NOAA Fisheries' Ecosystem-Based Fisheries Management Policy and Road Map

Yvonne deReynier, Chris Harvey, Jason Link, Wendy Morrison National Marine Fisheries Service Council Coordination Committee – Draft Road Map Briefing July 24, 2024

Bottom Line Up Front:

- EBFM Policy and Road Map first released in 2016
- EBFM Policy updated February 2024
- Updated EBFM Road Map draft released for public review in June 2024
- Comment deadline is August 31, 2024
- Following any revisions, Road Map will be an updated NOAA Fisheries' policy procedure



NOAA Fisheries defines EBFM as a systematic approach to fisheries management in a geographically specified area that contributes to the resilience and sustainability of the ecosystem; recognizes the physical, biological, economic, and social interactions among the affected fishery-related components of the ecosystem, including humans; and seeks to optimize benefits among a diverse set of societal goals.

EBFM Policy and Road Map Version 1.0



2016 EBFM Policy:

6 Guiding Principles

13 Core Components

Road Map: 49 Action Items







- Forage fish Corals (tropical & deep-sea) Species distribution Offshore wind & aquaculture Strategic and scenario
 - planning Ecosystem status reports

EBFM Policy and Road Map Version 2.0



NATIONAL MARINE FISH	Effective on: May 23, 2016
	To be reviewed on: January 2029
	Fisheries Management
Ecosystem-	Based Fisheries Management Policy
ICE: This publication is available at: <u>https://www</u> olicies/policy-directive-system	.fisheries.noaa.gov/national/laws-
or name: Jason Link e: Assistant Administrator	Certified by: Kelly Denit Office: Sustainable Fisheries
of Issuance: Revision, January 2024	
MARY OF REVISIONS:	
ed October 2023. This initial directive was put into wed on September 2018. The Policy has been update	effect on May 23, 2016, and ed to:
Clarify the links between EBFM and other NOAA l locuments, efforts, programs and initiatives, includ climate-ready fisheries; Better articulate the management aspect of EBFM a	Fisheries policies, guidance ing efforts that address the need for and the need to approach EBFM as
in adaptive process where science and management mproved, iterated, etc. for better integration of its s	t will always need to be updated, science and management programs;
Better integrate socio-economic, habitat, climate ch beean condition information and needs throughout a clarifying the need for climate-ready fisheries.	ange, ecological, ocean-use, and all EBFM Guidelines, particularly
Ecosystem-Based Fisheries Manage the National Marine Fisheries National Oceanic and Atmospheric A	ment Policy of s Service Administration
STATEMENT	
National Marine Fisheries Service (NOAA Fisheri stem-Based Fisheries Management (EBFM) to engr with and for our partners on the trade-offs among al, and subsistence), aquaculture, protected species n components, including the human communities th d ecosystem services. In the face of accelerating cli ieetedness of these ecosystem components is essent	es) strongly supports implementation age, inform, and enable better and between fisheries (commercial, s, biodiversity, habitats, and other hat depend upon them and their imate change, recognizing the tial to maintain resilient and

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The 6 EBFM Guidelines



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<u>2024 EBFM</u> <u>Policy</u>:

6 Guidelines

18 Goals

<u>Road Map</u>: 37 Action Items

The 6 EBFM Guidelines



What are the goals and objectives? Implement ecosystem-level planning What is the science we need? 2 Advance Our Understanding of Ecosystem Processes What are our challenges? Prioritize Vulnerabilities and Risks to Ecosystems and their Components What are our options? Explore and address trade-offs within an Ecosystem Let's do it! Implement Ecosystem-considerations into Management Is it working Support Ecosystem resilience through tracking Management Actions





★ Executive Summary

2

- Background, Purpose, Scope, and Resources of the EBFM Road Map
 - Implementation of EBFM
 - Guideline 1 Implement ecosystem-level planning
 - Guideline 2 Advance our understanding of ecosystem processes
 - Guideline 3 Prioritize vulnerabilities and risks to ecosystems and their components
 - Guideline 4 Explore and address trade-offs within an ecosystem
 - Guideline 5 Implement ecosystem considerations into management
 - Guideline 6 Support ecosystem resilience via monitoring and adjusting of management actions
- 3 Execution of the EBFM Road Map and Effective Dates
- 4 References
- Appendix A: EBFM Guidelines, Goals, and <u>Action Items</u> Appendix B: Focus Areas for EBFM Science and Management Conferences



Implement ecosystemlevel planning

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Implement ecosystem-level planning <u>Action Item 1.a.1</u>: Assist living marine resource management partners in their development of new, or revised, ecosystem-level goals and objectives within FEPs or other ecosystem-wide strategic planning documents.

<u>Action Item 1.b.1</u>: Include and prioritize EBFM Road Map action items in key regional and national strategic and operational documents.

<u>Action Item 1.c.1</u>: Establish and maintain joint staff EBFM and/or climate teams for each major U.S. management region to ensure planning and coordination across Headquarters Offices, Regional Offices and Science Centers.

Action Item 1.c.2: Develop, coordinate, and disseminate a national EBFM communication plan, including regular national reporting on progress towards EBFM Road Map action items.



Advance our Understanding of Ecosystem Processes

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Jul-20-2024



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normal (°C)

from

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North Pacific Index

*Sea Ice Extent (western and eastern Bering Sea)

Proportion of Open Water Bl

*Large Copepod Abundanc

Advance our Understanding of Ecosystem Processes



NOAA

Pacific Islands Fisheries Science Center ECOSYSTEM STATUS REPORT FOR HAWAI'I

NOAA FISHERIES



Advance our Understanding of Ecosystem Processes <u>Action Item 2.a.1</u>: Advance resources and build capacity to conduct science in support of EBFM.

<u>Action Item 2.a.2</u>: Expand, develop and maintain data streams and the production of information, and review archived data to update it where appropriate.

<u>Action Item 2.a.3</u>: Conduct biennial EBFM science and management workgroups and conferences.

<u>Action Item 2.b.1</u>: Provide support and information for development and review of new or updated ESRs.

<u>Action Item 2.b.2</u>: Include ESR support duties as a significant percentage of personnel performance plans, for a sufficient number of personnel in each Financial Management Center.

<u>Action Item 2.b.3</u>: Expand and coordinate regional and national efforts to develop and disseminate ecosystem indicators that support multiple decision support products and reach across Councils and other management partners. <u>Action Item 2.c.1</u>: Identify, prioritize, research and address key ecosystem and climate questions for a region, as defined by EBFM and climate staff teams working internally (see Goal 1.c.1) and with external management partners and stakeholders.

<u>Action Item 2.c.2</u>: Assess the science needs, assets, and gaps associated with management on-ramps for bringing ecosystem science into key decision-making processes, as noted in Goals 1.a and 5.b.



Prioritize Vulnerabilities and Risks to Ecosystems and their Components



170W

-1.4

160W 150W 140W 130W

5/1/21 to 5/10/21 NCEP/NCAR Reanalysis

0

1.4

2.8

75N

70N

65N ·

55N ·

50N

45N -40N 35N 30N · 25N

20N -150E

160E

-5.6

170E

-4.2

180

-2.8



Very High

Other Odontocete

wysucete

Prioritize Vulnerabilities and Risks to Ecosystems and their Components <u>Action Item 3.a.1</u>: Conduct climate vulnerability assessments (CVAs) for living marine resources, habitats and coastal communities, identify gaps or needed updates in existing CVAs, and identify new and existing on-ramps for use in management.

<u>Action Item 3.a.2</u>: Conduct ecosystem-level risk assessments to identify existing and emerging stressors, opportunities, vulnerabilities, and cumulative impacts most likely to hinder our ability to meet management goals and objectives. <u>Action Item 3.b.1</u>: Research and apply methodologies for identifying or predicting significant and disproportionately impactful pressures and events within managed marine ecosystems.

<u>Action Item 3.b.2</u>: Identify those habitats, species, and human communities that are most vulnerable to pressures and events and evaluate management mitigation measures.

<u>Action Item 3.c.1</u>: Identify potential improvements for existing regulatory responses to rapid within-year changes in catch rates of target species and bycatch rates of non-target and protected resources to mitigate risks.

<u>Action Item 3.c.2</u>: Identify where outreach to partnering agencies and affected communities with interacting authorities and interests can be initiated or strengthened and assist management partners in developing policies that address risk and uncertainty from climate and other ecosystem drivers.

<u>Action Item 3.c.3</u>: Develop and test management strategies, recovery strategies, and habitat restoration approaches that are robust to rapid environmental change and extreme conditions.



Explore and address tradeoffs within an Ecosystem



Fortune and Favor

- Mostly favorable conditions for fish and fisheries
- Many stocks shift northward in predictable ways
- Few severe extreme eventsSocietal values move away from
- globalization, instead
- encourage collective
- support of local fishing

Mostly steady changes, few extreme events

Blue Revolution

- Warmer climate/ocean
- conditions, but little variability
- Familiar stocks gradually
- decline but new subtropical and
- tropical species appear in the
- southern CCE
- Open, globalized commerce encourages alternative uses of ocean resources
 Aquaculture and offshore energy puts
- pressure on commercial fishing

Box of Chocolates

Increases

Species abund

availability

Decreases

Climate and

- A world of environmental surprises and extremes, but where stock levels increase on average
 Regular "boom and bust" cycles for some key
- stocks
 - New technology is deployed to better monitor the unpredictable environment
 Seafood mar difficult be variability

ocean conditions many extreme even.

Hollowed Out

- Unpredictable and extreme shifts in ocean conditions lead to a fundamental reorganization of the CCE food web
- Extreme storms and rising tides create regular and damaging inundations
- Only a few stocks remain at harvestable levels and most commercial fisheries suffer
- The nature of coastal activity changes as some places are neglected, others become fortified, commercial hubs

NOAA FISHERIES

Office of Science and Technology Implementing a Next Generation Stock Assessment Enterprise

NOAA Technical Memorandum NMFS-F/SPO-183 June 2018

Implement Management Action Evaluate and Assess Outcomes

> Monitoring of Ecosystem

Indicators

ne EBM Goals &

Explore and address tradeoffs within an Ecosystem <u>Action Item 4.a.1</u>: Conduct scenario planning to explore living marine resource and coastal community dynamics under current and future ocean conditions and to consider multiple objectives across fisheries and ocean uses.

<u>Action Item 4.a.2</u>: Develop and expand capacity of fisheries, habitat, protected resources, and integrated ecosystem assessments to explore ecosystem dynamics under extreme events and changing ocean conditions.

<u>Action Item 4.a.3</u>: Develop a framework for identifying and assessing fishing fleet behavior, including fishing location choices and changes in shoreside support sectors, to support fisheries management planning and planning for other ocean uses under climate change.

<u>Action Item 4.b.1</u>: Develop fora to identify, evaluate, and minimize conflict within and across fisheries, habitats, protected resources recovery, and human well-being priorities at near-term and long-term time scales.

<u>Action Item 4.b.2</u>: Expand capacity of fisheries, habitat, protected resources, and ecosystem assessments to explore multi-species harvest, conservation and recovery policies and guidance on setting multi-species annual catch limits.

<u>Action Item 4.c.1</u>: Develop MSEs to assess management options to mitigate and prepare for the risks and vulnerabilities identified under Guideline 3 to meet the ecosystem goals and objectives identified under Guideline 1.

<u>Action Item 4.c.2</u>: Develop MSEs in collaboration with management partners that address manager and stakeholder needs and leverage existing public-engagement processes. <u>Action Item 4.c.3</u>: Develop and maintain capacity to conduct whole-ecosystem MSEs to test the robustness of living marine resource management plans and policies to ecosystem-scale changes.



Implement Ecosystem considerations into Management

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§ 679.20 General limitations. (1) **OY**—

(i) BSAI and GOA. The OY for BSAI and GOA target species is a range or specific amount that can be harvested consistently with this part, plus the amounts of

"nonspecified species" taken incidentally to the harvest of target species. The species categories are defined in Table 1 of the specifications as provided in paragraph (c) of this section.

> (A) The OY for groundfish in the BSAI regulated by this section and by part million to 2.0

PERSPECTIVE

Ecosystem-level reference points: Moving toward ecosystem-based fisheries management

Wendy E. Morrison¹ | Stephanie A. Oakes² | Melissa A. Karp² Max H. Appelman¹ | Jason S. Link³

Abstract

onal Oceanic and Atmospher ministration, National Marine isheries Service, Office of Sustainal isheries, Silver Spring, Maryland, US National Oceanic and Atmospheric

tion, National Marin Fisheries Service, Office of Science a mology, Silver Spring, Maryland National Oceanic and Atmospher

Administration, National Marine isheries Service, Office of th Assistant Administrator, Woods Hol achusetts, USA

Wendy E. Morrison

Result: We organize existing and potential ELRPs into five categories (statisti cal analysis of nonlinear dynamics and tipping points, ecosystem productivity ecosystem trophic information, biodiversity, and human dimensions), provide an overview of analytical methods that can estimate ELRP benchmarks, provide ex amples of where ELRP benchmarks are being used today, and evaluate pros and cons of the different ELRP categories. We also attempt to identify potential next steps for fisheries scientists and managers to further the science, development,

esirable ecosystem conditions and function

ter discussions of trade-offs in management deci

Conclusion: Ecosystem-level reference points can be used as a proactive accountability mechanism to achieve ecosystem objectives and maintain the ecosystem in a preferred operating space or as an early warning that ecosystem-level changes (e.g., tipping points) could be i nminent if current biological and ecological trends in the system continue

Objective: To support the movement in marine fisheries management towar

cosystem-based fisheries management by exploring ecosystem-level reference

points (ELRPs) as an option for managing fisheries at the ecosystem level. An

ELRP is an ecosystem harvest level or indicator with one or more associated

benchmarks or thresholds (i.e., targets, limits) to identify, monitor, or maintain

Methods: This paper explores the development and implementation of ELRPs

in fisheries management to support ecosystem and fisheries sustainability, help

identify when ecosystem changes that impact fisheries resources occur, and fos-

KEYWORDS

and application of ELRPs.

cap, ecosystem indicators, productivity cap, ELRP, ecosystem-level reference point

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al of Marine Science (2019), 76(1), 1-9. doi:10.1093/icesjms/fsy152

view Article

lusion of ecosystem information in US fish sto gests progress toward ecosystem-based fisherie

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all, K. N. Koehn, L. E. Levin, P. S. Essinaton, T. E. and Jensen, O. P. Inclusion of ecosystem information in US fish stock asses uggests progress toward ecosystem-based fisheries management. - ICES Journal of Marine Science, 76: 1-9. ed 2 July 2018 revised 7 Sentember 2018 accented 10 Sentember 2018 advance access sublication 25 October 2018

petite for ecosystem-based fisheries management (EBFM) approaches has grown, but the perception persists that implem Here, we synthesize progress toward implementing EBFM in the United States through one potential avenue: expanding fish stock nts to include eco iderations and interactions between species, fleets, and sectors. We reviewed over 200 stock asse and assessed how the stock assessment reports included information about system influences on the assessed stock. Our goals were t ify whether and how assessments incorporated broader system-level considerations, and to explore factors that might contribute to the tem-level information. Interactions among fishing fleets (technical interactions) were more commonly included than biophysica ctions (species, habitat, climate). Interactions within the physical environment (habitat, climate) were included twice as often as interar ing species (prediation). Many assessment reports included ecological interactions only as background or qualitative consid han incorporating them in the assessment model. Our analyses suggested that ecosystem characteristics are more likely to be inc he species was overfished (stock status), the assessment is conducted at a science centre with a longstanding stomach contents analys , and/or the species life history characteristics suggest it is likely to be influenced by the physical env ent habitat or prodution ity (short-lived species, sessile benthic species, or low trophic-level species). Regional differences in stomach contents analysis program mit the inclusion of predation mortality in stock assessments, and more guidance is needed on best practices for the prioritization of and how biophysical information should be considered. However, our results demonstrate that significant progress has been made to sit available science and data to expand single-species stock assessments, particularly when a broad definition of EBFM is applied. ords: ecosystem-based fisheries management, ecosystem considerations, stock assessment

frameworks and policies that broaden considerations in fisherie ush ecosystem-based fisheries management (EBFM) is inmanagement decisions to include the human and biophysical sysngly identified as a way to improve management outcomes, is little consensus as to the extent to which management Framework Directive, 2008; NOAA, 2016). Even so, many have ns are based on, or informed by, EBFM principles. On one management bodies around the world have developed tion of EBFM frameworks (Arkerna et al., 2006; Pitcher et al.

ed by International Council for the Exploration of the Sea 2018. This work en by US Government employees and is in the public domain in the US.



COMPREHENSIVE ECOSYSTEM-BASED AMENDM

AMENDMENT 8 TO THE FISHERY MANAGEMENT PLAN FOR THE SHRIMP

AMENDMENT 19 TO THE FISHERY MANAGEMENT PLAN FOR THE COASTAL MIGR

MENDMENT 4 TO THE FISHERY MANAGEMENT PLAN FOR THE GOLDEN CRAB FISH

AMENDMENT 9 TO THE FISHERY MANAGEMENT PLAN FOR SPINY LOBSTER IN THE

AMENDMENT 1 TO THE EISHERY MANAGEM MENDMENT 19 TO THE FISHERY

FOR THE SOUTH ATLANTIC REGION

ATLANTIC REGION

RESOURCES IN THE ATLANTIC AND GULF OF MEXICO AMENDMENT 6 TO THE FISHERY MANAGEMENT PLAN FOR CORAL, CORAL

ATLANTIC REGION

Implement

Ecosystem

considerations

into

Management

LIVE/HARDBOTTOM HABITATS OF THE SOUTH ATLANTIC REGIO

AND SOUTH AT

Regional Summarv

The graphs below show the annual change in the latitude and depth averaged across species that are caught every year in the selected survey dataset

Change in Average Latitude G

Marine fish and invertebrates in this region have shifted on average 0.61 degree (68.27 km) north from 1974 to 2022



1980	1990	2000	2010	2020	20
		Year			

t the species are moving south, and positive values indicate the



Chapter 7—

An Introduction to the Future of NOAA Fisheries' Stock Assessments

Chapter highlights: Three primary objectives make up NOAA Fisheries' next generation stock as (NGSA) enterprise Expand the scope of many stock assessments to support harvest policies that are mo holistic and ecosystem-linked following a strategic approach that makes best use of Use innovative science and technological advancements to improve the data used i sments and projection Create a more timely, efficient, and effective stock assessment process that stock-specific goals and objectives

		7.1 SUMMARY OF CHALLENGES AND THE NEED FOR IMPROVEMENT
2020 20		NOAA Fuheries' stock assessment enterprise faces numerous de mands from federal operations, fishery managers, and interested parties. There are conflicting requests to make tock assessments simpler, more comprehensive, based on better data, ecosystem linked, more transparent to affected parties, better prioritized updated using the latest data and model advancements, quicker to
		produce, as well as other demands. Many aspects of these demands

idvanced statistical efforts used to overcome v omines in the data

Assessments could be updated more quickly if they use standardized, streamlined data systems and standard model ing methods. Imp could then be made by conducting research outside the nor mal management process, rather than attempting to develop new operational methods during a constrained managem

s provided in this document Assessments could be simpler if analysts had access to reliable, basic data streams regarding the abundance of fish stocks. Much of the complexity of assessments is due to the

in the following examples, which provide the context behind the

cedures to build in broader system-level mechanisms wer available. Most assessments incorporate environmental an ecosystem changes indirectly and without including the actua echanism driving the changes; hence, they have limited abil ity to project changes in future-stock conditions that may occu as a result of future environmental and ecosystem change

Implement Ecosystem considerations into Management <u>Action Item 5.a.1</u>: Develop and implement best practices for identifying and estimating ELRPs for ecosystem-level biodiversity, resilience, and persistence, taking into account the potential effects of climate variability and change on marine ecosystems.

<u>Action Item 5.b.1</u>: Develop ecosystem- and climate-ready terms of reference for fish and protected resources stock assessments, habitat assessments, and ecosystem assessment analyses, reviews, and decision-making processes. <u>Action Item 5.b.2</u>: Update regulatory language that provides guidance on MSA national standards, MSA and MMPA bycatch mitigation, ESA recovery planning and implementation, and EFH refinements and consultations to ensure that language addresses EBFM principles and supports climate-ready fisheries, species, and habitats.

<u>Action Item 5.c.1</u>: Provide guidance for and examples of dynamic and flexible fisheries management measures that can respond to shifts in species' distribution and availability for all living marine resource taxa in an ecosystem. <u>Action Item 5.c.2</u>: Build habitat (EFH and critical habitat) mapping and designation capacity to address the potential effects of climate change and to site, design and implement habitat protection and priority restoration across all regions, with the goal of enhancing fish productivity and recovering protected resources.



Support Ecosystem resilience through tracking Management Actions



Support Ecosystem resilience through tracking Management Actions Support Ecosystem resilience through tracking Management Actions <u>Action Item 6.a.1</u>: Develop operational definitions, measures, and thresholds of resilience that can be used across NOAA Fisheries' range of mandates (MSA, MMPA, ESA, NEPA, Executive Orders, and others) and that can be applied to our ecosystems under a future of climate variability and change.

<u>Action Item 6.b.1</u>: Develop and report on metrics for human wellbeing in fishing communities that address fishery benefits to the nation.

Action Item 6.b.2: Develop a framework for identifying seafood systems and seafood supplies that have been affected by fisheries and natural disasters, as well as by more general ecosystem change, particularly identifying and including traditional seafoods and culturally-important fish species and stocks. Action Item 6.c.1: Establish and report on EBFM performance measures.

<u>Action Item 6.c.2</u>: Review and track action items accomplished across NOAA Fisheries.

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Links:

EBFM Policy

https://www.fisheries.noaa.gov/s3/2024-02/Revised-EBFM-Policy-FINAL-2.12.24-508-signed-JC.pdf

EBFM Road Map Update

https://www.fisheries.noaa.gov/resource/document/ecosystem-based-fisheries-management-road-map-update



Comment deadline is August 31, 2024 nmfs.ebfm.roadmap@noaa.gov.