

Data Documentation

Dataset Information

Dataset Title:

NCCOS Assessment: Digitized histological slides for stony coral tissue loss disease (SCTLD) development in *Orbicella franksii* colonies located in the Dry Tortugas, 2021-09-01 to 2022-08-01

Description:

This digitized histological slide collection includes tissue biopsies from wild colonies of *Orbicella franksii* (OFRA) located at three sites throughout the Dry Tortugas and collected at four time points to capture pre-disease and endemic disease states (September 2021, February 2022, June 2022, and August 2022). Slides were stained with either hematoxylin and eosin stains to highlight tissue morphology or Movat's pentachrome stain to differentiate connective tissues (mucin, collagen, elastin, myosin). All slides were scanned on a digital slide scanner to a maximum magnification of 40x. All images are in an .svs format. This dataset only includes the raw histological slide collection and associated metadata from biopsied coral colonies. Results from the analysis of the histological slides will be available from partner labs in separate associated datasets.

Purpose:

Stony coral tissue loss disease (SCTLD) is a lethal disease that has been affecting Florida's coral reefs since 2014 whose etiology and etiological agent(s) are still unknown at the time of writing. The Dry Tortugas were one of the last Florida reefs to be infected, with the first sign of infection appearing in December 2021. This project was an extension of previous molecular work led by Dr. Grace Klinges (Mote Marine Laboratory) with the goal of pairing histological analysis and proteomic data to better understand SCTLD development as it arrives at a naïve reef. Understanding the functional changes associated with disease progression during early onset will provide a foundation for developing new treatments and diagnostics for intervention and management of SCTLD and other coral diseases, and increase our understanding of how endemic diseases may be impacting the reef population in the long term.

Methods:

Four SCTLD- susceptible species of coral were targeted for this study: *Colpophyllia natans*, *Montastrea cavernosa*, *Orbicella faveolata*, and *Orbicella franksii*. Three replicate colonies per species were monitored and sampled at three reef locations (n=36). Each coral was visited and sampled over three time periods: September 2021 (before SCTLD was reported in the Dry Tortugas), February or June 2022, and August 2022). When disease lesions were present on a colony, multiple tissue biopsies were collected for histological analysis, both at the disease lesion and from the apparently healthy tissue a distance away from the disease

lesion. Histological processing and slide preparation from collected tissue biopsies was completed by Dan Holstein's lab (Louisiana State University) and stained using Movat's pentachrome staining technique by IDEXX BioAnalytics (Columbia, MO). This slide collection only includes samples from *Orbicella franksii*.

Instruments:

- MoticamProS12 Plus
- EasyScanInfinity
- Digital Slide Scanner (40x)

People & Projects

Dataset Authors:

- Saunders, Janet; Woodley, Cheryl; McDonald, E. Murphy; Klinges, Grace

Principal Investigator:

- Cheryl Woodley, cheryl.woodley@noaa.gov, <https://orcid.org/0000-0001-7532-2934> , NOAA NOS National Centers for Coastal Ocean Science (ROR- <https://ror.org/05ba43f71>)

Additional Principal Investigators:

- Grace Klinges, gklinges@asu.edu, <https://orcid.org/0000-0003-3172-133X>, ASU Center for Global Discovery and Conservation Science, 'Āko'ako'a Reef Restoration Program

Primary Point of Contact:

- Cheryl Woodley, cheryl.woodley@noaa.gov, <https://orcid.org/0000-0001-7532-2934> , NOAA NOS National Centers for Coastal Ocean Science (ROR- <https://ror.org/05ba43f71>)
- NCCOS Data Manager, nccos.data@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) (ROR- <https://ror.org/05ba43f71>)

Collaborators:

- Dan Holstein, Louisiana State University
- Ashley Rossin, Louisiana State University

Partners:

- The National Park Service
- Mote Marine Laboratory
- Arizona State University, 'Āko'ako'a Restoration Program

Funding:

- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) (ROR <https://ror.org/05ba43f71>)
- NOAA Coral Reef Conservation Program, Use of 'omics for coral restoration and disease intervention #31618

Extents:

Start Date: 2021-09-01

End Date: 2022-08-01

North- 24.65943

South- 24.66838

West- -82.93448

East- -82.92525

Citations

Associated Datasets:

- Cheryl Woodley. (2025). NCCOS Assessment: Tracking Proteomic Changes throughout Stony Coral Tissue Loss Disease Development in the Dry Tortugas, 2021-09-01 to 2022-09-01. NOAA National Centers for Environmental Information. Dataset. (in prep)
- Cheryl Woodley. (2025). NCCOS Assessment: Digitized histological slides for stony coral tissue loss disease (SCTLD) development in *Montastrea cavernosa* colonies located in the Dry Tortugas, 2021-09-01 to 2022-09-01. NOAA National Centers for Environmental Information. Dataset. (in prep)
- Cheryl Woodley. (2025). NCCOS Assessment: Digitized histological slides for stony coral tissue loss disease (SCTLD) development in *Orbicella faveolata* colonies located in the Dry Tortugas, 2021-09-01 to 2022-09-01. NOAA National Centers for Environmental Information. Dataset. (in prep)
- Saunders, Janet; Woodley, Cheryl M.; McDonald, E. Murphy; Klinges, Grace (2025). NCCOS Assessment: Digitized histological slides for stony coral tissue loss disease (SCTLD) development in *Colpophyllia natans* colonies located in the Dry Tortugas, 2021-09-01 to 2022-08-01 (NCEI Accession 0302466). <https://www.ncei.noaa.gov/archive/accession/0302466>.
- Saunders, Janet; Woodley, Cheryl M.; McDonald, E. Murphy; Klinges, Grace. NCCOS Assessment: Digitized histological slides for stony coral tissue loss disease (SCTLD) development in *Colpophyllia natans*, *Montastrea cavernosa*, *Orbicella faveolata*, and *Orbicella franksii* colonies located in the Dry Tortugas, 2021-09-01 to 2022-09-01. NOAA National Centers for Environmental Information. Dataset. <https://doi.org/10.25921/rsxk-4030>
 - Collection of all related Accessions in this dataset

Associated Online Resources:

- FWC Digital Pathology database (eSlide manager): FWC Digital Pathology | FWC (<https://myfwc.com/research/about/resources/eslide/>)
- OpenSlide | slide-reading resource <https://openslide.org/>

Keywords

Sea Areas, Water Bodies, Marine Protected Areas:

- Atlantic Ocean
- Caribbean Sea
- Dry Tortugas National Park

Discovery Theme Keywords

- Stony coral tissue loss disease
- Coral pathology
- Coral histology
- *Orbicella franksii*
- Coral disease

NCCOS Keywords:

- NCCOS Research Priority > Stressor Impacts and Mitigation
- NCCOS Research Topic > Regional Ecosystem Science
- NCCOS Research Location > Region > Atlantic Ocean
- NCCOS Research Location > U.S. States and Territories > Florida
- NCCOS Research Data Type > Field Experiment

CoRIS Keywords: *Required if CRCP-funded, see [link](#) for CoRIS keywords.*

- CoRIS Discovery Thesaurus:
 - Visual Images > Invertebrates
 - Visual Images > Corals
- CoRIS Theme Thesaurus:
 - EARTH SCIENCE > Biosphere > Zoology > Corals > Coral Condition
 - EARTH SCIENCE > Biosphere > Zoology > Corals > Coral Mortality
 - EARTH SCIENCE > Oceans > Marine Biology > Coral
 - EARTH SCIENCE > Oceans > Marine Biology > Marine Invertebrates
- CoRIS Place Country/Territory Keywords:
 - COUNTRY/TERRITORY > United States of America > Florida > Florida Reef Tract (25N080W0002)
 - COUNTRY/TERRITORY > United States of America > Florida > Florida Reef Tract (26N080W0007)
 - COUNTRY/TERRITORY > United States of America > Florida > Monroe County > Dry Tortugas (24N082W0001)
- CoRIS Place Ocean/Seas Keywords:
 - OCEAN BASIN > Atlantic Ocean
 - OCEAN BASIN > Atlantic Ocean > North Atlantic Ocean > Florida
 - OCEAN BASIN > Atlantic Ocean > North Atlantic Ocean > Florida Reef Tract (26N080W0007)
 - OCEAN BASIN > Atlantic Ocean > North Atlantic Ocean > Florida Reef Tract > Florida Keys (24N081W0007)
 - OCEAN BASIN > Atlantic Ocean > North Atlantic Ocean > Florida Reef Tract > Dry Tortugas > Dry Tortugas (24N082W0001)

File Information

Total File Size: 51.3 GB total, 66 files in 1 folder (unzipped)

Data File Format(s):

- o Spreadsheet: Comma-separated value (.CSV)
- o Microsoft Excel Worksheet (.xlsx)
 - o Duplicate copy of metadata file in .xlsx format which includes data dictionary
- o Images (.SVS)

Data File Compression: none

Data File Resolution: μm

GIS Projection: NA

Data Files:

Image Metadata: Metadata_DRTO_OFRA.csv

Images:

File naming convention:

SpeciesReplicate_SamplePeriod_MoteSiteID_TissueCondition_SlideNumber_ScanDate

OFRA1_Aug2022_DT25_J_5_20230927095047.svs	OFRA2_June2022_DT28_J_5_20230927160542.svs
OFRA1_Aug2022_DT26_J_5_20230927112520.svs	OFRA2_June2022_DT28_M_5_20230927160559.svs
OFRA1_AUG22_DT25_J_7_20230919163936.svs	OFRA2_JUNE22_DT28_J_4_20230921094914.svs
OFRA1_AUG22_DT26_J_6_20230919163953.svs	OFRA2_JUNE22_DT28_M_4_20230921094931.svs
OFRA1_Feb2022_DR28_J_5_20230920161544.svs	OFRA2_Sept2021_site2_J_5_20230927122056.svs
OFRA1_Feb2022_DR28_J_5_20230927150859.svs	OFRA2_Sept2021_site25_J_5_20230927095104.svs
OFRA1_June2022_DT25_J_5_20230927095028.svs	OFRA2_Sept2021_site3_J_5_20230927150926.svs
OFRA1_June2022_DT25_J_6_20230920161601.svs	OFRA2_SEPT21_SITE2_J_7_20230921094949.svs
OFRA1_June2022_DT26_J_5_20230927112504.svs	OFRA2_SEPT21_SITE25_J_4_20230921095006.svs
OFRA1_June2022_DT26_J_7_20230920161620.svs	OFRA2_SEPT21_SITE3_J_3_20230921095023.svs
OFRA1_June2022_DT28_J_5_20230927150838.svs	OFRA3_Aug2022_DT25_J_5_20230921102818.svs
OFRA1_June2022_DT28_J_6_20230920161637.svs	OFRA3_Aug2022_DT25_J_5_20230927112431.svs
OFRA1_Sept2021_site2_J_5_20230927112447.svs	OFRA3_Aug2022_DT26_J_3_20230921102835.svs
OFRA1_Sept2021_site2_J_7_20230920161653.svs	OFRA3_Aug2022_DT26_J_5_20230927150746.svs
OFRA1_Sept2021_site25_J_5_20230927095011.svs	OFRA3_Aug2022_DT26_M_3_20230921102854.svs
OFRA1_Sept2021_site25_J_7_20230920161710.svs	OFRA3_Aug2022_DT26_M_5_20230927150802.svs
OFRA1_Sept2021_site3_J_5_20230921090340.svs	OFRA3_Feb2022_DR28_J_5_20230927160719.svs
OFRA1_Sept2021_site3_J_5_20230927150821.svs	OFRA3_Feb2022_DR28_J_6_20230921102911.svs
OFRA2_Aug2022_DT25_J_5_20230927095138.svs	OFRA3_June2022_DT25_J_5_20230927112412.svs
OFRA2_Aug2022_DT25_J_6_20230921090357.svs	OFRA3_June2022_DT25_J_7_20230921102928.svs
OFRA2_Aug2022_DT26_J_5_20230927122156.svs	OFRA3_June2022_DT26_J_5_20230921102944.svs
OFRA2_Aug2022_DT26_J_6_20230921090417.svs	OFRA3_June2022_DT26_J_5_20230927122244.svs
OFRA2_Aug2022_DT26_M_5_20230927122138.svs	OFRA3_June2022_DT28_J_5_20230927160658.svs
OFRA2_Aug2022_DT26_M_7_20230921090433.svs	OFRA3_June2022_DT28_J_7_20230921112632.svs
OFRA2_Feb2022_DR28_J_5_20230927160618.svs	OFRA3_Sept2021_site2_J_3_20230921112741.svs
OFRA2_FEB22_DR28_J_4_20230921095039.svs	OFRA3_Sept2021_site2_J_5_20230927122220.svs
OFRA2_June2022_DT25_J_5_20230927095121.svs	OFRA3_Sept2021_site25_J_4_20230921112708.svs
OFRA2_June2022_DT25_J_7_20230921090450.svs	OFRA3_Sept2021_site3_J_5_20230927160641.svs
OFRA2_June2022_DT26_J_5_20230921090507.svs	OFRA3_Sept2021_site3_J_7_20230921112725.svs
OFRA2_June2022_DT26_J_5_20230927122118.svs	OFRA3_Sept2022_site25_J_5_20230927112355.svs

Documentation Files:

- BrowseGraphic.jpg
- Metadata_DRTO_OFRA.xlsx
- DataDocumentation.PDF

Table 1: Data Dictionary

Column	Variable	Label	Definition Units Range
1	File Name	File Name	File names of scanned slide images (.svs)
2	File Size (MB)	File Size (MB)	File size of scanned slide images (megabytes)(360 MB - 1400 MB)
3	Colony ID	Colony ID	Species and replicate identifiers written on each slide (OFRA 1-3= <i>Orbicella franksii</i> replicates 1-3)
4	Species	Species	Coral genus and species (<i>Orbicella franksii</i>)
5	Replicate	Replicate	Colony replicate collected of each species at each site. Three colonies (replicates 1, 2, 3) were collected from each species from each site.
6	Colony Tag Number	Colony Tag Number	Identification number assigned to each coral colony sampled and monitored in this study. Each colony is tagged with this number in the field on a visible cattle tag.
7	Sample Period	Sample Period	Month and year that each coral colony was biopsied for histology (September 2021, February 2022, June 2022, August 2022). The same coral colonies were sampled over multiple months.
8	Site (Mote)	Site (Mote)	Name of colony location site assigned by Mote Marine Laboratory (Grace Klings). Each site has a name assigned by Mote, the Environmental Protection Agency, and the National Park Service.
9	Site (EPA)	Site (EPA)	Name of colony location site assigned by the Environmental Protection Agency (EPA). Each site has a name assigned by Mote, the Environmental Protection Agency, and the National Park Service.
10	Site (NPS)	Site (NPS)	Name of colony location site assigned by the National Park Service (NPS). Each site has a name assigned by Mote, the Environmental Protection Agency, and the National Park Service.

11	Latitude	Latitude	Latitude coordinates of each sample site (Decimal Degrees) (24.65943 - 24.66838)
12	Longitude	Longitude	Longitude coordinates of each sample site (Decimal Degrees) (-82.93448 - -82.92525)
13	Tissue Condition	Tissue Condition	Tissue condition (healthy or diseased) of the biopsy collected for histology. On diseased colonies, biopsies were taken both from the actively diseased tissue near the lesion and from the apparently healthy tissue far removed from the disease lesion. J= apparently healthy tissue; M= diseased tissue.
14	Slide Number	Slide Number	Histology slide number- each tissue sample was sectioned onto multiple slides for additional stains and analysis by different institutions.
15	Colony Health State	Colony Health State	Health condition of the coral colony reported during field sampling (Healthy, Diseased), including additional notes of interest (for example, percentage of the colony that is dead or diseased, whether mortality appears to be recent or old, etc.)
16	Stain	Stain	Histological stain applied to tissue section (HE= Hematoxylin and eosin; Movats= Movat's Pentachrome)

Data Types (Parameter Information)

List of major parameters included in this accession:

Parameter Description:

Parameters: Digitized histology slides of diseased coral tissues

Property Type: Images

Units: NA

Observation Category: other

Sampling Instrument: Digital Slide Scanner (40x) with EasyScanInfinity software

Sampling and Analyzing Method: Tissue biopsies were taken from targeted coral colonies *in situ* and fixed in zinc-formalin to preserve tissue integrity. Histological sections were prepared by Dr. Dan Holstein's laboratory at Louisiana State University using standard processing techniques including dehydrating tissues with a graduated series of alcohols, infiltrating tissues with paraffin wax, embedding tissues in paraffin blocks, sectioning tissues and mounting onto glass slides for staining. Staining with Movat's pentachrome stain kit was performed by IDEXX BioAnalytics (Columbia, MO). Stained slides were scanned on a digital slide scanner at a magnification of 40x using EasyScanInfinity software. No histological analysis is included in this dataset-any data resulting from the analysis of the histological slides will be available from partner labs in separate associated datasets.

Data Quality Method: Control slides prepared from rat tissues were stained alongside coral samples to ensure quality of Movat's pentachrome staining kit. No histological analysis is included in this dataset-any data resulting from the analysis of the histological slides will be available from partner labs in separate associated datasets.

Document Information

Date Last Updated: 2025-06-27

Resource Provider:

NCCOS Data Manager, nccos.data@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)

Comment:

This data documentation describes data files archived as a NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.

Use Limitation:

NOAA makes no warranty, expressed or implied, regarding these data, nor does the fact of distribution constitute such a warranty. NOAA cannot assume liability for any damages caused by any errors or omissions in these data.

Data License:

These data were produced by NOAA and are not subject to copyright protection in the United States. NOAA waives any potential copyright and related rights in these data worldwide through the [Creative Commons Zero 1.0 Universal Public Domain Dedication \(CC0 1.0\)](https://creativecommons.org/licenses/by/4.0/).