



ECOSYSTEM BASED TECHNICAL ADVISORY PANEL  
(EBFM TAP)

FEP DRAFTING & DATA MANAGEMENT WORKING  
GROUPS

Caribbean Fishery Management Council  
(CFMC)

Ecosystem Based Fishery Management -  
Technical Advisory Panel (EBFM-TAP)

Meeting

August 1-2, 2024

Sennai Habtes

EBFM TAP Chair

Bureau Chief, Fisheries

VI DPNR – Division of Fish & Wildlife



## FEP DEVELOPMENT –TECHNICAL WRITERS

- Technical Writer – Katherine Tzadik
  - funded by PEW Charitable Trusts
  - Writing support of draft FEP for EBFM TAP
    - Intro/background
    - Interface between Fishery and Ecosystem Management
    - Environmental Setting
    - Conceptual Models/FEP Management Framework
  - Action to support EBFM TAP'
  - Completed Draft: 7/2023
  - 4 Chapters:
    - Introduction
    - Vision, Framework, Strategic Objectives
    - Synthesis of the U.S. Caribbean Fisheries System
    - Indicators

# RISK ASSESSMENT DEVELOPMENT – TECHNICAL WRITER

- *Risk Assessment – Technical Writer*
  - *Tauna Rankin & Council Staff – MSA - Sustainable Fisheries internal funding*
  - *Contractor – Bioimpact – Leigh Fletcher*
    - *Developing Risk Assessment Framework for FEP*
    - *Met with all working groups; and attended World Fisheries Congress*
    - *Evaluating Current Risk Assessment frameworks*
    - *Regular Risk Assessment Working group meetings to develop CFMC ERA*
      - Includes a framework for how the Council can use the results
      - Points out risk factors that the Council can affect/influence
      - Includes specific management objectives – for evaluating what is the risk to
      - Can accommodate data gaps
      - Includes spatiotemporal context (a component of likelihood

## WORKING GROUPS



Bioimpact, Inc.

# DRAFT FEP COMPONENTS - COMPLETED

Foreward (To be drafted by Council)

## I. Introduction

I.1 Purpose of document

I.1.1 EBFM Theory

I.1.2 Importance of stakeholder involvement and how it is used in this document.

## 2.Vision Framework, Strategic Objectives

2.1 Vision

2.2 Framework

2.3 Strategic Objectives

2.3.1 Ecological/Habitat/Biotic Objectives

2.3.2 Socio-Economic Objectives

2.3.3 Abiotic Objectives

2.3.4 Anthropogenic Sources of Impact Objectives

2.3.5 Management/Policy/Governance Objectives

## 3 Synthesis of the U.S. Caribbean Fisheries System

3.1 General Description

3.1.1 US Caribbean Jurisdictions within the EBFM context

3.1.2 Magnuson Stevens Act

3.1.3 Other federal law, federal agencies, and obligations

3.1.3.1 National Wildlife Refuges

3.1.3.2 Virgin Islands National Park

3.1.3.3 Virgin Islands Coral Reef National Monument

3.1.3.4 Buck Island National Reef Monument

3.1.3.5 Salt River National Historic Park and Ecological Preserve

3.1.3.6 Jobos Bay National Estuarine Research Reserve

3.1.4 Territorial and Local Regulations

## 3.2 Conceptual Models

3.2.1 Main Components

3.2.2 Main Relationships

3.3 Data available for description of patterns of temporal and spatial variation

## 3.3.1 Biological Data

3.3.1.1 PRCRMP

3.3.1.2 TCRMP

# DRAFT FEP COMPONENTS - DRAFTED

3.3.1.3 NCRMP

3.3.1.4 SEAMAP-C

## **3.3.2 Environmental Data**

3.3.2.1 Bathymetry and slope

3.3.2.2 Habitat characteristics

3.3.2.3 Proximity to shelf break

3.3.2.4 Larval Connectivity

3.3.3 Fisheries-related variables

3.3.4 Disturbances

3.4 Identify gaps

## **4. Indicators**

4.1 General description of an indicator and definition of attributes

4.2 Criteria for selecting indicators under:

4.2.1 Indicators Derived from Ecosystem Status Report

4.2.2 Indicators Derived from Main Components of Conceptual Models

4.2.3 Indicators Derived from Available Data Sets

4.3 Indicators

4.3.1 ESR Indicator List

4.3.2 Main Components of Conceptual Models Indicator List

4.3.3 Available Data Set Indicator List

4.3.4 Amalgamated List of all derived indicators

# DRAFT FEP COMPONENTS – INCOMPLETE

## DRAFT FEP

## CURRENT FEP OUTLINE

### 5. Threats/Stressors

1. Define the risk assessment approach for the FEP (this FEP).
2. Summarize elements of risk associated with the drivers derived from conceptual models or relevant to the US Caribbean Fisheries Systems:
  1. Table that contains unit of the fishery system, risk element being evaluated and strategic objective by which the risk is being assessed.
  2. Table that contains criteria for different risk levels (Tauna will come back on this).
  3. Application of risk assessment results. Or guide to use risk assessment's results.
  4. Example of using the table in b to fit the risk assessment process for this FEP.

### 6. Operational objectives and tasks/actions

3. Represent as table. Indicating:
  1. Which ones are under CFCM control and those that are not.
  2. Also, useful to identify Acts, rules and norms that could be related to the operational objectives.
  3. An extra column should be data sources and/or references.
  4. Identify working group to identify strategic and operational objective (for EBFM TAP members).

### 7. Use of ecosystem information into current Single Species Approach such as Current Stoick Assessments. To be used during SEDAR process. This needs to be checked with Stock Assessment perform. This will be done under a EAFM...but not EBFM as described in section 1. Make sure to transmit the message that this is a stepping stone.

4. Description by SEFSC on the criteria and characteristics of indicators that can be used directly into stock assessment.
5. Table with the list of indicators and the attributes that make them ideal to use it in the Stock Assessment.

### 8. Prioritized actionable projects that will help implement operational objectives for the US Caribbean. Examples are given below (To be defined after working on strategic and operational objectives):

6. Example...project to create Caribbean data center.
7. Formal Local Ecological Knowledge (LEK)
8. Fisheries Performance report

### 9. Evaluation tools and programs (optional). Suggest of working group that evaluates this plan every XX or YY years. Suggest different time frames to revised different parts of this plan. Suggest that EBFM TAP is a permanent advisory panel. Argument that NOAA is shifting to EBFM.

### 4. Use of Indicators in Management

#### 1. Tools for Council Use:

1. Risk Assessment
2. Quantitative Models
3. Restoration/Mitigation

#### 2. Other ecosystem approaches

1. MSA Revision
2. FMP amendments
3. CFMC policy statements
4. Integrated Ecosystem Assessment

### 5. Plan Moving Forward

3. Research needs
4. Strategic objectives
5. Operational objectives
6. Performance measures
7. Management strategy Evaluation
8. Review and revision schedule

Amalgamated List of all derived Indicators in the Draft FEP

|                                                                                                                                         |                                         |                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------|
| Ecosystem Status Report                                                                                                                 | Conceptual Models                       | Data-Driven Approach                     |
| Point Source Pollution Sites                                                                                                            | Water Quality                           | Organic Pollution<br>Inorganic Pollution |
| Turbidity                                                                                                                               | Run-Off                                 | Organic Pollution<br>Inorganic Pollution |
|                                                                                                                                         | Coral Reefs                             | Coral Reefs                              |
|                                                                                                                                         | Mangroves                               | Proximity to Nurseries                   |
|                                                                                                                                         | Seagrass                                |                                          |
|                                                                                                                                         | Marine Diseases                         | Marine Diseases                          |
| Recreational Opportunities<br>•Recreational Landings<br>•Recreational Trips<br>•Commercial Engagement                                   | Recreational Fishing                    |                                          |
| Tourism (Hotel Occupancy)                                                                                                               | Tourism                                 |                                          |
| Disturbances<br>•Hurricane Activity<br>•Number of Earthquakes<br>•Sargassum Inundation<br>•Degree Heating Weeks<br>•Market Disturbances | Disturbances                            |                                          |
| Coastal Development                                                                                                                     | Coastal Development                     |                                          |
|                                                                                                                                         | Local Cultural and Religious Traditions |                                          |
|                                                                                                                                         | Education/Outreach                      |                                          |

Amalgamated List of all derived Indicators in the Draft FEP Cont’d.

|                                                                                                                                                                                                         |                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Coastal Development                                                                                                                                                                                     | Coastal Development |
| Ocean Acidification                                                                                                                                                                                     |                     |
| Sea Surface Temperatures                                                                                                                                                                                |                     |
| Marine Debris                                                                                                                                                                                           |                     |
| Primary Productivity                                                                                                                                                                                    |                     |
| Human Population Density                                                                                                                                                                                |                     |
| <b>Abundance of Economically Important Fishes</b><br>•Landings<br>•Pelagic/Demersal ratio<br>•Target Species Changes<br>•Fish Size Over Time<br><br>Revenues<br>•Ocean Economy<br>•GDP<br>•Unemployment |                     |
|                                                                                                                                                                                                         |                     |
| Equity<br>•Gini Coefficient<br>•Human Health Index                                                                                                                                                      |                     |
| Changes in Fishing Gear Type                                                                                                                                                                            |                     |

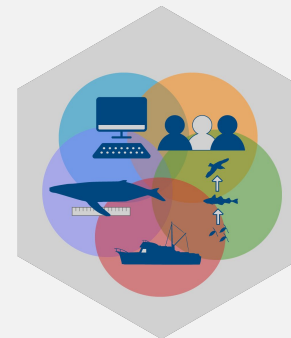
# DATA REPOSITORY WORKING GROUP

- *Data Repository – Host and store data but also/more importantly the knowledge to build the tools and data.*
  - *SEAMAP-C funding for external contractor to develop a cloud-based Data Management System/Portal for fisheries independent data collected by SEAMAP-C*
  - *GVI Bureau of Information Technology to develop procurement contract and Identify Developers that can work withing GVI system.*
- *Possible Models:*
  - *CARICOOS – DMACS external contractor manages – hosting and product development and delivery.*
    - <https://www.caricoos.org/>
  - *Develop US Caribbean Community of Practice Hub*
    - *Ex. NASA - Cryo-Cloud: a curated interactive computing platform and develop Cryosphere community expertise in open-sourced and cloud-based platforms.*
      - <https://book.cryointhecloud.com/intro.html>
      - JupyterHub; International Interactive Computing Collaboration (2i2c) – <https://2i2c.org/>
    - *Ex. NOAA Fisheries Hubs – NOAA Fisheries Integrated Toolbox (NOAA FIT)*
      - <https://noaa-fisheries-integrated-toolbox.github.io/>
      - GitHub; NOAA Office of Science & Technology
    - *Ex. NOAA Integrated Ecosystem Assessment - ESR – data processing automation*
      - <https://www.integratedecosystemassessment.noaa.gov/ecosystem-status-reports>
      - Github; NOAA Office of Science & Technology

## WORKING GROUPS



# CARICOOS



## 1. Introduction

- a. Purpose, need, and limits of the FEP
- b. Goals and objectives
- c. Approach of EBFM
  - i. Within EBFM context:
    - 1. US Caribbean jurisdictions
    - 2. MSA
    - 3. Other federal law, federal agencies, and obligations
    - 4. Local regulations

## 2. Ecosystems and ecosystem services

- a. Local interface between fisheries, fishery communities, and ecosystem management
- b. Basic description, compare/contrast, and describe connectivity among the three island platforms with regards to:
  - i. Society and Culture
  - ii. Economics
  - iii. Ecology
  - iv. Fisheries

## 3. Ecosystem indicators

- a. ESR
- b. Conceptual Models
- c. Other available products for reference

## 4. Use of Indicators in Management

- d. Tools for Council Use:
  - i. Risk Assessment
  - ii. Quantitative Models
  - iii. Restoration/Mitigation
- e. Other ecosystem approaches
  - i. MSA Revision
  - ii. FMP amendments
  - iii. CFMC policy statements
  - iv. Integrated Ecosystem Assessment

## 5. Plan Moving Forward

- f. Research needs
- g. Strategic objectives
- h. Operational objectives
  - i. Performance measures
  - j. Management strategy Evaluation
- k. Review and revision schedule

# DRAFTING FEP WORKING GROUP

- Members:
  - Liajay Rivera Garcia (Chair)
  - Maria Lopez
  - SEFSC Caribbean Branch?
  - Leigh Fletcher
- Goal: Coordinate in conjunction with technical writer drafting of sections 4 & 5 of the draft FEP and revisions to sections 1-3 of FEP.
- Deliverables FY 2024:
  - Refine Outline
  - Populate information on Tools and other Ecosystems approaches for Ch. 4
    - Include **purpose** for each tool – Why/how would the council use it?
  - Summarize, Restoration & Mitigation,
  - Review Sec. 1-3 for necessary revisions.
  - Flesh out Ch. 5.
- Meeting: Bi-weekly starting in August.

## DATA REPOSITORY NEEDS

- Members:
  - Rachel Banton?
  - Edwin Cruz-Rivera
  - Kevin McCarthy
  - Orian Tzadik
  - Sennai Habtes
  - Carissa Gervasi
  - Liajay Rivera
- Goal: Draft a strategy for developing data management and coordination policies and infrastructure necessary for EBFM operational management in the US Caribbean through the CFMC.
- Regular working group meetings
- Justification of need to Council
- Identify similar system in region
- Meeting Schedule: Monthly

# CONCEPTUAL MODELS/FEP FRAMEWORK –FINISHED!

- Members
  - JJ Cruz Mota
  - Stacey Williams
  - Tarsila Seara
  - Orian Tzadik
  - Sarah Stephenson
  - Liajay Rivera
  - Tauna Rankin
- Tasks:
  - 1: Come up with common terms between models before melding & crosswalk.
  - 2: Build CM for e/stakeholder (7 stakeholders)
    - 2a: See spatial variability between each model
  - 3 Validate step #2 with the stakeholders
  - 4: Compare across groups of stakeholders
    - 4a: Test all models (SSC TBD) against the DAPs
  - 5: Combine melded model
    - 5a: Meld if similarity is high (high is not defined)
    - 5b: Test different models with data if similarity is low (low is not defined)
- Outputs
  - Indicators and gaps
  - Model framework
  - Appendix with all CMs
  - Comparative analysis within and among model types
  - Indicator rankings

- Members:
- Tauna Rankin - Chair
  - M. Karnauskas
  - JJ Cruz-Mota
  - Stacey Williams
  - Tarsila Seara
  - Orian Tzadik
  - Sennai Habtes
  - Leigh Fletcher
  - Carissa Gervasi
  - Kevin McCarthy
  - Maria Lopez?
  - Sarah Stephenson
  - Liajay Rivera
  - Adyan Rios (After SEDAR 84 COMPLETED)

## ECOSYSTEM INDICATORS

- Tasks:
  1. ESR Indicators –suite of indicators tentatively completed – NOAA SEFSC?? Finalized
  2. CM and quantitative indicators
    1. Qualitative indicators related to the CM
    2. Indicators extracted from the quantitative models
    3. Refine indicators based on RA needs –
    4. Finalized list and description for Draft FEP
  3. Process to prioritize combined indicators identified
  4. Combine list of ESR and CM indicators to create a master list of indicators

Timeline for meeting: Monthly

# RISK ASSESSMENT – PAUSED/FINALIZED

- Members:

- Tauna Rankin
- Richard Appledorn
- Orian Tzadik
- Sennai Habtes
- Leigh Fletcher
- T. Seara
- JJ Cruz-Mota
- K. McCarthy
- Liajay Rivera
- Adyan Rios
- Maria Lopez-Mercer

- Tasks:

- Goal: Define indicators from the master indicator list into drivers and receivers (Gaichas et al., 2018) as component to develop strategic objectives via risk assessment process to inform the DSS for the Council.

- Steps:

- Form working group –Aug 2022
    - Adopt approach –Dec 2022
    - Define measurable and quantifiable indicators to be used as drivers –Apr 2023
    - Identify thresholds –June 2023
    - Draft results –Aug-Sep 2023
    - Assess/evaluate the strategic objective –Dec 2023