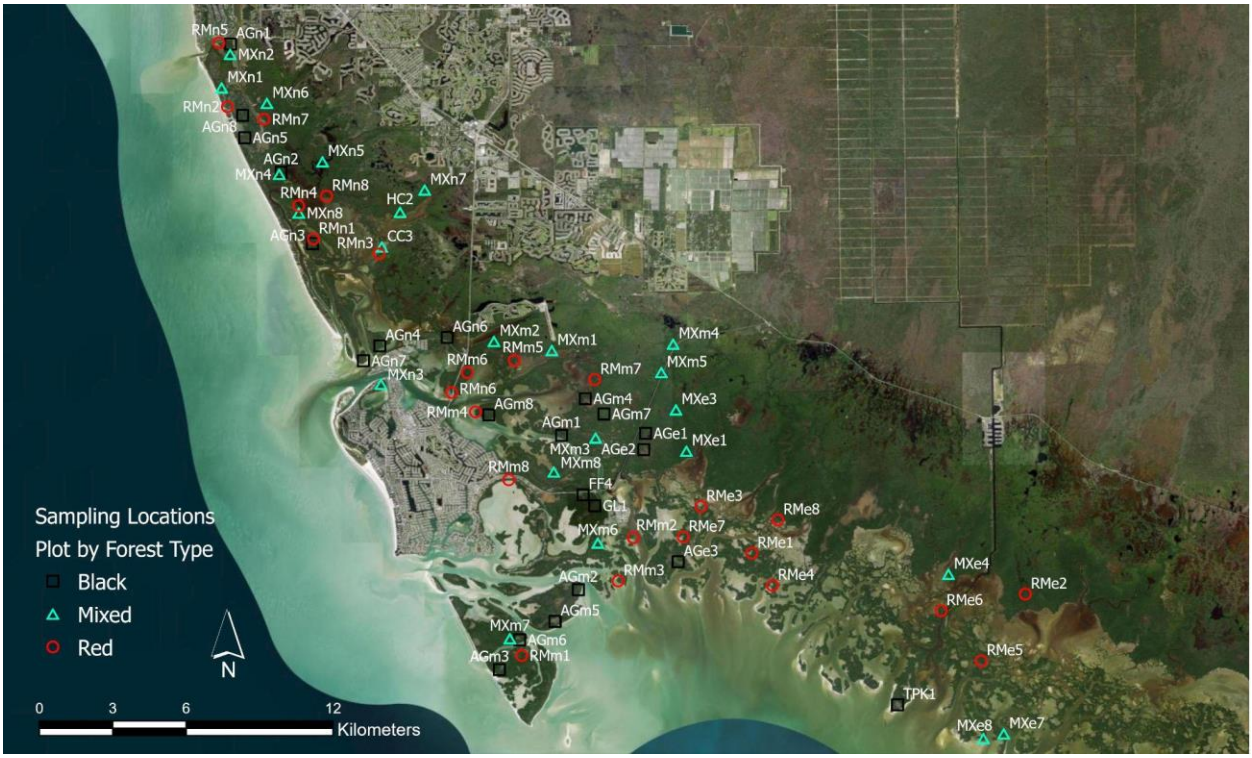
File format:
CSV

File name(s):
RookeryBay_MangroveStructure_2022_2023.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data are also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D., K. Colón Lozada, Z. Shribman, and A. Guarin. 2025. Mangrove Coast Collaborative Project, Post-hurricane Irma mangrove forest structure data, Rookery Bay NERR, February 2022 - March 2023 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/c1a59c4255992d2a81ca542f32802f1c

Maps and schematics for data collection



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3. **Post-Hurricane Maria mangrove forest understory data, Jobos Bay NERR**

General description of data:
This dataset describes the structure and composition of the mangrove forest understory in Jobos Bay NERR assessed approximately 5 years after disturbance from Hurricane Maria (2017). The dataset includes information on the number of seedlings and saplings of each species as sampled in four 1m^2 quadrats in each 100 m^2 structural sampling plot. The dataset also includes counts of the five tallest pneumatophores occurring in each quadrat. The height of pneumatophores was

used as a proxy for the average maximum high water level in a plot. This dataset is associated with the Mangrove Coast Collaborative project (2020 - 2024).

Search keywords:
Disturbance; field assessment; Hurricane Maria; Jobos Bay; mangrove forest; pneumatophore; Puerto Rico; quadrat sampling; regeneration

More about the data:

- Seedlings are defined as individuals with a height less than 50 cm and saplings are defined as individuals greater than or equal to 50 cm but having a diameter at breast height of less than 1 cm.
- Dead seedlings and saplings were tallied separately from live individuals.
- Pneumatophores present in a plot could include those from either black mangrove or white mangrove. The species from which the heights were taken was recorded.

Data collection period:
March, 2022 to August, 2022

Geographic extent:
Jobos Bay National Estuarine Research Reserve and adjacent lands including Aguirre Forest.
Latitude Limits [17.91385218, 17.96614999]
Longitude Limits [-66.16764795, -66.26663533]

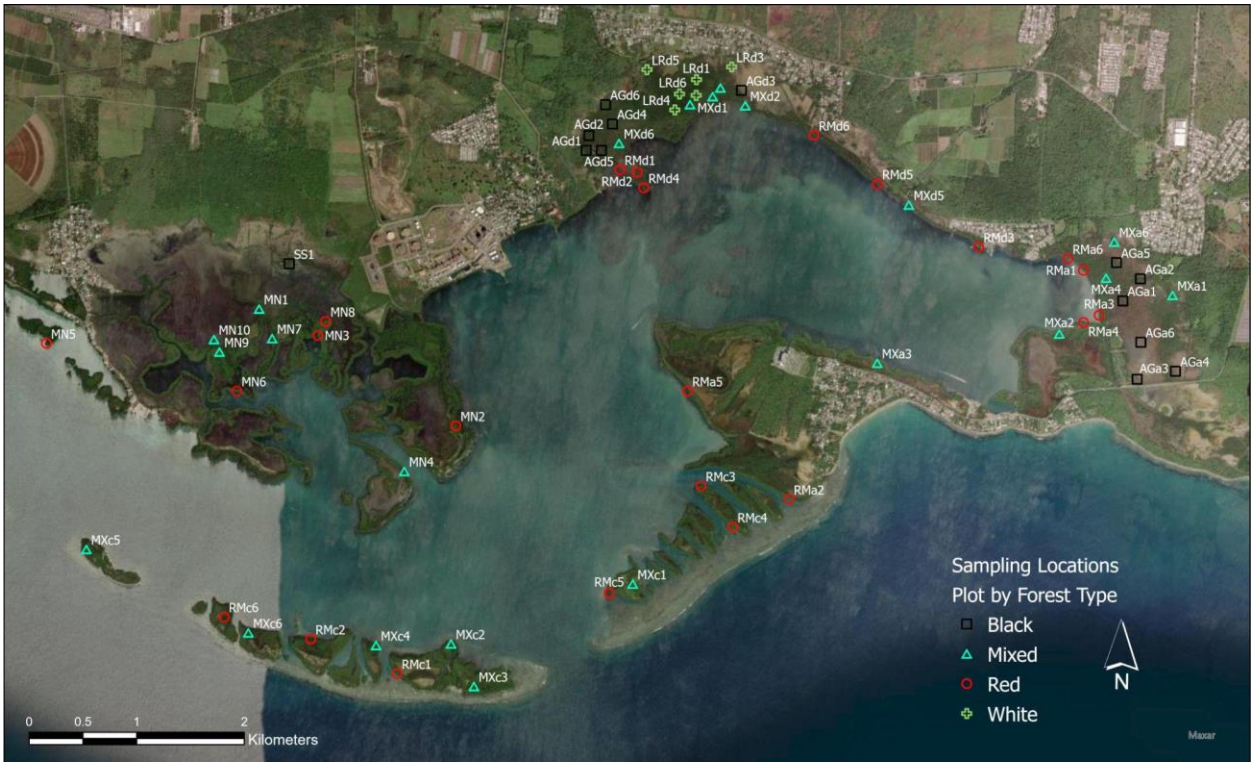
File format:
CSV

File name(s):
JobosBay_MangroveUnderstory_2022.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data are also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D., K. Colón Lozada, and A. Ramirez-Jiménez. 2025. Mangrove Coast Collaborative Project, Post-hurricane Maria mangrove forest understory data, Jobos Bay NERR, March 2022 - August 2022 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/2b30aefa28320f373f27fe746f79d966

Maps and schematics for data collection



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4. Post-Hurricane Irma mangrove forest understory data, Rookery Bay NERR

General description of data:
This dataset describes the structure and composition of the mangrove forest understory in Rookery Bay NERR assessed approximately 5 years after disturbance from Hurricane Irma (2017). The dataset includes information on the number of seedlings and saplings of each species as sampled in four 1 m^2 quadrats in each 100 m^2 structural sampling plot. The dataset also includes counts of the five tallest pneumatophores occurring in each quadrat. The height of pneumatophores was used as a proxy for the average maximum high water level in a plot. This dataset is associated with the Mangrove Coast Collaborative project (2020 - 2024).

Search keywords:
Disturbance; field assessment; Hurricane Irma; mangrove forest; pneumatophore; quadrat sampling; regeneration; Rookery Bay

More about the data:

- Seedlings are defined as individuals with a height less than 50 cm and saplings are defined as individuals greater than or equal to 50 cm but having a diameter at breast height of less than 1 cm.
- Dead seedlings and saplings were tallied separately from live individuals.

- Pneumatophores present in a plot could include those from either black mangrove or white mangrove. The species from which the heights were taken was recorded.

Data collection period:
February, 2022 to March, 2023

Geographic extent:
Rookery Bay National Estuarine Research Reserve
Latitude Limits [25.8417446899999, 26.0966649]
Longitude Limits [-81.4978423099999, -81.7938469]

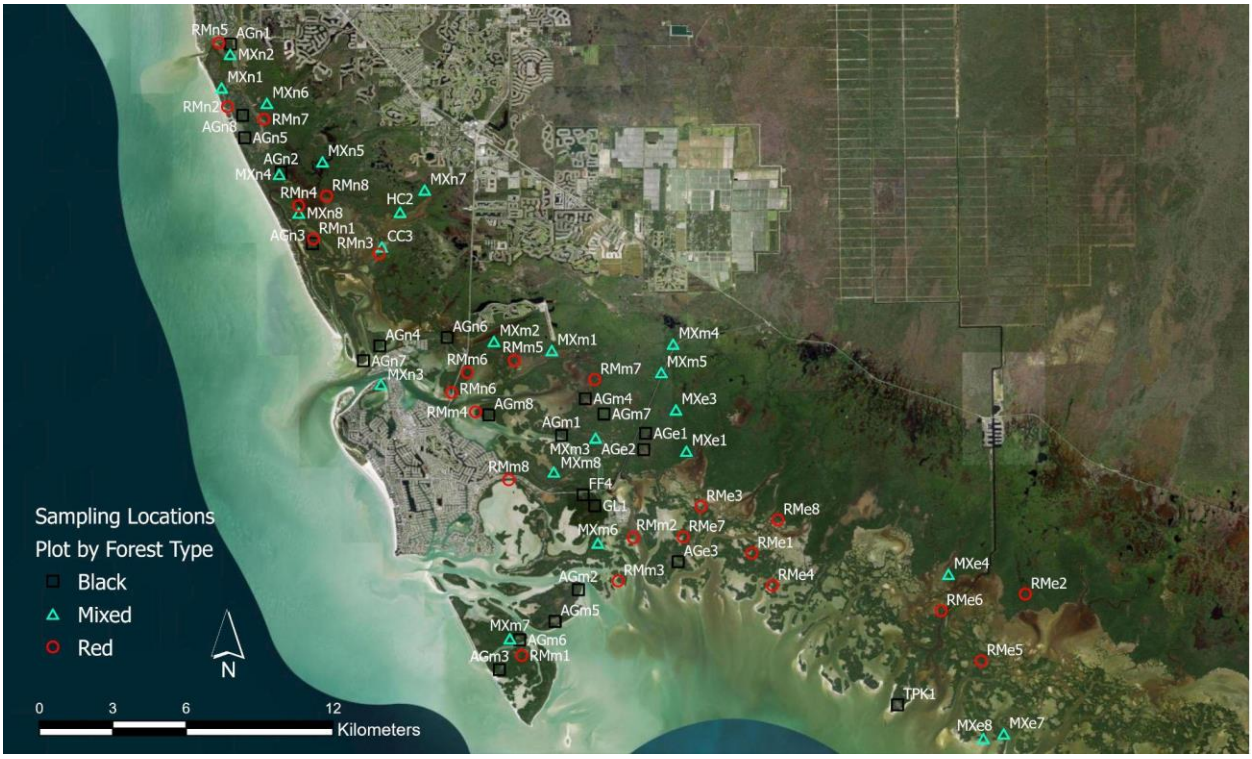
File format:
CSV

File name(s):
RookeryBay_MangroveUnderstory_2022_2023.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data are also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D., K. Colón Lozada, Z. Shribman, and A. Guarin. 2025. Mangrove Coast Collaborative Project, Post-hurricane Irma mangrove forest understory data, Rookery Bay NERR, February 2022 - March 2023 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/7c6e13aa6c90ecc825b04f89b16d9a67

Maps and schematics for data collection



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5. **Downed woody debris data, Jobos Bay NERR**

General description of data:
This dataset describes the quantity, quality, and size distribution of downed woody debris for each mangrove forest structural plot. Data was collected along three 20 m transects beginning at each plot center point and heading toward a randomly-selected azimuth.

Search keywords:
Coarse woody debris; disturbance; field assessment; fine woody debris; Hurricane Maria; Jobos Bay; mangrove forest; Puerto Rico; transect sampling

More about the data:

- Coarse woody debris is defined as woody material having a diameter > 7.5 cm that is no longer rooted and either lying on or above the forest floor (to a height of 2 m). Coarse woody debris is assigned a decay status (sound, intermediate, or rotten). Coarse woody debris is measured along the entirety of the 20 m transect.
- Fine woody debris is defined as woody material having a diameter ≤ 7.5 cm that is no longer rooted, either lying on the forest floor or just above. It is divided into 3 diameter categories: small (< 1 cm), medium (1 - 2.5 cm), and large (> 2.5 - 7.5). Fine woody debris counts are tallied along the first four meters of the transect with the smallest size

category tallied only within the first 2 meters. Leaves, flowers, fruits, and pneumatophores are excluded and not considered part of the DWD pool.
- Randomly-selected azimuths were restricted to those directions that would fall within the same habitat type as the 100 m^2 plot.

Data collection period:
March, 2022 to August, 2022

Geographic extent:
Jobos Bay National Estuarine Research Reserve and adjacent lands including Aguirre Forest.
Latitude Limits [17.91385218, 17.96614999]
Longitude Limits [-66.16764795, -66.26663533]

File format:
CSV

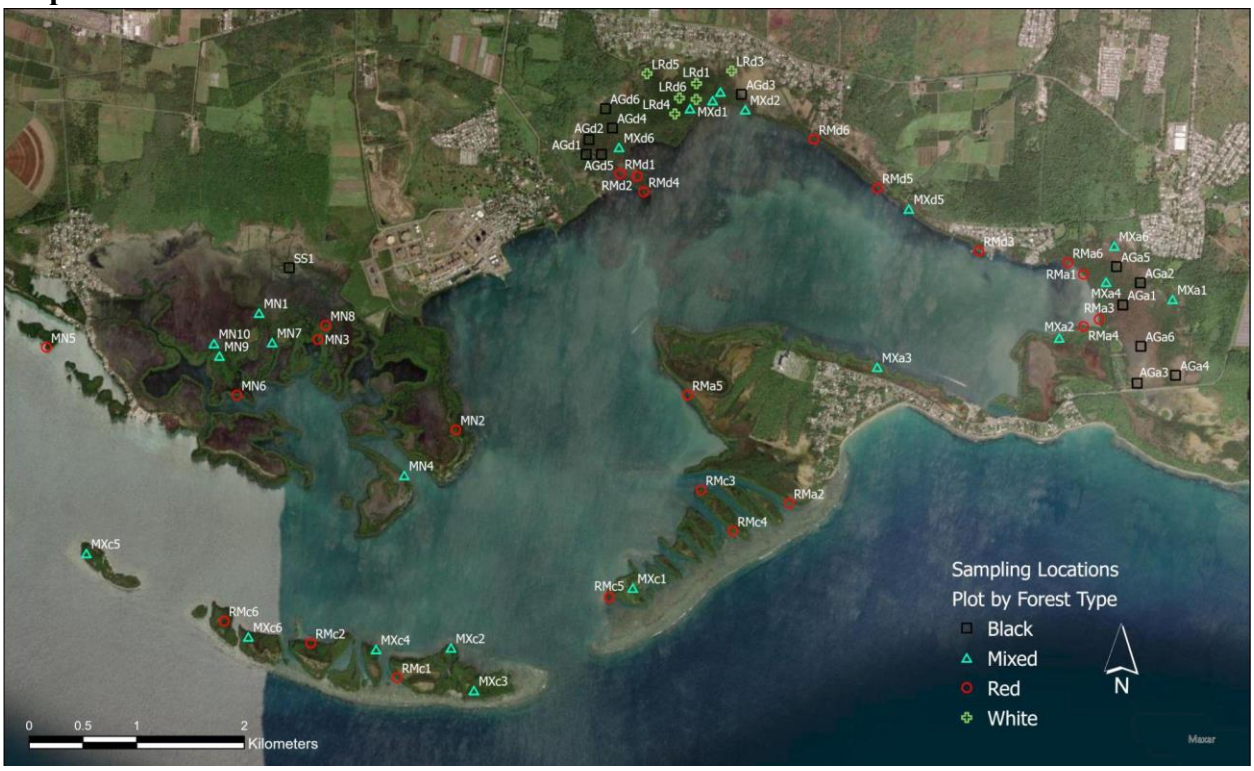
File name(s):
JobosBay_MangroveDownWoodyDebris_2022.csv
JobosBay_MangroveCoarseWoodyDebris_2022.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data are also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D., K. Colón Lozada, Z. Shribman, and A. Guarin. 2025. Mangrove Coast Collaborative Project, Post-hurricane mangrove forest coarse woody debris data, Rookery Bay NERR, February 2022 - March 2023 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/e19bd9d250b4b139260e40bb22bf1f0f

Ogurcak, D., K. Colón Lozada, and A. Ramirez-Jiménez. 2025. Mangrove Coast Collaborative Project, Post-hurricane Maria mangrove forest downed woody debris data, Jobos Bay NERR, March 2022 - August 2022 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/004b000364491d32c6d6d3396fe62e79

Maps and schematics for data collection



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6. Downed woody debris data, Rookery Bay NERR

General description of data:
This dataset describes the quantity, quality, and size distribution of downed woody debris for each mangrove forest structural plot. Data was collected along three 20 m transects beginning at each plot center point and heading toward a randomly-selected azimuth.

Search keywords:
Coarse woody debris; disturbance; field assessment; fine woody debris; Hurricane Irma; mangrove forest; Rookery Bay; southwest Florida; transect sampling

More about the data:

- Coarse woody debris is defined as woody material having a diameter > 7.5 cm that is no longer rooted and either lying on or above the forest floor (to a height of 2 m). Coarse woody debris is assigned a decay status (sound, intermediate, or rotten). Coarse woody debris is measured along the entirety of the 20 m transect.
- Fine woody debris is defined as woody material having a diameter ≤ 7.5 cm that is no longer rooted, either lying on the forest floor or just above. It is divided into 3 diameter categories: small (< 1 cm), medium (1 - 2.5 cm), and large (> 2.5 - 7.5). Fine woody debris counts are tallied along the first four meters of the transect with the smallest size category tallied only within the first 2 meters. Leaves, flowers, fruits, and pneumatophores are excluded and not considered part of the DWD pool.

- Randomly-selected azimuths were restricted to those directions that would fall within the same habitat type as the 100 m^2 plot.

Data collection period:
February, 2022 to March, 2023

Geographic extent:
Rookery Bay National Estuarine Research Reserve
Latitude Limits [25.8417446899999, 26.0966649]
Longitude Limits [-81.4978423099999, -81.7938469]

File format:
CSV

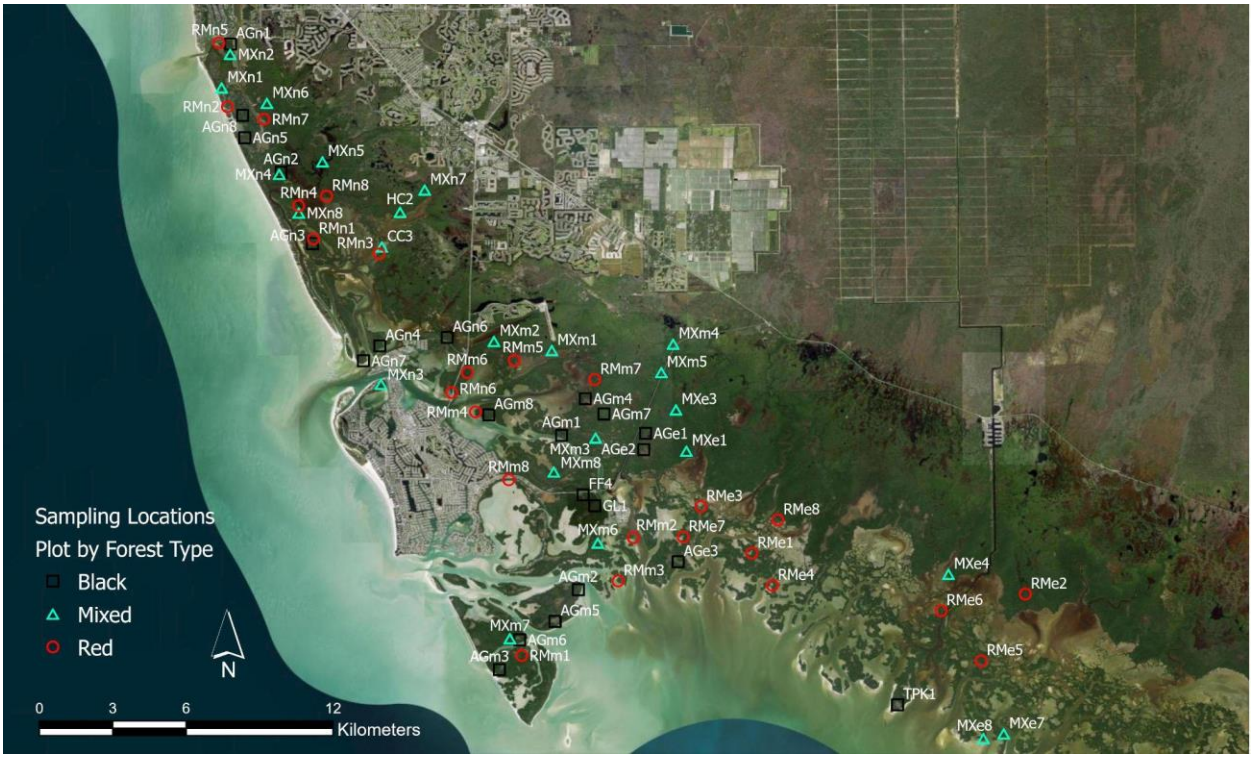
File name(s):
RookeryBay_MangroveDownWoodyDebris_2022_2023.csv
RookeryBay_MangroveCoarseWoodyDebris_2022_2023.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data are also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D., K. Colón Lozada, and A. Ramirez-Jiménez. 2025. Mangrove Coast Collaborative Project, Post-hurricane Maria mangrove forest coarse woody debris data, Jobos Bay NERR, March 2022 - August 2022 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/6f87e9d45a90791eb2b47a39f9fffc66

Ogurcak, D., K. Colón Lozada, Z. Shribman, and A. Guarin. 2025. Mangrove Coast Collaborative Project, Post-hurricane mangrove forest downed woody debris data, Rookery Bay NERR, February 2022 - March 2023 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/a1d910e23b46769e16120e95d993c03b

Maps and schematics for data collection



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7. **Mangrove hydrologic monitoring data, Jobos Bay NERR (Apr - Dec 2024)**

General description of data:
The dataset describes the hydrologic conditions of the soil porewater (water level, conductivity, and temperature) at a depth of ~70 cm below ground in six mangrove forest locations in Jobos Bay NERR at 30-minute intervals between April 2024 to December 2024. Locations of minimal forest recovery following the effects of Hurricane Maria (September 2017) were identified and selected for hydrologic monitoring coincident with sites sampled for structural metrics in 2022. One reference site was selected in black mangrove forest. A reference is defined as a site that was observed to be recovering following the hurricane. Two of the six sampling locations were selected to monitor effects of human encroachment on the western boundary of the reserve. These two sites were not coincident with plots established in 2022. This dataset is associated with the MCC Catalyst Project entitled Limits of Resilience (2023-2025).

Search keywords:
black mangrove forest; ecosystem resilience; hydrologic monitoring; Jobos Bay; mixed mangrove forest; porewater salinity; Puerto Rico

More about the data:

- *In-Situ* AquaTROLL 200 data loggers that record pressure, conductivity, and temperature were deployed in four black mangrove forest locations.

- *Solinst* Levelogger 5 LTC data loggers that record pressure, conductivity, and temperature were deployed in two mixed mangrove forest locations near the western reserve boundary.
- All units were non-vented to the atmosphere and Barologgers were deployed for atmospheric compensation.
- Time is referenced to Atlantic Standard Time (AST).
- Infrastructure consists of a 2-inch diameter PVC pipe and well screen inserted to a depth of approximately 1 m in a borehole. Fiberglass mesh was wrapped around the exposed well screen to limit sediment infilling. Loggers were suspended on stainless steel wire to a depth of ~70 cm below the ground surface.
- Water level is reported relative to the ground surface of each site.

Data collection period:
April, 2024 to December, 2024

Geographic extent:
Jobos Bay National Estuarine Research Reserve and adjacent lands including Aguirre Forest
Latitude Limits [17.93547832, 17.9641969099999]
Longitude Limits [-66.17236398, -66.26018794]

File format:
CSV

File name(s):
JobosBay_MangroveHydroData_Apr2024_Dec2024.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data are also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D. and A. Band. 2025. Mangrove Coast Collaborative Project, Hydrologic monitoring data in mangrove forests, Jobos Bay NERR, April 2024 - December 2024 ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/d0eda00a5eeefd034b4727e353d84d6b

Maps and schematics for data collection

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8. Mangrove hydrologic monitoring data, Rookery Bay NERR (April - Dec 2024)

General description of data:
The dataset describes the hydrologic conditions of the soil porewater (water level, conductivity, and temperature) at a depth of ~70 cm below ground in six black mangrove forest locations in Rookery Bay NERR at 30-minute intervals between April 2024 to December 2024. Locations of minimal forest recovery following the effects of Hurricane Irma (September 2017) were identified and selected for hydrologic monitoring. The design consists of three sites in mainland/interior black mangroves and three sites on ocean-facing islands all of which are located on the east side of Hurricane Irma eyewall. In each group, two of the sites selected were considered sites of minimal recovery whereas one site was selected as a reference (location of recovering mangroves). This dataset is associated with the MCC Catalyst Project entitled Limits of Resilience (2023-2025).

Search keywords:
black mangrove forest; ecosystem resilience; hydrologic monitoring; porewater salinity; Rookery Bay; southwest Florida

More about the data:

- *In-Situ* AquaTROLL 200 data loggers that record pressure, conductivity, and temperature were deployed in six black mangrove forest locations.
- All units were non-vented to the atmosphere and Barologgers were deployed for atmospheric compensation.
- Time is referenced to Eastern Standard Time (EST).
- Infrastructure consists of a 2-inch diameter PVC pipe and well screen inserted to a depth of approximately 1 m in a borehole. Fiberglass mesh was wrapped around the exposed well screen to limit sediment infilling. Loggers were suspended on stainless steel wire to a depth of ~70 cm below the ground surface.
- Water level is reported relative to the ground surface of each site.

Data collection period:
April, 2024 to December, 2024

Geographic extent:
Rookery Bay National Estuarine Research Reserve
Latitude Limits [25.8846408799999, 25.96626046]
Longitude Limits [-81.6252699, -81.67044506]

File format:
CSV

File name(s):
RookeryBay_MangroveHydroData_Apr2024_Dec2024.csv

Data access and archival:
The data are available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

The data also available at the Environmental Data Initiative (EDI) portal:
Ogurcak, D. and A. Band. 2025. Mangrove Coast Collaborative Project, Hydrologic monitoring data in mangrove forests, Rookery Bay NERR, April 2024 - December 2024 ver 1. Environmental Data Initiative.
https://doi.org/10.6073/pasta/7a3d66c7e8f4ad54d2530191938f1df4

Maps and schematics for data collection

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9. **Habitat maps for Jobos Bay NERR (2014 - 2020)**

General description of data:
Very high-resolution (2 m) annual habitat maps of coastal areas around Jobos Bay, in southern Puerto Rico, were generated using Maxar WorldView satellite imagery to assess mangrove degradation and recovery following storms. These habitat maps are associated with the first project of the Mangrove Coast Collaborative (2020 - 2024). The time series spans from 2014 to 2020, except for 2019, when insufficient clear imagery prevented the annual mosaic generation.

These maps were produced by the Institute for Marine Remote Sensing (IMaRS, https://imars.usf.edu/) at the College of Marine Science of the University of South Florida.

Search keywords:
Mangrove map, habitat map, land cover, Jobos Bay, JBNERR, Puerto Rico, WorldView.

More about the data:
- Habitat land-cover maps were generated using very high-resolution (2-m) 8-band multispectral WorldView imagery, following a modified version of the methodology of

McCarthy et al. 2018 (https://doi.org/10.1016/j.rse.2018.02.021), using vegetation and other indices within a decision tree approach.

- The model was tailored to maximize the accuracy of the mangrove class.
- The classes used in the habitat classification include: no-data/unclassified (0), shadow (1), clouds (2), natural non-vegetated soil (3), water (4), dry low-vegetation (5), marsh (6), scrub (7), mixed low-relief vegetation (8), mixed upland vegetation (9), mangrove (10), and developed high-reflectance non-vegetated (11).
- WorldView imagery was acquired through the NASA Commercial Satellite Data Access (CSDA) program. The CSDA program provided access to the MAXAR product browser and to a separate CSDA product browser, where files can be downloaded. The files were each processed using the USF supercomputer CIRCE into habitat coverage maps using methods documented in this GitHub repository: https://github.com/USF-IMARS/wv-land-cover. The "classMap" images were then uploaded into GEE using methods documented here: https://github.com/USF-IMARS/wv-land-cover/tree/master/gee-uploads . Using GEE, the images were combined into a single annual mosaic image using a mode pixel-by-pixel aggregation.
- Filenames for this dataset include the "start_date" and "end_date" used to create the mosaic of images. All available images were used between these dates (processed individually and then mosaiced using a mode function) to create the file.

Data collection period:
January, 2014 to August, 2020

Geographic extent:
Jobos Bay National Estuarine Research Reserve and adjacent areas including Aguirre Forest and Salinas. The coordinate limits for the maps are:

LatitudeLimits: [17.8999920481167, 18.0501184983988]
LongitudeLimits: [-66.4500165001381, -66.0499967041197]

File format:
The annual habitat maps for Jobos (2014-2020) are provided in normal and smoothed versions (3x3 pixels) as geotiff files, png files, and as assets in Google Earth Engine. The size of the .tif files varied between 15 and 33 MB, and for the .png files varied between 130 and 450 KB.

File name(s):
Filenames match the following formatting pattern:

- *Annual habitat maps:*

Final_mosaic_jobos_{start_date}_{end_date}_Postprocessed_v4.{png | tif}

- *Annual habitat maps smoothed:*

Final_mosaic_jobos_{start_date}_{end_date}_Postprocessed_v4_smoothedMode3x3.{png | tif}

Data access and archival:
This dataset is available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

This dataset is also stored in several other locations:

- Annual mosaics within IMaRS-managed, public Google Earth Engine (GEE) assets:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/Final_mangroveMaps_MCC_Catalyst
  - GEE script to visualize the annual habitat maps (the user will need a GEE account to be able to run this script): https://code.earthengine.google.com/43dcf3fa21c55013e0f8d8b54a1ff87f
  - Comparison between two annual mosaics can be accessed with no GEE account at https://nerrs-mcc.projects.earthengine.app/view/land-classification-mosaics-jobos
- ClassMap images for each pass in an IMaRS-managed, public GEE asset:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/nerrs_jobos_classmaps
- Within USF-supported box.com storage
  - https://usf.box.com/s/z3sj5iwmyc7a1xu7x1zsxx9kj6jtc7l7

List of individual WorldView images used for the annual maps
2014: Final_mosaic_jobos_2014-01_2014-04_Postprocessed_v4
20140105T151707_01_P006_WV02
20140124T151736_01_P006_WV02
20140325T150848_01_P006_WV02
20140402T151358_01_P001_WV02
20140402T151414_01_P005_WV02
20140402T151415_01_P006_WV02
20140413T150820_01_P001_WV02
20140429T151854_01_P001_WV02
20140429T151909_01_P005_WV02
20140429T151910_01_P006_WV02

2015: Final_mosaic_jobos_2015-01_2015-03_Postprocessed_v4
20150109T150602_01_P006_WV02
20150128T150449_01_P001_WV02
20150128T150450_01_P002_WV02
20150128T150509_01_P006_WV02
20150224T150737_01_P001_WV02
20150224T150738_01_P002_WV02
20150224T150756_01_P006_WV02
20150315T150534_01_P006_WV02

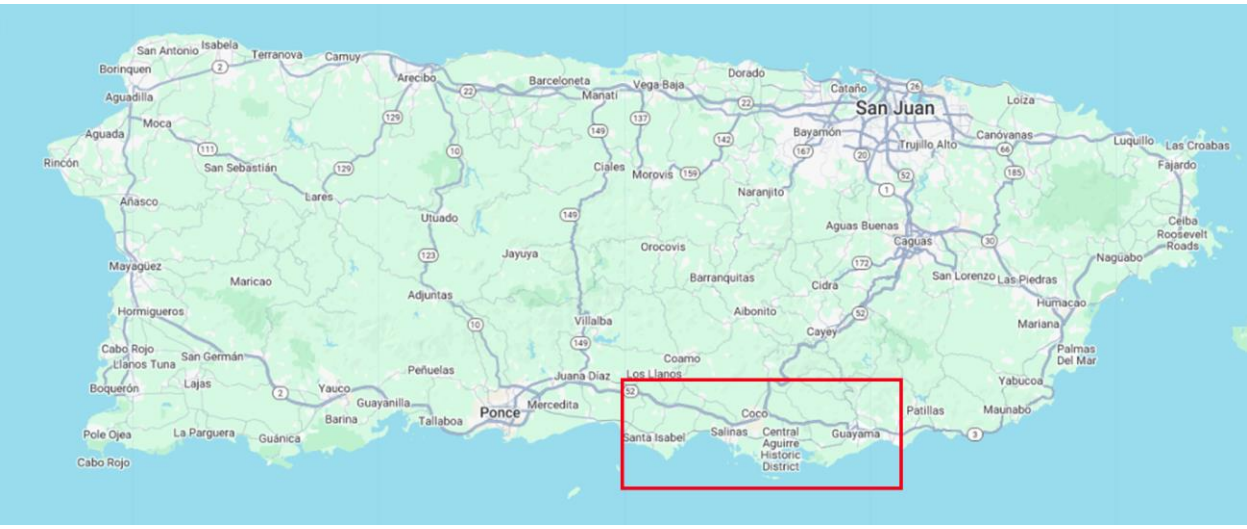
2016: Final_mosaic_jobos_2016-02_2016-04_Postprocessed_v4
20160209T145720_01_P006_WV02
20160209T145854_01_P001_WV02
20160218T150613_01_P001_WV03
20160218T150615_01_P002_WV03
20160220T145245_01_P006_WV02
20160220T145255_01_P001_WV02
20160220T145256_01_P002_WV02
20160302T144633_01_P001_WV02
20160302T144634_01_P002_WV02
20160318T145554_01_P001_WV02
20160318T145708_01_P006_WV02
20160406T145458_01_P006_WV02
20160406T145508_01_P001_WV02
20160406T145509_01_P002_WV02

2017: Final_mosaic_jobos_2017-01_2017-04_Postprocessed_v4
20170120T151436_01_P001_WV03
20170222T151211_01_P006_WV02
20170327T145448_01_P002_WV02
20170327T145505_01_P006_WV02
20170412T150354_01_P001_WV02
20170412T150355_01_P002_WV02
20170412T150414_01_P006_WV02

2018: Final_mosaic_jobos_2018-01_2018-02_Postprocessed_v4
20180104T152102_01_P001_WV03
20180104T152141_01_P001_WV03
20180110T151715_01_P001_WV03
20180210T150850_01_P001_WV02

2020: Final_mosaic_jobos_2020-01_2020-04_Postprocessed_v4
20200108T150532_01_P001_WV03
20200129T145406_01_P001_WV02
20200203T150924_01_P001_WV02
20200203T151708_01_P001_WV03
20200214T150518_01_P001_WV02
20200228T151303_01_P001_WV03
20200318T151236_01_P001_WV03
20200412T150812_01_P001_WV03

Maps and schematics for data collection
Area of the habitat maps for Jobos Bay in Puerto Rico.



10. Habitat maps for Jobos Bay NERR (2021 - 2024)

General description of data:
Very high-resolution (2 m) annual habitat maps of coastal areas around Jobos Bay, in southern Puerto Rico, were generated using Maxar WorldView satellite imagery to assess mangrove degradation and recovery following storms. These habitat maps are associated with the second project of the Mangrove Coast Collaborative, a Catalyst Project entitled Limits of Resilience (2023 - 2025). The time series spans from 2021 to 2024.

These maps were produced by the Institute for Marine Remote Sensing (IMaRS, https://imars.usf.edu/) at the College of Marine Science of the University of South Florida.

Search keywords:
Mangrove map, habitat map, land cover, Jobos Bay, JBNERR, Puerto Rico, WorldView.

More about the data:
- Habitat land-cover maps were generated using very high-resolution (2-m) 8-band multispectral WorldView imagery, following a modified version of the methodology of McCarthy et al. 2018 (https://doi.org/10.1016/j.rse.2018.02.021), using vegetation and other indices within a decision tree approach.
- The model was tailored to maximize the accuracy of the mangrove class.
- The classes used in the habitat classification include: no-data/unclassified (0), shadow (1), clouds (2), natural non-vegetated soil (3), water (4), dry low-vegetation (5), marsh (6), scrub (7), mixed low-relief vegetation (8), mixed upland vegetation (9), mangrove (10), and developed high-reflectance non-vegetated (11).
- WorldView imagery was acquired through the NASA Commercial Satellite Data Access (CSDA) program. The CSDA program provided access to the MAXAR product browser and to a separate CSDA product browser, where files can be downloaded. The files were each

processed using the USF supercomputer CIRCE into habitat coverage maps using methods documented in this GitHub repository: https://github.com/USF-IMARS/wv-land-cover. The "classMap" images were then uploaded into GEE using methods documented here: https://github.com/USF-IMARS/wv-land-cover/tree/master/gee-uploads . Using GEE, the images were combined into a single annual mosaic image using a mode pixel-by-pixel aggregation.

- Filenames for this dataset include the "start_date" and "end_date" used to create the mosaic of images. All available images were used between these dates (processed individually and then mosaiced using a mode function) to create the file.

Data collection period:
January, 2021 to December, 2024

Geographic extent:
Jobos Bay National Estuarine Research Reserve and adjacent areas including Aguirre Forest and Salinas. The coordinate limits for the maps are:

LatitudeLimits: [17.8999920481167, 18.0501184983988]
LongitudeLimits: [-66.4500165001381, -66.0499967041197]

File format:
The annual habitat maps for Jobos (2021-2024) are provided in normal and smoothed versions (3x3 pixels) as geotiff files, png files, and as assets in Google Earth Engine. The size of the .tif files varied between 8 and 18 MB, and for the .png files varied between 130 and 280 KB.

File name(s):
Filenames match the following formatting pattern:

- *Annual habitat maps:*

Final_mosaic_jobos_{start_date}_{end_date}_Postprocessed_v4.{png | tif}

- *Annual habitat maps smoothed:*

Final_mosaic_jobos_{start_date}_{end_date}_Postprocessed_v4_smoothedMode3x3.{png | tif}

Data access and archival:
This dataset is available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

This dataset is also stored in several other locations:

- Annual mosaics within IMaRS-managed, public Google Earth Engine (GEE) assets:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/Final_mangroveMaps_MCC_Catalyst
  - GEE script to visualize the annual habitat maps (the user will need a GEE account to be able to run this script): https://code.earthengine.google.com/43dcf3fa21c55013e0f8d8b54a1ff87f

    - Comparison between two annual mosaics can be accessed with no GEE account at https://nerrs-mcc.projects.earthengine.app/view/land-classification-mosaics-jobos
- ClassMap images for each pass in an IMaRS-managed, public GEE asset:
    - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/nerrs_jobos_classmaps
- Within USF-supported box.com storage
    - https://usf.box.com/s/z3sj5iwmyc7a1xu7x1zsxx9kj6jtc7l7

List of individual WorldView images used for the annual maps:

2021: Final_mosaic_jobos_2021-01_2021_11_Postprocessed_v4
20210109T145803_01_P001_WV03
20210220T145743_01_P006_WV02
20210913T145839_01_P001_WV03

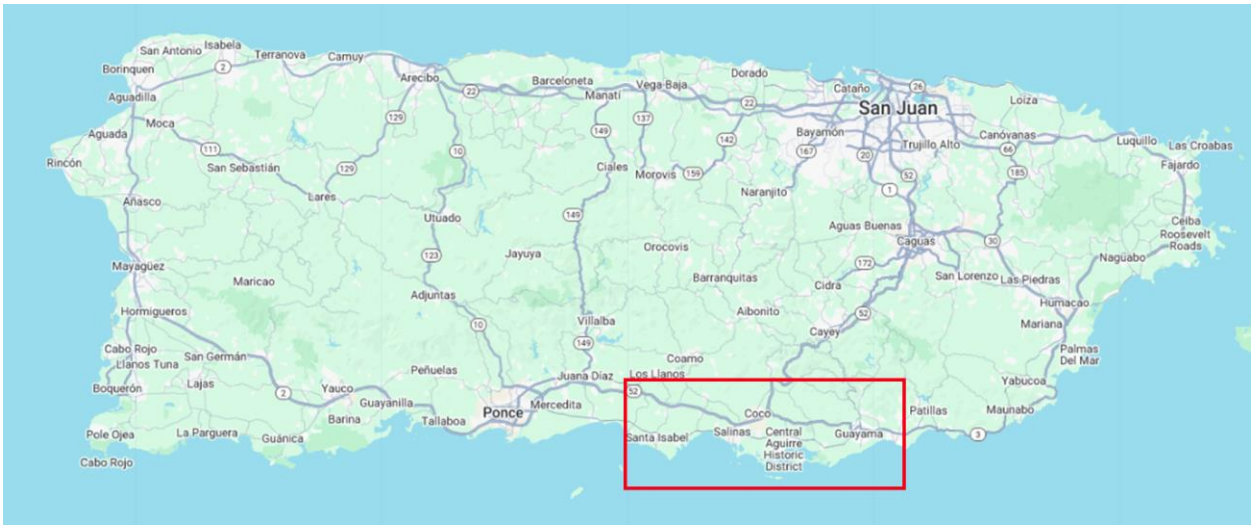
2022a: Final_mosaic_jobos_2022-01_2022-04_Postprocessed_v4
20220124T145943_01_P001_WV03
20220329T150503_01_P001_WV03
20220417T150211_01_P001_WV03
20220417T150231_01_P001_WV03

2022b: Final_mosaic_jobos_2022-10_2022-11_Postprocessed_v4
20221003T145704_01_P001_WV03
20221009T145245_01_P001_WV03
20221110T145804_01_P001_WV03

2023: Final_mosaic_jobos_2023-05_2023-12_Postprocessed_v4
20230513T150841_01_P001_WV02
20230811T150711_01_P001_WV03
20230918T151639_01_P001_WV02
20231223T145249_01_P001_WV02

2024: Final_mosaic_jobos_2024-01_2024-02_Postprocessed_v4
20240130T145644_01_P001_WV02
20240215T150900_01_P001_WV02
20240229T145514_01_P001_WV02

Maps and schematics for data collection
Area of the habitat maps for Jobos Bay in Puerto Rico.


San Antonio
Isabela
Terranova
Camuy
Borinquen
Arecibo
Barceloneta
Manatí
Vega Baja
Dorado
Cataño
San Juan
Loíza
Aguadilla
Moca
Aguada
Bayamón
Trujillo Alto
Canóvanas
Luquillo
Las Croabas
Fajardo
Rincón
San Sebastián
Ciales
Morovis
Naranjito
Añasco
Lares
Utuado
Aguas Buenas
Caguas
Ceiba
Roosevelt Roads
Naguabo
Jayuya
Orocovis
Mayagüez
Maricao
Barranquitas
Cidra
San Lorenzo
Las Piedras
Humacao
Adjuntas
Aibonito
Hormigueros
Villalba
Cayey
Mariana
Cabo Rojo
Llanos Tuna
San Germán
Coamo
Palmas Del Mar
Peñuelas
Juana Díaz
Los Llanos
Yabucoa
Boquerón
Lajas
Yauco
Guayanilla
Mercedita
Coco
Patillas
Maunabo
Barina
Tallaboa
Ponce
Salinas
Central Aguirre
Guayama
Pole Ojea
La Parguera
Guánica
Santa Isabel
Cabo Rojo
Historic District

11. Habitat maps for Rookery Bay NERR (2014 - 2020)

General description of data:
Very high-resolution (2 m) annual habitat maps of coastal areas around Rookery Bay, in southwestern Florida, were generated using Maxar WorldView satellite imagery to assess mangrove degradation and recovery following storms. These habitat maps are associated with the first project of the Mangrove Coast Collaborative (2020 - 2024). The time series spans from 2014 to 2020, except for 2016 and 2019, when insufficient clear imagery prevented the annual mosaic generation.

These maps were produced by the Institute for Marine Remote Sensing (IMaRS, https://imars.usf.edu/) at the College of Marine Science of the University of South Florida.

Search keywords:
Mangrove map, habitat map, land cover, Rookery Bay, RBNERR, Florida, WorldView.

More about the data:
- Habitat land-cover maps were generated using very high-resolution (2-m) 8-band multispectral WorldView imagery, following a modified version of the methodology of McCarthy et al. 2018 (https://doi.org/10.1016/j.rse.2018.02.021), using vegetation and other indices within a decision tree approach.
- The model was tailored to maximize the accuracy of the mangrove class.
- The classes used in the habitat classification include: no-data/unclassified (0), shadow (1), clouds (2), natural non-vegetated soil (3), water (4), dry low-vegetation (5), marsh (6), scrub (7), mixed low-relief vegetation (8), mixed upland vegetation (9), mangrove (10), and developed high-reflectance non-vegetated (11).
- WorldView imagery was acquired through the NASA Commercial Satellite Data Access (CSDA) program. The CSDA program provided access to the MAXAR product browser and to a separate CSDA product browser, where files can be downloaded. The files were each processed using the USF supercomputer CIRCE into habitat coverage maps using methods documented in this GitHub repository: https://github.com/USF-IMARS/wv-land-cover. The "classMap" images were then uploaded into GEE using methods documented here: https://github.com/USF-IMARS/wv-land-cover/tree/master/gee-uploads . Using GEE, the images were combined into a single annual mosaic image using a mode pixel-by-pixel aggregation.
- Filenames for this dataset include the "start_date" and "end_date" used to create the mosaic of images. All available images were used between these dates (processed individually and then mosaiced using a mode function) to create the file.

Data collection period:
January, 2014 to August, 2020.

Geographic extent:

Rookery Bay National Estuarine Research Reserve and adjacent areas to Chokoloskee, FL. The nearest town for Rookery Bay's habitat maps is Marco Island.
The coordinate limits for the maps are:

LatitudeLimits: [25.7499920236179, 26.1402381493451]
LongitudeLimits: [-81.8200113483663, -81.2999945966952]

File format:
The annual habitat maps for Rookery (2014-2020) are provided in normal and smoothed versions (3x3 pixels) as geotiff files, png files, and as assets in Google Earth Engine. The size of the .tif files varied between 41 and 117 MB, and for the .png files varied between 350 and 540 KB.

File name(s):
Filenames match the following formatting pattern (N is the number of the final version):

- *Annual habitat maps:*

Final_mosaic_rookery_{start_date}_{end_date}_Postprocessed_v{N}.{png | tif}

- *Annual habitat maps smoothed:*

Final_mosaic_rookery_{start_date}_{end_date}_Postprocessed_v{N}_smoothedMode3x3.{png | tif}

Data access and archival:
This dataset is available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

This dataset is also stored in several other locations:

- Annual mosaics within IMaRS-managed, public Google Earth Engine (GEE) assets:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/Final_mangroveMaps_MCC_Catalyst
  - GEE script to visualize the annual habitat maps (the user will need a GEE account to be able to run this script): https://code.earthengine.google.com/43dcf3fa21c55013e0f8d8b54a1ff87f
  - Comparison between two annual mosaics can be accessed with no GEE account at https://nerrs-mcc.projects.earthengine.app/view/land-classification-mosaics-rookery
- ClassMap images for each pass in an IMaRS-managed, public GEE asset:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/nerrs_rookery_classmaps
- Within USF-supported box.com storage
  - https://usf.box.com/s/7m79jwmg0j7sncd7fjrx0befpjjr4l38

List of individual WorldView images used for the annual maps:

2014: Final_mosaic_rookery_2014-02_2014-12_Postprocessed_v3

20140202T162431_01_P001_WV02
20140202T162432_01_P002_WV02
20140202T162440_01_P001_WV02
20140202T162441_01_P002_WV02
20140202T162451_01_P001_WV02
20140202T162452_01_P002_WV02
20140202T162458_01_P001_WV02
20140320T163019_01_P001_WV02
20140320T163039_01_P006_WV02
20140320T163040_01_P007_WV02
20141030T155753_01_P001_WV03
20141030T155755_01_P002_WV03
20141030T155756_01_P003_WV03
20141031T163029_01_P007_WV02
20141031T163031_01_P008_WV02
20141031T163032_01_P009_WV02
20141031T163042_01_P001_WV02
20141031T163043_01_P002_WV02
20141031T163045_01_P003_WV02
20141031T163107_01_P009_WV02
20141031T163108_01_P010_WV02
20141103T161931_01_P001_WV02
20141130T162200_04_P001_WV02
20141130T162201_04_P002_WV02
20141130T162228_05_P010_WV02
20141130T162229_05_P011_WV02
20141203T161113_01_P009_WV02
20141203T161115_01_P010_WV02
20141203T161116_01_P011_WV02

2015: Final_mosaic_rookery_2015-03_2015-07_Postprocessed_v3

20150306T161630_01_P002_WV03
20150306T161632_01_P003_WV03
20150401T161639_01_P001_WV02
20150401T161706_01_P009_WV02
20150401T161708_01_P010_WV02
20150401T161709_01_P011_WV02
20150721T161733_01_P011_WV02
20150721T161743_01_P001_WV02
20150721T161744_01_P002_WV02
20150721T161810_01_P009_WV02

20150721T161812_01_P011_WV02

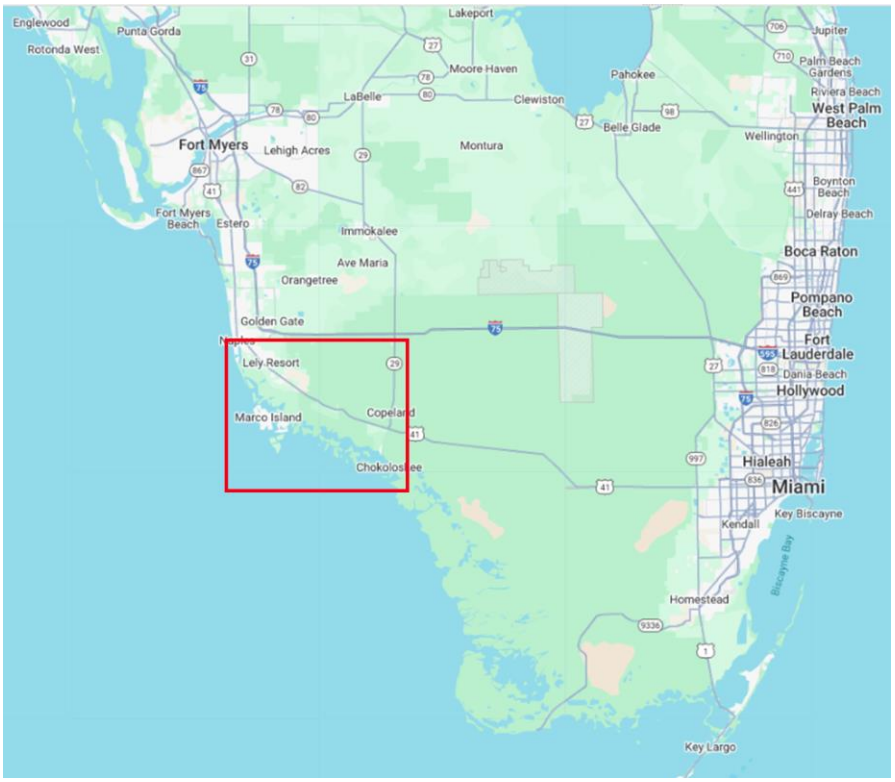
2017: Final_mosaic_rookery_2017-01_2017-08_Postprocessed_v3
20170103T155702_01_P002_WV02
20170103T155703_01_P003_WV02
20170103T155704_01_P004_WV02
20170105T162323_01_P002_WV02
20170105T162324_01_P003_WV02
20170105T162325_01_P004_WV02
20170308T163334_01_P009_WV02
20170308T163335_01_P010_WV02
20170308T163336_01_P011_WV02
20170319T162814_01_P010_WV02
20170319T162815_01_P011_WV02
20170319T162816_01_P012_WV02
20170617T160448_01_P010_WV02
20170617T160449_01_P011_WV02
20170617T160451_01_P012_WV02
20170622T161950_01_P011_WV02
20170625T160907_01_P001_WV02
20170625T160908_01_P002_WV02
20170627T163515_01_P010_WV02
20170627T163516_01_P011_WV02
20170630T162448_01_P010_WV02
20170630T162449_01_P011_WV02
20170703T161331_01_P010_WV02
20170703T161332_01_P011_WV02
20170708T162924_01_P010_WV02
20170708T162925_01_P011_WV02
20170725T160304_01_P001_WV02
20170725T160306_01_P002_WV02

2018: Final_mosaic_rookery_2018-01_2018-04_Postprocessed_v3
20180106T163220_01_P001_WV02
20180106T163222_01_P002_WV02
20180106T163223_01_P003_WV02
20180106T163249_01_P010_WV02
20180106T163250_01_P011_WV02
20180106T163300_01_P001_WV02
20180106T163301_01_P002_WV02
20180318T162252_01_P010_WV02
20180318T162253_01_P011_WV02

20180318T162351_01_P010_WV02
20180318T162352_01_P011_WV02
20180319T163949_01_P010_WV03
20180319T163951_01_P011_WV03
20180326T162911_01_P010_WV02
20180326T162912_01_P011_WV02
20180326T163009_01_P010_WV02
20180326T163011_01_P011_WV02
20180428T161600_01_P010_WV02
20180428T161601_01_P011_WV02

2020: Final_mosaic_rookery_2020-03_2020-07_Postprocessed_v3
20200317T163200_01_P004_WV03
20200317T163202_01_P005_WV03
20200317T163213_01_P001_WV03
20200627T160628_02_P002_WV02
20200627T160629_02_P003_WV02
20200627T160638_01_P001_WV02
20200627T160639_01_P002_WV02
20200627T160640_01_P003_WV02
20200627T160733_03_P001_WV02
20200627T160734_03_P002_WV02
20200627T160734_03_P003_WV02
20200708T161605_01_P002_WV03
20200710T162802_02_P001_WV02
20200710T162803_02_P002_WV02
20200710T162804_02_P003_WV02
20200710T162813_01_P001_WV02
20200727T160057_01_P002_WV02
20200727T160058_01_P003_WV02
20200727T160107_01_P007_WV02
20200727T160109_01_P008_WV02
20200727T160109_01_P009_WV02
20200728T163208_01_P001_WV03
20200728T163210_01_P002_WV03
20200728T163212_01_P003_WV03

Maps and schematics for data collection
Area of the habitat maps for Rookery Bay in southwestern Florida.



12. Habitat maps for Rookery Bay NERR (2021 - 2024)

General description of data:
Very high-resolution (2 m) annual habitat maps of coastal areas around Rookery Bay, in southwestern Florida, were generated using Maxar WorldView satellite imagery to assess mangrove degradation and recovery following storms. These habitat maps are associated with the second project of the Mangrove Coast Collaborative, a Catalyst Project entitled Limits of Resilience (2023 - 2025). The time series spans from 2021 to 2024; however, WorldView imagery was inconsistent during this period, limiting regional coverage in the annual mosaics. As a result, the 2021 mosaic includes imagery from late 2020, and coverage for 2023 and 2024 is very limited.

These maps were produced by the Institute for Marine Remote Sensing (IMaRS, https://imars.usf.edu/) at the College of Marine Science of the University of South Florida.

Search keywords:
Mangrove map, habitat map, land cover, Rookery Bay, RBNERR, Florida, WorldView.
More about the data:

- Habitat land-cover maps were generated using very high-resolution (2-m) 8-band multispectral WorldView imagery, following a modified version of the methodology of McCarthy et al. 2018 (https://doi.org/10.1016/j.rse.2018.02.021), using vegetation and other indices within a decision tree approach.
- The model was tailored to maximize the accuracy of the mangrove class.

- The classes used in the habitat classification include: no-data/unclassified (0), shadow (1), clouds (2), natural non-vegetated soil (3), water (4), dry low-vegetation (5), marsh (6), scrub (7), mixed low-relief vegetation (8), mixed upland vegetation (9), mangrove (10), and developed high-reflectance non-vegetated (11).
- WorldView imagery was acquired through the NASA Commercial Satellite Data Access (CSDA) program. The CSDA program provided access to the MAXAR product browser and to a separate CSDA product browser, where files can be downloaded. The files were each processed using the USF supercomputer CIRCE into habitat coverage maps using methods documented in this GitHub repository: https://github.com/USF-IMARS/wv-land-cover. The "classMap" images were then uploaded into GEE using methods documented here: https://github.com/USF-IMARS/wv-land-cover/tree/master/gee-uploads . Using GEE, the images were combined into a single annual mosaic image using a mode pixel-by-pixel aggregation.
- Filenames for this dataset include the "start_date" and "end_date" used to create the mosaic of images. All available images were used between these dates (processed individually and then mosaiced using a mode function) to create the file.

Data collection period:
September 2020 to December, 2024

Geographic extent:
Rookery Bay National Estuarine Research Reserve and adjacent areas to Chokoloskee, FL. The nearest town for Rookery Bay's habitat maps is Marco Island.
The coordinate limits for the maps are:

LatitudeLimits: [25.7499920236179, 26.1402381493451]
LongitudeLimits: [-81.8200113483663, -81.2999945966952]

File format:
The annual habitat maps for Rookery (2021-2024) are provided in normal and smoothed versions (3x3 pixels) as geotiff files, png files, and as assets in Google Earth Engine. The size of the .tif files varied between 18 and 73 MB, and for the .png files varied between 126 and 450 KB.

File name(s):
Filenames match the following formatting pattern (N is the number of the final version):

- *Annual habitat maps:*

Final_mosaic_rookery_{start_date}_{end_date}_Postprocessed_v{N}.{png | tif}

- *Annual habitat maps smoothed:*

Final_mosaic_rookery_{start_date}_{end_date}_Postprocessed_v{N}_smoothedMode3x3.{png | tif}

Data access and archival:
This dataset is available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

This data set is stored in several other locations:

- Annual mosaics within IMaRS-managed, public Google Earth Engine (GEE) assets:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/Final_mangroveMaps_MCC_Catalyst
  - GEE script to visualize the annual habitat maps (the user will need a GEE account to be able to run this script): https://code.earthengine.google.com/43dcf3fa21c55013e0f8d8b54a1ff87f
  - Comparison between two annual mosaics can be accessed with no GEE account at https://nerrs-mcc.projects.earthengine.app/view/land-classification-mosaics-rookery
- ClassMap images for each pass in an IMaRS-managed, public GEE asset:
  - https://code.earthengine.google.com/?asset=projects/nerrs-mcc/assets/nerrs_rookery_classmaps
- Within USF-supported box.com storage
  - https://usf.box.com/s/7m79jwmg0j7sncd7fjrx0befpjjr4l38

List of individual WorldView images used for the annual maps:

2021: Final_mosaic_rookery_2020-09_2021-02_Postprocessed_v1
20200903T160106_02_P001_WV02
20200903T160107_02_P002_WV02
20200903T160108_02_P003_WV02
20200903T160117_01_P001_WV02
20200903T160118_01_P002_WV02
20200904T163153_02_P001_WV03
20200904T163154_02_P002_WV03
20200908T155659_01_P001_WV03
20200908T155659_03_P001_WV03
20200908T155700_01_P002_WV03
20200929T162701_03_P003_WV03
20200929T162714_03_P006_WV03
20200929T162715_03_P007_WV03
20210221T160911_01_P001_WV03

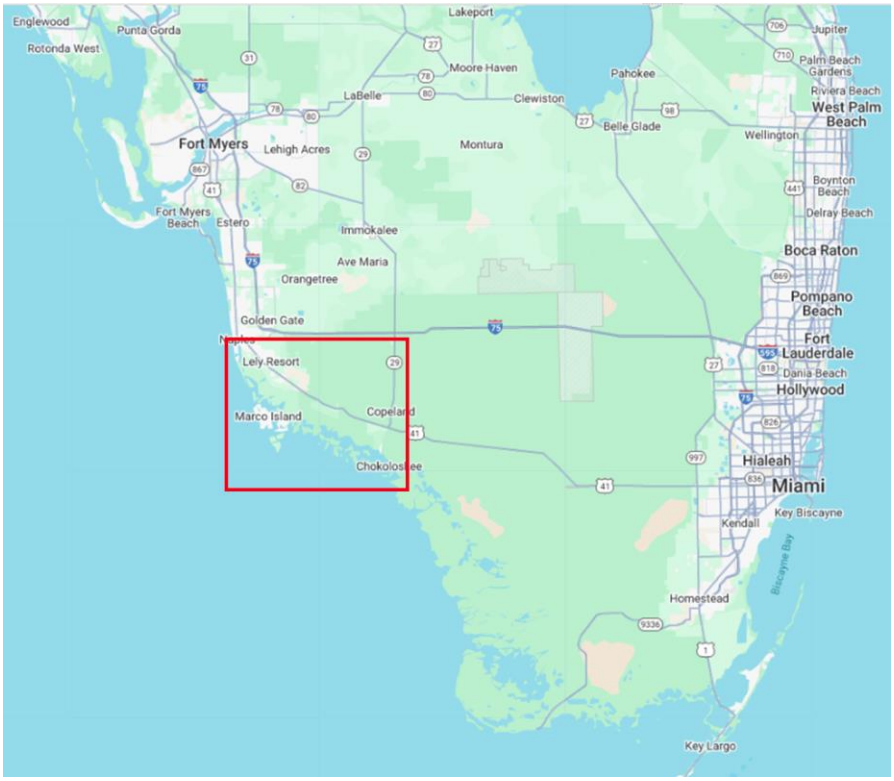
2022: Final_mosaic_rookery_2022-10_2022-12_Postprocessed_v2
20221001T160205_01_P001_WV03
20221024T162656_01_P001_WV02
20221030T160518_01_P001_WV02

20221207T160205_01_P001_WV02

2023: Final_mosaic_rookery_2023-02_2023-02_Postprocessed_v1
20230210T161315_01_P001_WV02

2024: Final_mosaic_rookery_2024-11_2024-11_Postprocessed_v1
20241129T161840_01_P001_WV02

Maps and schematics for data collection
Area of the habitat maps for Rookery Bay in southwestern Florida.



13. Mangrove interannual change maps for Jobos Bay NERR

General description of data:
Very high-resolution (2 m) annual habitat maps of coastal areas around Jobos Bay, in southern Puerto Rico, were generated using Maxar WorldView satellite imagery to assess mangrove degradation and recovery following storms. These habitat maps are associated with the Mangrove Coast Collaborative project and include data produced from both Science Collaborative (2020 - 2024) and Catalyst projects (2023 - 2025). The time series spans from 2014 to 2024, except for 2019, when insufficient clear imagery prevented generation of the annual mosaic.

Interannual mangrove change maps were generated by subtracting mangrove class values between two annual habitat maps on a pixel-by-pixel basis, allowing identification of mangrove loss, gain, or no change. These maps cover a smaller area than the annual habitat maps, focusing

specifically on the Jobos Bay National Estuarine Research Reserve (JBNERR) and the adjacent Aguirre Forest.

Two types of change maps are provided:
1) Regional change (custom years): Mangrove change between two selected years for the study region.
2) Regional change (consecutive years): Mangrove change between consecutive years across the study region.

These maps were produced by the Institute for Marine Remote Sensing (IMaRS, https://imars.usf.edu/) at the College of Marine Science of the University of South Florida.

Search keywords:
Mangrove cover change, mangrove degradation, mangrove recovery, mangrove time series analysis, Jobos Bay, JBNERR, Florida, WorldView.

More about the data:

- Using habitat classification maps produced by the Mangrove Coast Collaborative, interannual mangrove change was calculated by subtracting the mangrove class values between two annual mosaics (year-2 minus year-1). Each pixel in the resulting change map is classified as:
    - 0: No data or no mangrove in either year
    - 1: Mangrove loss (present in year-1, absent in year-2)
    - 2: No change in mangrove coverage
    - 3: Mangrove gain (absent in year-1, present in year-2)
- Filenames for this dataset include the "start_date" and "end_date" used to create the mosaic of images. All available images were used between these dates (processed individually and then mosaiced using a mode function) to create the file. For each file there are four total dates - a start_date and end_date for each mosaic product that were then subtracted.

Data collection period:
January, 2014 to December, 2024

Geographic extent:
Jobos Bay National Estuarine Research Reserve and Aguirre Forest.
The coordinate limits for the mangrove change maps are:
LatitudeLimits: [17.91, 17.97]
LongitudeLimits: [-66.275, -66.165]

File format:
The mangrove change maps are provided as geotiff files and png files. The size of the .tif files are < 2 MB, and for the .png files are < 200 KB.

File name(s):
Filenames match the following formatting patterns:

- *Mangrove change between two years of interest:*
JBNERR_MangroveChange_{year-2_start_date}_{year-2_end_date}_minus_{year-1_start_date}_{year-1_end_date}.{tif | png}

- *Mangrove change between two consecutive years*:
JBNERR_Mangrove_consecutiveYearsChange_{year-2_start_date}_{year-2_end_date}_minus_{year-1_start_date}_{year-1_end_date}.{tif | png}

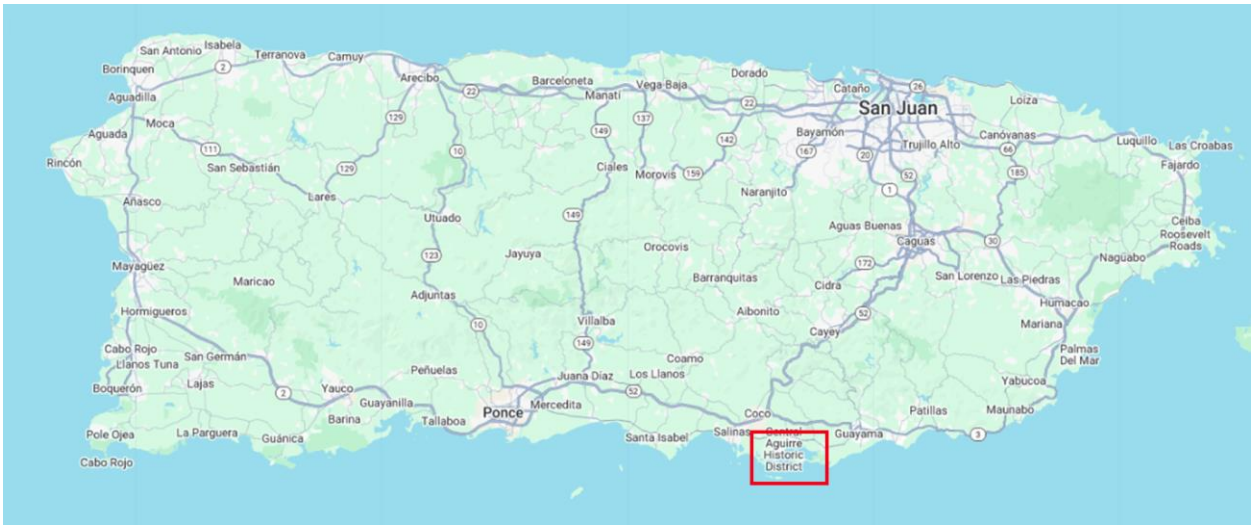
Data access and archival:
This dataset is available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

This data is also available here:

- Within USF-supported box.com storage
    - https://usf.box.com/s/czj0v9w778wgixvqs6k5ds3otg5yf8d1

Maps and schematics for data collection

The interannual mangrove change maps cover a smaller area than the annual habitat maps, focusing specifically on the Jobos Bay National Estuarine Research Reserve (JBNERR) and the adjacent Aguirre Forest in southern Puerto Rico.



14. Mangrove interannual change maps for Rookery Bay NERR

General description of data:
Very high-resolution (2 m) annual habitat maps of coastal areas around Rookery Bay, in southwestern Florida, were generated using Maxar WorldView satellite imagery to assess mangrove degradation and recovery following storms. These habitat maps are part of the Mangrove Coast Collaborative project and include data produced from both Science Collaborative (2020 - 2024) and Catalyst projects (2023 - 2025). The time series spans from 2014 to 2024, except for 2016 and 2019, when insufficient clear imagery prevented generation of the annual mosaics. Additionally, after 2021, WorldView imagery became inconsistent, limiting regional coverage. As a result, the 2021 mosaic includes imagery from late 2020, and coverage for 2023 and 2024 is very limited.

Interannual mangrove change maps were generated by subtracting mangrove class values between two annual habitat maps on a pixel-by-pixel basis, allowing identification of mangrove loss, gain, or no change. These maps cover a smaller area than the annual habitat maps, focusing specifically on the Rookery Bay National Estuarine Research Reserve (RBNERR).

Three types of change maps are provided:
1) RBNERR-specific change (custom years): Mangrove change between two selected years, limited to the RBNERR boundaries.
2) Regional change (custom years): Mangrove change between two selected years for the entire study region.
3) Regional change (consecutive years): Mangrove change between consecutive years across the entire study region.

These maps were produced by the Institute for Marine Remote Sensing (IMaRS, https://imars.usf.edu/) at the College of Marine Science of the University of South Florida.

Search keywords:
Mangrove cover change, mangrove degradation, mangrove recovery, mangrove time series analysis, Rookery Bay, RBNERR, Florida, WorldView.

More about the data:

- Using habitat classification maps produced by the Mangrove Coast Collaborative, interannual mangrove change was calculated by subtracting the mangrove class values between two annual mosaics (year-2 minus year-1). Each pixel in the resulting change map is classified as:
    - 0: No data or no mangrove in either year
    - 1: Mangrove loss (present in year-1, absent in year-2)
    - 2: No change in mangrove coverage

    - 3: Mangrove gain (absent in year-1, present in year-2)
- Filenames for this dataset include the "start_date" and "end_date" used to create the mosaic of images. All available images were used between these dates (processed individually and then mosaiced using a mode function) to create the file. For each file there are four total dates - a start_date and end_date for each mosaic product that were then subtracted.

Data collection period:
January, 2014 to December, 2024

Geographic extent:
Rookery Bay National Estuarine Research Reserve. The nearest town for Rookery Bay's mangrove change maps is Marco Island, and the coordinate limits for the maps are:

LatitudeLimits: [25.9131840154689, 26.1]
LongitudeLimits: [-81.804, -81.5491974847982]

File format:
The mangrove change maps are provided as geotiff files and png files. The size of the .tif files varied between 6 to 30 MB, and for the .png files varied between 300 and 600 KB.

File name(s):
Filenames match the following formatting patterns:

- *Mangrove change between two years of interest, only within the RBNERR boundaries*:
onlyRBNERR_MangroveChange_{year-2_start_date}_{year-2_end_date}_minus_{year-1_start_date}_{year-1_end_date}.{tif | png}

- *Mangrove change between two years of interest, whole region*:
RBNERR_MangroveChange_{year-2_start_date}_{year-2_end_date}_minus_{year-1_start_date}_{year-1_end_date}.{tif | png}

- *Mangrove change between two consecutive years, whole region:*
RBNERR_Mangrove_consecutiveYearsChange_{year-2_start_date}_{year-2_end_date}_minus_{year-1_start_date}_{year-1_end_date}.{tif | png}

Data access and archival:
This dataset is available from the NERRS Centralized Data Management Office (CDMO) at the following link: https://nerrssciencecollaborative.org/resource/field-assessments-hydrologicmonitoringdata-habitat-maps-and-mangrove-interannual-change

This data is also available here:

- Within USF-supported box.com storage
    - https://usf.box.com/s/zfwz6jf0xqb2nv75tnhupu59prsq6qia

Maps and schematics for data collection

The interannual mangrove change maps cover a smaller area than the annual habitat maps, focusing specifically on the Rookery Bay National Estuarine Research Reserve (RBNERR) in southwestern Florida.