

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL



Ecosystem Data Workshop Series Report

*Collaborative Guidance for Advancing Ecosystem Information Use in Support
of South Atlantic Regional Fisheries Management*

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Executive Summary

The SAFMC Ecosystem Data Workshop Series was held in January and February 2026 to advance practical approaches for incorporating ecosystem information into South Atlantic Council fishery management. The five-session virtual workshop brought together Council, NOAA, state, academic, and regional partners from the South Atlantic, Gulf of America (formerly Gulf of Mexico), and Mid-Atlantic regions to compare decision-making processes, review existing ecosystem information tools, identify data and indicator needs, and develop guidance that can be implemented through existing Council and regional pathways. The workshop was designed to produce practical guidance rather than formal Council recommendations, with an emphasis on improving the usefulness, timing, interpretation, and uptake of ecosystem information in management decisions.

Across the workshop, participants found that many ecosystem information products already exist across regions, including Ecosystem Status Reports, SAFE reports, risk assessments, Management Strategy Evaluations, fishery performance reports, citizen science products, ecosystem models, and fishermen observations. However, these products are not always easy to find, interpret, update, or apply to specific Council decisions. Participants repeatedly noted that ecosystem information is often documented or discussed but not fully integrated into decision-making because tools may lack a clearly defined audience, decision pathway, timing, or interpretation framework.

The primary workshop finding is that improving ecosystem data availability and integration is less about creating entirely new data streams and tools and more about aligning existing tools, indicators, data sources, and processes with clearly defined management questions and goals. The workshop also highlighted the importance of collaboration, trust, transparency, and feedback loops, particularly where ecosystem information will inform decisions that affect fishermen, stakeholders, and regional partners.

Workshop participants identified a collaborative, strategic cycle that could serve as a useful framework for implementation. The cycle begins with collaboratively defining goals, objectives, decisions, and roles; then moves through indicator selection, tool design, data integration, decision-making, and continued learning over time. Participants emphasized that the cycle should be flexible rather than strictly linear, because different management issues may enter the process at different points. Even so, the foundational need remains the same: ecosystem information is most useful when it is tied to a specific decision, reviewed through a trusted process, and revisited over time as understanding improves.

The collaborative, strategic cycle provided a shared framework for participants to translate workshop discussions into practical next steps. Using that cycle as a foundation, participants

developed strategic guidance intended to help the Council and regional partners strengthen how ecosystem information is selected, interpreted, communicated, and used in fishery management. The resulting guidance is organized around six themes:

- **Clearly define goals, objectives, decisions, and roles.** Start by clarifying the management question, expected outcome, decision pathway, and responsibilities so ecosystem information is tied to a specific Council need.
- **Build ecosystem information into existing governance and management processes.** Use current Council, SSC, advisory panel, SEDAR, and cross-council pathways rather than creating separate processes.
- **Collaborate across regions, institutions, and roles.** Coordinate early and consistently among Council members and staff, NOAA, states, scientists, advisory panels, fishermen, and regional partners, especially for shared stocks and cross-boundary ecosystem issues.
- **Strategically design indicators and tools.** Select indicators and tool formats that are decision-relevant, understandable, timely, transparent, and matched to the audience and decision type.
- **Build trust through transparency, feedback, and demonstrated use.** Involve ecosystem data holders, data users and stakeholders in development and review, communicate uncertainty clearly, document how input is used, and show how ecosystem information informs decisions over time.
- **Improve uptake, interpretation, and practical use of existing tools.** Improve awareness, navigation, timing, and interpretation of current products such as Ecosystem Status Reports, SAFE reports, Ecosystem and Socioeconomic Profiles, risk assessments, Management Strategy Evaluations, fishery performance reports, citizen science products, ecosystem models, and fishermen observations.

Together, these outcomes provide a practical and actionable foundation for developing a focused implementation plan to improve how ecosystem information is integrated into SAFMC fisheries management. This includes supporting implementation of the SAFMC Resilient Fisheries Initiative project outcomes and related NOAA and Council efforts by improving regional coordination and strengthening the connection between ecosystem data, decision-support tools, and Council decision processes.

Acronyms

ABC	Allowable Biological Catch
ACCSP	Atlantic Coastal Cooperative Statistics Program
AI	Artificial Intelligence
AP	Advisory Panel
ASMFC	Atlantic States Marine Fisheries Commission
CCC	Council Coordination Committee
CVA	Climate Vulnerability Analysis
DMF	Division of Marine Fisheries
DNR	Department of Natural Resources
EAFM	Ecosystem Approach to Fisheries Management
EBFM	Ecosystem-Based Fisheries Management
ECCG	East Coast Coordination Group
ED	Executive Director
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESR	Ecosystem Status Report
ESP	Ecosystem and Socioeconomic Profile
EwE	Ecopath with Ecosim
FEP	Fishery Ecosystem Plan
FMP	Fishery Management Plan
FMU	Fishery Management Unit
FWC	Florida Fish and Wildlife Conservation Commission
GFMC	Gulf Fishery Management Council
HEAP	Habitat and Ecosystem Advisory Panel
IEA	Integrated Ecosystem Assessment
IFAS	Institute of Food and Agricultural Sciences
IRA	Inflation Reduction Act

MAFMC	Mid-Atlantic Fishery Management Council
MPA	Marine Protected Area
MSE	Management Strategy Evaluation
MSY	Maximum Sustainable Yield
NEAMAP	Northeast Area Monitoring and Assessment Program
NGO	Nongovernmental Organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCC	Northeast Regional Coordinating Council
SAFE	Stock Assessment and Fishery Evaluation
SAFIS	Standard Atlantic Fisheries Information System
SAFMC	South Atlantic Fishery Management Council
SBRM	Standard Bycatch Reporting Methodology
SECOORA	Southeast Coastal Ocean Observing Regional Association
SEDAR	Southeast Data, Assessment, and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound
SSC	Scientific and Statistical Committee
SWCA	SWCA Environmental Consultants
UF	University of Florida

Workshop Overview

Workshop Purpose and Objectives

The purpose of the SAFMC Ecosystem Data Workshop was to continue coordination and collaboration between regional partners to identify ecosystem data availability, prioritize information needs, and develop guidance for operationalizing the use of ecosystem information in federal fisheries management decision-making processes. Cross-regional collaboration was a high priority for the workshop, not only because of the cross-regional nature of ecosystem data, but also because the South Atlantic, Gulf and Mid-Atlantic Councils all have NOAA-funded projects focused on improving the use of ecosystem data in fisheries management. Collaboration and knowledge sharing as the projects are ongoing and during the implementation of the outcomes is expected to benefit not only the SAFMC but all regional partners.

A Steering Committee composed of SAFMC staff and contractor, Gulf and Mid-Atlantic Council staff, and NOAA Southeast Fisheries Science Center staff helped to plan the workshop with the support of contracted facilitators from SWCA Environmental Consultants. The Steering Committee met several times between September-November 2025 to refine the workshop objectives and provide feedback on the agenda and workshop format. The objectives of the workshop were to:

1. Develop strategies to use ecosystem data to support management decisions.
2. Identify existing ecosystem data sources across the South Atlantic, Gulf, and Mid-Atlantic regions.
3. Identify decision-relevant ecosystem data gaps.
4. Improve collaboration and consistency across regions.

Workshop Format and Content

The SAFMC Ecosystem Data Workshop Series was held virtually over five sessions in January and February 2026, with participation by 35 invited attendees representing NOAA, Council, state, academic, and regional partners from the South Atlantic, Gulf, and Mid-Atlantic regions. The workshop was structured as a facilitated, discussion-based series that moved from reviewing contextual information and knowledge sharing to development of practical and actionable guidance for the SAFMC and regional partners. Sessions began with brief presentations, but focused primarily on full-group discussion, small-group exercises, and facilitated synthesis to work through the workshop topics. Figure 1 below was used during the workshop to orient participants to the workshop flow and summarizes the primary topics addressed in each workshop session.

SAFMC Ecosystem Data Workshop

Session 1 Management Decisions (Jan. 12)

- Review SAFMC management decisions and existing ecosystem information support
- Identify priority decisions to help guide discussion in following workshop sessions

Session 2 Ecosystem Information Tools (Jan. 15)

- Presentation by Sarah Gaichas on Ecosystem Information Tools Across Councils
- Understand regional differences in ecosystem data and tool development
- Alignment of tools with management decision and needs discussed in previous session.

Session 3 Indicators and Data (Jan. 22)

- Presentation by Mandy Karnauskas on Development of ESR's for the SE Region
- Understanding existing indicators and data sources in the Southeast
- Identify data gaps and opportunities to fill them

Session 4 Guidance Development (Feb. 4)

- Connecting management decisions with ecosystem information
- Build consensus on practices for using indicators and tools in decision-making
- Define actionable strategies to overcome data and tool challenges

Session 5 Guidance and Report Review (Feb. 18)

- Review draft summary workshop report and finalize guidance

Figure 1. Workshop Topics by Session

Expected Outcomes and Guidance Use

The expected outcomes of the SAFMC Ecosystem Data Workshop were: an improved awareness and understanding of ecosystem information currently available within and beyond the southeast U.S., including instances of successful integration; to support a shared understanding of how ecosystem data can be more effectively incorporated into fisheries management; and to develop practical and actionable guidance for improving the use of ecosystem information tools, indicators, and data in Council decision-making. The guidance developed through the workshop is intended to support the South Atlantic Council in identifying where ecosystem information can inform existing management processes, how tools can be refined to better meet decision needs, and what improvements are needed. Although the workshop was focused primarily on the South Atlantic Council, the outcomes are intended to support a bidirectional flow of information among Councils, NOAA, and other regional partners by clarifying how ecosystem tools, management decisions, and indicators can be better aligned within and across regions. Potential first applications of the Guidance developed through the workshop is during the implementation of the [South Atlantic Council's Resilient Fisheries Initiative](#) outcomes.

Core Concepts

This section summarizes the core concepts introduced or developed during the workshop, which provided a framework for thinking about how ecosystem data can better inform decision-making, identifying common challenges and existing information.

Council Decision Types

The number of decisions made by Council's can quickly overwhelm discussions of their specific ecosystem information needs. The steering committee determined that categorizing the types of decisions was helpful to keep discussions focused on the interface between ecosystem information and Council decisions, rather than on specific decisions. Throughout the workshop series, participants used the following categories to characterize Council decisions based on their timing (Routine or Occasional) and scope (Tactical or Strategic). Routine decisions, such as setting catch limits, are made or reviewed annually or more often across all the managed stocks while occasional decisions, such as setting gear restrictions, are made as needed to address specific issues. Strategic decisions consider long-term, high-level goals and objectives, while tactical decisions implement strategies in the short-term, examples are approving stock definitions and implementing accountability measures, respectively.

Ecosystem Information Tools

One of the objectives of the workshop focused on identifying ecosystem data sources, however, this term did not accurately reflect the breadth of form that ecosystem information can take. To more broadly cover the different types of information that are or potentially could be informative for Council decision-making, the term ecosystem information tools was used. Ecosystem information tools describe the many different types of data products that have been developed to analyze available ecosystem data streams with the intent of conveying ecosystem data to managers. This includes different types of analyses, reports, and processes, and different formats. Some ecosystem information tools were listed and provided to workshop participants at the beginning of the workshop series and others were identified during workshop discussions. A more extensive and complete evaluation of these tools is being developed as part of the Council's Ecosystem Information Review and Strategy Development project which is ongoing. The initial findings of this Resilient Fisheries Initiative project were presented at the beginning of Session II.

Collaborative Strategic Cycle

The workshop discussions resulted in the idea of a collaborative, strategic cycle of integrating ecosystem data into decisions which is diagramed in Figure 2 below. The steps in this cycle are not numbered, as it may be possible to enter the cycle at any step. Instead, the entry point to the cycle will depend on the specific issue. The Council or other partners may benefit from defining a clear process for entering the cycle to address certain types of needs or decisions.

Despite this entry point flexibility, workshop participants frequently returned to the red “Collaboratively define goals, objectives, and decisions” step as foundational for the other steps to be successful. A key conclusion of this workshop series is that a shared understanding of what decisions are being made and how those link to clearly defined management goals and objectives is central to effective management and meaningful integration of ecosystem data. At whatever step managers enter, they will need to look back to the goals, objectives, and decisions defined in the red step to understand how to orient and align their work within the overall strategy. This cycle directly informed development of the guidance themes.

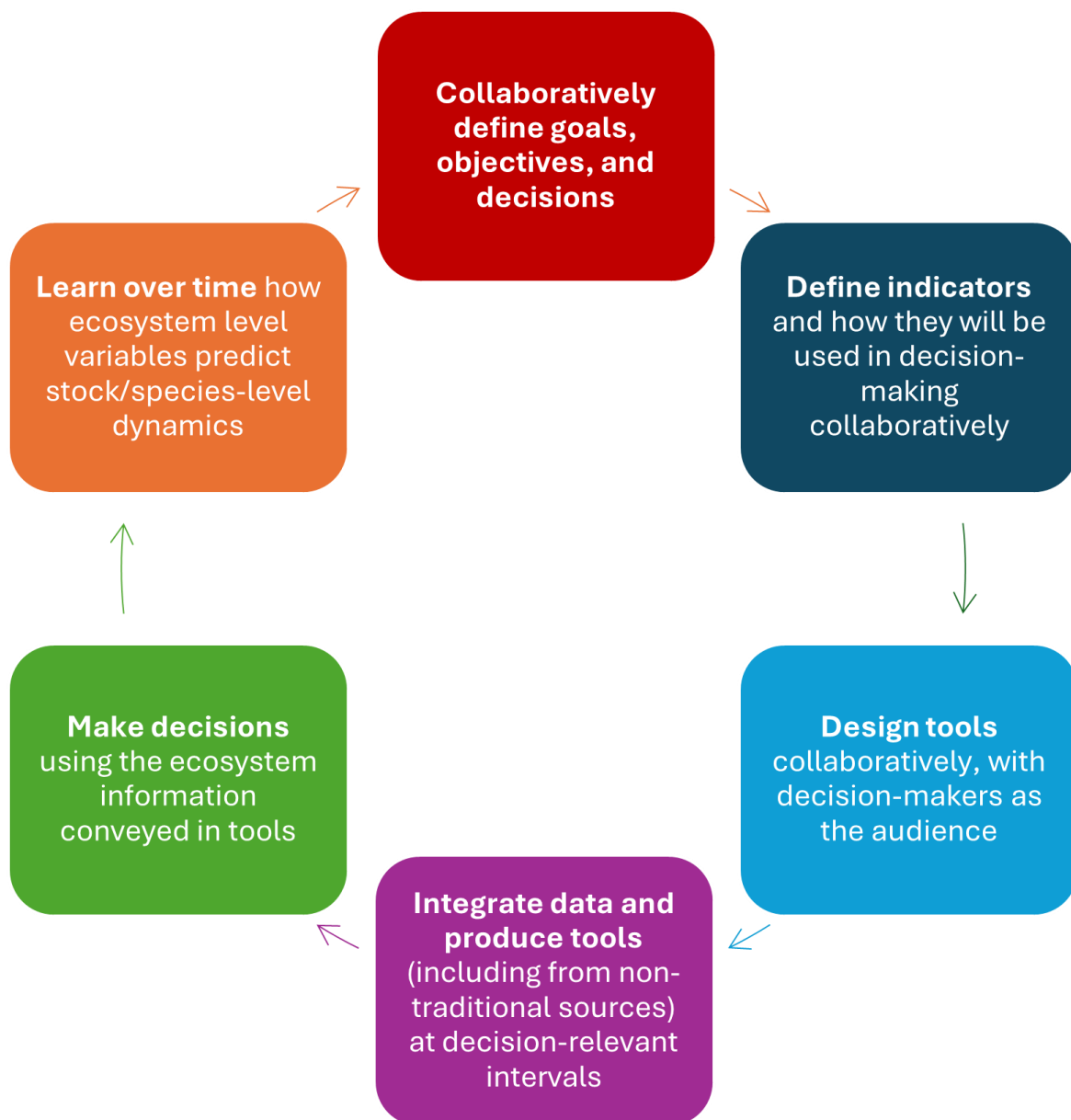


Figure 2. Collaborative, Strategic Cycle to Integrate Ecosystem Data into Fisheries Management Decisions

System-Level Observations

The following system-level observations draw from all the input provided during the workshop and the recurring themes in discussions. These observations help characterize how the system is currently working and, like the collaborative, strategic cycle, informed development of the guidance themes and actionable guidance. The opportunities and needs associated with each of these observations will help shape the implementation of guidance for improving the integration of ecosystem data going forward.

1. Prior to this workshop, most attendees were only aware of a few of the available ecosystem information tools.

There is an opportunity and a need to make existing ecosystem information tools more readily available and widely understood. This lack of awareness of the available tools has also led to duplication of effort. This presents the opportunity to bring forward and streamline the information provided through existing tools, since newer tools may have been developed without awareness of tools already designed to convey similar information.

2. Staff capacity and financial resources are likely to be constrained for the near future.

This highlights the importance of making more strategic and coordinated use of existing tools, processes, and avenues for collaboration, rather than creating new systems. Intentional prioritization and sequencing efforts to refine existing systems will be most effective while resource constraints remain.

3. Many existing ecosystem information tools do not have a clearly defined audience or set of decisions they are intended to inform.

Many of the tools available in the Southeast are highly technical reports that require translation to be valuable to specific audiences during decision-making processes. This highlights an opportunity to make existing tools more useful in decision-making by refining them to emphasize the information that is most relevant to decisions in a way that's easy for the intended audience to understand and use. It also highlights an opportunity to learn from other regions that may produce similar tools but have been more successful in adapting, refining and using them in decision-making.

4. For decision-makers, the most trusted ecosystem information tools are the most familiar ones.

For decision-makers, familiarity is an important foundation for trust. Tools that are produced on a regular schedule and developed collaboratively with managers are more likely to be understood, trusted, and used in decision-making than tools produced intermittently or without sustained input from the end users. This highlights the need for existing familiar tools to be

refined so they are more directly relevant to Council decisions, for new tools to be developed collaboratively with the intended users to ensure decision relevance, and for both new and existing tools to be developed and updated at a consistent frequency.

5. Compiling data for each updated version of the various ecosystem information tools involves significant effort and takes time to complete.

This points to the need for long-term efforts to work with regional data providers to improve data availability and to refine existing tools so they are quicker to update. This could then be combined with supplemental approaches in the near term to quickly convey information about ecosystem changes in a format that enables timely responses and decisions.

6. Ecosystem information is often documented or noted but not meaningfully integrated into decisions.

This suggests that, in many cases, what is needed is not additional information, but existing information conveyed in a more accessible format, with the end user or specific decision in mind.

Guidance for Advancing Ecosystem Data Integration

Based on all the discussion and input during the workshop, this section describes actionable guidance across six guidance themes. Each guidance theme includes key points raised during the multi-day workshop and reflect areas of broad agreement across the workshop participants. Together, they highlight actions the Council, or other regional partners could take, to strengthen the incorporation of ecosystem information in Council decision-making processes.

Guidance Theme 1: Clearly define goals, objectives, decisions, and roles

Actionable Guidance:

- 1.a** Define goals, objectives, decisions, and roles from the beginning so collaborators share an understanding of the process and expected outcomes.
 - Use SMART objectives and other measurable targets to ensure the outcomes are meeting expectations.
 - Consider and determine the best starting point by issue. In some cases, it may make sense to begin with broad ecosystem goals and narrow to a specific issue, while in other cases it may be more effective to begin with a specific fishery or management issue and build outward.
 - Likewise, consideration should be given to the direction or flow of an issue. A top-down, strategy first process could originate via advisory panels, formal stakeholder groups, or the Council, while a bottom-up technical process could

originate with Council staff, technical committees, scientists, ecosystem data, and stakeholder concerns.

- A focused process can help managers more clearly identify where an ecosystem approach is most likely to add value.

1.b Document how decisions will be made, who is involved at each step, and how recommendations move between groups.

- As goals are defined, identify which species, management units, or issues they apply to and specify who should participate in each case.
- Documenting information flow between collaborating groups, advisory panels, committees, and the Council can improve transparency and make the process easier to navigate.
- Committee chairs and vice chairs could serve as conduits between advisory panels and committees, including explaining why some recommendations may not yet be ready for Council action.

1.c Plan an inclusive process from the beginning, including clear entry points to participate and regular communication to help build early buy-in and sustained support.

Who should be involved: It will depend on the issue at hand, however, to ensure effective collaboration it should be a group, such as a steering committee or standing work group, with broad but clearly defined expertise. This could include Council members and staff, NOAA staff, advisory panel members, members of the fishing community, other stakeholders and scientists.

Additional consideration: Workshop participants consistently identified this guidance theme as foundational, linking clear goals, roles, and decision pathways to stronger trust, accountability, and implementation.

Guidance Theme 2: Build ecosystem information into existing management processes

Actionable Guidance:

2.a Adapt and use existing venues, schedules, and pathways rather than creating new parallel processes, allowing ecosystem information to be incorporated in practical and sustainable ways. This means identifying where ecosystem information can inform real management discussions, recommendations, and decisions while considering the reality of meeting constraints and staff capacity.

2.b Existing processes and structures, including those found in other regions, should be evaluated not only for where ecosystem data can be incorporated, but also for whether they can successfully support management decisions, recurring reviews, and shared learning discussions. Participants identified examples of relevant governance and management processes and structures which include:

- Habitat & Ecosystem Advisory Panel – existing advisory processes could serve as an initial venue for developing priorities, indicators, and recommendations that later move through committee and Council processes.

- Council research and priority setting processes include opportunities to identify where the Council and SSC need ecosystem information and where long-term priorities already align.
 - Stock assessment and SEDAR-related processes - could support strategic, regional conversations extending beyond species-specific assessments.
 - SSC and advisory panel meetings, especially during structured decision-focused discussions that result in recommendations rather than information sharing alone.
 - Using existing ecosystem modeling teams or work groups under the SSC may provide a useful model for bringing in outside expertise while staying connected to Council needs.
 - East Coast and regional coordination mechanisms like the East Coast Coordination Group, which can help align ecosystem actions across councils and regions.
 - State of the Ecosystem and risk assessment products and tools connecting indicator reporting to management objectives and more actionable follow-up discussions and could provide an example long-term process. Examples identified included the Mid-Atlantic risk assessment process and the State of the Ecosystem reports provided annually.
- 2.c** Different decisions may require different pathways depending on the information available, the tool being used, and the fishery management plan affected.
- If an indicator points to a beneficial or concerning condition, the process should make clear whether and how that indicator can affect management actions.
 - Decision trees or other agreed upon decision rules that are understandable to everyone involved should be developed and documented.
- 2.d** The process must be realistic for current resources and meeting schedules and thus work through existing agendas and decision points whenever possible.
- 2.e** Designate one Council meeting per year as an Annual Ecosystem Update meeting. This would be an opportunity for the Council to evaluate their priorities annually and to have outcome-driven discussions that could move toward recommendations rather than just being informational.
- a. Annual or recurring review of ecosystem information can help normalize the process, improve usability over time, and make space for refinement after an initial trial period.
 - b. Early cycles are likely to be imperfect and should be treated as iterative learning opportunities rather than one-time efforts.

Who should be involved: This will depend on the topic, but could include Council members and staff, steering or coordinating groups, SSC members, advisory panels, and NOAA staff. Those involved should be knowledgeable in existing processes and have roles in determining where ecosystem information fits most effectively in existing processes.

Additional consideration: This theme is most effective when paired with clear objectives, decision rules, and trusted governance. Embedding ecosystem information in existing processes is not only a capacity issue; it is also a way to make the work more actionable, visible, and durable over time.

Guidance Theme 3: Collaborate across regions, institutions, and roles

Actionable Guidance:

- 3.a** Collaborate early and often throughout the full decision-making process rather than relying on one-time consultation.
- 3.b** Identify and bring together the people who shape the science, the process, and the communication of results, including council staff, tool developers, scientists, managers, communications specialists, and affected stakeholders.
- 3.c** Recognize that decision-makers and tool audiences are not always the same. For example, some products should be designed specifically for Council use, while others should help fishermen and the broader public understand the information.
- 3.d** Maintain close coordination between tool developers, who are primarily NOAA staff, and council staff so tools can be aligned with agenda timing, data needs, and the format needed for a specific decision.
- 3.e** Use collaboration across councils, NOAA science centers and regional offices, State management agencies and interstate management bodies, especially when fishery management plans or ecosystem issues span boundaries.
 - Examples included holding joint SSC meetings to address issues such as cross-council allocation decisions ([see Blueline Tilefish SSC Joint Sub-group Workshop](#)) or using East Coast coordination efforts to collaborate on shifting stock challenges under capacity constraints.
 - Collaborative approaches focused on data aggregation and shared infrastructure will also support more consistent regional ecosystem information use.

Who should collaborate: Roles will vary by decision, but workshop participants pointed to collaboration among Council members, SSCs, advisory panels, fishermen, Council staff, state partners, NOAA science centers, NOAA regional offices, communications specialists, academic and NGO data partners, and the broader fishing public.

Additional Considerations: The workshop participants specifically highlighted the need for more regular communication and collaboration between NOAA data analysts who produce ecosystem information tools with regional partners who produce non-federal data sources.

Guidance Theme 4: Strategically design indicators and tools

Actionable Guidance:

- 4.a** Align tools and indicators with the timing and structure with that of existing Council processes.

- Council agendas require advanced planning, so products need to be prepared early enough to effectively support scheduled discussions and follow-up.
 - Where possible, tools should be linked to existing council, committee, and advisory panel schedules.
- 4.b** Design tools so they are directly tied to specific decisions and provide clear guidance on how the results should be interpreted.
- If an indicator signals a favorable or concerning condition, users need to understand what that means for the decision at hand, including any related decision rules or trigger points.
- 4.c** Match the format of outputs to the needs of the intended audience.
- Examples raised in the workshop included full reports, shorter condensed products, traffic-light summary tables, interactive tools, and decision-specific views that allow users to find the indicators most relevant to a stock, fishery, or management question.

Guidance Theme 4: Suggested Criteria for Decision Supporting Tools and Indicators

Well Timed	• Aligned with data availability cycles • Aligned with decision timing and Council meeting preparation
Strategic	• Tied to clearly defined goals, objectives, and decisions • Developed through collaboration among science, management, and Council participants • Legally defensible where needed
Resilient	• Supported by a clear data-sharing process • Include redundancies in the component data of the indicator or tool, so decisions can still be made even if data sources are not reliably available
Decision-Relevant	• Select indicators and tool formats that inform decisions linked to clear goals • Communicated in formats that work for the decision-making audience
Trustworthy	• Easy to interpret and transparent about what is behind the indicator • Supported by evidence linking the indicator to the condition or change it is intended to represent • Accompanied by clear communication about uncertainty, reliability, and current scientific understanding

- Participants noted the importance of thinking explicitly about who will use a product, when they will use it, and whether the structure makes it easy to find actionable information.

4.d Use the tool development process itself to improve relevance and usability.

- A deliberate, repeatable process for discussing objectives, available data sources, and intended use was viewed as just as important as the final product.
- Participants emphasized starting with Council needs and working backward, rather than beginning with a tool and then searching for a way to use it.
- Existing tools should be evaluated for how they can be adapted, simplified, or repositioned to meet practical decision needs more effectively.

Guidance Theme 5: Build trust through transparency, feedback, and demonstrated use

Actionable Guidance:

5.a Build trust by involving decision-making and tool users early in both goal setting and tool development so the people expected to use or respond to ecosystem information can see how it was developed.

- Examples discussed by the workshop participants included taking products to the SSC before Council review, early involvement in tool development as well as in early objective setting and bringing ecosystem topics before the Council on a recurring basis so members and stakeholders can track how the work evolves.
- Participants also emphasized setting expectations that indicators and tools will improve over time, rather than being perfect on their first use.

5.b Use mechanisms that connect scientific indicators with on-the-water experience and local knowledge.

- Workshop participants pointed to fishermen observations, fishery performance reports, citizen science programs, and feedback tools as tools that support comparing indicators with observed conditions and strengthen credibility.
- These mechanisms are most effective when the purpose of the information is clear and participants can see how their input informs subsequent products or discussions.
- An example of this guidance theme identified during the workshop was the inclusion of [fisherman's observations in the State of the Ecosystem Report](#) produced by NOAA for the Mid-Atlantic and New England Council's.

5.c Create clear feedback loops and document how input is used, what follow-up is expected, and how the cycle will be revisited. Participants repeatedly identified transparency and visible follow-through as essential for building long-term trust.

Who should be involved: Include both decision-makers and tool users, including Council members, SSCs, advisory panels, fishermen, stakeholders, and members of the public who contribute observations or rely on the resulting guidance.

Additional consideration: Trust can be a cross-cutting principle rather than a separate technical step. Across the workshop, participants linked trust to inclusive participation, transparency about uncertainty and process, visible use of feedback, and repeated opportunities to revisit and refine products over time.

Guidance Theme 6: Improve uptake, interpretation, and practical use of existing tools

Actionable Guidance:

- 6.a** Assess which existing products, reports, indicators, and tools are already available and identify where they are underused, overly technical, poorly timed, or disconnected from decisions.
 - Workshop participants identified several promising ecosystem information tools that could be updated, adapted, or made more decision-oriented. These include Ecosystem Status Reports (ESRs), Stock Assessment and Fishery Evaluation (SAFE) reports, Ecosystem and Socioeconomic Profiles (ESP), fishery performance reports, Risk Assessments, and Management Strategy Evaluations (MSE).
- 6.b** Adapt existing tools whenever possible before creating new ones. This includes aligning tools to support established goals and objectives, simplifying formats, improving navigation, clarifying intended use, and connecting outputs more directly to management questions.
- 6.c** Increase awareness of how current products such as ESRs, SAFE reports, fishery performance reports, citizen science outputs, or risk assessment summaries can inform recurring management discussions.
- 6.d** Support interpretation through recurring presentation, onboarding, and communication so Council members, advisory panels, and other users understand what a product is for, how to read it, and what its limitations are.

Additional considerations: Workshop participants emphasized the importance of using feedback from actual users to refine the existing products over time and determine which tools merit continued or improved support.

Example Processes Used to Integrate Ecosystem Data into Management

Throughout the workshop, participants cited numerous instances of ecosystem data being successfully integrated in a collaborative and strategic way to inform fisheries management decisions. These are listed below along with a brief description and a link to more information where available.

2015 Atlantic Menhaden Multi-Objective Decision Analysis

Workshop participants identified this process that was used by the ASMFC Atlantic Menhaden Ecosystem Management Objectives Workgroup during their Ecosystem Management Objectives

Workshop. This process is a successful example of a formally facilitated, iterative process that brought together stakeholders, scientists, and managers to define ecosystem management goals, measurable objectives, and performance measures. The process supported development and refinement of ecological reference points and management objectives as modeling and implementation progressed. ([Ecosystem Management Objectives Workshop Report, p.31](#))

Caribbean Island-Based Fishery Management Plans

Participants cited the Caribbean Councils recent shift to island-based fishery management plans as moving toward ecosystem-level management by considering multi-species fishery structure and differing species compositions across islands. ([CFMC Island-Based Fishery Management Plans](#))

Evaluation of the Oculina Experimental Closed Area

Workshop participants described the evaluation of the Oculina Experimental Closed Area as a successful example of reviewing an ecosystem-level management system over time. The process reconsidered the effectiveness of management tools and indicators for a protected area originally established to protect coral, associated fish species, and habitat, and participants noted that clear up-front objectives are important for this type of evaluation. ([Evaluation Plan for the Oculina Experimental Closed Area, 2005](#))

Mid-Atlantic State of the Ecosystem Report and Risk Assessment Review Process

Participants identified the Mid-Atlantic Council's Ecosystem Approach to Fisheries Management which includes recurring use of State of the Ecosystem reporting and risk assessment products as an example of transparent, iterative indicator tracking and refinement. The approach, and specifically the risk assessment, was viewed as useful because it connects ecosystem indicators to management objectives, uses decision-oriented formats and creates recurring opportunities for Council and SSC review. ([MAFMC Ecosystem Approach to Fisheries Management](#))

Blueline Tilefish Joint SSC Subgroup

Participants cited the South Atlantic and Mid-Atlantic blueline tilefish subgroup as an example of a collaborative cross-council process involving Council members, SSC members, and staff. The subgroup focused on allocating acceptable biological catch between Councils and was identified as a useful model for addressing shared stocks and cross-boundary management questions with coordinated scientific and management input. ([Joint Mid-Atlantic and South Atlantic SSC Blueline Tilefish Sub-Group](#))

Mid-Atlantic Sector Allocation Decision Tree

Participants pointed to Mid-Atlantic allocation work, including changes to commercial black sea bass allocations associated with stock distribution changes, as an example where ecosystem and

distribution information helped inform a management decision. The sector allocation decision tree was described as a process that integrates ecosystem information and could be refined further to support more granular decisions.

Habitat Areas of Particular Concern / Essential Fish Habitat Decisions

Participants identified habitat-focused decisions designating Habitat Areas of Particular Concern (HAPC) and Essential Fish Habitat (EFH), as examples of ecosystem information being used to inform management. These decisions draw on information about fish distribution, habitat use, and conservation priorities, although participants also noted that EFH processes could be strengthened with additional information on abundance, food web relationships, predator-prey interactions, and habitat vulnerability. ([SAFMC Habitat and Ecosystem webpage](#))

Management Strategy Evaluations

Participants identified Management Strategy Evaluations as a promising process for testing how indicators, environmental variables, and management strategies may affect fishery outcomes before implementation. MSEs provide a way to road-test options, learn over time, define timelines and review points, and potentially develop environmentally responsive harvest control rules or other ecosystem-informed management approaches. The South Atlantic Council currently has ongoing MSEs for Dolphin Wahoo, Snapper Grouper, and Wreckfish. ([MSE Overview](#); [Dolphin Wahoo](#), [Snapper Grouper](#), [Wreckfish AIM](#))

Gulf Council Catch Shares Program Evaluation

Participants discussed the Gulf Council's recent initiative to evaluate how its catch shares programs are functioning, including the use of focus groups. This was cited as an example of a program evaluation processes that can incorporate ecosystem, socioeconomic, and stakeholder information and lead to management decisions such as changes to permit requirements or other program elements. ([Gulf Council IFQ Program Reviews](#))

East Coast Coordination Group

Participants identified the East Coast Coordination Group as an important existing mechanism for cross-council and cross-region coordination. The group was described as a potential venue for aligning ecosystem data efforts, developing shared approaches for jointly managed species or shifting stocks, and advancing recommendations through established coordination pathways rather than creating entirely new processes. Coordination of the IRA-funded Council Governance projects via a cross regional workshop has already demonstrated this group's potential. ([East Coast Coordination Group](#))

Fishermen Observations in State of the Ecosystem Reporting

Participants highlighted the inclusion of fishermen observations in State of the Ecosystem reporting from the Northeast Fisheries Science Center as an example of integrating non-traditional information into ecosystem products. These observations were described as a way to compare scientific indicators with on the water fisherman experience, improve credibility, and build trust when the purpose of the information and its role in follow-up discussions are clear. ([2026 State of the Ecosystem Report – Mid-Atlantic Bight, p.3](#))

Attachment A: Workshop Attendees

Name	Title, Affiliation
Amy Schuller	Stock Assessment Scientist, NOAA Southeast Fisheries Science Center
Anna Braswell	UF/IFAS Extension Specialist, Florida Sea Grant
Brandon Muffley*	Fishery Management Specialist, MAFMC
Carly Lovas	Quantitative Research Associate, Gulf of Maine Research Institute
Charlie Deaton	Habitat Lead, NC DMF
Chip Collier*	Deputy Director for Science, SAFMC
Christina Package-Ward	Social Scientist, NOAA SERO
David Chagaris	Associate Research Professor, University of Florida
Debra Hernandez	Executive Director, SECOORA
Geret DePiper	Endowed Chair for Resource Economics, Texas A&M University
Jade Hong	PhD Candidate, UNC Chapel Hill IMS (SAFMC IRA Project Contractor)
Jameson Gregg	Senior Marine Scientist/NEAMAP, VIMS
Janet Nye	Associate Professor, UNC Chapel Hill IMS (SAFMC IRA Project Contractor)
Jie Cao	Associate Professor, Quantitative Fisheries Lab, NCSU CMaST (SAFMC IRA Project Contractor)
John Carmichael	Executive Director, SAFMC
Julia Byrd*	Citizen Science Program Manager, SAFMC
Kathleen Howington*	Habitat and Ecosystem Scientist, SAFMC

Name	Title, Affiliation
Katie Drew	Stock Assessment Team Lead, ASMFC
Kevin Craig	Branch Chief of the Atlantic and Caribbean Reef Fish Branch, NOAA SEFSC
Lara Klibansky*	Resilient Fisheries Project Manager, SAFMC
Lauren Gentry	Ecosystem Data Scientist, Florida FWC
Mandy Karnauskas*	Ecosystem Science Lead, NOAA SEFSC
Meg Perry (Facilitator)	SWCA Environmental Consultants
Michael Opiekun	Senior Fisheries Data Coordinator, ACCSP
Michelle C Brodeur	Ecosystem Data Scientist, NCDMF
Mick Walsh	Fishery Resource Management Specialist, NOAA SERO
Myra Brouwer*	Deputy Director for Management, SAFMC
Roldan Munoz*	Research Fishery Biologist, NOAA SEFSC
Sarah Close	Program Director, Climate Resilient Fisheries Program, Blue Convergence Fund
Sarah Ensor (Facilitator)	SWCA Environmental Consultants
Sarah Gaichas	Lead Scientist, Hydra Scientific, LLC (SAFMC IRA Ecosystem Project Contractor)
Sarah Lupis (Facilitator)	SWCA Environmental Consultants
Scott Baker	Fisheries Specialist, NC Sea Grant
Tracey Smart	Ecosystem Data Scientist, South Carolina DNR
Verena Wang*	Ecosystem Analyst, Gulf Fishery Management Council

* Workshop Steering Committee Members

Attachment B: Workshop Session Agendas

Session 1: Management Decisions

Monday, January 12 from 1:00 PM – 4:00 PM Eastern

Objectives:

- Confirm decision types and explore examples.
- Identify lessons learned and cross-region similarities/differences in the use of ecosystem information in decision-making.
- Introduce the framework of Decision Types, Ecosystem Data Tools, and Implementation Pathways linking management decisions and ecosystem information.

Time	Session	Content
1:00–1:15	Welcome, Introductions, and Agenda Review	• Welcome remarks by SAFMC ED John Carmichael • Participants share name, role, and council affiliation
1:15–1:30	Presentation: Workshop Context	• Review agenda, purpose, history, and expected outcomes
1:30–2:00	Presentation: Introduce Decision Types, Ecosystem Data Tools, and Implementation Pathways	• Introduce Decision Types, Ecosystem Data Tools, and Implementation Pathways handout
2:00–2:05	Break	
2:05–3:00	Small Groups: Review & Discuss Decision Types	• Review examples of assigned decision type • Discuss generally how the processes are supported or not by ecosystem tools • Discuss where tools currently support or limit decision-making • Identify cross-region relevance and lessons learned from other regions
3:00–3:05	Break	
3:05–3:50	Discussion: Management Decisions List	• Brief share-out by facilitators • Confirm ~3 South Atlantic examples we want to use throughout the upcoming sessions • Highlight cross-cutting themes
3:50–4:00	Wrap-Up	• Recap key points • Next steps

Session 2: Ecosystem Information Tools

Thursday, January 15 from 10:00 AM – 1:00 PM Eastern

Objectives:

- Develop mutual understanding of how ecosystem tools (e.g., ESRs) are used in decision-making.
- Refine tool list and identify gaps or areas for improvement.
- Align on cross-region opportunities for tool usage and interpretation.

Time	Session	Content
10:00–11:00	Presentation: Ecosystem Information Tools Overview	• Review the ecosystem information tools available to the Councils (ESRs, integrated dashboards, etc.); • Compare the indicators available in each region; • Explain relevance to decisions; and • Discuss
11:00–11:30	Discussion: Compare and Contrast ESRs across Council Regions	• What do ESR's include in each NOAA region? How are they similar/different? • What do you like or find most useful? • What is missing or most challenging? • Consider content, timing, format, and presentation of the ESR
11:30–11:35	Break	
11:35–12:00	Discuss Tools in Different Regions	• Sorting Exercise for your council region's tools: • Are any missing for this region? Are any not used in this region?
12:00–12:05	Break	
12:05–12:50	Discussion: Tool Themes and Opportunities	• What are the themes across regions? • Which are the most promising or high potential tools? • If timing or format needs improvement, why, and how could they be improved? • Where are there opportunities for council regions to learn from one another's tools?
12:50–1:00	Wrap-Up	• Recap key points • Next steps

Session 3: Indicators and Data

Thursday, January 22, from 10:00 AM – 1:00 PM Eastern

Objectives:

- Develop shared understanding of ecosystem indicator development and decision-relevant data available across regions.
- Compile relevant data sources for indicators tied to management decisions, including traditional and non-traditional sources.
- Identify data gaps for the Southeast Region and across regions.

Time	Session	Content
10:00–10:30	Presentation: Indicators and Data Sources Introduction	• ESR Dashboard Example • Choosing Indicators: Review Indicators Development and Indicator Data Criteria • Common Data Sources
10:30–11:10	Discussion: Indicators and Data Sources	• In the context of our decision examples and most promising tools: ◦ What makes a good indicator? ◦ What criteria to use in selecting the best data for an indicator? • Data sources ◦ Discuss which data are used across regions vs region-specific ◦ Identify non-traditional sources that may be missing
11:10–11:05	Break	
11:05–11:45	Small Groups: Data Gaps Discussion	• For your most promising tools, are there key data gaps • What type of data or improvements to data are needed to fill the data gaps? • What non-traditional data sources might be available in your region?
11:45–12:00	Break	
12:00–12:50	Discussion: Data Gap Themes and Non-Traditional Data Sources	• Data Gaps ◦ Discuss data gaps seen within regions and between regions • Non-traditional Sources ◦ How are different regions using non-traditional data sources? Any lessons or good models for the South Atlantic?
12:50–1:00	Wrap-Up	• Recap key points

		• Next steps
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Session 4: Guidance Development

Wednesday, February 4 from 9:00 AM – 12:00 PM Eastern

Objectives:

- Build consensus on best practices linking indicators and data with decision-making using ecosystem data tools.
- Identify opportunities to learn from and/or align across Council Regions.
- Discuss guidance for NOAA and Councils to improve tools and make better use of existing data.

Time	Session	Content
9:00-9:15	Presentation: Review Three Example Decisions	• Present three examples incorporating feedback from prior sessions • Discuss refinements to data and tools that could improve this process
9:15-10:15	Discussion: Initial Guidance for Each Decision Type and Most Promising Tool	• Discuss best practices for linking indicators and data with decision-making: Within regions, Across regions • Identify similarities and differences across councils
10:15-10:30	Break	
10:30-11:50	Small Groups: Prioritize Guidance	• Which are most doable/realistic, least investment, data availability • Low hanging fruit, Feasible Long-term, Opportunistic
11:50-12:00	Wrap-Up	• Recap key points • Next steps

Session 5: Guidance and Report Review

Wednesday, February 18 from 10:00 AM – 12:00 PM Eastern

Objectives:

- Identify steps to advance the use of ecosystem information tools for decision-making, prioritize indicator updates/development, and advance data improvements for SAFMC and NOAA.
- Align councils and NOAA on actionable guidance and next steps.

Time	Session	Content
10:00-10:30	Presentation: Introduce Draft Summary Report	• Review Draft Summary Report
10:30-11:15	Discussion: Outstanding Questions on Report	• Discuss remaining questions, including whether or where cross-council alignment may be possible • Prompt: What steps are needed to advance data management and use of indicators within and across regions?
11:15-11:50	Discussion: Refinement of Guidance in Report	• Discuss and agree on guidance for SAFMC and NOAA
11:50-12:00	Wrap-Up	• Share contact information • Review next steps and thanks

Attachment C: Detailed Notes by Session

Provided below are the detailed notes for the workshop. They provide an overview of the topics discussed and input provided by participants during the five SAFMC Ecosystem Data Workshop sessions in January and February 2026.

Session 1: Management Decisions

Presentation: SAFMC Ecosystem Data Workshop – Workshop Context

presented by Lara Klibansky, SAFMC Resilient Fisheries Program Manager

The opening session of the SAFMC Ecosystem Data Workshop provided the context for this five-session, NOAA-funded and Council-led initiative. The presentation reviewed the workshop's origins through a decade of cross-regional efforts, including the 2021 Atlantic Coast Science Coordination Workshop, East Coast Climate Scenario Planning, and the Council's Inflation Reduction Act-funded Resilient Fisheries Initiative. The presentation also introduced the workshop's collaborative structure, purpose, and four objectives: developing strategies to use ecosystem data in management decisions, identifying existing data sources and decision-relevant gaps across the South Atlantic, Gulf, and Mid-Atlantic regions, and strengthening cross-regional collaboration. The workshop was described as intended to produce guidance rather than formal recommendations for the Council and to support implementation planning and execution of the other projects that comprise the Resilient Fisheries Initiatives. The presentation then previewed the flow for the five workshop sessions, connecting management decisions, ecosystem information tools, and indicators/data toward collaboratively developed guidance benefiting the Councils, NOAA, and other regional partners.

Presentation Slides: [LINK](#)

Decision Types

During Session 1, participants reviewed a decision typology that characterizes Fishery Management Council decisions based on timing (routine or occasional) and scope (tactical or strategic). Routine Decisions are made or reviewed annually or more often across all the managed stocks, whereas occasional decisions are made as needed to address emerging issues. Strategic decisions focus on long-term goals and objectives, while tactical decisions implement strategies in the short term. Examples of the decision types discussed in the workshop included routine, tactical decisions such as catch limits and targets, landings limits, minimum sizes, trip or possession limits, and fishing seasons; occasional tactical or strategic decisions such as ABC control rules, MSY proxies, essential fish habitats, and reporting requirements for each fishery management plan; and occasional, strategic decisions such as stock definition, sector allocations, and research priority development and review.

For each of these decision types, workshop participants identified additional examples, ecosystem data tools commonly used, and examples of ecosystem data being incorporated successfully into decisions.

Routine, Tactical Decisions

Participants reviewed the routine, tactical decisions provided in the workshop materials and identified two additional examples, which were setting assessment and Council management priorities. The ecosystem data tools mentioned during this discussion included stock assessments, recreational demand models, and ecological models. Policy statements, specifically those related to essential fish habitats, were also identified as a tool that could be used to inform routine, tactical decisions. Quota set asides were also mentioned as an important method Councils can use to gather additional ecosystem data via scientific research to support ecosystem data tools.

While several tools were identified, participants noted that ecosystem data are rarely integrated into routine, tactical decisions. Participants noted that tools currently available often don't align well with the timing and structure of these types of decisions. Long development timelines and uncertainty about how technical ecosystem products fit into decision making processes were also identified as barriers to their use in Council decision-making.

Participants described broadly similar challenges across regions, although some councils have more established ecosystem reporting practices than others. The Mid-Atlantic Council was seen as farther along because it receives ecosystem information more routinely through products such as the State of the Ecosystem Report and risk assessments, whereas participants from the South Atlantic and Gulf Councils described greater difficulty locating, interpreting, and applying the available information. Participants also noted that regional differences in risk policy, Scientific and Statistical Committee practices, and stock assessment frequency affect how readily ecosystem information can be incorporated into decisions.

Participants noted that ecosystem information is rarely integrated into routine tactical decisions, and were able to identify only a limited number of examples in which ecosystem information has informed them. These examples included acceptable biological catch control rules, some recreational management measures, and policy development related to other ocean uses, but participants generally agreed that such applications remain uncommon and are not yet routine across councils.

Occasional, Tactical or Strategic Decisions

For occasional tactical or strategic decisions, participants identified additional examples such as emerging fisheries, sector separation, state management delegation, emergency regulations, bag and size limits, seasonal closures, stock assessments and status determinations, and

exempted fishing permits. They discussed where ecosystem information has and has not influenced these decisions and noted that the specific pathways for integration vary widely by issue and region.

For occasional tactical or strategic decisions, participants pointed to many of the same tools used in routine decisions, including stock assessments, ecological modeling, and policy statements. However, they emphasized that these decisions often depend more heavily on specific datasets, contextual analysis, and qualitative judgment than on a single standardized ecosystem tool.

Participants cited several examples in which ecosystem information has informed occasional tactical or strategic decisions, including habitat-related decisions, spatial management measures, quota reallocations, and the use of qualitative information to describe impacts. They also emphasized that additional social and economic information, especially for the recreational fishery in the Southeast, is often needed to support these decisions effectively. In some cases, available data are sufficient to identify broad concerns, but not to provide the level of comparability or precision needed for direct use in decision-making.

Participants identified key limitations that included inconsistent datasets across jurisdictions, limited availability of habitat vulnerability analyses and other region-specific products in the Southeast, and the fact that some data are costly or collected infrequently. Participants also noted uncertainty about when ecosystem change is sufficient to justify a new strategy, tool, or process. Several participants contrasted this with other regions that have more established products, such as recurring risk assessments, climate vulnerability analyses, or broader integrated ecosystem assessment efforts.

Occasional, Strategic, more complex council processes

Participants also discussed the more complex, occasional strategic decision processes and identified additional examples such as fishery visioning efforts, development of or revision of Fishery Ecosystem Plans, Management Strategy Evaluations and risk policies, revisions to Fishery Management Plan goals and objectives, changes in lead-council responsibility for species, permitting requirements, and broader program evaluations. These types of decisions often involve longer planning horizons, multiple objectives, or substantial procedural change.

Across these more complex strategic processes, participants noted that ecosystem considerations are often present in principle through requirements related to habitat, optimum yield, bycatch reduction, and broader environmental review, but are not always meaningfully integrated into the resulting decisions. In practice, ecosystem information is more often used qualitatively than quantitatively. Examples discussed included the use of recreational information in decision-support models, evaluation of protected areas, sector allocation frameworks that

account for distribution shifts, and supplemental environmental review processes. Participants contrasted these examples with cases such as annual catch limits or Essential Fish Habitat designations, where they felt additional ecosystem information on abundance, habitat function, or food-web relationships would be useful but is not yet routinely incorporated.

Themes Across Decision Types

Across decision types, participants observed that ecosystem information is generally better suited to long-term and strategic decisions than to routine decisions, where timing, review requirements, and the format of available information can make integration difficult. They also emphasized recurring needs for stronger socioeconomic information, more decision-relevant presentation formats, clearer review processes, and greater confidence in how ecosystem information should be interpreted and applied. Participants noted that risk assessments and associated communication tools may offer a practical bridge between ecosystem information and routine council decisions.

Session 2: Ecosystem Data Tools

Presentation: Ecosystem Information Tools Across Fishery Management Councils

presented by Sarah Gaichas (Hydra Scientific LLC)

This presentation described how the eight U.S. regional fishery management councils develop and apply ecosystem information, comparing different management and the suite of tools each one uses. It walked through the major ecosystem information types, including Ecosystem Status Reports, Climate Vulnerability Analyses, Fishery Management Plans, Fishery Ecosystem Plans, and Ecosystem Socioeconomic Profiles, and described their scope, frequency, and content across regions, with the North Pacific and Mid-Atlantic councils highlighted as leaders in risk-based, indicator-driven catch advice. The talk synthesized three broad approaches to using ecosystem information (FMP/indicator-based, FEP/geography-based, and developing approaches such as the South Atlantic and Gulf), and closed by flagging common management concerns, such as forage-fish ecology, and promising practices, which included risk-based frameworks, stakeholder co-production, and actionable processes like the Fishery Ecosystem Issues being developed by the Gulf Council.

Presentation Slides: [LINK](#)

Key Discussion Themes Following the Introductory Presentation

This summarizes the questions and answer session that followed the introductory presentation.

Participants discussed how Fishery Management Plans and Fishery Ecosystem Plans serve distinct but complementary purposes. Fishery Management Plans are required management documents that contain the measures and processes councils use to manage fisheries, whereas

Fishery Ecosystem Plans are broader, non-regulatory frameworks intended to organize ecosystem-level information and support more integrated, long-term thinking.

Participants also reflected on the New England Fishery Ecosystem Plan experience, noting that its ambitious ecosystem-level reference points approach was difficult to implement within existing management structures. The scale of the proposed change, uncertainty about legal and policy constraints, and concern about disruption of the established permitting and management systems contributed to a shift toward more incremental approaches that could produce near-term benefits while remaining compatible with current decision-making frameworks.

Discussion of SAFE Reports highlighted their potential value as an interim source of updated biological, fishery, and economic information between stock assessments. Participants noted that the current code-driven and time-scaled format of the SAFMC SAFE reports are still relatively new and saw promise in their ability to improve awareness of recent changes in fisheries and to provide a clearer basis for ongoing management discussions if their development process and intended uses are well defined and understood.

When considering what supports or hinders implementation of ecosystem-based management in practice, participants emphasized that interest in ecosystem information has grown substantially as climate-related disruptions and rapid environmental change have made the limitations of traditional approaches more visible. At the same time, they noted that successful implementation requires durable processes, institutional support, and products that can be maintained over time rather than relying on the efforts of individual staff.

Participants identified several practical barriers to using ecosystem information in routine management decisions. These included, the difficulties of fitting ecosystem products into established decision processes especially stock assessment workflows, limited time and capacity to interpret additional information, and concern that some tools will not be produced consistently if they depend on a small number of staff or are not fully embedded in standard management practice.

Discussion of Ecosystem Data Tools

Participants discussed several considerations for introducing new ecosystem data tools into Council processes. They emphasized that new tools must be both legally defensible and understandable to decision-makers, particularly if they are intended to serve as triggers for management action. Participants also noted that current staffing and funding constraints create a dynamic context for tool development and use, underscoring the importance of avoiding overreliance on any single data source or product.

Participants also described several principles for designing effective ecosystem tools. They noted that useful tools may incorporate physical, chemical, biological, and socioeconomic indicators

and may need to be presented in multiple formats, such as a full technical report, an executive summary, and one or more concise decision-focused products. The Mid-Atlantic Council's State of the Ecosystem Report was cited as an example of a tool that's become familiar and useful to decision-makers because it is produced regularly, tailored to Council needs, and linked to related products such as risk assessments. Participants contrasted this with longer and less frequent technical reports, which may provide valuable documentation but can be harder for decision-makers to interpret and apply. They emphasized that tools should be understandable, actionable, and designed with communications experts so that key information is accessible to Councils, stakeholders, and the public.

When discussing situations in which there is concern about an individual species, participants noted that linking ecosystem variables to species-specific management remains challenging because relationships are often non-stationary and may shift as environmental conditions change. They suggested that broader ecosystem signals, such as temperature change, upwelling, cold pool dynamics, or red tide, may function as umbrella indicators that affect multiple species at once. Participants observed that many existing tools are already used at the species level, but that there is still a need to better connect habitat and ecosystem information to routine tactical decisions. Ecosystem and Socioeconomic Profiles were discussed as a potentially useful bridge between ecosystem-scale information and single-species management, although participants noted that these products can be labor intensive to develop and maintain. They also discussed the role of models and fishermen observations. Models were noted as helping inform discussions even when they are not used directly to set management thresholds, and fishermen observations can provide valuable contextual information for ecosystem reports and indicator development.

Implementation Pathways: How to Use Ecosystem Data Tools in Decision-Making

Participants identified several implementation challenges and bottlenecks that affect how ecosystem data tools can be used in decision-making. They noted that Council processes may need to be adjusted to better accommodate ecosystem information. For example, they suggested Council discussions often focus on catch limits and the stock assessment process rather than on how catch limits are implemented over time or what the consequences may be of sudden versus gradual management changes. Participants observed that socioeconomic indicators included in Ecosystem Status Reports could help address some of these implementation questions, but that such information doesn't typically enter the standard stock assessment and catch limit process. They also noted that familiarity matters. Tools and processes that have been used for longer tend to feel easier and more useful to decision-makers. Thus, newer processes may require time before their value is fully recognized, and if a new processes

is more cumbersome than an existing process, it may be abandoned, even if it's potentially more informative.

Participants also emphasized the importance of presenting ecosystem information in formats that are explicitly designed to support decisions. Rather than starting with a tool and asking how to implement it, they suggested beginning with the management need and then identifying what type of product or format would best address that need. The Mid-Atlantic Council risk assessment process was discussed as a useful model because along with the full technical report a condensed version and a simplified summary table were also developed, which presents complex information in a way Council members can interpret quickly. Participants also noted the potential value of more intuitive and interactive tools that would allow users to pull up the indicators most relevant to a stock, fishery, or decision type. The interactive version of the Gulf Ecosystem Status Report was cited as an example of a format that could be further tailored to decision groupings and audience needs.

Finally, participants stressed that no matter which ecosystem tool is used, developing a clear process for its use is essential. They described the need for a deliberate and repeatable approach that brings the relevant participants together to define objectives, identify appropriate data sources, and clarify what the tool is intended to accomplish. Participants emphasized that this process should begin with Council needs and work backward from there in order to build buy-in early and ensure that tool development remains aligned with decision-making priorities. They also suggested documenting who should review which tool and what information should be extracted from it for specific decisions so that expectations, roles, and pathways for use are transparent.

Identification of Most Promising Tools

During Session 2 participants also worked to identify which ecosystem data tools appeared most promising for future discussion and development. They compared tools used in the Northeast and Southeast NOAA regions by considering two practical dimensions that had emerged repeatedly throughout the session, timing and format. They considered whether the timing of a tool aligns with decision-making needs and whether the format is easy for decision-makers to interpret and use. This comparison helped participants distinguish between tools that may contain useful information but are difficult to apply in practice and those that are both decision-relevant and accessible. Based on this exercise, participants identified a subset of tools they considered most promising for more focused discussion in Session 3. This included Ecosystem Status Reports, SAFE Reports, Ecosystem and Socioeconomic Profiles, Management Strategy Evaluations and Risk Assessments.

Session 3: Promising Tools, Indicators, and Data Sources

Presentation: Development of Ecosystem Status Reports for the SE Region – Indicators and Data Sources

This presentation described Ecosystem Status Reports (ESRs) and how they are built beginning with the fundamentals of what an indicator is and how key ecosystem components and management-relevant changes are chosen, then explaining the indicator selection and the data sources feeding each category, from satellite and survey data to landings statistics, stock assessments, and citizen science. It highlights the shift toward newer "objective-focused" reports that explicitly tie indicators to fishery management objectives—such as food production, socioeconomic health, avoiding bycatch, good governance, and ecosystem protection—and showcases the modern, reproducible, open-source workflow (exemplified by the Caribbean ESR completed in 2025) that cuts update times from years down to a few weeks, before closing with emerging indicator areas like remote sensing, spatial analysis, social media, and AI, plus links to further resources.

Presentation Slides: [LINK](#)

Discussion of Most Promising Ecosystem Information Tools

In Session 3, participants continued the discussion of the most promising ecosystem data tools that were identified during Session 2. They described how each tool is functioning well and recommended potential improvements to make them more effective during Council management decision processes and within the context of existing data and indicators available in the region.

Participants noted that Ecosystem Status Reports are useful because they synthesize a broad range of physical, chemical, biological, and socioeconomic indicators and can help build familiarity and trust in ecosystem data over time. They observed that ESRs are presented differently across regions, including as full reports, executive summaries, decision-focused summaries, dashboards, or brief highlight pages, and discussed how those differences can affect how readily the information can be used by Councils and other decision-makers. The Mid-Atlantic State of the Ecosystem Report was cited as a useful example because it is produced annually, is designed specifically to support Council management decisions, and has become a familiar format for presenting ecosystem information. Participants also noted that its indicators feed into the Council's risk assessment process. Participants emphasized the importance of ESRs being understandable and actionable for decision-makers, not just technically complete. Longer and less frequent reports may provide an important legal and documentation foundation, but they can be difficult to interpret or use if they are too detailed or not timed to Council needs. Participants identified several opportunities for improvement for the South Atlantic ESR,

including involving communications experts in the development of summary and infographic products and clarifying how ESR information connects to specific species management decisions

SAFE reports were identified as promising tools in the Southeast because they integrate a broad range of information and are updated more frequently than many other tools. They also focus on species within fishery management units, rather than on a single species or an entire ecosystem. This broader perspective, combined with more frequent updates, may make SAFE reports especially useful for management decisions. They can provide information on species biology, stock status, recent harvest, landings data, fishery trends, essential fish habitat, economic and social factors, and the overall status of the fishery. Because most reports cover multiple species, they can serve a variety of audiences and offer a strong management-oriented overview of species within a management unit. They also compile survey data relevant to species and often provide detailed descriptions of the models used and their performance. Suggested improvements include linking to or incorporating ecosystem-related information, including landings relative to sector ACLs, identifying similar species (for example, by trophic level, spatiotemporal distribution, and optimal environmental conditions) to help fill data gaps for data-limited species, improving the format and navigation, making the reports easier to locate, adding data and plots on environmental variables that strongly affect stock status, and more clearly defining the intended audience.

Ecosystem and Socioeconomic Profiles were viewed as especially valuable because they apply ecosystem information at the stock level, where Councils make management decisions; however, participants noted that these products require substantial time and effort to develop, socialize, and maintain. In the Northeast, for example, staff turnover has created challenges in keeping the profiles updated and scientifically current. Participants also emphasized that these profiles create an important link between ecosystem indicators and individual species, bringing quantitative and qualitative information into the assessment process that might not otherwise be considered. They provide ecosystem context at the species-specific level and can lead to more tangible management outcomes. Suggested improvements included developing a more consistent structure across species and placing greater emphasis on ESR indicators, although participants acknowledged that this may be challenging given the species-specific nature of the profiles. Where possible, they recommended tying existing indicators more directly to species-specific management decisions. Participants also suggested finding alternative opportunities and pathways for development, since these profiles are highly time intensive and are often produced only as part of the assessment process. Additional recommendations included drawing indicator information from ESRs and applying it at the stock level, as well as incorporating community-level data and indicators, while recognizing that the meaning of “community scale” may vary across contexts.

Management Strategy Evaluations (MSEs) were viewed as a promising tool because they can build on information Councils already possess and help evaluate alternative management approaches. Participants said MSEs work well by allowing Councils to compare competing strategies in realistic scenarios, grounding management decisions in practical conditions, and identifying strategies that remain effective under uncertainty. They also emphasized that indicators play an important role within an MSE framework, since candidate strategies are judged by how well they achieve predefined management goals, which requires indicators to measure performance. In that sense, if an indicator is proposed for management use, an MSE can be critical for evaluating how well it performs. At the same time, participants noted several challenges that limit the usefulness of MSEs. These included long development timelines, lengthy gaps between Council discussions, inconsistent processes that make MSEs difficult for some Council members to understand, and confusion about when and why the tool should be used. Participants suggested that MSEs could be improved through shorter timeframes, clearer processes for Council updates and engagement, more consistent explanations or simple reference materials, and standing MSEs or operating models for each FMP to reduce startup time. They also suggested that proof-of-concept examples or case studies could help demonstrate the value of MSEs, and that MSE or ecosystem models could be used to explore how indicator changes affect assessment inputs such as natural mortality. Overall, participants saw MSEs as valuable for comparing management options, but stressed that they need to be clearly scoped, efficiently run, and tied to a broader strategic framework to be most effective.

Risk assessments were also identified as promising tools because of their flexibility and ability to be adapted across a variety of Council contexts. Participants noted that risk assessments are effective because they provide a clear format for communicating ecosystem information that can inform management decisions, often through visuals that are easy to understand. They also allow managers to compare relative risks and similarities across stocks and fishery management plans, support both tactical and strategic decision-making, and use indicators in a semi-quantitative way to connect risks to specific ecosystem components. In addition, participants emphasized that risk assessments offer an opportunity to examine ecosystem interactions and evaluate risks to the biological and social objectives of a particular fishery, fishery management plan, or fleet. They also help identify which management objectives are most affected by particular risk elements. Participants suggested several areas for improvement, including weighting risk elements, linking risk elements more directly to management decisions, developing more automated guidance through “if/then” risk probabilities similar to scenario planning, establishing a risk policy that defines levels of risk associated with specific decisions, connecting assessments to outcomes, defining risk thresholds, and more clearly considering the intended audience.

Indicators and Data

During Session 3 participants also discussed ecosystem data and indicators in the context of the most promising ecosystem information tools. They discussed data availability, indicator development within the southeast region and beyond, and discussed general challenges, needs, and opportunities for their effective use in management decision processes.

Participants noted that improving access to data and designing resilient indicators are expected as reporting processes become more automated. While automation may help reduce the long turnaround times historically associated with ecosystem reports, participants observed that automated systems can still be vulnerable to changes in data sources, delays in data availability, and shifts in where data are maintained. For this reason, they emphasized the importance of building redundancy into indicators where possible and establishing clear expectations for data sharing, updates, and stewardship across partner organizations. Participants suggested that regional data partnerships could help support this kind of systemic resilience if roles and responsibilities are clearly defined.

Participants emphasized that indicators need to be linked clearly to decision-making if they are to be useful in practice. They noted that goal development should be collaborative and should explicitly connect scientific information to management needs. Participants suggested selecting a relatively small number of key indicators that can be communicated clearly to decision-makers, while also aligning those indicators with the timing of specific decision cycles. They also recognized the ongoing challenge of connecting ecosystem-level indicators to single-species management decisions. Several potential approaches were discussed, including the use of risk tables, narrow species-specific indicators within stock assessments where possible, and prioritization of indicators based on their relevance to individual species. Participants also noted that developing this understanding will likely be iterative, requiring continued learning about how ecosystem variables relate to species-level responses over time.

Participants highlighted the importance of considering your audience in the development of indicators and discussed the kinds of indicators and tools that may be most effective for different audiences. They noted that some indicators are inherently qualitative or outcome-based, such as ranking indices of abundance used in stock assessments, and that both leading and lagging indicators may be important depending on the decision context. Participants emphasized that different audiences will apply different criteria when evaluating indicators, which reinforces the need for careful selection and presentation. They also pointed to interactive tools as a promising direction for communicating indicator information more effectively, citing ecosystem report cards and other experimental visualization platforms as examples of formats that can make complex information more accessible. Finally, participants observed that models occupy a somewhat different role than data sources or reporting tools. In the South Atlantic, for

example, Ecopath with Ecosim models are not generally used to communicate data directly, but they can still inform discussions, shape analytical priorities, and help identify which indicators may be most relevant. Management Strategy Evaluations were discussed as fitting into a similar category, serving less as a reporting product and more as a framework for exploring how information can inform management choices.

Session 3 also included discussion of non-traditional data sources. It was noted that the South Atlantic Council has a well-developed Citizen Science Program with a number of ongoing data collection projects. These types of non-traditional data were identified as potential options to fill data gaps as they are identified in the region. During discussions participants identified several promising non-traditional data sources including social media, remotely sensed data such as smartphone location and satellite data, spatial analysis, artificial intelligence, fisherman observations collected either directly or indirectly (with examples provided from the Gulf of Alaska, Northeast, and Southeast), citizen science data, and conceptual modeling. Participants noted the potential value of including non-traditional data into existing tools such as Ecosystem Status Reports, SAFE Reports, Management Strategy Evaluations, or Risk Assessments, which could be helpful in identifying ecosystem change prior to detection by data collection surveys.

Session 4: A Collaborative, Strategic Management Cycle

Building on the discussion of promising tools, indicators, and data sources in Session 3, in Session 4 participants turned to the broader question of how ecosystem information could be incorporated into management in a more deliberate and sustained way. This shift moved the discussion from individual tools and data needs toward the design of a strategic management process that could support collaboration, learning, and decision-making over time. In this context, participants focused on two closely related themes: the need for a strategic management cycle and the need for collaboration throughout that cycle. Summarized below are participant discussion on the general development of the strategic management cycle and the summaries on the more focused discussion on each step of the cycle.

Development of a Strategic Cycle for Integrating Ecosystem Data into Decision-Making

Based on the first three workshop sessions, participants outlined what they saw as a full management cycle for using ecosystem data and indicators in decision-making. They described an initial strategic planning and collaborative governance stage in which science teams, management groups, and Council members would work together to define goals, objectives, and decisions, identify relevant indicators and data sources, design tools that convey decision-relevant information clearly, and specify how indicators would be used in management. Participants then described a reporting stage focused on integrating data, developing indicators, producing visualizations and interpretive text, and reviewing the resulting tools or reports. A third stage centered on the use of indicators in decision-making, including socializing new tools

with decision-makers and incorporating indicator information into standard decision processes where thresholds, targets, or other forms of guidance could help shape management action.

The initial discussions around this outline led to the development of a collaborative, strategic cycle of strategizing and integrating ecosystem data into decisions. Figure 3 shows the cycle which is comprised of six steps which are: Collaboratively define goals, objectives, and decisions (red); Define indicators and how they will be used in decision-making collaboratively (dark blue); Design tools collaboratively, with decision-makers as the audience (light blue); Integrate data and produce tools (including from non-traditional sources) at decision-relevant intervals (purple); Make decisions using the ecosystem information conveyed in tools (green); Learn over time how ecosystem level variables predict stock/species-level dynamics (orange). Participants emphasized that the steps in this cycle should not be viewed as strictly linear or numbered, since different issues may require entering the process at different points. Even so, they repeatedly returned to the step of collaboratively defining goals, objectives, and decisions as the foundation for all other stages. Participants stressed that central to effective management and to the meaningful integration of ecosystem data is a shared understanding of what decisions are being considered and how those decisions connect to clearly defined management goals and objectives. They noted that managers entering the cycle at later stages would still need to look back to this foundational step to orient their work and ensure that indicators, tools, and decisions remain aligned with an overall strategy.

Participants also discussed multiple entry points into the cycle and identified several common triggers, depending on the issue being addressed. They suggested that planned evaluation and strategic planning would most naturally begin with the orange “Learn over time” step and the red “Collaboratively define goals, objectives, and decisions” step, whereas a scheduled update to an existing tool might begin later at the dark blue “Define indicators” or light blue “Design tools” steps. By contrast, a disaster could force entry at the green “Make decisions” step, while still creating an opportunity to return afterward to the orange “Learn over time” step. Participants also noted that input from partners such as fishermen, as well as broader ecosystem changes with management implications, could trigger entry at the purple “Integrate data” step, where new information would first be incorporated and interpreted. Overall, they viewed the cycle as a flexible framework that can support both timely responses to management needs and continued learning over time.

Collaboratively define goals, objectives, and decisions

When discussing the step of collaboratively defining goals, objectives, and decisions, participants emphasized the importance of establishing a collaborative work group that could prioritize management decisions, gather input to assist in defining goals and objectives, and clarify roles of partners across the cycle. Collaborators include the Council, NOAA and others as

needed. They noted that stakeholders, including the fishing community, should be involved in the co-development of goals and objectives, and that the work group should continue to meet overtime to revisit priorities and guide tool and indicator development. Participants also suggested that assessing available human and institutional resources should be part of this early stage, since resource limitations will shape what is feasible. More broadly, they stressed that this foundational step must include clear communication and transparency about how goals, objectives, and decisions are developed to build buy-in and trust from the beginning.

Define indicators and how they will be used in decision-making collaboratively

Participants said that defining indicators collaboratively requires a clear understanding of Council goals so that indicators can be designed to respond to specific management objectives and needs. They emphasized that indicators should, where possible, be linked to thresholds or targets and should clarify whether they are intended to function as leading indicators that support proactive responses or lagging indicators that help evaluate outcomes. Participants noted that climate vulnerability assessments, species narratives, and online tools may help identify candidate indicators, but they also stressed the importance of recognizing data gaps where useful indicators cannot yet be developed. Throughout this discussion, participants returned to the need for an inclusive process that would build trust in both the indicators and their application. They noted that if ecosystem indicators are expected to influence management, fishermen and other stakeholders will need to have confidence that those indicators reflect reality and that their input has been incorporated meaningfully into development and interpretation.

Design tools collaboratively, with decision-makers as the audience

Participants emphasized that tools should be designed collaboratively with decision-makers clearly in mind as the primary audience. This type of collaborative development of tools will require Council bandwidth to support successful discussions with scientists and others. They noted the importance of involving communications experts in tool development so that information is not only technically sound but also easy to interpret, engaging, and suited to the needs of different audiences. Participants observed that while some tools may rely on complex underlying analyses, the way decision-makers interact with them does not need to be complex, and they pointed to simple data portals, visualizations, and concise summaries as promising formats. They also stressed that available outputs must match the type of information needed for the decision at hand, whether that is a value, a trend, a threshold, or broader contextual guidance. In addition, participants noted the importance of timing of delivery of the tool and the potential for fishermen observations to supplement other information where appropriate.

Integrate data and produce tools (including from non-traditional sources) at decision-relevant intervals

On data integration and tool production, participants emphasized the continuing need for strong coordination among tool developers, Council staff, and data providers. They noted that ecosystem tools should be built on a solid data infrastructure and supported by a comprehensive understanding by all cooperators of what data are available, including alternative sources if particular data streams become unavailable or prove unsuitable. The use of online platforms, such as GitHub, were suggested by participants as a way to improve data gathering and sharing in the Southeast region. There was confirmation that the Southeast Fisheries Science Center is already moving to the use of GitHub for this purpose. Participants also discussed the importance of understanding the limitations and design of individual datasets, such as differences in survey objectives or gear that may affect interpretation. Data integration was described as a longstanding challenge in the Southeast because information is often scattered across partners and not easily accessible. Participants suggested that close coordination, including regular updates on the latest tools and their use, between data providers, tool developers, the Council and Council staff throughout the cycle could help ensure that tools are aligned with meeting timelines, agenda-setting processes, and the types of outputs decision-makers need. They also noted that these collaborative roles may need to be ongoing across multiyear efforts rather than limited to one-time development phases. This could be incorporated as part of the regular work group meetings.

Make decisions using the ecosystem information conveyed in tools

When discussing the use of ecosystem information in decisions, participants stressed that tools will only be effective if there is a clearly defined process for how the information they contain is expected to influence management. They suggested that this could take the form of decision trees, decision rules, or other documented pathways that clarify how indicators, goals, and decisions are connected. Participants noted that it may be necessary to use different processes depending on the type of information available, the tool being used, and the fishery management context. They also emphasized the importance of transparency and trust, noting that stakeholders and decision-makers need to understand both what is on the table and how ecosystem information may affect outcomes. Without clearly defined and agreed upon targets, thresholds, or pathways for response, participants observed that ecosystem information risks remaining purely informational rather than becoming operationally relevant.

Learn over time how ecosystem level variables predict stock/species-level dynamics

Finally, participants emphasized that the cycle must support learning over time. They noted the need for routine reporting, transparent review, and deliberate evaluation of whether tools, indicators, and management responses are functioning as intended. Management Strategy Evaluations, as in NOAA's Integrated Ecosystem Assessment framework, were discussed as a

promising mechanism for this stage because they can allow managers to explore how indicators might affect different management strategies, test approaches before implementation, and update decisions iteratively as more is learned. Participants suggested that a successful evaluation process depends on defining what success looks like at the outset and establishing realistic timelines for when outcomes can be observed and reviewed. They also pointed to examples such as sector allocation reviews, Essential Fish Habitat evaluations, bycatch reporting processes, and Ecosystem Status Reports as models that could inform this kind of structured review. Across all of these examples, participants returned to the value of working through existing decision points and established processes where possible, rather than creating entirely new systems, while still ensuring that ecosystem information is meaningfully incorporated and revisited over time. Finally, participants identified key groups that should be involved in any evaluation and implementation process, including Council Members, the Council SSC, fishermen, Council staff, and scientists.

Collaboration in Management

Participants discussed who should be involved in the collaborative, strategic management cycle as collaborators, decision-makers, and audiences for ecosystem information tools. They noted that while many tools and data sources come from federal NOAA efforts, it is important to consider how best to integrate tools, data, and approaches from other partners, including models, data, and indicators from academic, agency, and NGO partners.

Participants emphasized that roles will be decision-specific, especially for decisions that involve multiple Councils, multiple NOAA science centers, regional offices, or Fishery Management Plans that overlap across regions. They expressed a strong preference for matching existing groups or coordination mechanisms with the needs for coordination throughout the cycle, rather than creating new groups or structures where existing mechanisms could be used effectively.

- The East Coast Coordination Group was identified as a potential mechanism cross-regional efforts, especially where changes could trigger re-entering the collaborative, strategic cycle.
- Stock assessment prioritization was cited as an example of collaboration across groups, including recent discussions about shifting assessment priorities due to capacity constraints and how to use ecosystem information for species that may not be managed the same way in the future.
- Joint SSC meetings for Fishery Management Plans and other cross-region topics were identified as an existing mechanism that could help filter ecosystem information, because SSCs have capacity and are used to collaborating.
- Participants noted the possibility of a technical committee or work group involving the Gulf Council, South Atlantic Council, NOAA Southeast Science Center, and NOAA

Regional Office to develop processes and goals related to regulatory streamlining and more efficient science-management processes.

- The South Atlantic and Mid-Atlantic blueline tilefish SSC joint subgroup was identified as an example of a cross-council process focused on allocating ABC between two Councils, with participation from Council members, SSC members, and staff.

Thinking about the full management cycle, workshop participants identified collaborators but clarified that their involvement will depend on the decision at hand. The collaborators identified including Council members, Council SSCs, advisory panels, fishermen, Council staff, state-level partners, NOAA science centers, NOAA regional offices, communications and marketing specialists, academic, agency, and NGO data partners, and the general public or fishermen at large.

Decision-makers in the management cycle are also likely to be decision-specific. Participants identified Council members, including SSCs, advisory panels, and committees composed of recreational and commercial fishermen, scientific experts, and state managers, as well as ASMFC and NOAA, as potential decision-makers depending on the issue and process.

Participants also noted that audiences for ecosystem information tools are different from decision-makers and may include fishermen, NGOs, and the general public. They raised questions about where partners outside NOAA and the Councils best fit in, how non-traditional data could be incorporated, and whether updated Ecosystem Status Report processes could allow data providers to upload data directly to help reduce data collection timelines.

Session 5: Guidance and Report Review

During Session 5, participants reviewed and discussed draft guidance to improve the use of ecosystem data in fishery management. Based on the group's previous sessions and discussions, participants provided additional discussion and refinements related to the guidance themes.

Guidance Theme: Clearly define goals, objectives, decisions, and roles

Participants emphasized that goals, objectives, decisions, and roles should be defined before starting the iterative and strategic cycle. They noted that objectives should be SMART—specific, measurable, achievable, relevant, and time-bound—so that there is a clear basis for determining whether the objective was achieved. Participants also emphasized that how this happens will depend on the issue or topic. In some cases, the process could start more generally and focus in over time, while in others, it could start with a key issue or specific fishery and build from there.

Participants discussed the Menhaden Multi-Objective Decision Analysis Workshop as an example of a facilitated process that brought together stakeholders from fisheries and environmental groups, managers, and scientists to identify goals, objectives, and measurements. Participants noted that the process was very iterative and ongoing over time. New goals and

objectives were raised, not all of which could be addressed. After the workshop, some goals and objectives were adjusted during modeling and implementation, and changes since 2015 could not have been predicted at the outset. Participants noted that this example began with a specific fishery and management issues that needed to be addressed.

Participants also noted that if the focus is not clear to managers at the outset, a process can help focus managers on issues or questions that provide the largest benefits from taking an ecosystem approach. The Mid-Atlantic process was cited as an example that started at a high level and eventually focused on specific bycatch and summer flounder recreational fishery questions.

Participants described two different ways into this work. One approach would start with advisory panels, formal stakeholder groups, or the Council as part of a more top-down or strategy-first process. Another approach would start with more technical groups, such as Council staff, technical committees, or scientists, using available ecosystem data and stakeholder issues or concerns as the starting point. In either case, participants emphasized the importance of using a more diverse group and inclusive process to build trust. In addition to the Steering Committee or a standing work group, the process should include the fishing community, advisory panels, stakeholders, and others to co-develop and define goals and objectives for fisheries management.

Participants emphasized that this work should be ongoing, not just a one-off workshop. An ongoing group can help build trust by incorporating objectives as they are developed and explaining why some objectives may or may not be addressed. A standing work group could help maintain consistency and build trust over time, but participants noted that this does not have to be a new group. Existing groups such as the Habitat and Ecosystem Committee or Habitat and Ecosystem Advisory Panel could potentially serve this role. Participants also identified the East Coast Coordination Group as a potential avenue because it is developing workshops to identify potential collaborations between Councils, including joint management of changing fisheries, and could bring cross-council conversations back to the Council for prioritization. Participants also noted that a broad group could help identify priorities, while other groups or subgroups could focus on specific issues.

Participants discussed how this work could integrate with Council activities. They suggested putting big-picture issues, priorities, and ecosystem issues on the Council agenda in a consistent periodic cycle, such as one meeting per year, and noted that having this as an annual priority is an important piece of guidance. Participants suggested that the Habitat and Ecosystem Advisory Panel could be a good place to develop the information the Council would consider during this annual discussion, including indicators and priorities in the existing work plan. This discussion would occur before the Council discussion and could include representatives or liaisons from

other advisory groups. Participants noted that external people could participate as members of the public or as appointed members, that the Advisory Panel could make recommendations to the Committee, and that the Committee could then make recommendations to the Council. They also noted that because there are many different advisory panels, it could be helpful to have people across different groups coordinating through representatives in a steering committee or smaller coordinating meeting. The Mid-Atlantic joint advisory panel and Council meeting was cited as a useful example of a process that helps develop ideas that could move forward through the Council process.

Participants also emphasized the need to define roles for each partner at each step of the cycle. Clear communication and transparency about how the thought process behind goals was developed, how objectives were laid out, how decisions will be made, and how buy-in was established early will be important for trust. Participants discussed several ways to document these roles and pathways in a useful and accessible way. Existing examples that could inform this documentation include the Habitat Blueprint, which describes when the Council wants to be involved in consultation with the Habitat and Ecosystem Advisory Panel, and the Advisory Panel Policy, which describes general roles of Advisory Panels and onboarding materials. Participants suggested that as goals are defined, the process could also define who is involved, depending on the species or management unit. They also noted that amendment processes could describe how information can be incorporated. New outreach and communication materials could explain how information, decisions, and recommendations flow between groups. Participants also noted that Committee Chairs or Vice Chairs could attend Advisory Panel meetings to serve as a conduit between the Advisory Panel and Committee and help clarify why the Council may not be ready to accept or act on certain recommendations.

Who needs to be involved: Participants emphasized that this should not rely on just one decision-making body. An inclusive group should contribute to goals and objectives, including the Steering Committee, fishing community, stakeholders, and advisory panels.

Additional considerations: Participants noted that clear definitions and successful execution of goals, objectives, decisions, and roles will build trust for all parties involved.

Guidance Theme: Build on existing processes

Participants emphasized that improvements should be made through existing processes or systems where possible, rather than setting up a separate process. They noted that Council staff capacity is limited, so it will be important to look at existing decision points, processes, and endeavors that work within Council staff capacity and existing meeting schedules. Participants also suggested looking for opportunities to combine decision-making processes where realistic.

Participants identified several existing South Atlantic and regional processes that could be used to improve the use of ecosystem data. The Habitat and Ecosystem Advisory Panel was identified as a potential venue for developing information, reviewing priorities, and supporting Council consideration of ecosystem issues. Council priorities and research priorities were also identified as a way to determine where Councils and SSCs have information needs. Participants discussed an Annual Ecosystem Meeting as an opportunity to dedicate one Council meeting each year to evaluating processes and presenting an Ecosystem Status Report or similar ecosystem information. Participants noted that this is already done in the Gulf and other Councils.

Participants also identified stock assessments and the SEDAR Steering Committee as existing structures that could support strategic conversations. Although SEDAR is often associated with species-specific assessments, participants noted that procedural workshops have also been used, such as SEDAR 103 in the Caribbean, which developed a new non-species-specific management approach. Participants suggested that the Northeast Regional Coordinating Council (NRCC) provides an example of a place to discuss how to align across Councils, and noted that South Atlantic participation in those meetings evolved into the East Coast Coordination Group. Participants suggested that a Gulf, Caribbean, and South Atlantic regional group analogous to the NRCC could potentially focus on stock assessment priorities and science/ecosystem priorities for the region, but the first meeting must have a clear theme or purpose.

SSCs and advisory panels were also identified as opportunities for outcome-driven discussions with actionable objectives that lead to recommendations. Participants noted that prior SSC ecosystem modeling teams and work groups seemed to have more flexibility to include external members or outside advisors and could offer another path forward for including outside people in an advisory role. Participants also identified the East Coast Coordination Group, which was set up following the Climate Change Scenario Planning initiative, as a leadership-level and staff-level group that creates recommendations and action menus. Participants suggested it would be useful to coordinate with the group's actions. The Mid-Atlantic State of the Ecosystem Report was also cited as an example of a process that gives the Council an opportunity to suggest indicators for a future report and is often linked to risk assessment, which helps determine risks in the fishery and action steps to take.

Who needs to be involved: Participants identified Council members, the Steering Committee, SSCs, and advisory panels as key groups to involve.

Additional considerations: Participants noted that this guidance is most impactful if aligned with near-term guidance to clearly define goals, objectives, decisions, and roles. Council members and stakeholders must have trust in the goals, objectives, decisions, and roles and believe they will be successfully implemented. Participants suggested that a decision tree or set of decision

rules could make the process for improving the use of ecosystem data clear to everyone. For example, if an indicator is exposing something good or concerning, the Council needs guidance on whether and how that indicator should lead to change. Participants also emphasized that this is an iterative process, so it may not run smoothly the first time through, but the first cycle will allow for changes and adaptations in the second cycle.

Guidance Theme: Build trust in indicators and tools

Participants emphasized that trust in indicators and tools can be built by expanding the decision-maker group and including more people throughout the process. By including Council members, fishermen, advisory panels, stakeholders, and others, the process can help build relationships of trust. Participants suggested that presenting tools through the SSC on the way to the Council can help build trust, as can involving SSC members and other users in the actual development of the tools. They noted that the State of the Ecosystem Report and Risk Assessment processes are presented to the SSC in some regions, and SSC members help develop these tools.

Participants also emphasized the importance of including people in tool development in addition to goal development. They described ongoing collaboration as an overarching theme and noted that more collaboration is needed throughout the process. Participants stressed the need to set expectations that indicators will not be perfect the first time and may need to be adjusted over time. An iterative process can help Council members and the public see how scientists receive feedback and taking it into consideration, while also helping scientists understand how Councils and the public are receiving the information. Bringing ecosystem information before the Council more frequently, such as through an annual ecosystem meeting or recurring ecosystem topic, which could help Council members track and understand these processes better.

Participants also discussed the importance of cross-checking environmental indicator decisions with fishermen observations to determine whether indicators match what is happening on the ground. They emphasized that there must be a mechanism to demonstrate that input is used meaningfully. Examples discussed included State of the Ecosystem summaries that include fishermen observations, the SAFMC Citizen Science Program, and South Atlantic Fishery Performance Reports developed with Advisory Panels. Participants noted that Fishery Performance Reports currently collect fishermen observations at the species level by asking advisory panel members what they are seeing related to a specific species; those observations are summarized and provided as a working paper for the stock assessment. Participants also noted that some staff are looking at sentiment analysis from that information.

Participants discussed the Gulf fishermen feedback tool, which collects observations directly from fishermen, uses sentiment analysis, and is presented to SEDAR groups and more broadly to

the SSC and Council. Participants noted that this tool is launched ahead of stock assessment reviews and, because of bulk data collection rules, must remain broad and focused on engagement and observations. They suggested that the Gulf tool could be paired with Fishery Performance Reports that collect more detailed information from advisory panels, and that ideally both sources of information could be incorporated.

Participants emphasized that the information collected from fishermen and other collaborators should be focused. It should be clear how input will be used, how it cannot be used, and how results will be communicated back to the people providing the input. Participants also discussed the importance of gathering feedback from collaborations to create transparency that decisions are being followed through with. They noted that the SAFMC Citizen Science Program provides an example where the application of data should be understood from the outset and communicated initially to fishermen so shared expectations are established for how data will be used. Participants emphasized the importance of a feedback loop so those who provide input can see how their input is incorporated. Documentation, follow-through, and transparency were identified as important for building trust as the cycle is completed and people see how the process works.

Who needs to be involved: Participants identified decision-makers and audiences, including Council members, the fishing community, and stakeholders.

Additional considerations: Participants emphasized that trust depends on transparency, feedback loops, documentation, and follow-through, including clear communication about how input is used, how indicators and tools evolve over time, and how collaborators can see that decisions are being followed through with.

Who Needs to be Involved/Roles

Participants noted that who needs to be involved will depend on the specific issue or process. They suggested that determining who to involve should begin with identifying the decision-maker, the audience, technical experts both inside and outside Council and NOAA staff, and stakeholders or the public, at least for transparency.

Participants also noted that group size should be considered carefully because different sizes need different levels of support. A consistent or core set of voices can be helpful in building trust and maintaining continuity of vision over time. Participants cited the Mid-Atlantic experience as an example, where three core NOAA and Council staff and five to eight other Council or Advisory Panel allies were engaged over ten years.

Participants also raised several considerations for defining roles. Some data cannot be shared with all audiences, so the process should be clear about who needs access to which information and where broader transparency is possible. Participants noted that roles should also be

considered for enhancing the use of promising tools, including Ecosystem Status Reports, SAFE Reports in the Southeast, Ecosystem and Socioeconomic Profiles, Management Strategy Evaluations, and Risk Assessments.

In addition to making refinements to the draft report content, the group responded to the following questions via a poll. Participant responses are summarized thematically under each question below.

1. Where are the greatest opportunities for cross-council alignment or collaboration across NOAA regions?

Working Through Existing Groups or Processes

- Seven participants cited the East Coast Coordination Group as the greatest opportunity.
 - One noted this group and the associated technical staff already represent multiple Councils and multiple NOAA regions.
 - Another noted the group has been focused on strategy and contingency plans to date, and could be utilized to align ecosystem data-related efforts.
 - One suggested using established groups (e.g., CCC habitat sub group, East Coast Coordination Group) to start making recommendations for management to integrate.
- Three participants cited ESRs as the greatest opportunity.
 - One suggested developing species-specific ESRs as part of each stock assessment.
 - Another suggested pursuing consistent consideration of data across regions in ESRs.
 - A third noted ESRs are an example of the types of collaborative reports that bring together project leads from across councils/regions and form bonds and familiarities that can help form some of the ongoing collaborative groups that we mentioned during these meetings.
- One participant described two different opportunities: A top-down opportunity would be to work through the ECCG to identify a specific cross-council goal or objective that is relevant to management decisions for a jointly managed species/FMP. A bottom-up approach could be the development of goal and objective recommendations by the Habitat and Ecosystem Advisory Panel for inclusion in an IEA process.
- Other existing groups or processes mentioned:
 - The resilient fisheries projects have multiple regions on the project teams; this improves conversations and will hopefully lead to inter-regional decision-making.

- Integrating ecosystem information into single species assessments as a first step to EBFM.
- Fishery Ecosystem Plan
- Gulf and South Atlantic seem to be converging on a similar process, so it will be helpful to learn from each other.

More Communication & Coordination Opportunities

- More communication among Council staff is very important. Ideally, better collaboration with regional offices and science centers.
- Exchange visits between council staff.
- Continued workshops that involve multiple Councils, such as the present workshop, that allow cross-comparison of approaches and lessons learned.

Opportunities to Collaborate around Data and Regional Stocks and Drivers

- Come together on species distribution shifts and how to adjust management.
- Shared stocks, large system drivers (climate, alternate ocean uses such as offshore wind development).
- Some recent cross-region survey/data collection efforts (e.g., SADL survey).

2. What is an immediate next step you could take to help advance this type of collaborative, strategic use of ecosystem data?

Cross-Council Coordination and Alignment

- Continue working with Council staff across regions to develop specific and actionable recommendations for the SAFMC to incorporate ecosystem info and what that entails.
- Engage with other Councils' staff to agree on approach to optimize resources.
- Continued/increased consistent communication with council staff from other regions - opportunities to share ideas, issues, and increase coordination.
- Continued coordination between GFM and SAFMC to align priorities where possible in the co-development of ecosystem tools with the SEFSC.

Improving Data, Science Products, and Decision Support

- Filling gaps that I can see in the data being used in the processes. Improving the resources available for the decision-making processes.
- Ensuring that the very limited resources we have are directed toward the highest priority science products to inform decision-making.

-
- Demonstrate how ecosystem models can be used within existing SAFMC management frameworks and to explore hypotheses about environmental change.
 - As a modeler, I could provide feedback/guidance (either from my own knowledge or from polling colleagues) early in new initiatives as to what is and is not possible with particular modeling tools, realistic timelines, etc. This could help set shared expectations.

Stakeholder Engagement and Incorporation of Fisher Knowledge

- Help facilitate collection and incorporation of fishermen observations/data to be considered in something like a state of the ecosystem report; would likely need to meet with stakeholder group to determine what info needs to be collected, how it could be used, how it could be collected, etc.
- Connect with fishermen and stakeholders in a meaningful way early and often.

Governance Processes and Institutional Advocacy

- As a participant in SEDAR and NRCC steering committees, support using those processes to prioritize/direct more integration of ecosystem issues.
- Facilitate sharing of state data/resources in these processes.
- Advocate within the agency and SSC.
- Integrate resilient fisheries projects into the HEAP agenda and start discussion on how to make recommendations that the council can integrate into management.