Southeast Fisheries Science Center EBFM(ish) projects

Updated:
20240312

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Strategic Planning

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Caribbean Strategic Planning

- 2 projects finalizing deliverables
  - Socioeconomic
    - Identifying data needs and developing recommendations for implementing data into stock assessment
  - Communications
    - Identifying communications organizations and mechanisms
- 2 projects in the middle of creating deliverables
  - Fishery independent
    - Identifying and prioritizing of data needs
  - Fishery dependent
    - Identifying and prioritizing of data needs

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Caribbean Strategic Planning

- 3 projects will begin to create deliverables soon
  - Life history
    - Identifying and prioritizing of data needs
  - Habitat
    - Identifying data needs and developing recommendations for implementing data into stock assessment
  - Funding governance
    - Identifying the needs for establishing a funding governance structure

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Caribbean Strategic Planning

- 1 project still in process of accomplishing goals
  - Toolbox
    - Determine available data appropriate methods to inform management → LANTERN Detail beginning in August
- First phase of projects will be made available to stakeholders
- Second phase of projects to begin later this year or early next
- Contact Rachel (rachel.banton@noaa.gov) with questions or information

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Surveys and Sampling

- Fishery Independent
  - Queen Conch
  - Deep water snapper-grouper
  - Shallow water diver survey
- Fishery Dependent
  - Port sampling – landings
  - Port sampling – size composition
  - Life history sampling
  - WECAFC
  - Management history data

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U.S. Caribbean Conch Survey Project

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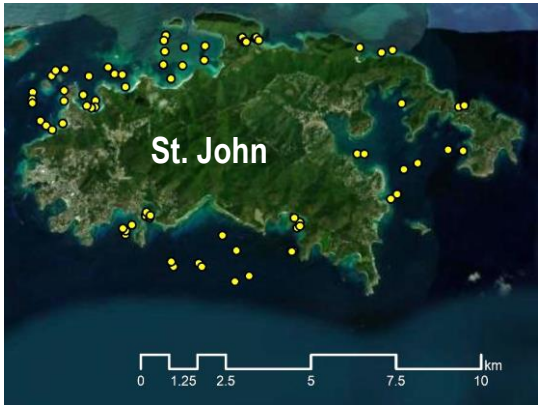
U.S. Caribbean Survey

- 1 island group per year
  - STT/STJ 2023
  - STX 2024
  - PR 2025



- Randomly stratified by depth (5-m bins) and benthic habitat category
- Aggregation mapping and within aggregation surveys

St. Croix – July 2024

- 125 radial surveys completed
  - ➢ Overall densities = 266 conch/ha
  - ➢ By age class = 199 juveniles/ha and 66 adults/ha

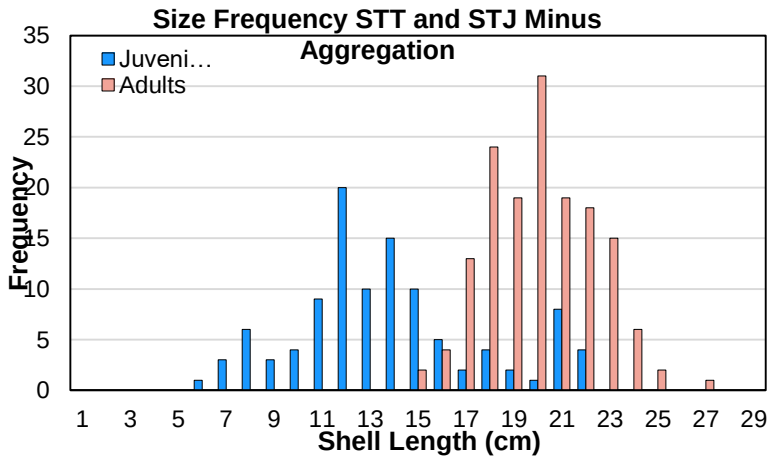
Results Summary

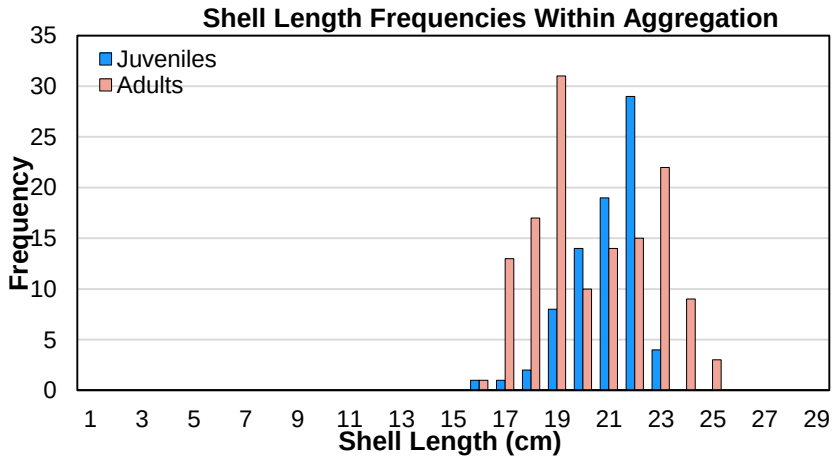
130 radial surveys completed (59 STT, 71 STJ)

- Overall densities = 64 conch/ha
- By age class = 24 juv/ha and 40 adults/ha

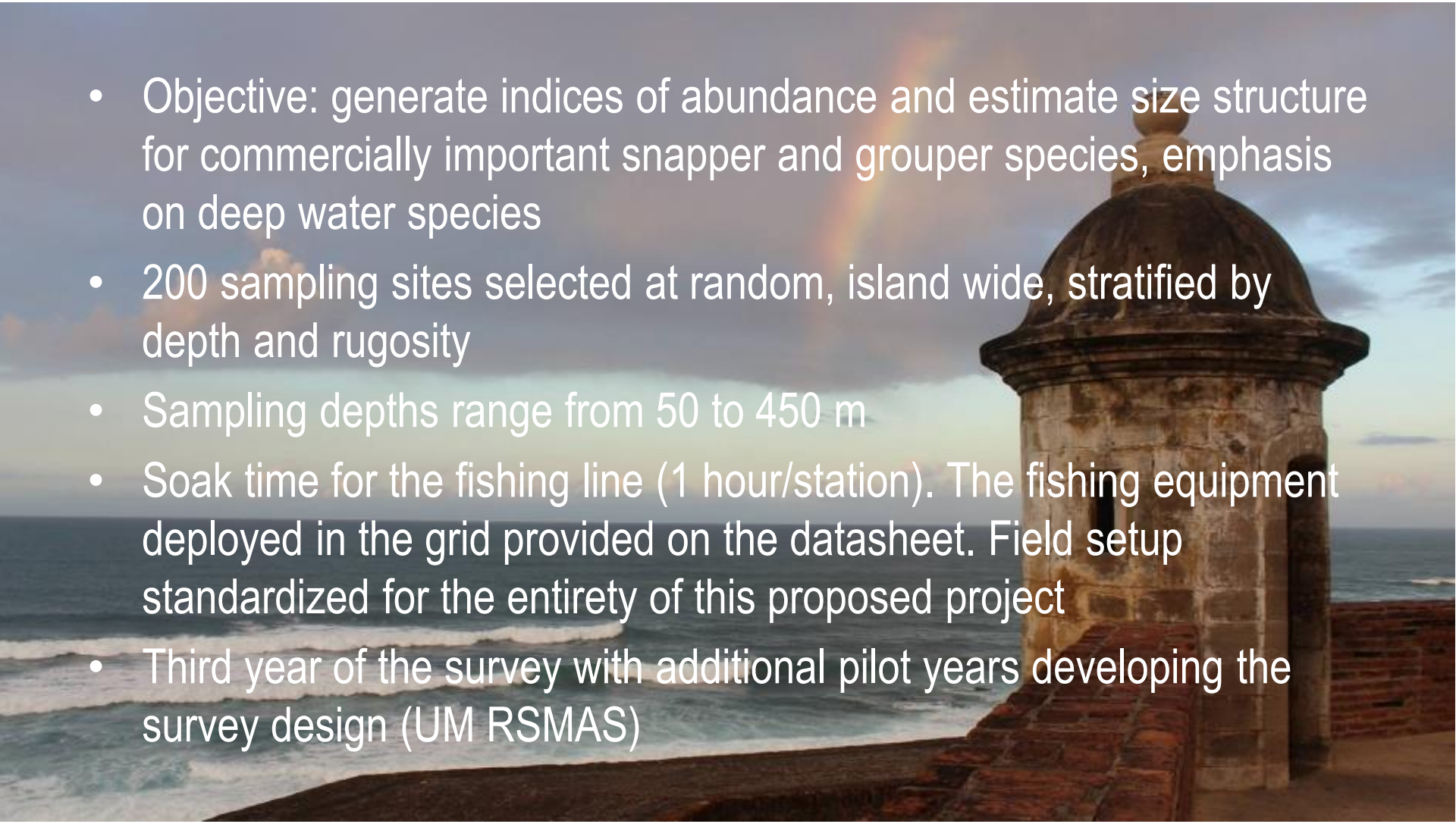
4 surveys w/in aggregation (~1 ha area)

- Overall density = 1695 conch/ha
- By age class = 621 juv/ha and 1074 adults/ha





Deep-water Fishery Independent Survey of Reef Fishes in Puerto Rico



- Objective: generate indices of abundance and estimate size structure for commercially important snapper and grouper species, emphasis on deep water species
- 200 sampling sites selected at random, island wide, stratified by depth and rugosity
- Sampling depths range from 50 to 450 m
- Soak time for the fishing line (1 hour/station). The fishing equipment deployed in the grid provided on the datasheet. Field setup standardized for the entirety of this proposed project
- Third year of the survey with additional pilot years developing the survey design (UM RSMAS)

Fishery-Independent Reef Fish Visual Survey

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Fishery-Independent Reef Fish Visual Survey

- **Year Range NCRMP:** 2001 to 2021
- **Year Range Deep-NCRMP:** 2020 to 2022
- **Geographic Range:** US Caribbean
- **Survey Design NCRMP:** Stratified-random sampling on hard-bottom coral reef habitats from 0 to 30 m.
- **Survey Design Deep-NCRMP:** Stratified-random sampling on hard-bottom coral reef habitats from 30 to 60 m.
- **Sampling Mode:** Fishery-independent reef fish visual surveys.
- **Survey Methodology:** Fully calibrated estimates that consider the change in sampling methodology from Belt Transects (BT) to RVC Stationary Points Counts (RVC-SPC) to allow for multi-decadal evaluations.
- **Historic belt-transect (BT) estimates:** (2001–2015)
- **Present reef visual census stationary point count:** (RVC-SPC) estimates (2016–2021)

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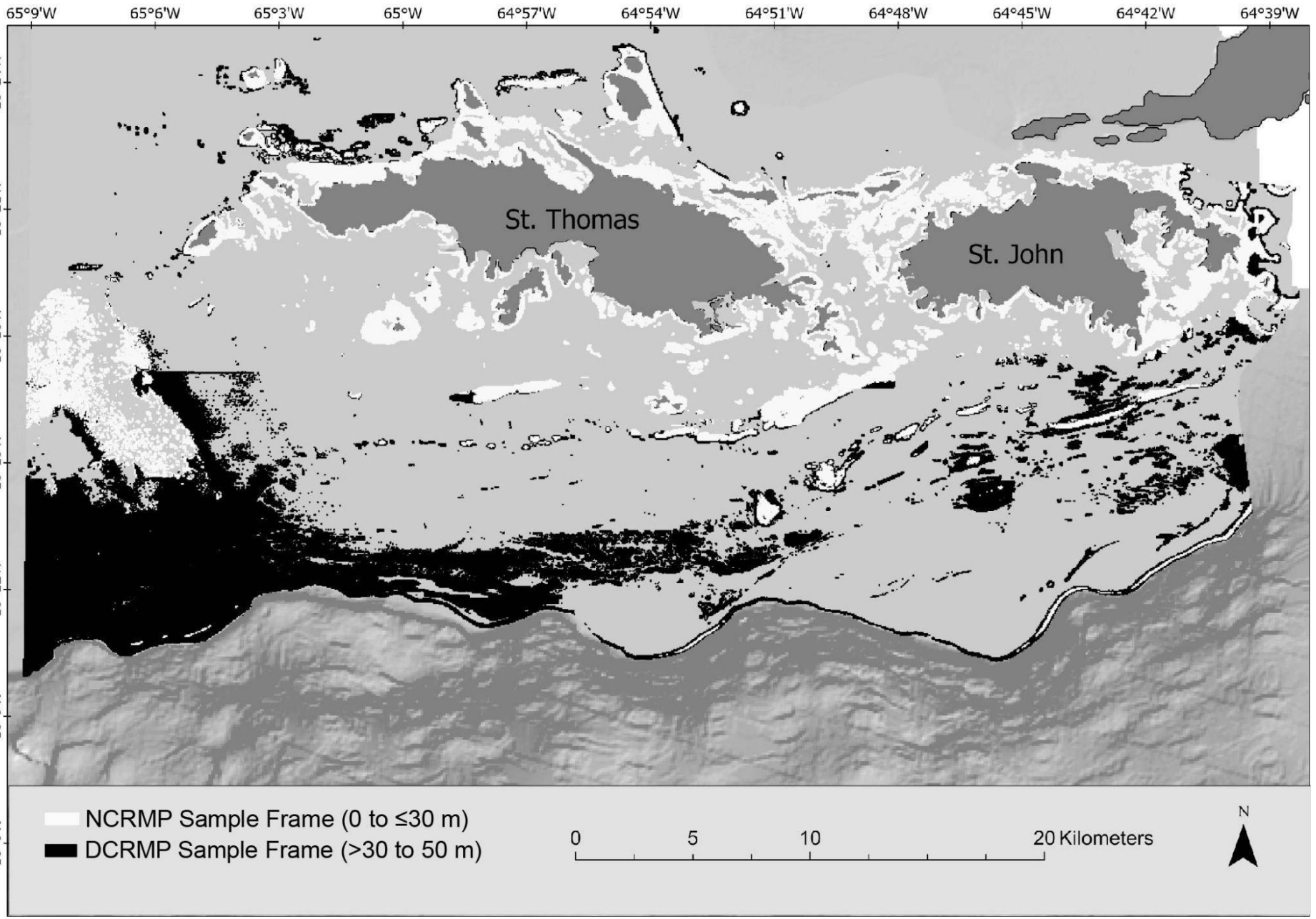
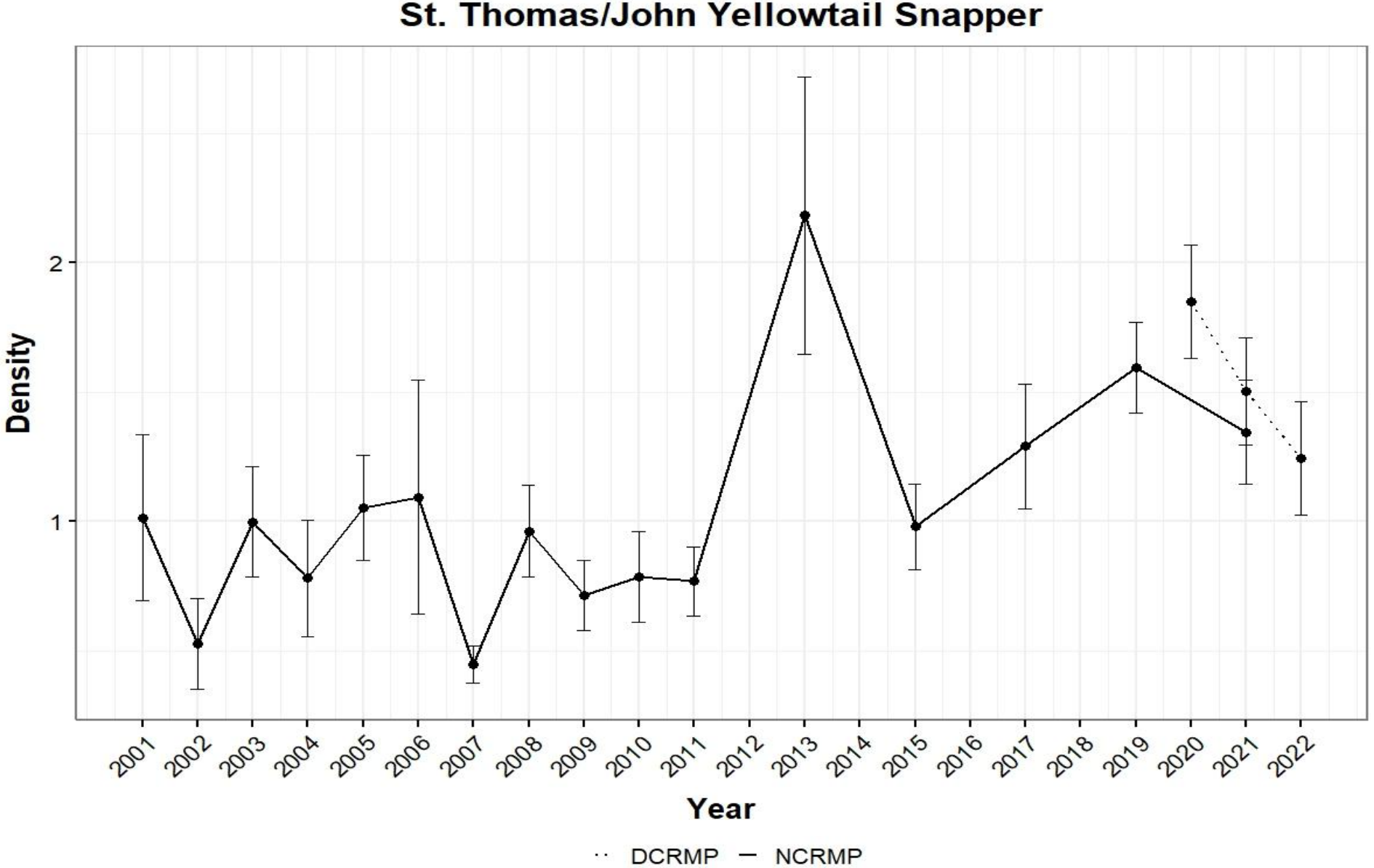
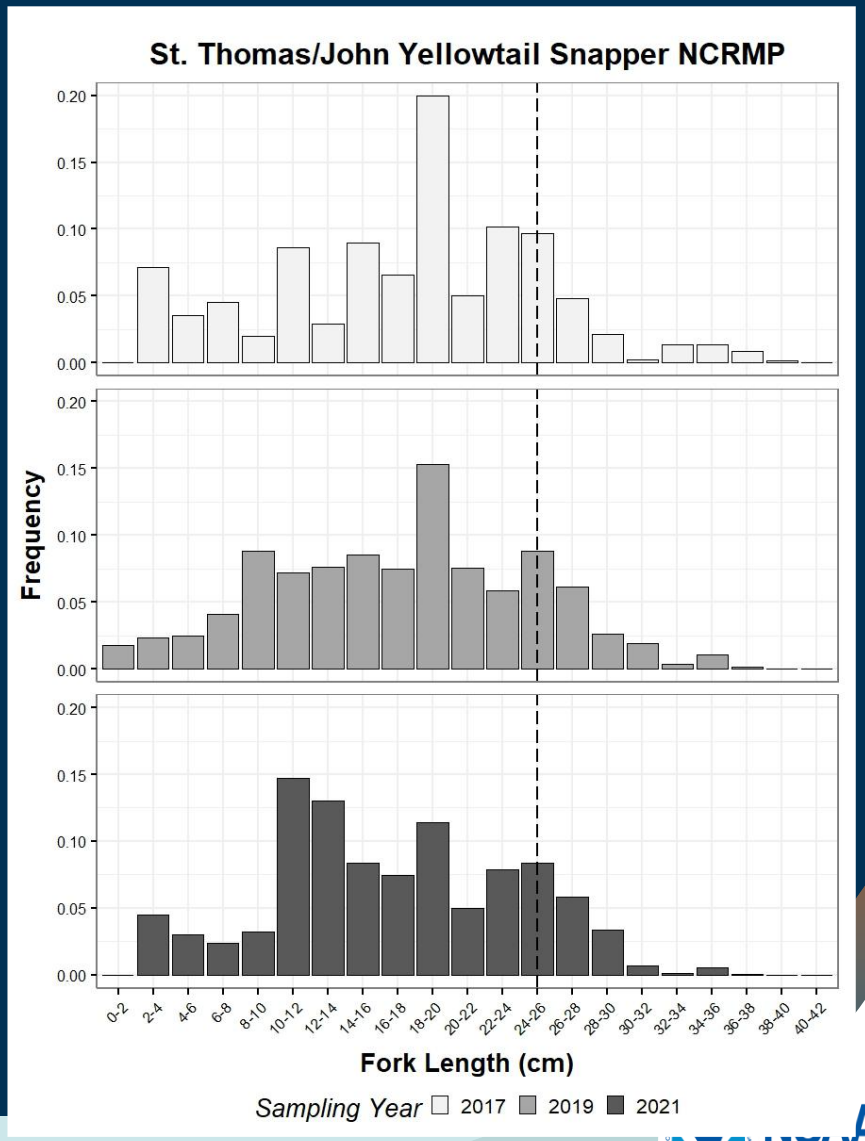


St. Thomas and St. John NCRMP (white) and DCRMP (black) sampling domain.



Time series (2001–2021) of yellowtail snapper (*Ocyurus chrysurus*) mean population density (number per 178 m2, ± SE) from the NCRMP (solid line) and DCRMP (dotted line) reef fish visual surveys in the St. Thomas and St. John coral reef ecosystem.

Yellowtail snapper population size-frequency distribution at 2-cm bins from the 2017 - 2021 NCRMP RVC-SPC St. Thomas and St. John surveys. Vertical dashed line is length at capture (25.0 cm fork length).



30 - 60 meters					
Year	Aggregate	Patch	Pavement	Site Total	Length Total
2020	75	48	39	162	376
2021	59	23	16	98	258
2022	33	21	35	89	160

Number of DCRMP reef fish visual survey sites (left column) and number of Yellowtail Snapper (*Ocyurus chrysurus*) length observations (right column) by hard-bottom strata from the reef fish visual surveys in St. Thomas and St. John coral reef ecosystem (2020–2022).

Fishery Dependent Data

Implementing an updated sampling procedure for fishery-dependent sampling in Puerto Rico

Investigating multiple approaches for estimating total catch and effort using fishery-dependent data in the US Caribbean

Working with Partners in Puerto Rico and the US Virgin Islands to develop a statistical sampling design for a port sampling program

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Gathering essential life history information in cooperation with local fishing communities in Puerto Rico to enhance stock assessment

- **Objectives:**
  1. Develop partnership with fishers to allow observers aboard to collect biosamples of commercially important reef fishes
  2. Fill in the gaps in life history data on commercially important reef fishes to conduct stock assessment
- **Collaboration with HJR Reefscaping and PR DNER**
  - Fishery-dependent sampling off the west coast by trained observers
- **Years of sampling**: 2022-2024
- **Biosamples collected:** otoliths, gonads, eyes, and DNA samples

Gathering essential life history information in cooperation with local fishing communities in Puerto Rico to enhance stock assessment

- **Species of interest:**
  - Priority species:
    - Groupers: black, red, red hind, tiger, yellowedge, yellowfin
    - Snappers: mutton, black, vermillion
    - Hogfish
  - Opportunistic species:
    - Snapper, groupers, wrasses, jacks, parrotfish
- **Number of fish sampled:**

Sampling Year	Number of fish
2022	179
2023	386
2024	119

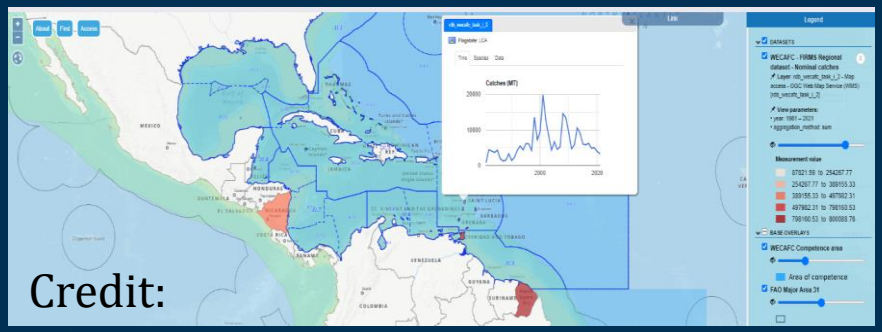
WECAFC: Overview

Credit:
FAO

- Western Central Atlantic Fishery Commission (WECAFC)
- Regional fisheries body
- Acts in advisory capacity for conservation and management of all living marine resources in the Wider Caribbean
- Comprised of 34 members, including USA

WECAFC: Current Work by CFB

- Data scoping for the Data Collection Reference Framework (DCRF):
  - Relevance to DCRF/WECAFIS tasks
  - Dataset issues and limitations
  - Data availability
  - Synchronization potential
- Working Group Attendance:
  - Caribbean Spiny Lobster
  - Fish Spawning Aggregations
  - Flyingfish - Dolphinfish
  - Fisheries Data and Statistics



Credit: FAO

4,599 records*
858 FRs*
77 Species
13 FMPs

SEFSC-MH-Processing

1. Load species list dataframe
2. Bug related cleaning (temporary)
3. Sector, zone, & species branches
4. Pre-processing
5. Group by type & fill in dates
6. Post-processing of related groups

https://github.com/SEFSC

SEFSC MANAGEMENT HISTORY PROJECT

COMPILE

2020 FIS-Supported Project

- Double blind data entry
- Custom data entry application with input validation & metadata

MAINTAIN

Plan Drafted

- SEFSC will train SERO
- SERO will keep MH current

PROCESS

In progress

- Define and execute logic for related management events
- Spot check relational database & improve data input validations

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*Slide updated 11/22/2021

USE

Started

- Filter analysis ready dataset by species, sector, or region of interest
- Automate the output for SEDARs and FMP Amendments

Data Analysis

- Efficiency and analytical improvements
- Stock assessments
- Simulation studies
- Close kin mark recapture
- Management strategy evaluations

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Caribbean Trip Interview Program Modernization Project:

Goals met:

(Phase 1 of 2)

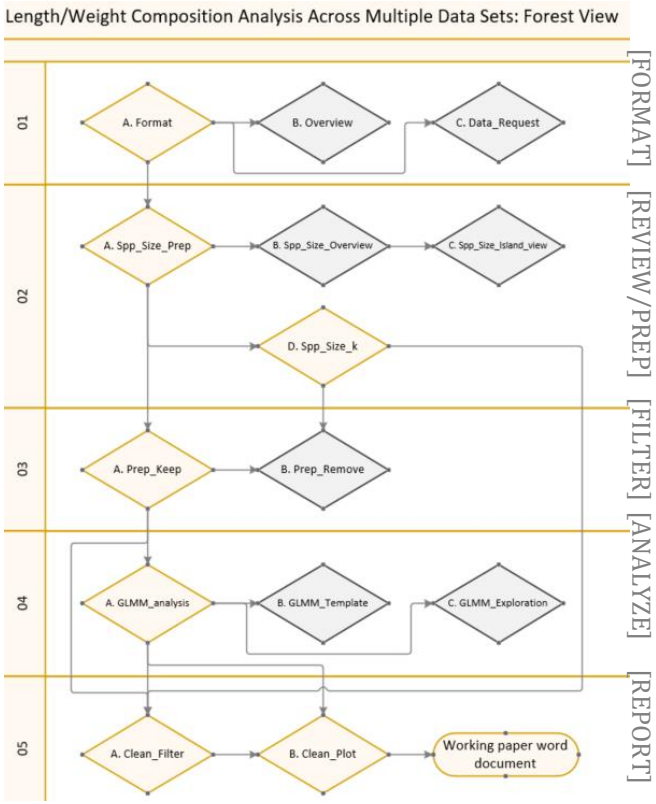
Explored data visualization by island, species, gear.

Outlined and refined SEDAR size composition analysis process.

Outlined and refined flagging process to create analysis ready dataset.

Investigated historical accuracy of Puerto Rico TIP data over last 40 years against available original raw data.

Outline of flagging process:



Next Steps :

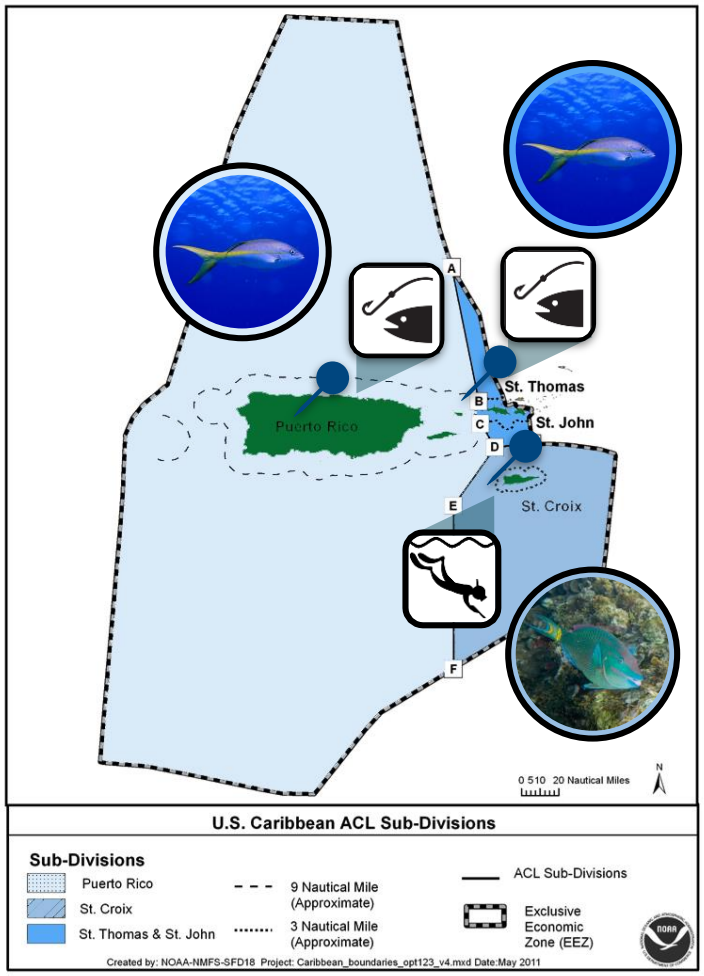
(Phase 2 of 2)

Proposed R Shiny application instead of originally planned Oracle due to changes in available personnel.

R Shiny applications are highly customizable, hosted on NMFS Posit Connect server, and can be built by available personnel.

Planned flexibility to modify analysis based on: year range, island, species, gear groupings, and bin size.

SEDAR 84 Caribbean Yellowtail Snapper and Stoplight Parrotfish SEFSC SFD Caribbean Fisheries Branch



Roadmap

☑Data Workshop January 2024

Assessment Webinars

☑Puerto Rico (3) April - May 2024
☑St. Thomas (3) May - June 2024
☑St. Croix (2) July 2024
❑St. Croix (1) August 2024
❑Final Webinar October 2024

❑Reports to Panel January 2025
❑Review Workshop February 2025
❑Complete Report April 2025

CFB Strategy

Start simple.
Add layers of complexity.
Apply lessons learned from SEDAR 80.

Slide updated 7/29/2024

Data inputs

x3 Island Platforms

- Commercial Logbook Landings
- Trip Interview Program Lengths
- Region-Specific Life History
- National Coral Reef Monitoring Program Fishery-Independent Indices and Observed Lengths

Tools

- Stock Assessment Continuum Tool
- Stock Synthesis
- R4SS
- Quarto

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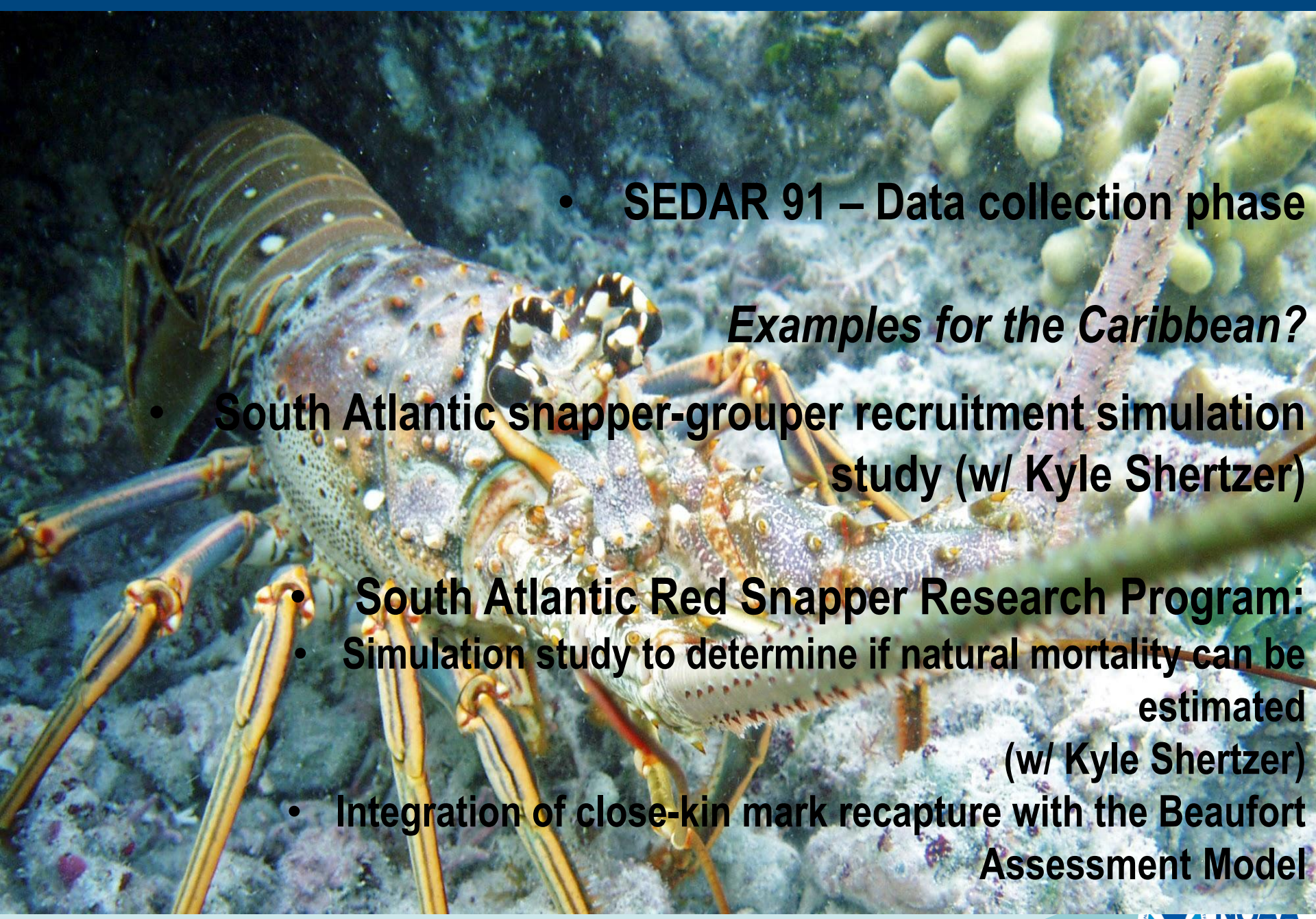


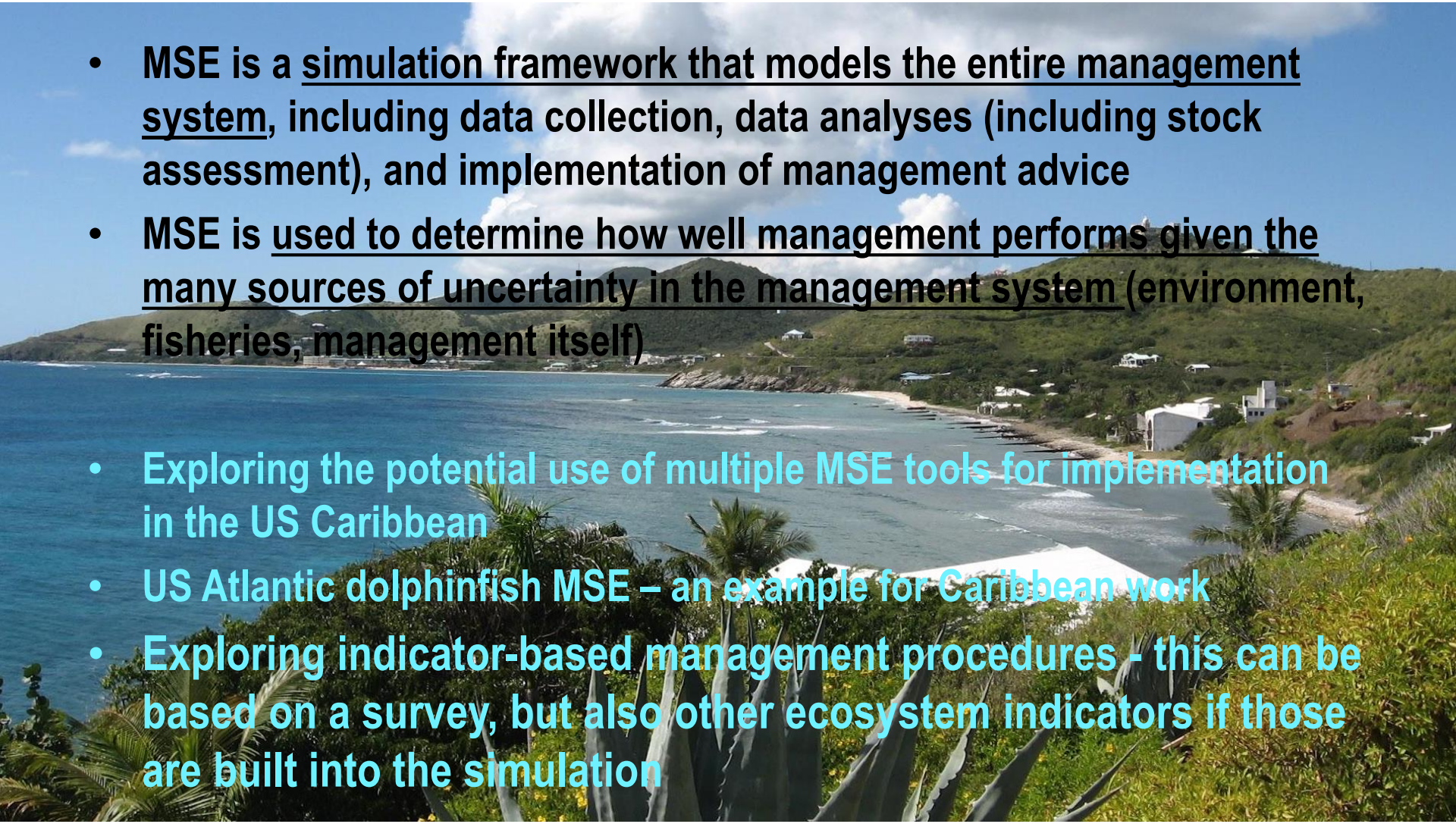
- SEDAR 91 – Data collection phase

Examples for the Caribbean?

- South Atlantic snapper-grouper recruitment simulation study (w/ Kyle Shertzer)

- South Atlantic Red Snapper Research Program:
  - Simulation study to determine if natural mortality can be estimated (w/ Kyle Shertzer)
  - Integration of close-kin mark recapture with the Beaufort Assessment Model

Management Strategy Evaluation (MSE) activities

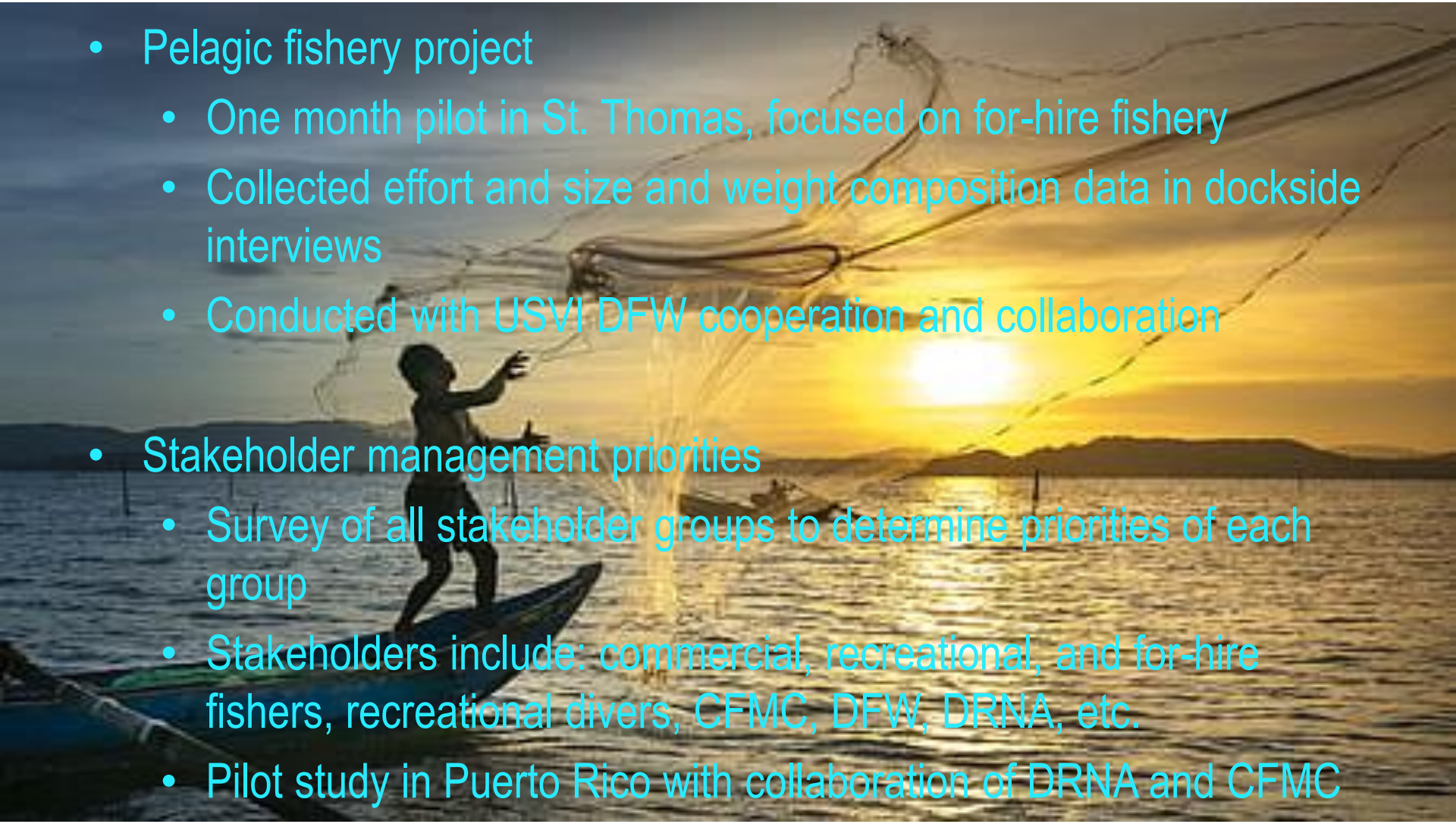


- MSE is a simulation framework that models the entire management system, including data collection, data analyses (including stock assessment), and implementation of management advice
- MSE is used to determine how well management performs given the many sources of uncertainty in the management system (environment, fisheries, management itself)

- Exploring the potential use of multiple MSE tools for implementation in the US Caribbean
- US Atlantic dolphinfish MSE – an example for Caribbean work
- Exploring indicator-based management procedures - this can be based on a survey, but also other ecosystem indicators if those are built into the simulation


New Projects
Pelagic fishery project
Stakeholder management priorities
Inflation Reduction Act (IRA) funded projects

Other projects



- Pelagic fishery project
  - One month pilot in St. Thomas, focused on for-hire fishery
  - Collected effort and size and weight composition data in dockside interviews
  - Conducted with USVI DFW cooperation and collaboration
- Stakeholder management priorities
  - Survey of all stakeholder groups to determine priorities of each group
  - Stakeholders include: commercial, recreational, and for-hire fishers, recreational divers, CFMC, DFW, DRNA, etc.
  - Pilot study in Puerto Rico with collaboration of DRNA and CFMC

Inflation Reduction Act Funding in 2024

Fishery independent survey for reef fishes

To be conducted as cooperative research with US Caribbean commercial fishers

- Extend existing Puerto Rico deep-water reef fish survey into US Virgin Islands
- Extend the existing Puerto Rico survey into shallow water to overlap with NCRMP diver survey
- This survey work will leverage existing Cooperative Research Program funding
- *This work is an outgrowth of key needs identified in the Caribbean Strategic Planning workshop funded through Ecosystem, Climate, and Stock Assessment Improvement.*

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Inflation Reduction Act Funding in 2024

Fishery independent lobster trap survey

- Extend existing Puerto Rico survey into the US Virgin Islands.
- This work will be conducted as cooperative research with US Virgin Islands commercial fishers.
- This extended survey will leverage existing Cooperative Research Program funding for the Puerto Rico survey.
- *This work is an outgrowth of key needs identified in the Caribbean Strategic Planning workshop*.

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Inflation Reduction Act Funding in 2024

Additional projects

Continued analysis of existing benthic habitat data (depth, substrate complexity, substrate hardness) from existing multi-beam sonar datasets

Queen Conch survey efficiency improvement using camera arrays and AI

- **Includes funding for a student**

Estimating fishing effort using remote sensing

- **Possible collaboration with NCCOS and Duke University**
- **Includes funding for a student**

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Southeast Fisheries Science Center | Sustainable Fisheries Division

Caribbean Fisheries Branch

Adyan Carly David Katherine Kevin Matt Rachel Refik Stephanie

Strategic Planning

24 ongoing projects

Improving collaborative data collection to support fisheries management

Enhancing collaborations and workflows

Engaging regional federal, territorial, and university partners and stakeholders

Data Collection

Collaborate with regional partners and local fishers to conduct:

- Port sampling in Puerto Rico and US Virgin Islands
- Cooperative lobster trap surveys in Puerto Rico
- Reef fish life history sampling in Puerto Rico
- Research with regional graduate students

Data Analysis and Provision

Reproducible workflows to support:

- Stock assessments
- Western Central Atlantic Fishery Commission reporting requirements
- Caribbean Fishery Management Council and external requests
- Data storage and automation
- Aquaculture stakeholders
- Management Strategy Evaluation

Stock Assessments

Coordinated by the SouthEast Data and Review Process

2024

Queen Triggerfish
Yellowtail Snapper
Stoplight Parrotfish
Spiny Lobster

2025

Hogfish and Red Hind

Updated: 20240312

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