Mapping On-Ramps for Climate and Ecosystem Information

Approaches and lessons learned across U.S. Regional Fishery Management Councils

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Special thanks to Jocelyn Runnebaum

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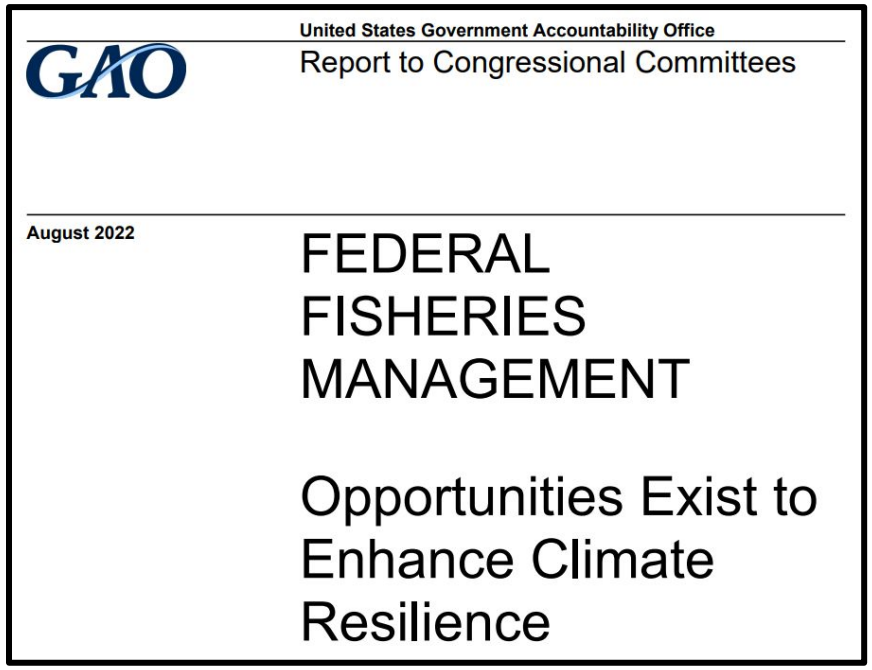
The Problem

- Slow uptake of climate-related information products and tools into the fishery management process (GAO 2022)
  - Limited time and resources
  - Lack of clarity on how to incorporate
  - Rigid regulatory structures
  - Complexity of fishery management process
- Difficult for researchers to tailor and deliver information without deep understanding of individual council processes



Goal

- Facilitate discussion and uptake of climate and ecosystem information in decision-making
  - Diagrams/maps of the U.S. fishery management process
  - Database of tools and approaches that produce climate and ecosystem information
- Enhance climate-informed decision making to better support the resilience of fisheries, fisheries management, and fishing communities

Benefits of mapping on-ramps

- Identify significant opportunities to integrate climate and ecosystem tools
  - Understand how examples can be translated across councils
- Streamline management
  - Increase resources and communication in support of a robust science to management pathway
- Support education/outreach and enable the public to know when to engage in the management process

On-Ramps

A structured opportunity within the fishery management process where information can be introduced, analyzed, and interpreted to inform deliberation or decision-making

Climate Readiness Synthesis

Prepared by the NPFMC Climate Change Task Force 2022

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Brenden Raymond-Yakoubian[3], Lauren Divine[4], Mike LeVine[5], Scott Goodman[6] Jeremy Sterling[7], Jason Gasper[8], Steve Martell[9], Todd Loomis[10]

Previous On-Ramps Work

- To achieve climate-ready fisheries we need to know what work is required
  - The scale and scope of this can be overwhelming which is why on-ramps are being used
- This is an achievable action, within 1-2 years, if made a Council Priority

POLICY AND PRACTICE REVIEWS article

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Sec. Marine Fisheries, Aquaculture and Living Resources

Volume 12 - 2025 | https://doi.org/10.3389/fmars.2025.1558251

Harnessing the value of near-term actions for achieving climate-ready fishery management

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Marine Policy

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Linking knowledge and action for climate-ready fisheries: Emerging best practices across the US

Julia G. Mason [a 1], Sarah J. Weisberg [a b 1], Janelle L. Morano [c], Richard J. Bell [d], Mark Fitchett [e], Roger B. Griffis [f], Elliott L. Hazen [g], William D. Heyman [h], Kirstin Holsman [i], Kristin M. Kleisner [a], Katie Westfall [a 2], Michele K. Conrad [j], Margaret Daly [a k], Abigail S. Golden [l], Chris J. Harvey [m], Lisa A. Kerr [n o], Gway Kirchner [d], Arielle Levine [p], Rebecca L. Lewison [q], Sean M. Lucey [r], Wendy Morrison [s], Brandon Muffley [t], Jameal F. Samhouri [m], Matthew Seeley [a e], S. Kalei Shotwell [i], Diana L. Stram [u]

Focus Groups

Held a series of focus groups to solicit feedback on process maps and discuss potential on-ramps to bring climate and ecosystem information and local knowledge into management.

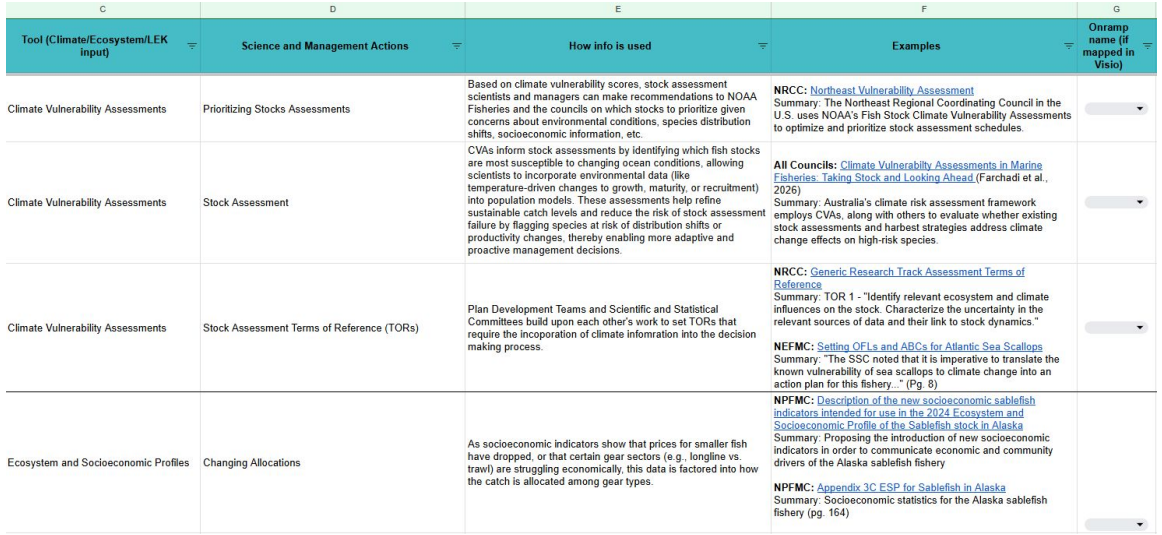
Focus groups included:

- Council-engaged scientists
- Council staff
- Fishermen
- Managers (those with experience as council members or in management-related roles at NOAA Fisheries)

How will you use the maps or tables?

Table to Process Map

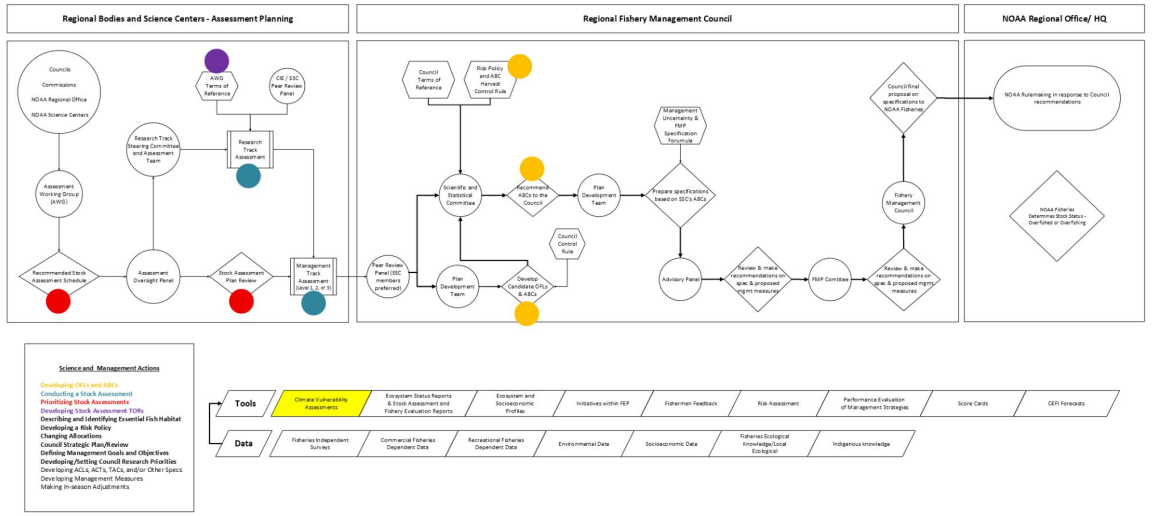
- Table is useful for exploring list options and associated details
- Table is not useful for identifying on-ramp locations and process steps
  - Output: pull table rows into Visio and pin table details to associated shapes



C	D	E	F	G
Tool (Climate/Ecosystem/LEK input)	Science and Management Actions	How info is used	Examples	Onramp name (if mapped in Visio)
Climate Vulnerability Assessments	Prioritizing Stocks Assessments	Based on climate vulnerability scores, stock assessment scientists and managers can make recommendations to NOAA Fisheries and the councils on which stocks to prioritize given concerns about environmental conditions, species distribution shifts, socioeconomic information, etc.	**NRCC:** Northeast Vulnerability Assessment Summary: The Northeast Regional Coordinating Council in the U.S. uses NOAA's Fish Stock Climate Vulnerability Assessments to optimize and prioritize stock assessment schedules.	
Climate Vulnerability Assessments	Stock Assessment	CVAs inform stock assessments by identifying which fish stocks are most susceptible to changing ocean conditions, allowing scientists to incorporate environmental data (like temperature-driven changes to growth, maturity, or recruitment) into population models. These assessments help refine sustainable catch levels and reduce the risk of stock assessment failure by flagging species at risk of distribution shifts or productivity changes, thereby enabling more adaptive and proactive management decisions.	**All Councils:** Climate Vulnerability Assessments in Marine Fisheries: Taking Stock and Looking Ahead (Farchadi et al., 2026) Summary: Australia's climate risk assessment framework employs CVAs, along with others to evaluate whether existing stock assessments and harbest strategies address climate change effects on high-risk species.	
Climate Vulnerability Assessments	Stock Assessment Terms of Reference (TORs)	Plan Development Teams and Scientific and Statistical Committees build upon each other's work to set TORs that require the incoporation of climate infomration into the decision making process.	**NRCC:** Generic Research Track Assessment Terms of Reference Summary: TOR 1 - "Identify relevant ecosystem and climate influences on the stock. Characterize the uncertainty in the relevant sources of data and their link to stock dynamics." **NEFMC:** Setting OFLs and ABCs for Atlantic Sea Scallops Summary: "The SSC noted that it is imperative to translate the known vulnerability of sea scallops to climate change into an action plan for this fishery..." (Pg. 8)	
Ecosystem and Socioeconomic Profiles	Changing Allocations	As socioeconomic indicators show that prices for smaller fish have dropped, or that certain gear sectors (e.g., longline vs. trawl) are struggling economically, this data is factored into how the catch is allocated among gear types.	**NPFMC:** Description of the new socioeconomic sablefish indicators intended for use in the 2024 Ecosystem and Socioeconomic Profile of the Sablefish stock in Alaska Summary: Proposing the introduction of new socioeconomic indicators in order to communicate economic and community drivers of the Alaska sablefish fishery **NPFMC:** Appendix 3C ESP for Sablefish in Alaska Summary: Socioeconomic statistics for the Alaska sablefish fishery (pg. 164)	

Process Map to Table

- Map is useful for exploring all process points to incorporate one tool at a time, lacks details on how to apply the tool
  - Output: create summary table reports of on-ramps created from the application of many tools



Tools

- **Climate Vulnerability Assessments**
- Ecosystem Status Reports (SOE reports) & SAFE Reports
- **Ecosystem and Socioeconomic Profiles**
- FEPs & Initiatives within FEPs
- **Fishermen Feedback Tools (e.g., Fishery Performance Reports)**
- Risk Assessment Tools (e.g., Risk Tables)
- Performance Evaluation Tools (e.g., MSE, scenario planning)
- Score cards
- CEFI forecasts
- *LKTK**

Science and Management Actions

	Actions	Process Map
Harvest Specifications	Developing OFLs and ABCs	Specs
	Developing ACLs, ACTs, and/or TACs	Specs
	Developing management measures	Specs
	Making in-season adjustments	Specs
Other FMP Management Actions	Defining management goals & objectives	Amendment
	Describing and identifying EFH	Amendment
	Changing allocations	Amendment
	Developing a risk policy	Amendment
Stock Assessment Process	Conducting a stock assessment	Specs/Amendment
	Prioritizing stock assessments	Specs/Amendment
	Developing stock assessment terms of reference	Specs/Amendment
Strategic Decision Making	Council strategic plan/review	N/A
	Developing/setting council research priorities	N/A

Database

C	D	E	F	G
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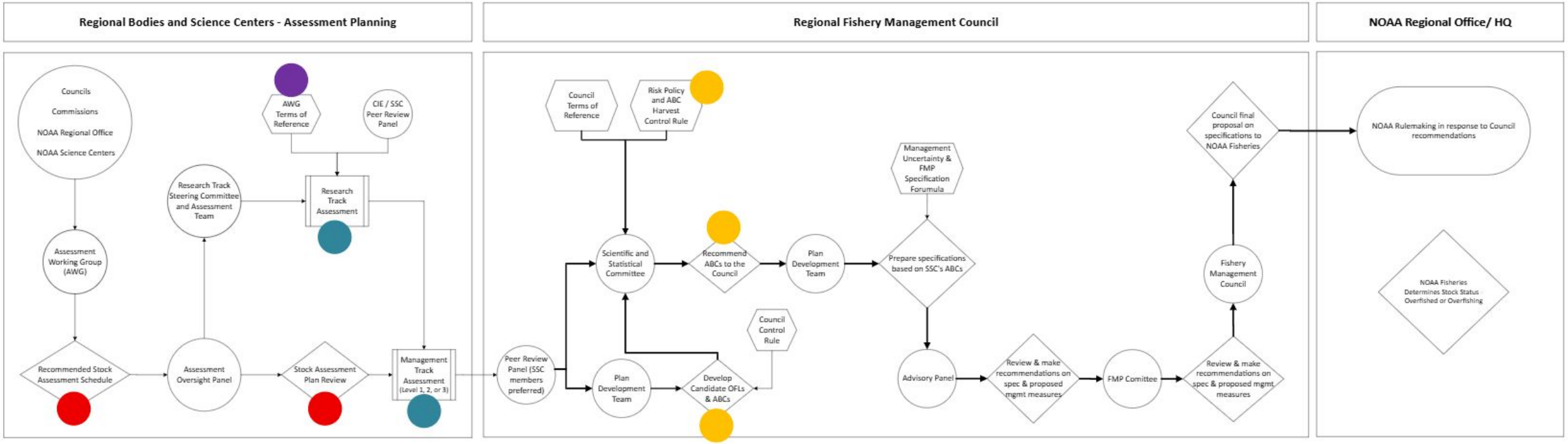
Tool to Action; CVA On-ramps



Science and Management Actions

Developing OFLs and ABCs
Conducting a Stock Assessment
Prioritizing Stock Assessments
Developing Stock Assessment TORs
Describing and Identifying Essential Fish Habitat
Developing a Risk Policy
Changing Allocations
Council Strategic Plan/Review
Defining Management Goals and Objectives
Developing/Setting Council Research Priorities
Developing ACLs, ACTs, TACs, and/or Other Specs
Developing Management Measures
Making In-season Adjustments

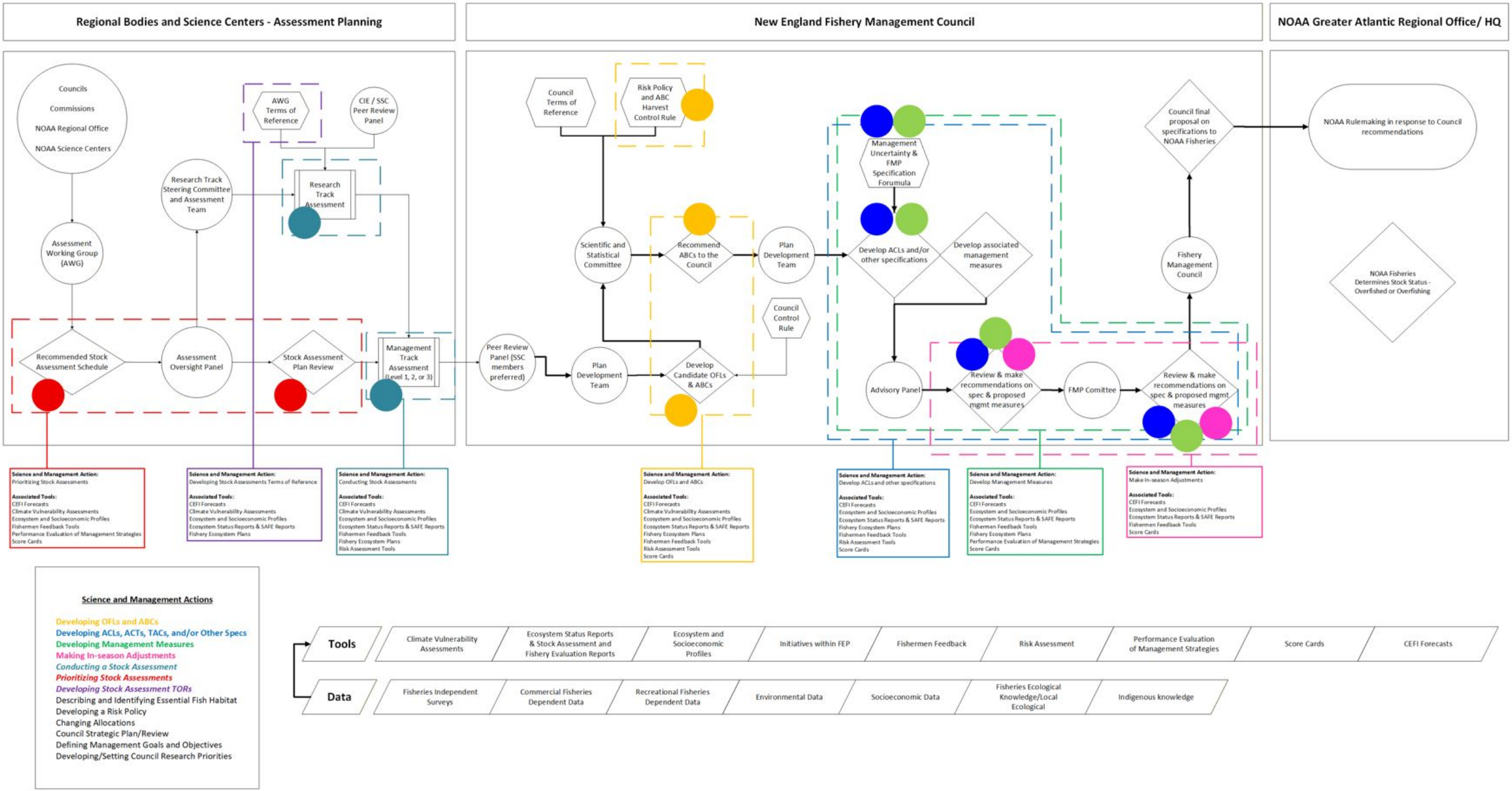
Tools

- Climate Vulnerability Assessments
- Ecosystem Status Reports & Stock Assessment and Fishery Evaluation Reports
- Ecosystem and Socioeconomic Profiles
- Initiatives within FEP
- Fishermen Feedback
- Risk Assessment
- Performance Evaluation of Management Strategies
- Score Cards
- CEFI Forecasts

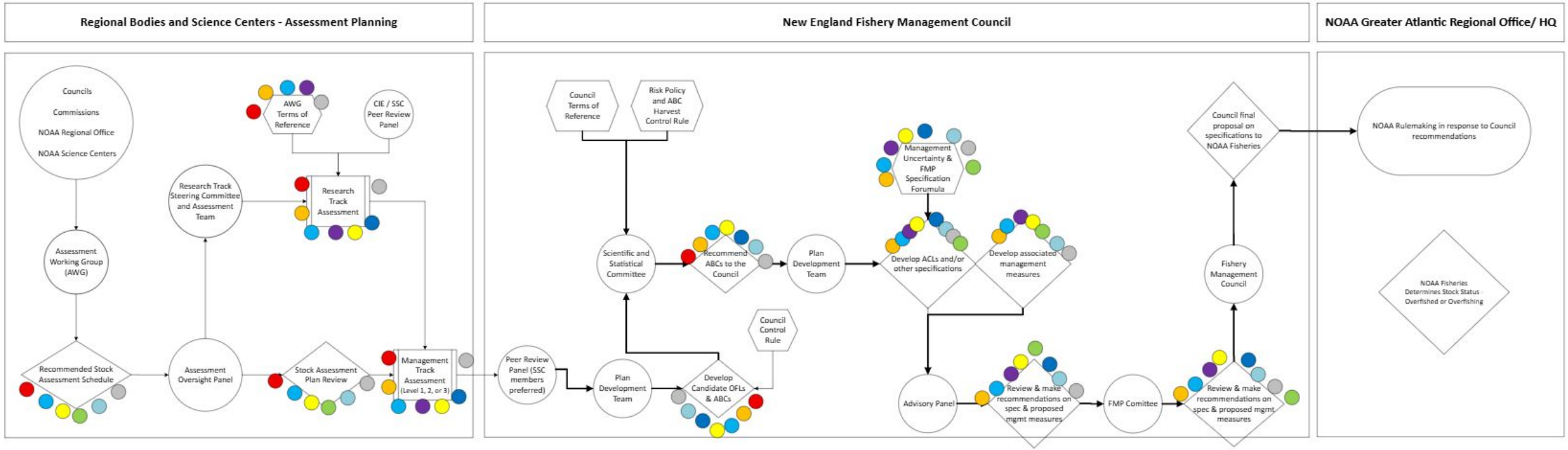
Data

- Fisheries Independent Surveys
- Commercial Fisheries Dependent Data
- Recreational Fisheries Dependent Data
- Environmental Data
- Socioeconomic Data
- Fisheries Ecological Knowledge/Local Ecological
- Indigenous knowledge

Action to Tool V1; Science and Management Actions Include Many Decision Points



Action to Tool V2; Many tools apply at each decision point



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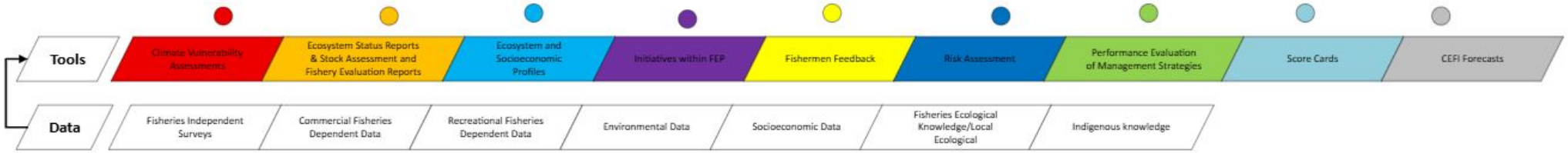
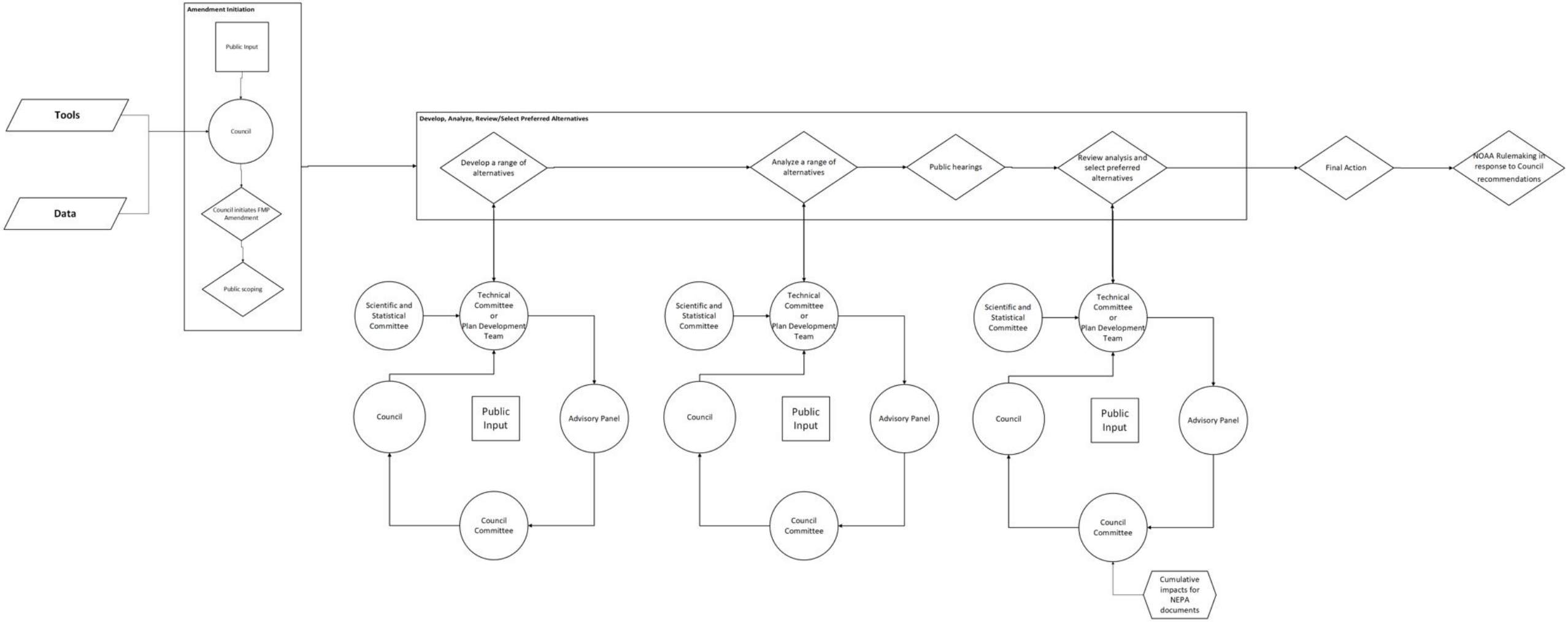


One approach for amendments and frameworks



Our work with other councils

- Sharing generalized process maps with interested councils
  - Pacific
    - In conversation to develop Pacific-focused process maps
  - South Atlantic/Gulf SSC members
    - Highlighted the need to continue to identify new on-ramps for climate and ecosystem information
    - Anticipated presentation in Fall 2026
  - Gulf
    - Engaging with council staff to inform the Fishery Ecosystem Plans and Fishery Ecosystem Issues
  - Mid-Atlantic
    - Engaging with council staff to inform public processes/engagement and to highlight lessons learned across council regions

Environmental Defense Fund

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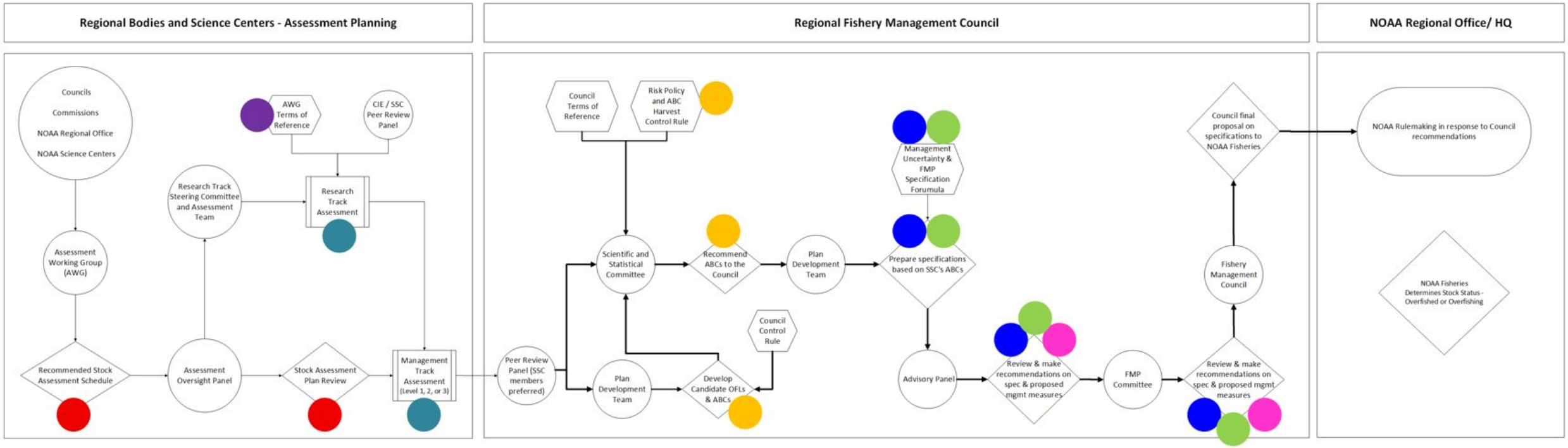
Thank You!

Questions?



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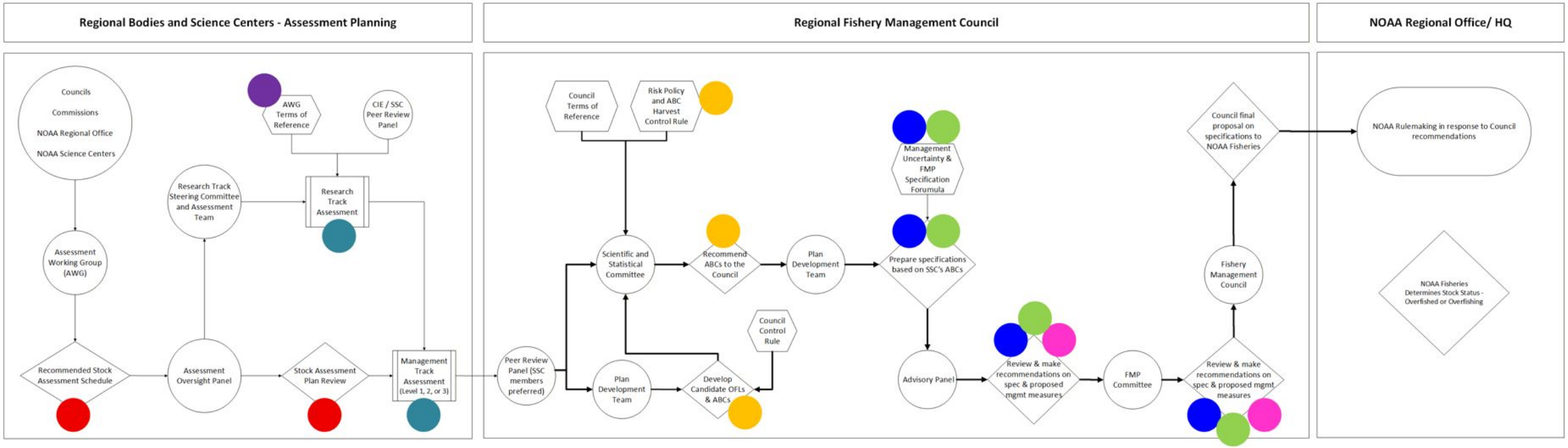

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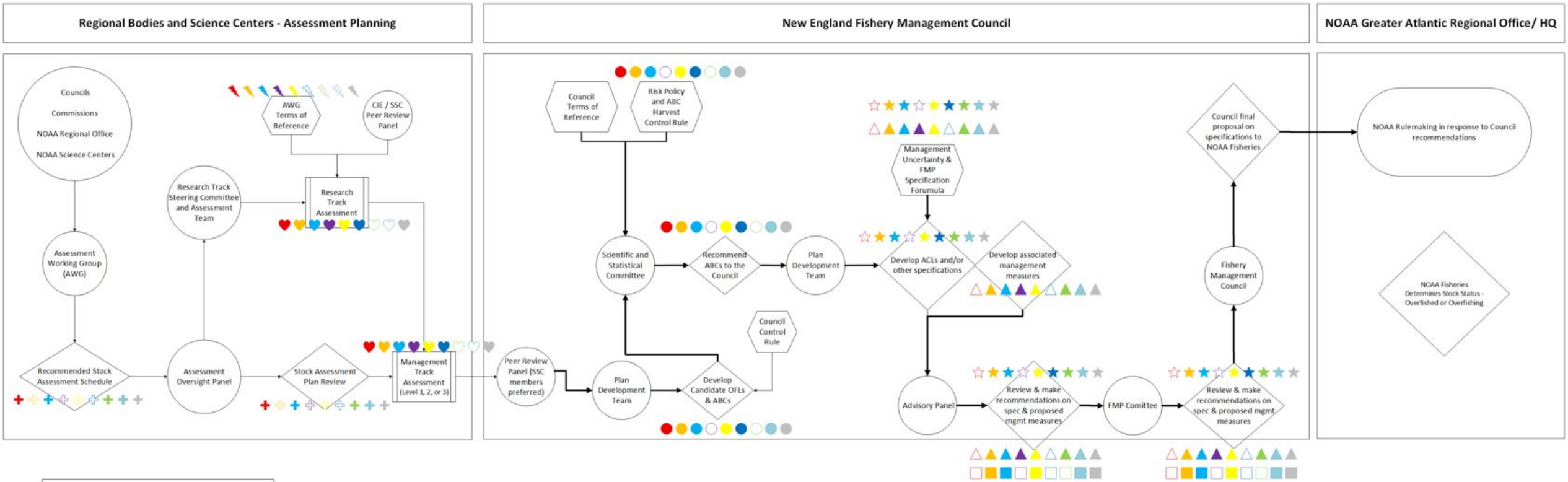

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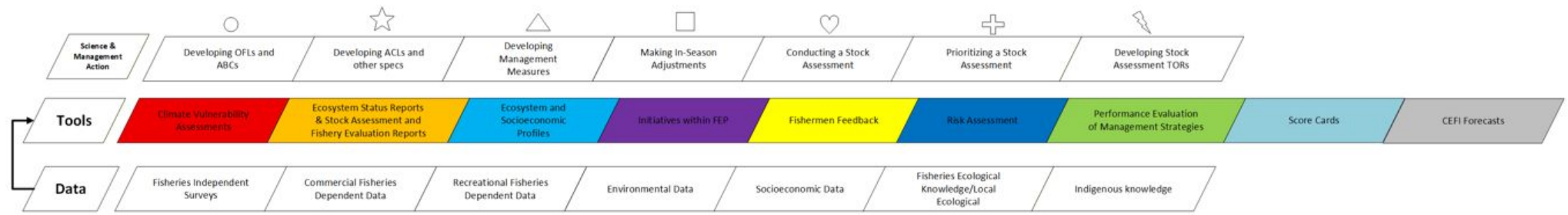

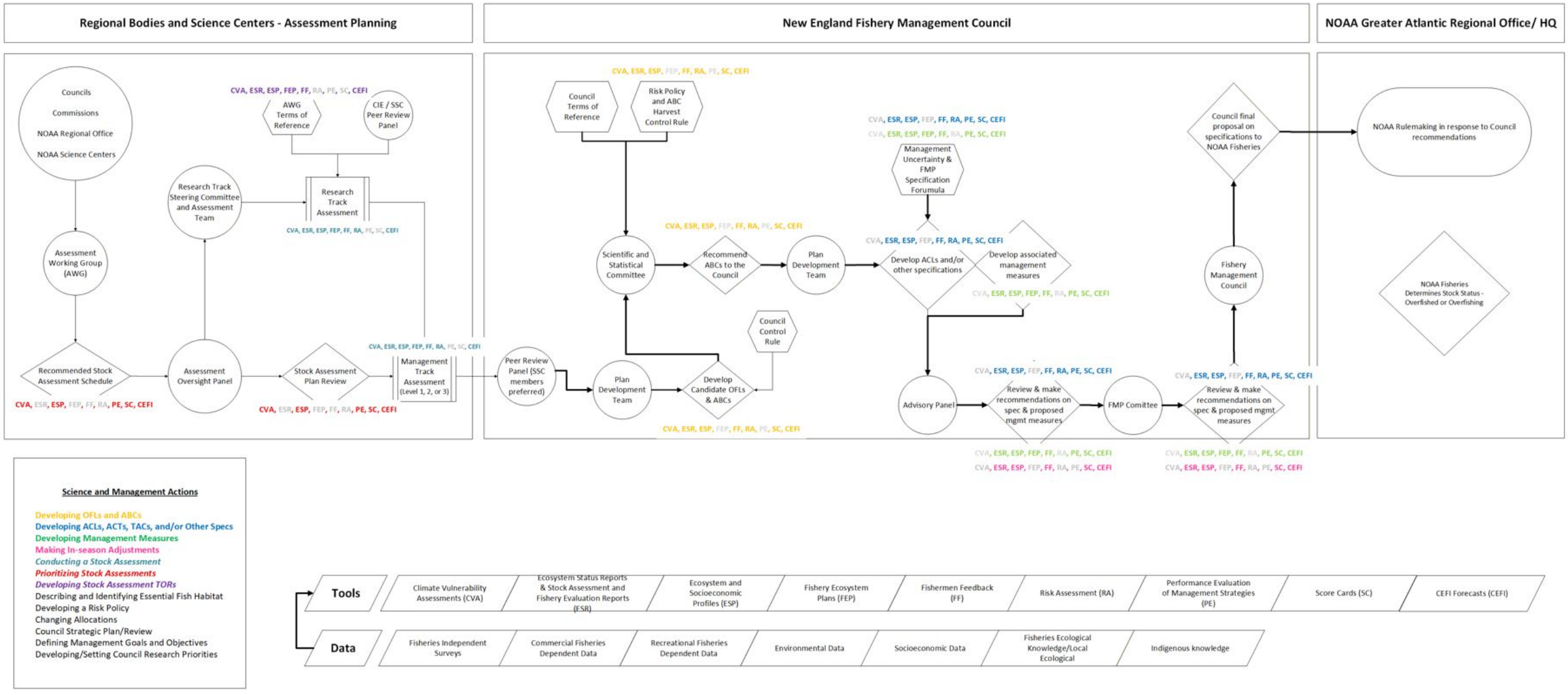

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Tools

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- Ecosystem Status Reports & Stock Assessment and Fishery Evaluation Reports (ESR)
- Ecosystem and Socioeconomic Profiles (ESP)
- Fishery Ecosystem Plans (FEP)
- Fishermen Feedback (FF)
- Risk Assessment (RA)
- Performance Evaluation of Management Strategies (PE)
- Score Cards (SC)
- CEFI Forecasts (CEFI)

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