ECOSYSTEM BASED FISHERIES MANAGEMEMT - TECHNICAL ADVISORY PANEL (EBFM TAP)

UPDATE

Caribbean Fishery Management Council (CFMC)

186th General Meeting

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

April 22, 2025

Sennai Habtes

EBFM TAP Chair

Bureau Chief, Fisheries

VI DPNR – Division of Fish & Wildlife

EBFM TAP History Background

October 23, 2019: CFMC establishes EBFM Technical Advisory Panel

December 10-11, 2019: EBFM TAP Members Appointed

The EBFM TAP Charter - Elements

- Assist in the development, collection, evaluation, and peer review of such statistical, biological, economic, social, and other scientific information relevant to the Council's development of the FEP and amendments.
- Composed of individuals engaged in ecosystem research or knowledgeable and interested in the conservation and management of the ecosystems of *managed* fisheries. Shall reflect the expertise and interest from the standpoint of the scientific need for advice of the Council within the Council's geographical area of concern.
- Provides expert scientific and technical advice to the Council on the development of, on the preparation of fishery ecosystem plan, and on the effectiveness of such plan once in operation. Aids the Council in identifying scientific resources available for the development of plans, in establishing the objectives of plans, in establishing criteria for judging plan effectiveness and in the review of plans

The EBFM TAP Charter - Objectives

- The EBFM TAP shall provide the Council ongoing scientific advice on ecosystem-based fishery management for fishery management decisions, including recommendations for habitat status, social and economic impacts of management measures, and ecosystem-based impacts (stressors) on sustainability of fishing practices

MISSION

The overarching *goal* of the Fishery Ecosystem Plan (FEP) is to promote ecosystem-based approaches to ensure healthy, resilient and productive marine ecosystems and the fisheries resources dependent upon those ecosystems, within the context of the unique biological, ecological, economic, social and cultural characteristics of those fishery resources and the communities dependent on them.

- **Framework that promotes the following goals:**
  - Increase human community resilience within the context of changing ecosystems;
  - Promote ecosystem resilience within the context of changing ecosystems;
  - Define present ecosystem status/functionality;
  - Understand dynamics of fisheries and ecosystem services;
  - Describe key ecosystem linkages;
  - Identify research priorities;
  - Identify additional ecosystem-essential species in need of conservation and management;
  - Understand the risks to the fishery ecosystem and tradeoffs from different management strategies;
  - Improve the data and information needed to support marine ecosystem management;
  - Prevent overfishing and/or ecosystem overfishing;
  - Achieve optimum yield;
  - Incorporate ecosystem considerations into stock assessments;
  - Bring ecosystem considerations into the decision-making process;
  - Promote adaptive management policies (Revising MSA, National SSC, CCC).

STRATEGIC AND OPERATIONAL OBJECTIVES

- **Ecological/Habitat/Biotic**
- Reduce the degradation and enhance the recovery and resistance of marine habitats, particularly coral reefs
- Maintain structure and function of essential fish habitat, especially sensitive nursery habitats
- Ensure ecosystem-essential species are considered in management (operational)
- Reduce and monitor marine diseases (operational under reduce degradation)
- Maintain larval connectivity pathways necessary for successful recruitment on ecologically and commercially important fishes in the US Caribbean
- **Socio-Economic**
- Maintain and promote social cultural and economic resilience of fishing communities in the US Caribbean
- Support tourism opportunities that promote healthy fisheries and habitat (operational under maintain and promote social, cultural…)
- Develop education and outreach opportunities that support sustainable fisheries and habitat (operational under maintain and promote social, cultural…)
- Increase adaptive capacity of fishing communities to climate change impacts

Abiotic

•Minimize the impacts of climate variability and enhance resilience of fisheries to climate variability in the US Caribbean

Anthropogenic Sources of Impact

•Incorporate ecosystem considerations into stock assessments
•Bring ecosystem considerations into the decision-making process
•Ensure sustainable fishing (from all sectors) to maintain ecosystem integrity, and optimizes benefits across all stakeholder groups
•Ensure water quality is sufficient to promote healthy habitats and fish populations
•Ensure minimal impact of anthropogenic impacts and disturbances (including coastal development) on coastal marine habitats and fisheries
•Ensure data collection incorporates sources from all sectors (commercial, recreational, for-hire) to inform management decisions in the US Caribbean (for operational objectives)

Management/Policy/Governance

•Promote adaptive management practices
•Ensure greater equity and environmental justice among stakeholders for fisheries in the US Caribbean
•Enhance inter-jurisdictional collaboration to promote healthy fisheries and ecosystems
•Eliminate illegal, unreported, and unregulated fishing

Development of stakeholder driven conceptual models to support EBFM in the U.S. Caribbean

Tarsila Seara
Juan J. Cruz-Motta
Stacey M. Williams

EBFM TAP Meeting Aug 1-2, 2024

WORKING GROUPS

Conceptual Models Melding

Members: JJ Cruz Mota, T. Seara, O. Tzadik, S. Stephenson, L. Rivera, R. Appledorn (?), T. Rankin

Outputs: Indicators & Gaps, Model Framework, Appendix of CM's, Comparative model analysis, Indicator Rankings

Identification of Major Threats

Identified by at least 3 stakeholder groups*

*Except for Hurricanes-Recreational Fishing (2 groups) and Tourism-Education/Outreach (1 group).

Major Threats	Components Affected
Run Off Climate Change	Coral Reefs
	Marine Habitat
	Water Quality
Hurricanes	Coral Reefs
	Recreational Fishing
Tourism	Marine Habitat
	Education/Outreach
Non-Point Pollution	Marine Habitat
	Water Quality
Marine Diseases Invasive Species Water Temperature	Coral Reefs
Coastal Development Disturbances Anchoring	Marine Habitat
Nutrients Erosion Point Pollution	Water Quality
Sargassum	Tourism

Main Discussion Points

- Analyses emphasized the importance of participatory methods and co-production of knowledge to better understand factors affecting the region's fisheries.
- The identification of similar elements and relationships among different conceptual models, provides a compelling method for prioritization to guide fisheries policy and management actions.

Current uses in FEP process include:

  - Providing a conceptualization of the fishery ecosystem from the perspective of key stakeholders.
  - Using ecosystem elements with high agreement to guide strategic objectives.
  - Using elements and threats to ecosystem in development of risk assessment framework.

- Identify data gaps and guide the development of future research priority documents and allocation of funds.
- Create a baseline for future iterations and monitoring efforts while ensuring continuous engagement and representation – *process oriented*.

WORKING GROUPS

Ecosystem Indicators

Members: M. Karnauskas, JJ Cruz Mota, S. Williams, T. Seara, O. Tzadik, S. Habtes, T. Rankin

Outputs: Suite of ESR Indicators, Data Repository, CM & Quantitative indicators, Process of indicator prioritization, List of ESR & CM indicators

Indicators tracking risks to meeting fishery management objectives

Degree heating weeks
Ocean acidification
Hurricane activity
Turbidity
Ocean temperature
Marine debris
Land-based pollution
Primary productivity
Coastal development
Major earthquakes
Market disturbances
Sargassum inundation
Tourism activity
Human population density

Indicators tracking progress toward fishery management objectives

- Food production and stock sustainability
- Socioeconomic health
- Engagement and participation
- Bycatch reduction
- Governance, outreach and enforcement
- Protection of ecosystems and trophic integrity

Final thoughts for now

- Risk indicators show some increasing stressors and major disturbances in last decade with high volatility in indicators
- Notable impacts from 2017 hurricane season and pandemic disturbances on social and economic indicators
- Impacts from major disturbances also influence fishing activity and manifest in fishery-dependent indicators
- Room for additional research (e.g. further exploration of size-based indicators with fishery-independent data, explore TIP data to compare with trends in landings data)
- Nearing full automation of report; only a select few indicators are tedious to update (e.g., ocean acidification, enforcement, engagement indices)

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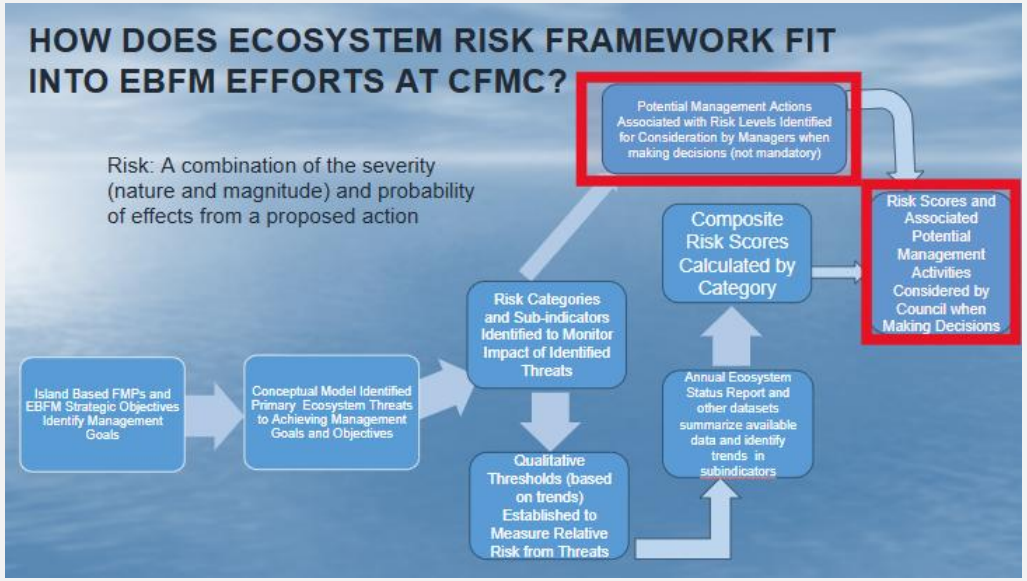
WORKING GROUPS

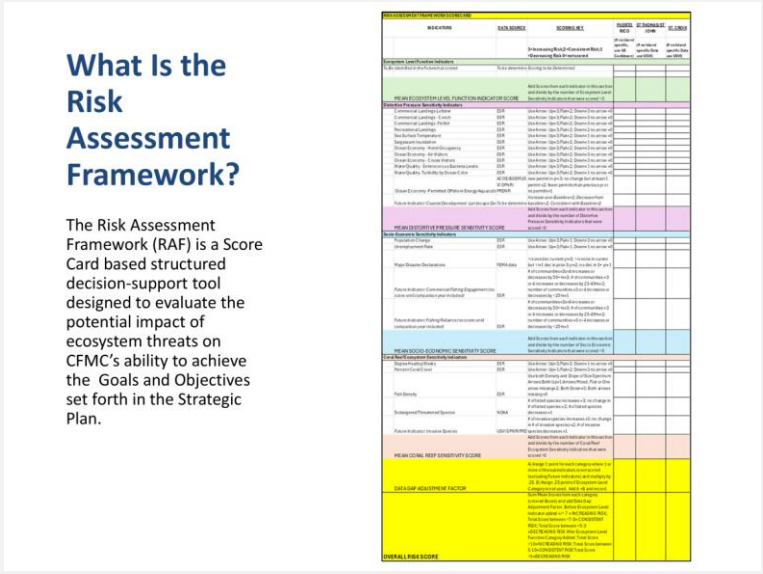
Risk Assessment

Members: S. Habtes, O. Tzadik, M. Karnauskas, T. Rankin, L. Rivera Garcia, K. McCarthy, S. Stephenson

Outputs: Define indicators from the master indicator list, identify drivers and receivers as ecosystem components to develop strategic objectives to inform the council

- *Risk Assessment – Technical Writer*
  - *Tauna Rankin (NOAA – Habitat Consv.) & Council Staff*
    - *MSA - Sustainable Fisheries internal funding*
  - *Contractor – BioImpact – Leigh Fletcher - Developing Risk Assessment Framework for FEP – Summer 2025*





WORKING GROUPS

Multi-Species Modeling Roadmap

Members: S. Habtes, O. Tzadik, E. Cruz-Rivera, K. McCarthy, S. Williams, S. Stephenson, G. Garcia-Moliner, H. Townsend

Outputs: Strategy for developing data management and coordination policies and infrastructure necessary to develop EBFM operational management/mult-species stock-assessment in the US Caribbean through CFMC.

Data Repository/Multi-species Modeling Roadmap WG #4

- *IRA proposal - S. Habtes & Council Staff – Developing a US Caribbean COP for EBFM & Multi-species Modeling – in review*
- *Coordination with DMACS Hubs, & Modeling Groups in and outside the region.*
- *Two Working Group meetings: Dec. 12 & Jan 21*
- Develop 1st draft of Multi-species/EBFM framework Table
- Update ESR indicator List on FEP
- Develop appropriate Multi-species Modeling Frameworks

SEFSC Caribbean Branch Strategic Planning Toolbox Working Group:

- Recommending SEDAR Procedural Workshop – US Caribbean Alternative Management Approaches

Drafting FEP

All EBFM TAP members – In progress

- Technical Writer – Katherine Tzadik
  - PEW Charitable Trusts — Completed Draft: 7/2023
  - 4 Chapters:

1. Introduction
   a. Purpose, need, and limits of the FEP
   b. Goals and objectives
   c. Approach of EBFM
      . 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
   a. Other ecosystem approaches
      i. MSA Revision
      ii. FMP amendments
      iii. CFMC policy statements
      iv. Integrated Ecosystem Assessment
   b. Tools for Council Use:
      i. Risk Assessment
      ii. Quantitative Models
      iii. Restoration/Mitigation
      iv. Other Management Approaches (i.e. Harvest Control Rules)
5. Plan Moving Forward
   a. Research needs
   b. Strategic objectives
   c. Operational objectives
   d. Performance measures
   e. Management strategy Evaluation
   f. Review and revision schedule

NEXT STEPS

Activity	Expected Date of Completion
Revise and draft EBFM TAP goals and objectives	December 2020
Draft FEP goals and objectives	April 2021
Continue to collect and analyze existing data sets from Lenfest, SeaMap, ESR, etc… • Expected products = a centralized repository of data (e.g., MBON, Caricoos, etc..); summary analyses of pertinent datasets; potentially peer-reviewed publications	April - December 2021
Complete all conceptual models	June 2022
Meld conceptual models to create island-specific conceptual models	December 2022
Use the conceptual models & additional products to develop an island-specific risk assessment framework for consideration by the SSC, that will be used to inform approaches that will be presented in the FEP.	~~June 2025~~ April 2025
Use the conceptual models and other products produced by the ESR, EBFM TAP, and by the Lenfest FEP project to identify ecosystem indicators that should be monitored. In addition to inclusion in the FEP, these indicators will be presented to the SSC and the CFMC for consideration to include in EBFM management practices.	~~June 2025~~ April 2025

NEXT STEPS

Activity	Expected Date of Completion
Develop strategic objectives, prioritize the objectives, and outline a vision for the use of the FEP for consideration in the CFMC processes.	August 2024
Develop operational objectives with concrete action items to be presented in the FEP, for consideration by the CFMC.	August 2025
Develop performance measures and draft a management strategy that can be used situationally during CFMC decision making, to be presented in the FEP, for consideration by the CFMC.	August 2025
Develop a feedback mechanism for adaptive management to be presented in the FEP, for consideration by the CFMC.	August 2025
Develop a draft FEP document	November 2025
Submit FEP for council approval	December 2025