

Developing Management-Ready Fishery Ecosystem Plans for the Gulf Council through Public Engagement & Synthesis

Gulf Council Presentation

August 24, 2026



Project Team



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Large Language Models
Participatory Modeling

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Gulf Fishery Ecosystem Plan

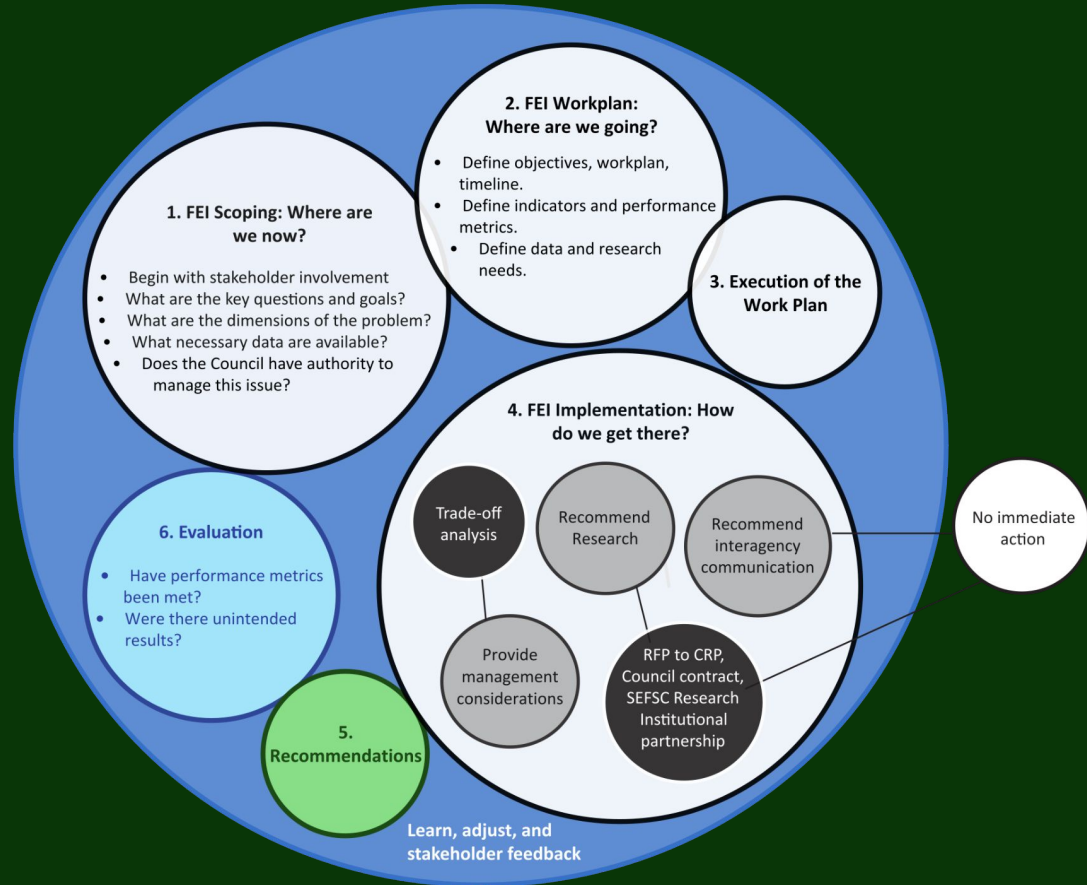
Mission Statement: “To identify and address key fisheries ecosystem issues and inform the Gulf Council’s decision-making for long-term ecological, social, and economic sustainability of Gulf fishery resources.”

Fishery Ecosystem Issues (FEIs) – concerns that arise from on-the-water observations that impact fishery resources in the Gulf region and extend beyond single species management.

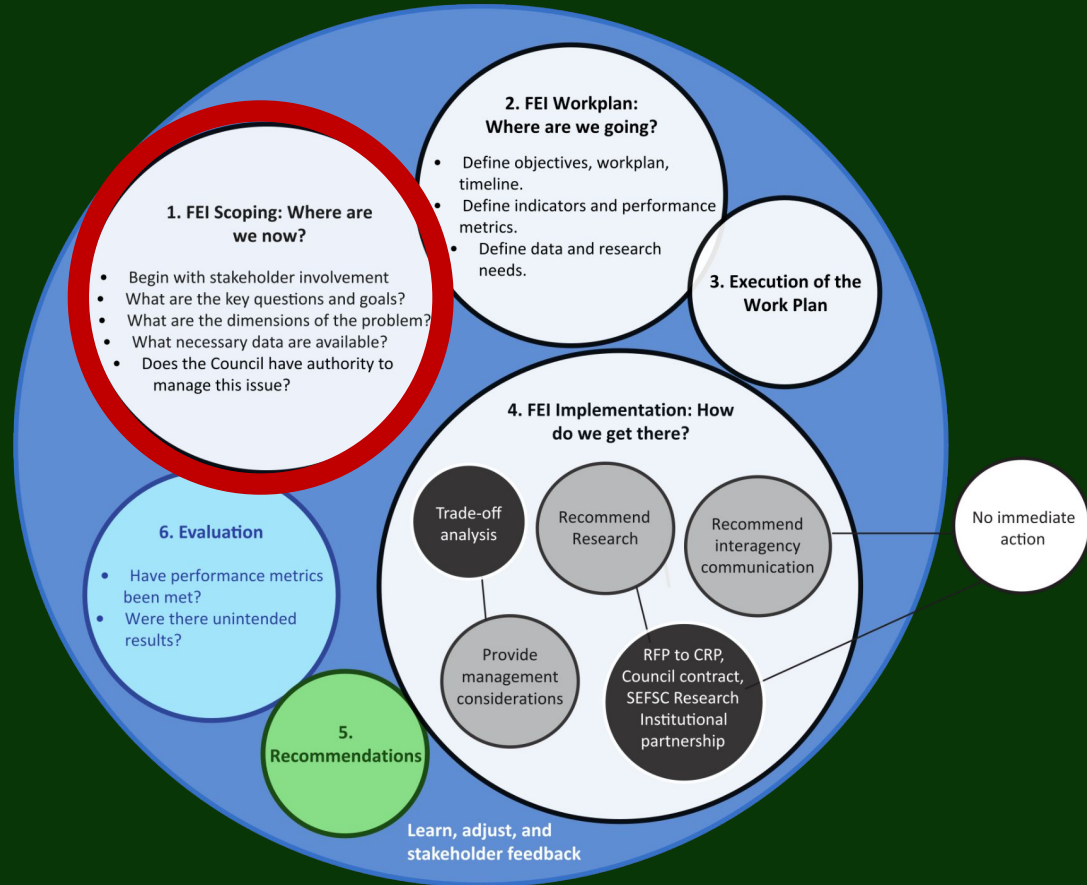
Project Goal

To support the Gulf Fishery Ecosystem Plan by using social-science driven approaches to identify the universe of fishery ecosystem issues of concern to Gulf stakeholders for the Council to consider.

Gulf Council FEI Loop



Gulf Council FEI Loop



Project Outline

Phase 1

Phase 2

A

B

Participatory Modeling Workshops

- Spring 2026
- Lead: Furman

Large Language Model Analysis

- Spring-Fall 2026
- Lead: Brugnone

Impact Assessment and FEI Prioritization

- Fall 2026-Spring 2027
- Lead: Kasperski

Phase 1

- Communicate goals and expectations of the Fishery Ecosystem Plan
- Identify and prioritize fishery ecosystem issues for further social and economic impact assessments
- Produce social-ecological models representing real-world dynamics to predict fisheries, ecosystem, & management outcomes

Participatory Modeling Workshops

- Gulfport, Mississippi
- Houma, Louisiana
- Gulf Shores, Alabama
- Fort Myers, Florida
- Galveston, Texas

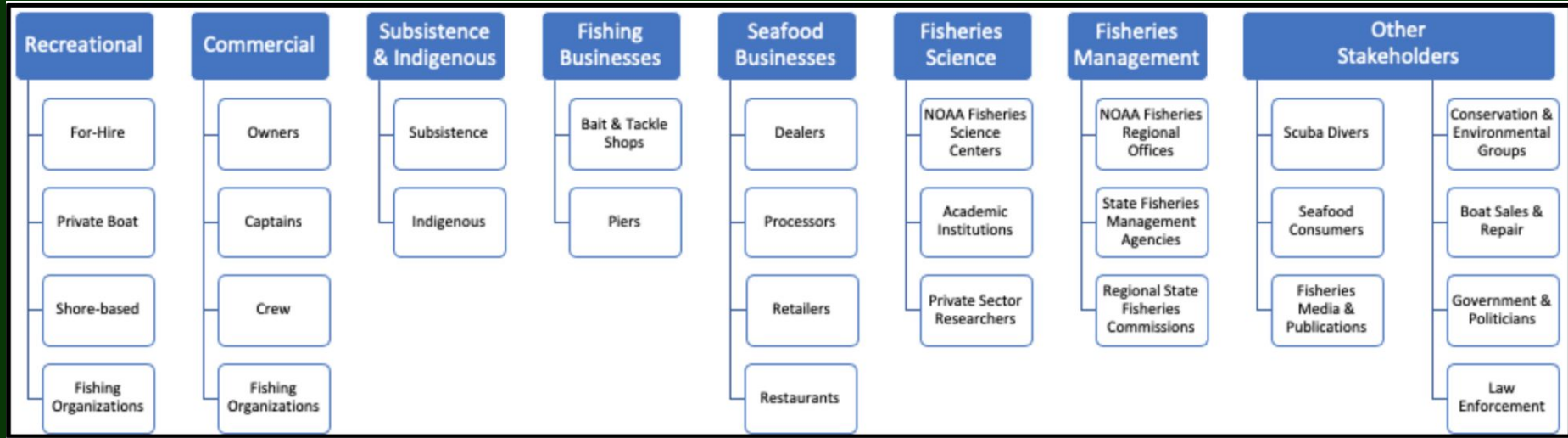
Workshop Goals

1. Map the system of key factors that affect Gulf fisheries
2. Identify concerns relative to the fishery ecosystem
3. Understand how issues impact fisheries, businesses, and communities

Ultimate Goal:

To support a stakeholder-driven Gulf Fishery Ecosystem Plan.

Stakeholder Mapping



Tiered list of major stakeholders that could be considered for Gulf of America fisheries ecosystem planning, taken from Scyphers et al. 2021.

Workshop Samples

State	# Participants	# Models	Focus Group Models			
			Recreational	Charter/For-Hire	Commercial	NGO
Alabama	7	2	-	X	X	-
Florida	22	3	X	-	X	X
Louisiana	12	3	X	-	X	X
Mississippi	7	1	-	X	-	-
Texas	5	2	-	X	X	-
TOTALS	53	11	2	3	4	2

Table 1. Workshop participant sample and model count by state.

SAMPLE AGENDA

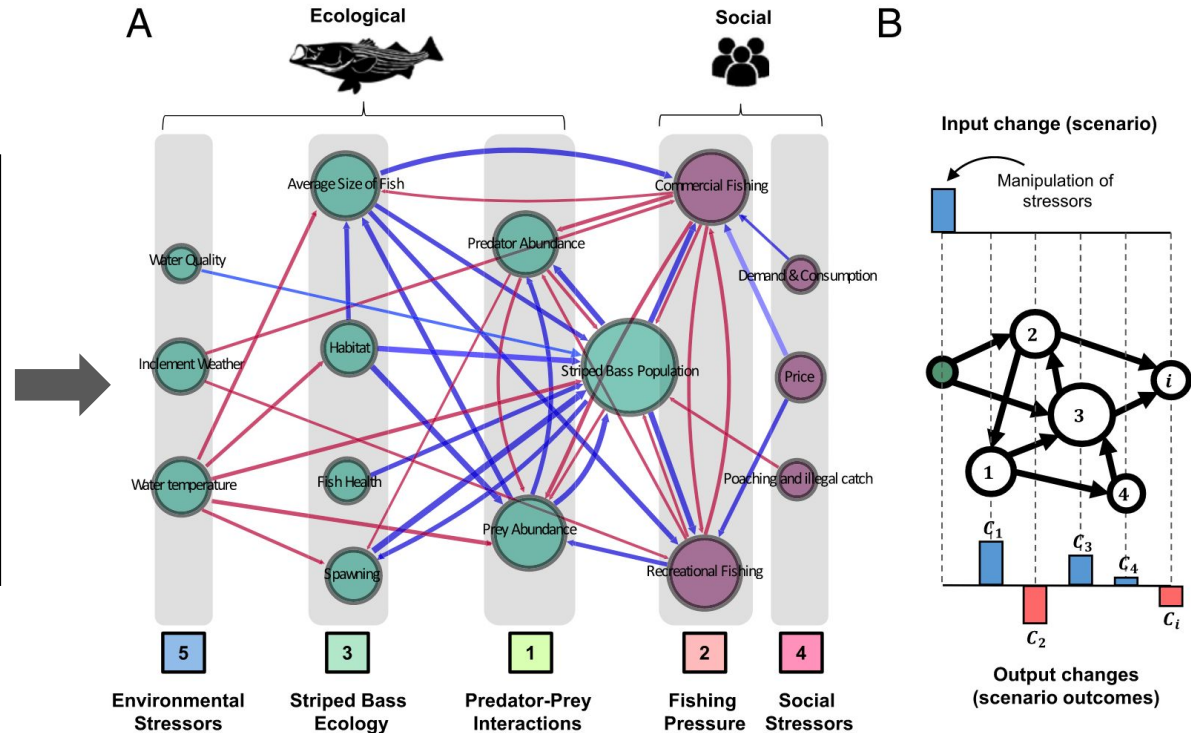
9:00 AM	Arrival, Participant Sign-In, Coffee
9:15 AM	Welcome, Agenda Overview, Introductions
9:45 AM	Project Background - Dr. Wang
10:15 AM	Fishery Ecosystem Issue (FEI) Identification
11:15 AM	Lunch
12:00 PM	Mental Model Introduction
12:15 PM	FEI Collaborative Modeling Focus Groups
1:15 PM	Break
1:30 PM	Focus Group Report-Outs
2:00 PM	Concluding Thoughts & Final Questions

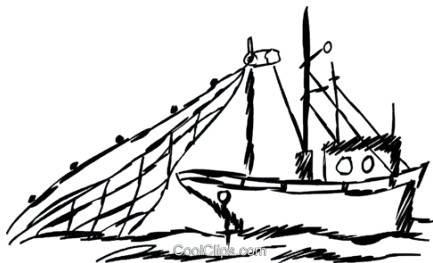
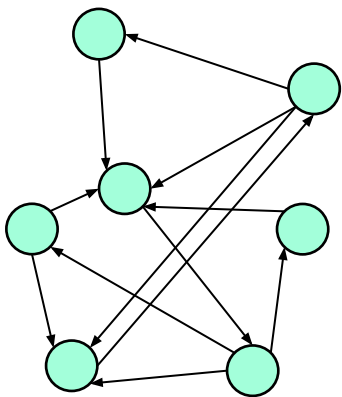
Group Discussion - Fishery Ecosystem Issues

1. What are the key ecosystem issues affecting federally-managed Gulf fisheries?
2. What are the environmental impacts of these issues?
3. How are these ecosystem issues impacting different fisheries, businesses, and communities?
4. Which issues are you most concerned about?

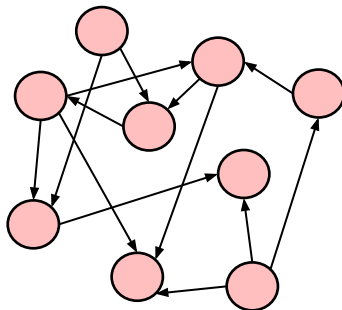
Conceptual Modeling Focus Groups

How do stakeholders and managers see the system working?

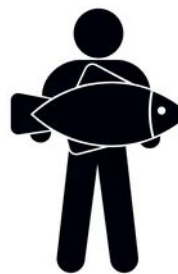
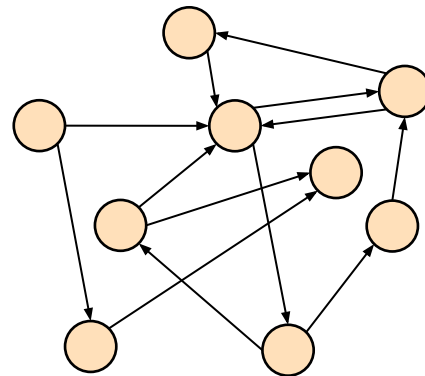




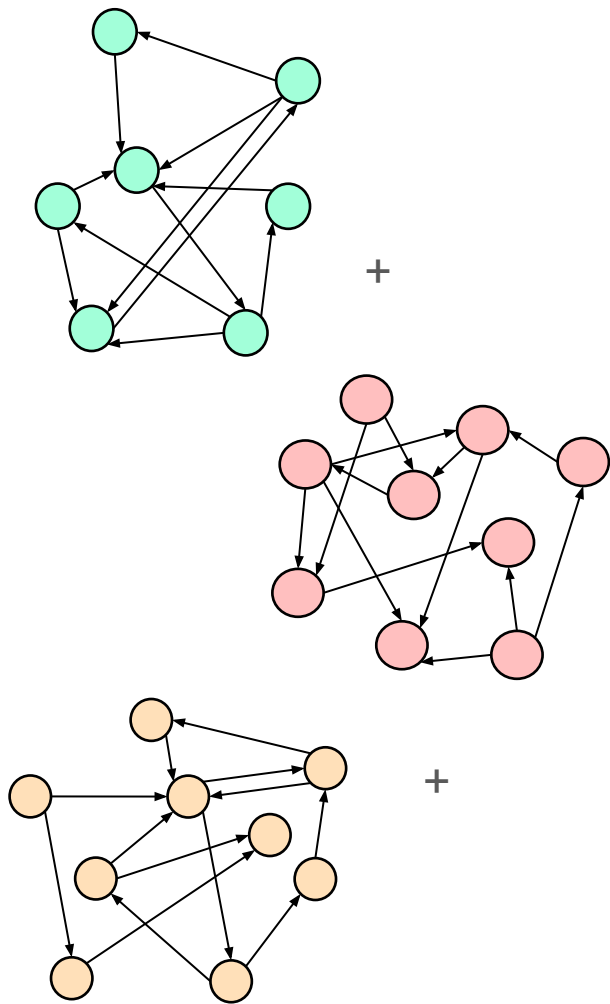
**Commercial
Fishermen**



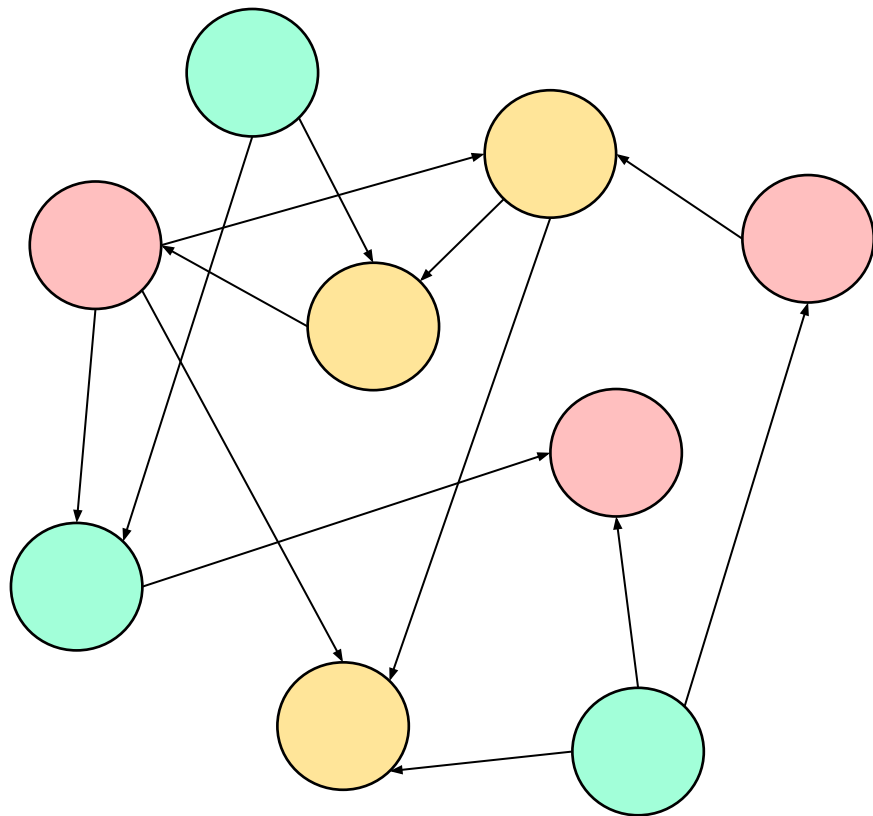
**Recreational
Fishermen**



**Charter/For-Hire
Fishermen**



Crowd Model





Conceptual Modeling Focus Groups

1. What are the environmental impacts of the fishery ecosystem issue?
2. What are the social and economic impacts of the issue?
3. What is causing the ecosystem issue?
4. What management approaches are needed to help mitigate this issue?

Fuzzy-Cognitive Mapping Focus Group Script

Step 1: Re-introduce participants to Concept 1 (e.g., FEI focus, such as red tide) to start model building.

Step 2: In a conversational manner, ask participants to develop a list of factors (independent variables) that might be associated with Concept 1 (the FEI at hand). You may repeatedly prompt with “are there any other things that you think influence Concept 1” and “are there any other things that are influenced by Concept 1.”

Step 3: Next, for each new concept, ask about the direction of the relationship, whether the effect is positive or negative, and, if possible, rate the strength on a scale of weak (0.33), moderate (0.67), or strong (1.0). Alternatively, you may simply score positive influences as 1.0 and negative influences as -1.0.

Step 4: Finally, ask a series of questions to cross-reference all of the shown concepts, remembering to include any new ones the participants might feel are important. Repeat Step 3, asking about the direction of the relationship, whether the effect is positive or negative, and rate the strength.

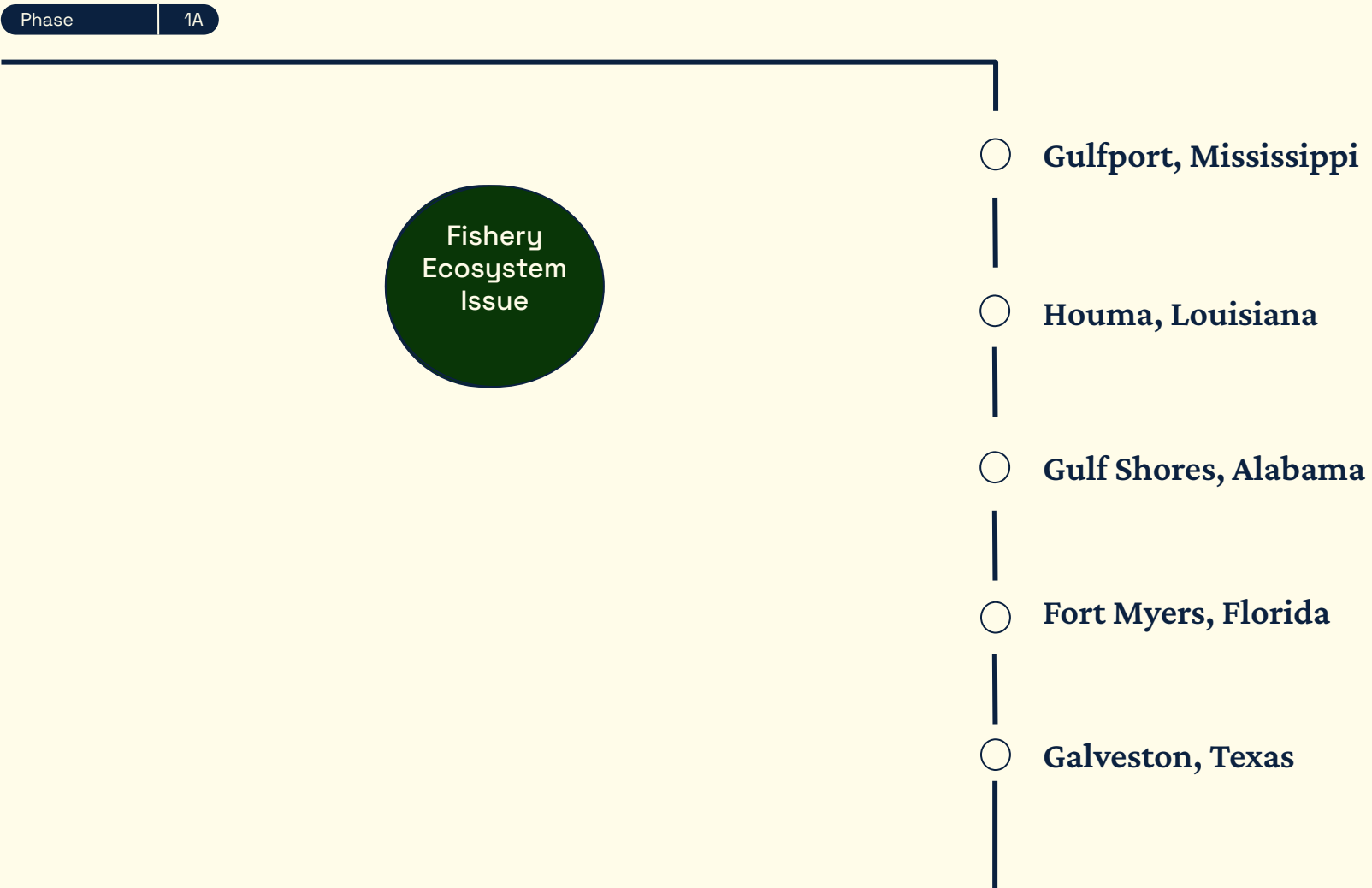
○ Gulfport, Mississippi

○ Houma, Louisiana

○ Gulf Shores, Alabama

○ Fort Myers, Florida

○ Galveston, Texas



Fishery
Ecosystem
Issue

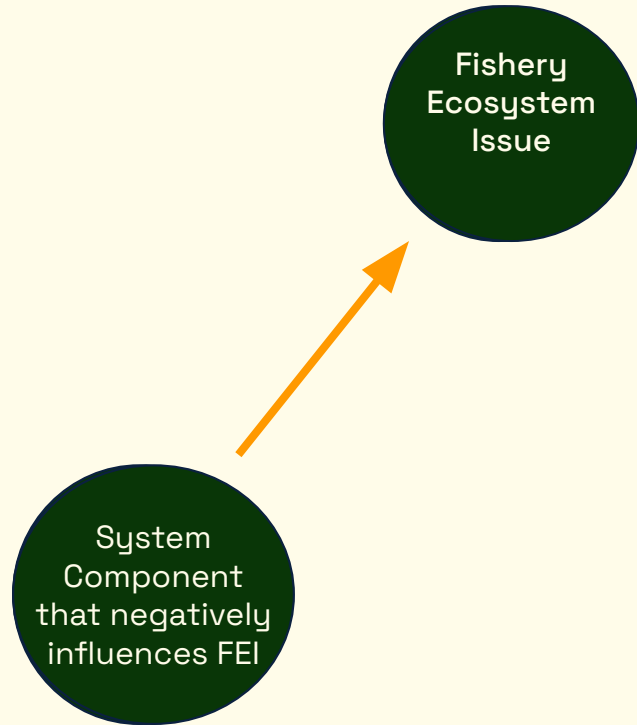
○ Gulfport, Mississippi

○ Houma, Louisiana

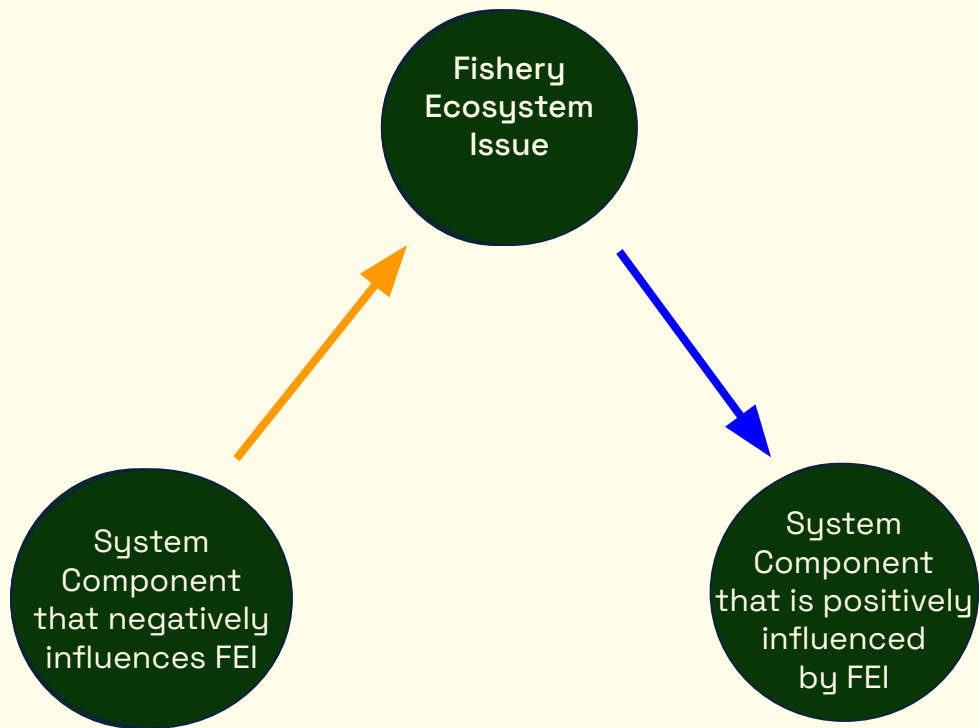
○ Gulf Shores, Alabama

○ Fort Myers, Florida

○ Galveston, Texas



- ☐ Gulfport, Mississippi
- ☐ Houma, Louisiana
- ☐ Gulf Shores, Alabama
- ☐ Fort Myers, Florida
- ☐ Galveston, Texas



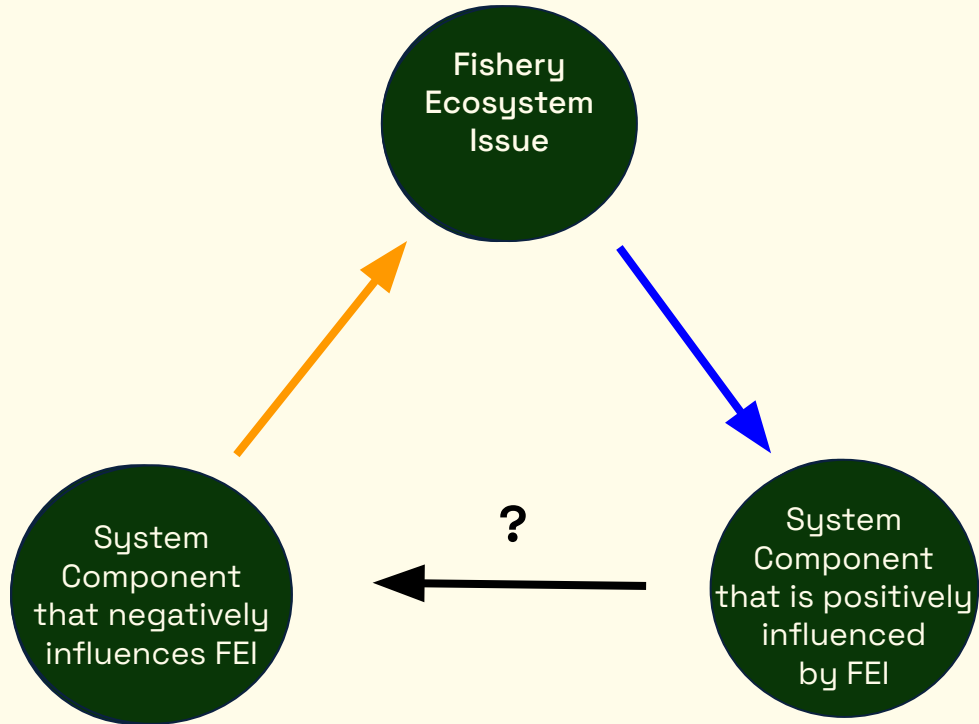
○ Gulfport, Mississippi

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☐ Gulfport, Mississippi

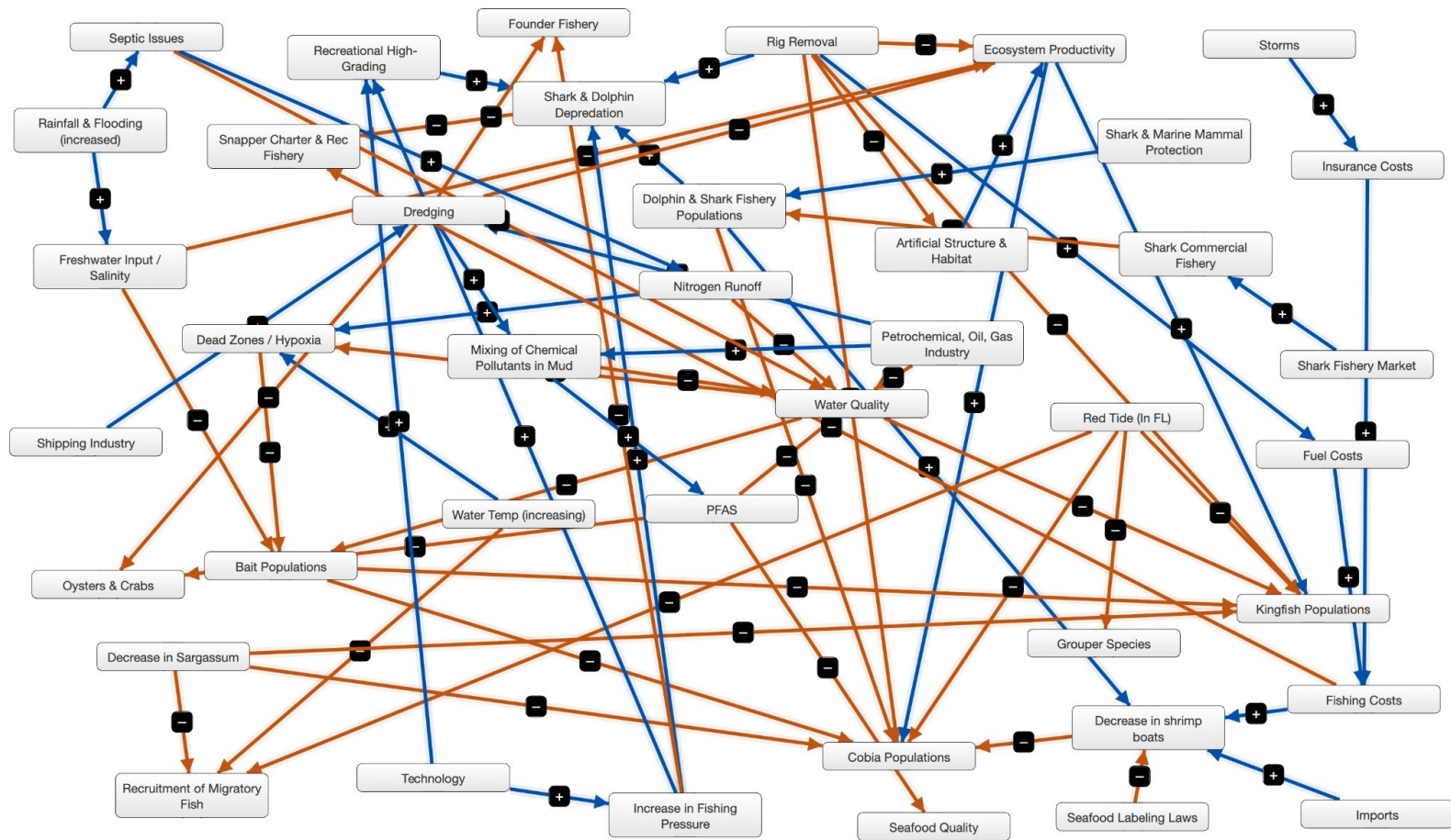
☐ Houma, Louisiana

☐ Gulf Shores, Alabama

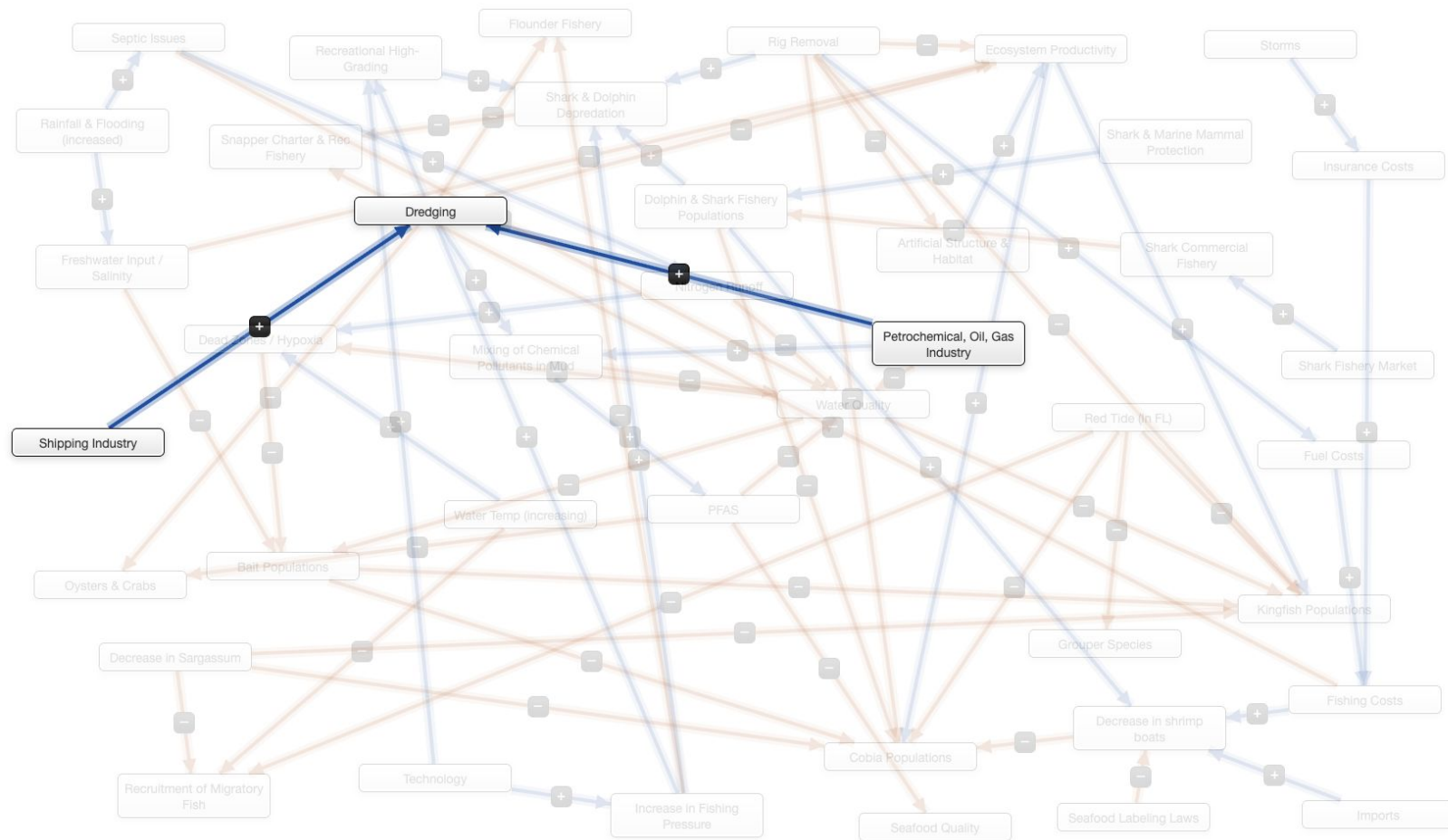
☐ Fort Myers, Florida

☐ Galveston, Texas

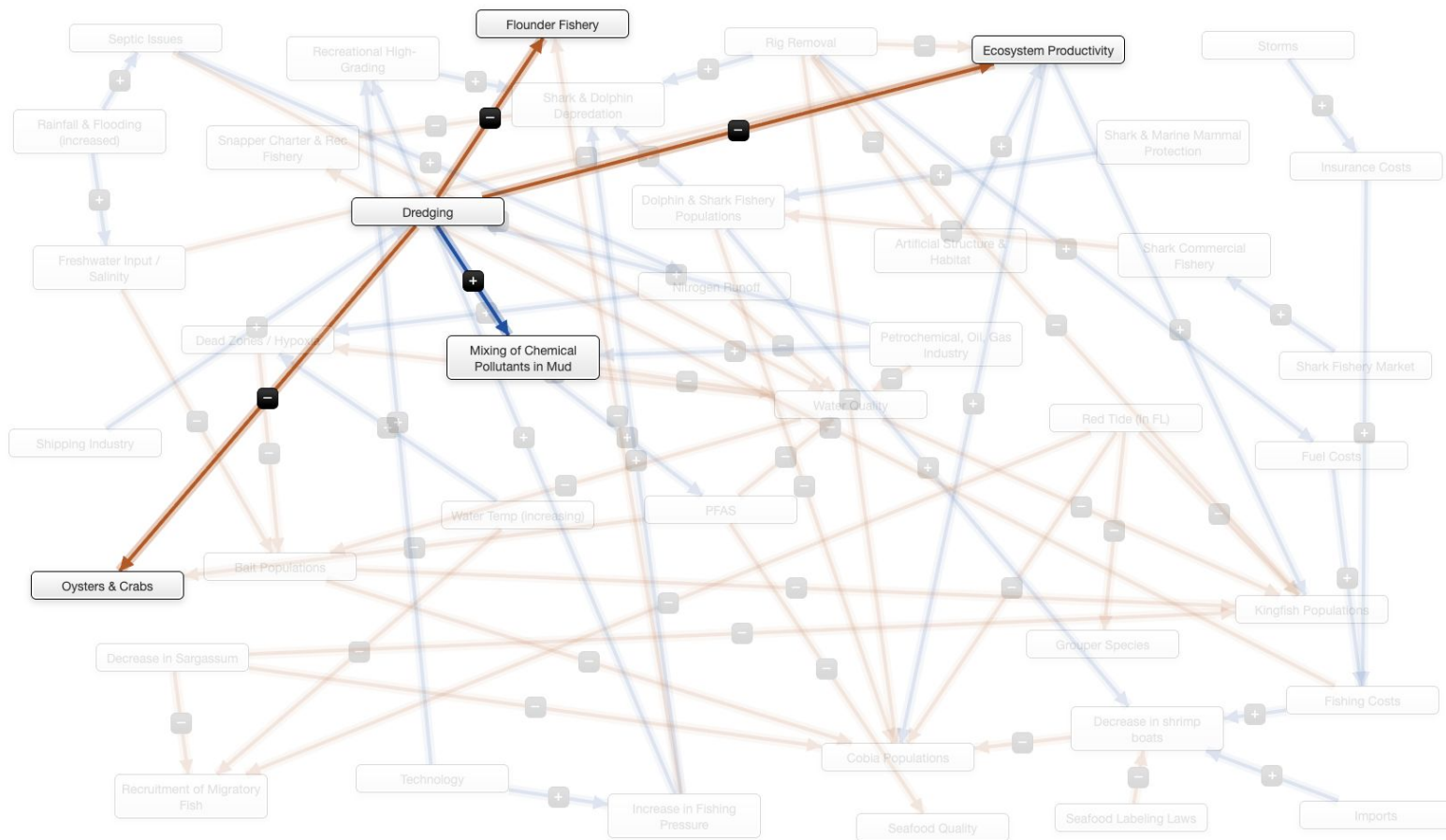
Example Focus Group Model - Texas Charter/For-Hire Captains



Example Focus Group Model - Texas Charter/For-Hire Captains



Example Focus Group Model - Texas Charter/For-Hire Captains



Identifying Fishery Ecosystem Issues

- To identify priority fishery ecosystem issues, a complete list of all model concepts was compiled ($n = 441$)
- Concepts were then cleaned to remove redundancy or minor differences (ex., singular vs. plural concepts)
- Cleaned concepts were then binned using a developed qualitative thematic coding framework
 - Preliminary results produced 27 bins
- From those bins, 12 fishery ecosystem issues were identified

Fishery Ecosystem Issue Topics

1. Climate & Oceanographic Trends
2. Coastal Development & Industrial Activity
3. Depredation Impacts
4. Discards & Release Mortality
5. Extreme Weather & Storms
6. Fisheries Economics & Operating Costs
7. Freshwater & Estuarine Flows
8. Inshore & Nursery Habitat
9. Offshore & Artificial Habitat
10. Poor Water Quality, Pollution & Spills
11. Runoff, Nutrients & Hypoxia
12. Seafood Markets & Global Trade



Climate & Oceanographic Trends

Warming waters and climate unpredictability have led to alteration of species distribution and habitat.

Described Drivers & Impacts

- Warming water temperature
- Tropicalization of local ecosystems
- Salinity shifts
- Current flow changes
- Changes in fish movement

Community Needs

Holistic management of upstream and downstream systems

”

”King mackerel have basically collapsed here since Katrina. Nobody knows exactly why but they’re just not there.”

-Mississippi charter captain

Coastal Development & Industrial Activity

Coastal development and industrial activity were linked to habitat loss, water quality degradation, and loss of working waterfront access and habitat.

Described Drivers & Impacts

- Dredging-induced sedimentation and siltation
- Saltwater intrusion, turbidity, ship wakes from port development
- Land-based pollution
- Chronic oil and gas damage
- Displacement of working waterfronts

Community Needs

Maintenance of fishing culture in coastal communities

”

“The working waterfront is disappearing. Younger people can’t afford to enter commercial fishing and docks are being sold for condos.”

- Florida commercial fisherman

Depredation Impacts

Depredation from predators, specifically dolphins, sharks, and goliath groupers.

Described Drivers & Impacts

- Increased discarding due to regulations
- Management and protection of predators

Community Needs

- Research to quantify depredation by fishery & gear type
- Development of non-lethal mitigation strategies to disrupt the predator-learning cycle
- Commercial shark harvest

”

“Depredation is getting worse every year. Sharks have figured out that where there’s a boat there’s food. They’re being trained by the system.”

-Alabama charter captain

Discards & Release Mortality

Discards and release mortality were identified as essential but often poorly estimated components of total mortality.

Described Drivers & Impacts

- Limited data on release mortality rates
- Regulatory discards
- High-grading
- Depredation
- Bycatch from less selective gear

Community Needs

- Better estimation of discards and release mortality
- Use of descending devices
- Increased education
- Tagging systems
- Limited-retention systems

”

“We catch a fish, it’s injured, it gets eaten by a shark before it can swim away, and we can’t even keep it. That’s the system we’re managing under.”

- Alabama charter captain

Extreme Weather & Storms

Storms, particularly hurricanes, are repeatedly linked to significant habitat decline & environmental changes, setting back recovery & restoration efforts, alongside direct economic consequences & infrastructure challenges.

Described Drivers & Impacts

- Reef burial
- Sand redistribution
- Seagrass and oyster reef damage
- Freshwater pulses
- Increased turbidity
- Shifting fish distributions
- Stormwater runoff
- Loss of coastal infrastructure
- Reduced business stability

Community Needs

- Disaster recovery programs
- Infrastructure replacement

”

“Any time there’s a hurricane, recovery is too slow, people move to other industries because it’s too expensive to come back”

- Florida commercial fisherman

Fisheries Economics & Operating Costs

Rising operating costs and economic strain impact various stakeholders from individual fishermen to entire coastal communities.

Described Drivers & Impacts

- Costs of fuel, insurance, equipment repair
- Concentration of quotas and permits
- Lack of dock and working waterfront infrastructure
- Aging fleets

Community Needs

- Affordable access to quota/license
- Coastal infrastructure
- Stable fishing opportunity from predictable regulations and stable level of catch

”

”The quota costs \$5 a pound to lease and we get \$1.90 back. That’s not a fishery. That’s a system designed to squeeze working fishermen out.”

-Texas commercial fisherman

Freshwater & Estuarine Flows

Salinity changes, including freshwater plumes and saltwater intrusion, are seen as a critical determinant of ecosystem health and fishery productivity.

Described Drivers & Impacts

- Saltwater intrusion from reduced freshwater flow from the Mississippi River
- Altered runoff patterns from land conversion and diversions
- Increasing water demand
- New residential development

Community Needs

- Improved water quality monitoring
- Restoration with attention to short-term fishery impacts
- Assessment of fishery impacts from diversion projects

”

“Louisiana decides when to open the spillway and we get all the freshwater. No say in it, just the consequences.”

-Mississippi charter captain

Inshore & Nursery Habitat

Degradation of inshore and nursery habitats are consistently identified as a universal concern impacting the ecological foundation of Gulf fisheries.

Described Drivers & Impacts

- Turbidity & sedimentation
- Coastal erosion
- Storms
- Poor water quality
- Salinity changes from diversions and spillways
- Dredging & port expansion
- Potential habitat damage from Menhaden fishing operations

Community Needs

- Creation of new artificial reefs
- Restoration of natural habitat

”

“The seagrass in Charlotte Harbor is disappearing in places where it had recovered. We are watching nursery habitat turn to muck.”

-Florida NGO

Offshore & Artificial Habitat

Removal of artificial structures, such as offshore oil rigs, is widely criticized for causing significant habitat loss, impacting fish populations, and forcing fisherman to travel farther offshore, increasing costs and effort. Implementation of artificial reefs can cause conflict between commercial (ex., shrimpers) and recreational sectors.

Described Drivers & Impacts

- Regulatory pressures including federal removal mandates of rigs and permitting delays for artificial reefs
- Limited oversight
- Create navigational clearance hazards for shrimp boats when trawling

Community Needs

- Stopping removal of decommissioned rigs
- Implementing strategic reef placement to avoid reef sedimentation and burial
- Exploring "rotating reef zones"
- Streamlining reef permitting processes
- Conducting impact assessments involving all stakeholders

”

"I cried when they took those rigs away. That wasn't just structure — that was a whole ecosystem built over 50 years, gone in a blast."

-Texas charter captain

Poor Water Quality, Pollution & Spills

Poor water quality from pollution and spills were described as pervasive and interconnected threats to Gulf fisheries.

Described Drivers & Impacts

- Oil and gas operations
- Dredging activities
- Ship traffic

Community Needs

- Collaboration between state and federal entities
- Sufficient oversight
- Increased monitoring

”

“The orphan wells are still leaking. Nobody is fixing them. We fish around them and see the sheens but nothing gets done.”

- Louisiana commercial fisherman

Runoff, Nutrients & Hypoxia

Excess nutrient loading, primarily nitrogen and phosphorus, are perceived to be the fundamental drivers of water quality degradation.

Described Drivers & Impacts

- Land-based and inland pollution sources
- Stormwater
- Wastewater discharge
- Septic systems and aging infrastructure
- Agricultural runoff
- HABs

Community Needs

- Stronger wastewater management
- Accountability for upstream polluters
- Improved monitoring

”

“Management can only ask whether a stock is overfished. It can’t ask why the habitat is gone or the water is dead. That’s the whole problem.”

- Louisiana commercial fisherman

Seafood Markets & Global Trade

The Gulf seafood sector is grappling with significant economic instability and complex market dynamics which raises concerns about the future of local livelihoods.

Described Drivers & Impacts

- Rising domestic costs (fuel, equipment, repairs, insurance, etc.)
- Low dockside prices
- Import competition and overseas aquaculture production
- Bait supply
- IFQ and catch share dynamics

Community Needs

- Access to working docks
- Affordable access to quota
- Support for local seafood businesses
- Consumer education and awareness

”

“Story of young fisherman who hasn’t been able to recover...third generation talented, knowledgeable fisherman getting out of the business. Moving away from the industry because they can’t make the money they need to feed their families and grow”

- Florida commercial fisherman

Next Steps

- Focus group models will be cleaned and aggregated into merged group models by state, sector, and Gulf-wide
- Group models will then be used for “what-if” scenario analyses to simulate:
 - 1) the social and economic impact of different ecosystem issues on different sectors or groups
 - 2) the effect of different management responses or approaches to those issues.

Example Scenario Simulation - Texas Charter/For-Hire Captains



FISHERMAN FEEDBACK SURVEY

Fisherman Feedback on Fishery Ecosystem Issues

The Gulf Council relies on advice from fishermen and other constituents to gain a better understanding of what's happening on the water. We would like to know what you have noticed about the Gulf ecosystem in recent years to help us understand how it's impacting our fisheries. We are particularly interested in ecosystem issues affecting fisheries that may include environmental problems, habitat concerns, species interactions, changes in the distribution or abundance of fish, or any other unusual ecosystem patterns you have observed.

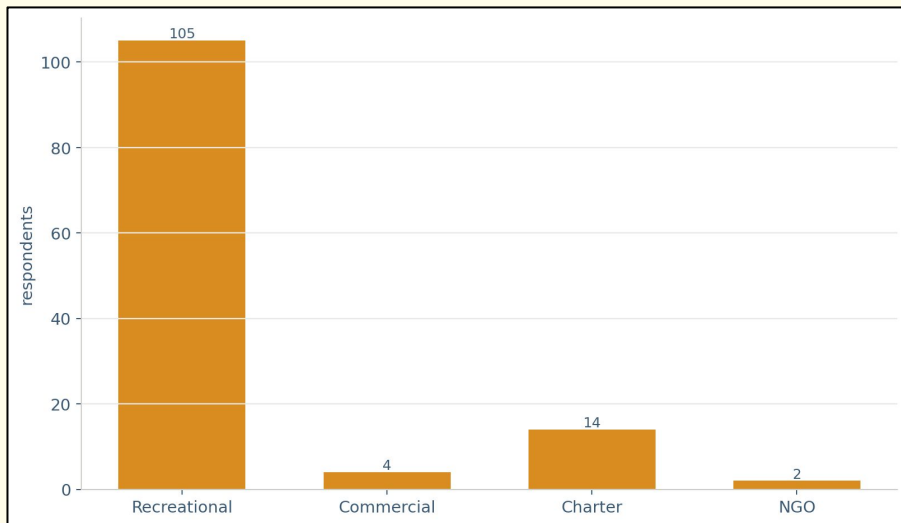
We are interested in gaining a better understanding of these ecosystem issues and how they impact Gulf fisheries, communities and businesses. These fishery ecosystem issues will help to shape our work on the Gulf Fishery Ecosystem Plan, which is a non-regulatory document developed by the Council to explore how to inform management decisions with ecosystem-based information.

The collection of this Fisherman Feedback information is authorized under the OMB Control Number included in the [Citizen Science & Crowdsourcing Information Collection page](#).

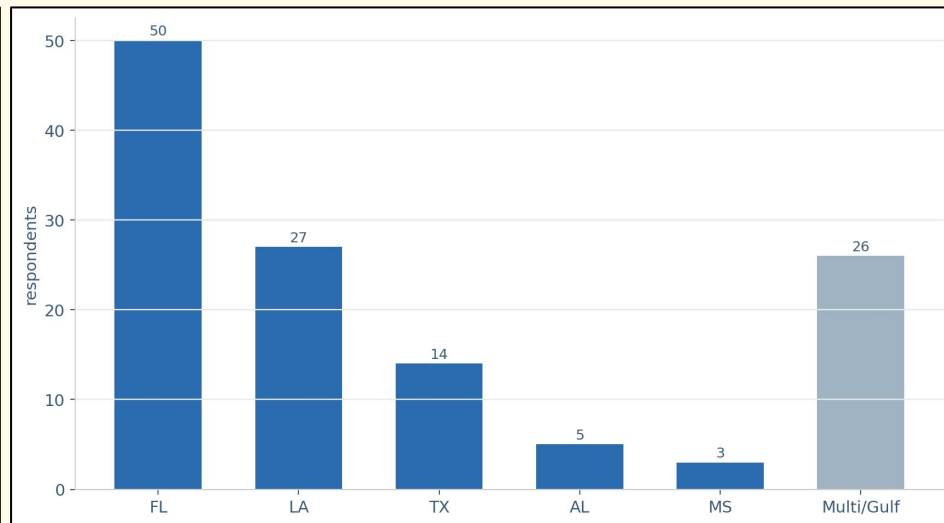
“Please describe your observations or concerns about the Gulf ecosystem and indicate how you think it impacts our fisheries. For each issue, please include time periods and specific species if applicable.”

FISHERMAN FEEDBACK SURVEY (n = 125)

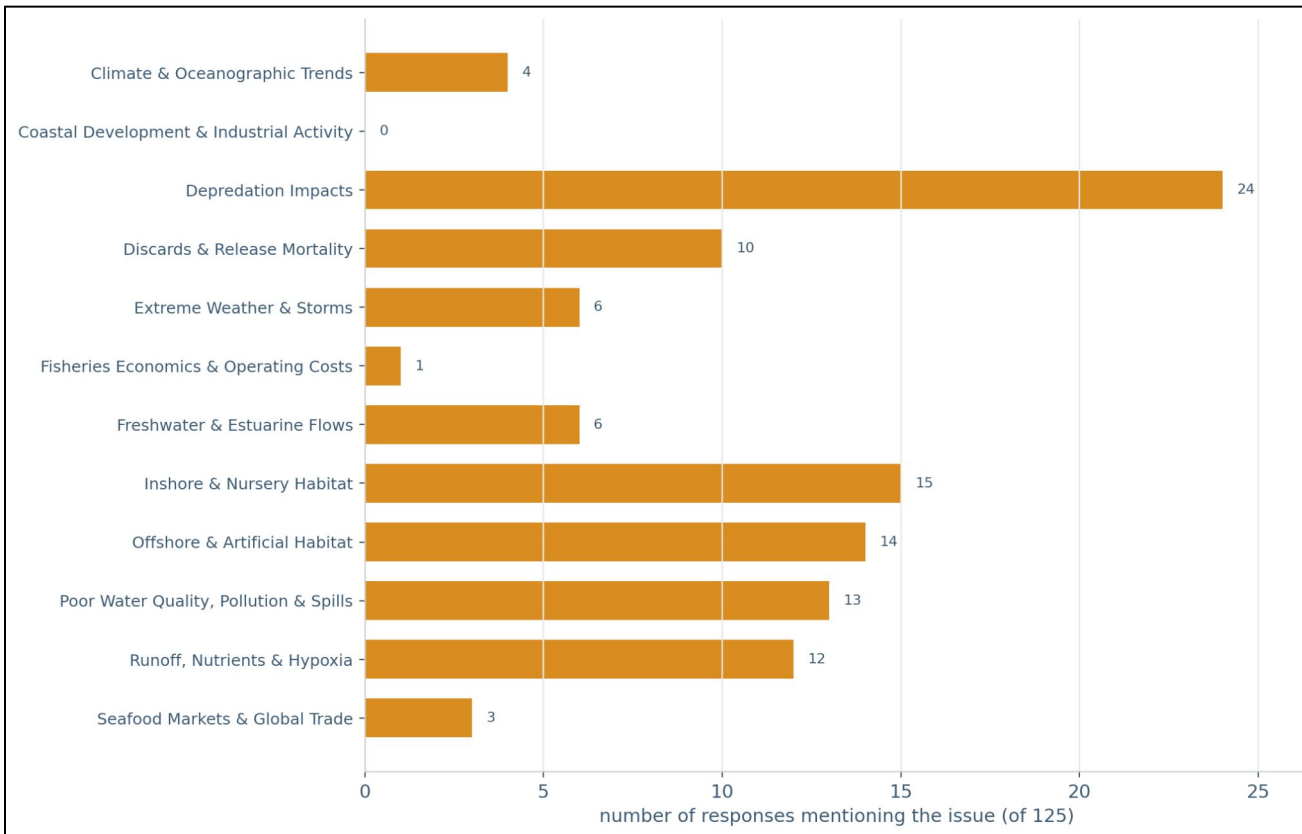
Responses by Sector



FEI Locations by State



FISHERMAN FEEDBACK SURVEY

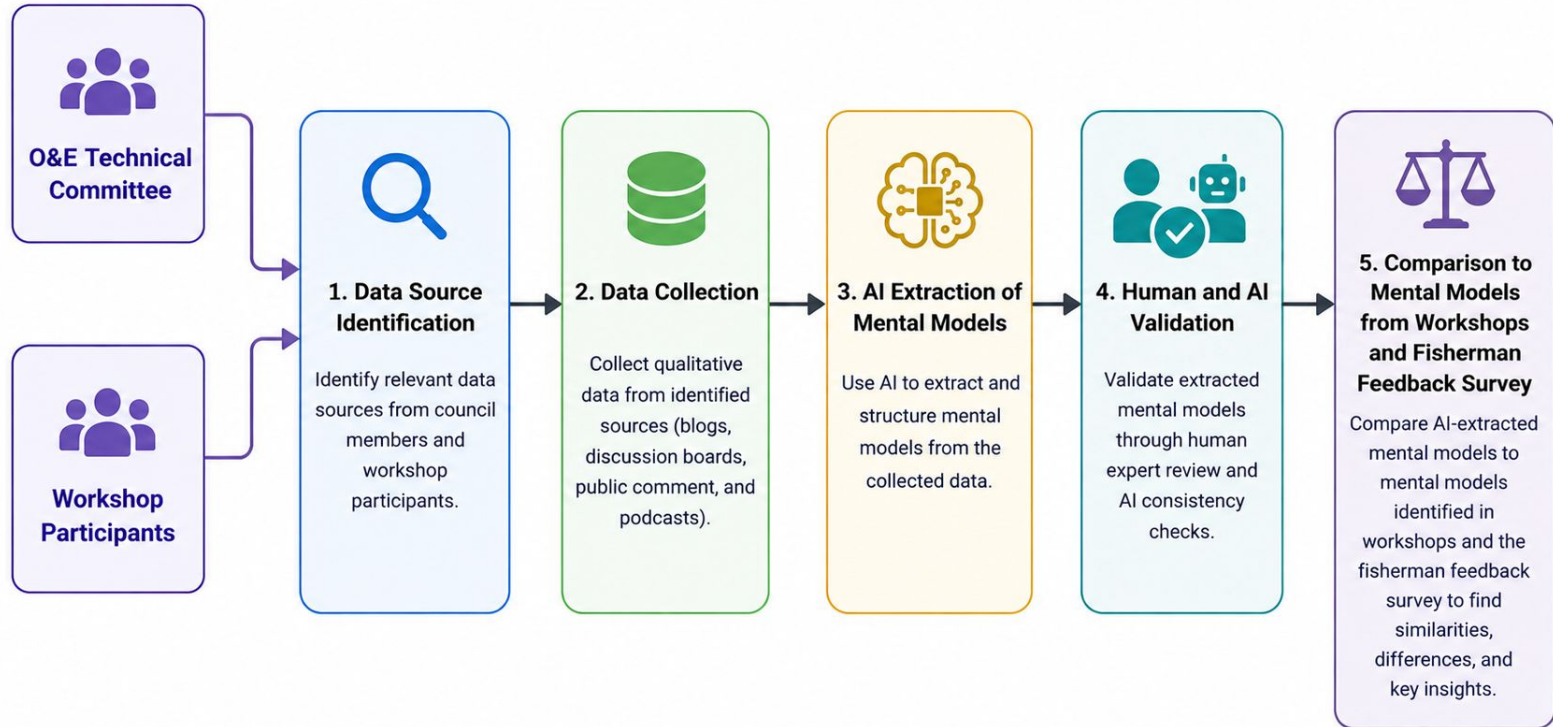


- Overall, survey results mirrored workshop findings and re-emphasized identified FEIs such as depredation
- Additionally, survey respondents expressed dissatisfaction with regulatory processes such as stock assessment accuracy and biomass estimates
- Respondents also highlighted the increase in fishing pressure from technological advancements

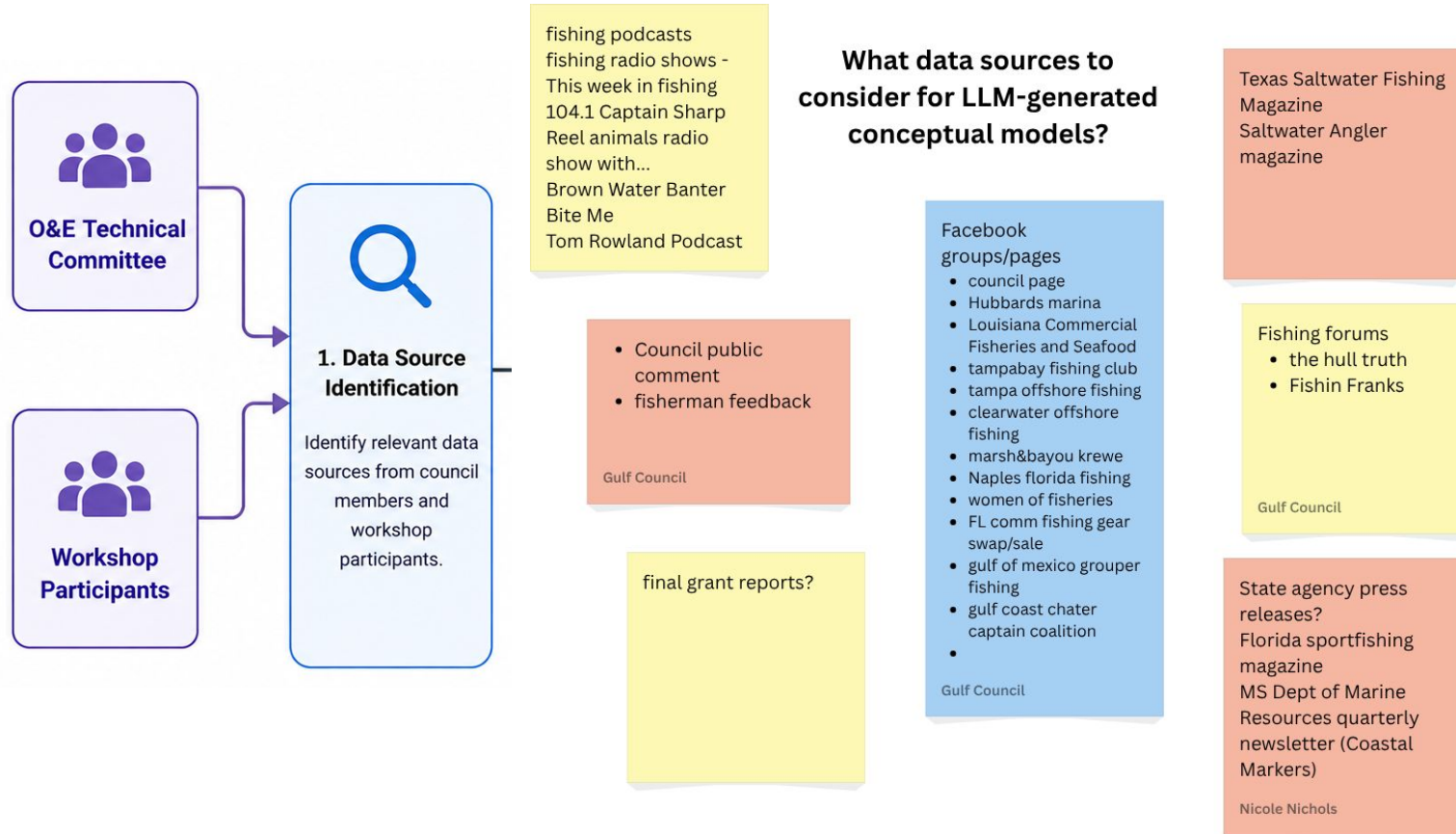
Leveraging AI to Capture Broad Gulf Ecosystem Perspectives



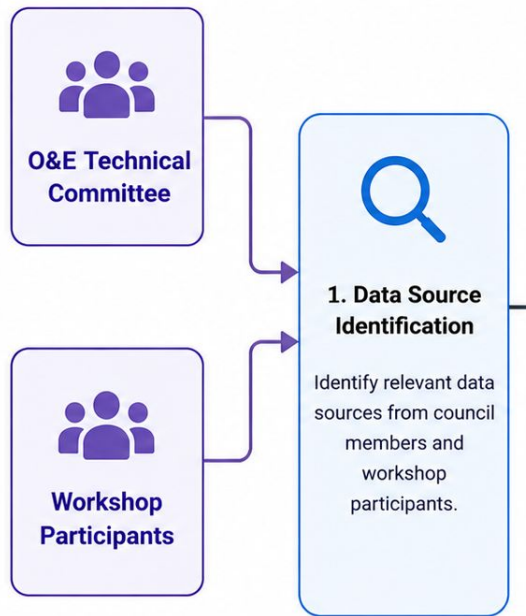
AI Process Workflow



Outreach & Education Technical Committee Whiteboard Session



Workshop Participant Feedback



Participants were largely positive and supportive of AI.

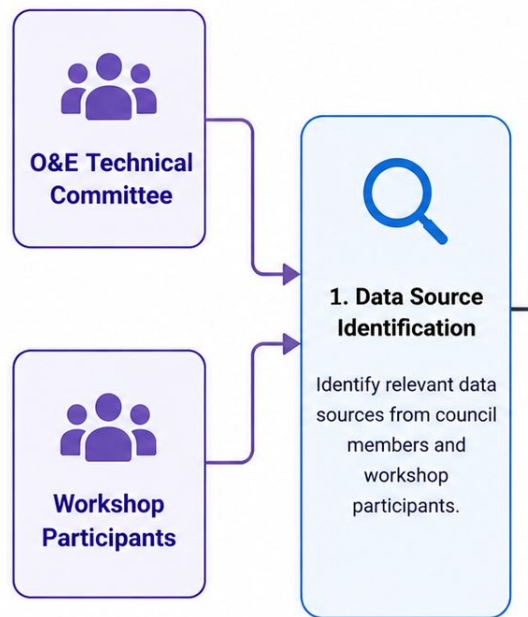
“[AI is] obviously not going away. We’re just old salty guys; we’re not reluctant to change, though.”
– Gulfport, MS

“Everyone else is doing it.” – Galveston, TX

Many participants indicated that they engage with

- Facebook groups,
- Discussion forums (e.g., The Hull Truth), and
- Podcasts (e.g., Brown Water Banter).

Workshop Participant Feedback (2)

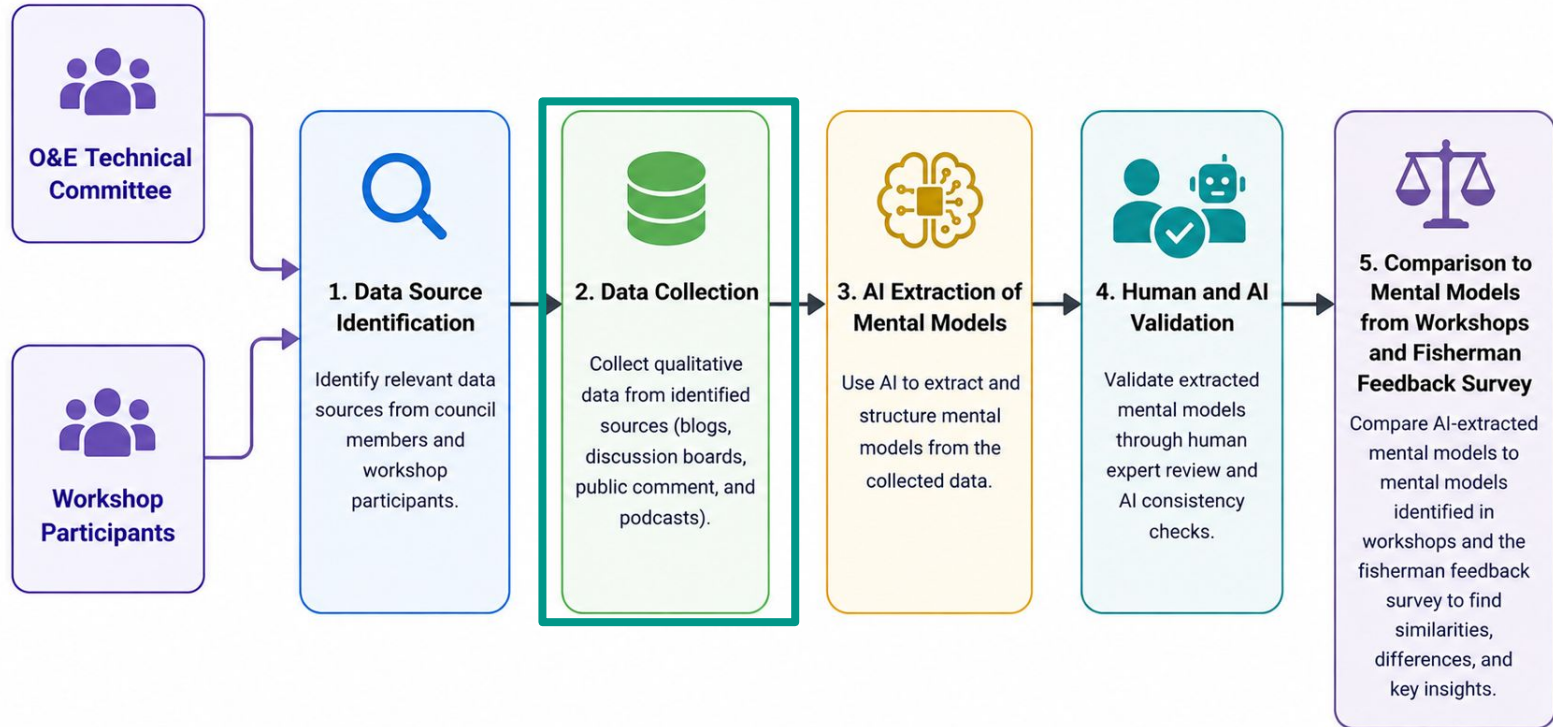


Some concerns about AI was shared during workshops:

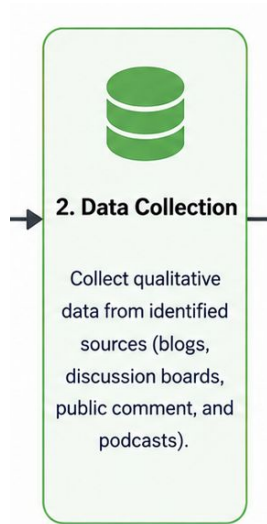
- **Loudest voices** getting the most representation,
- **Well-funded organizations** dominating the record,
- **Commercial fishermen** who do not post online, and in some cases still use flip phones, would be **underrepresented in AI** processes.

“Need to sort through the idiots and misinformation.”
— Galveston, TX

AI Process Workflow



Data Collection



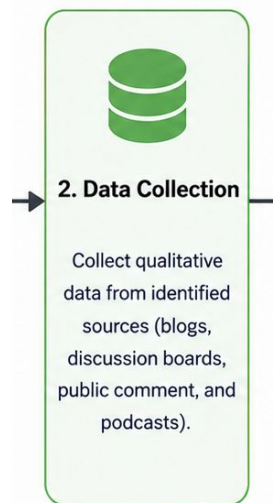
Using open-source software packages, we attempted to scrape all websites identified through workshops and O&E whiteboard session.

Podcasts were transcribed from **YouTube**, **Spotify**, and other websites.

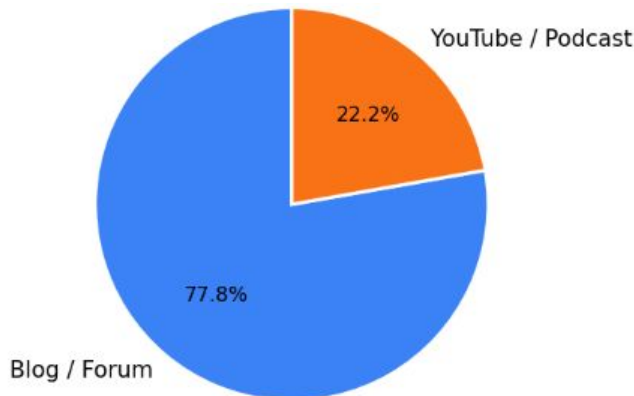
Facebook groups were consistently difficult/impossible to access.

Scraped and transcribed text was keyword-filtered for relevance to the Gulf and fishery ecosystem issues.

Data Collection (2)



We collected a total of 3,042 text documents across discussion threads, podcast transcripts, and blogs

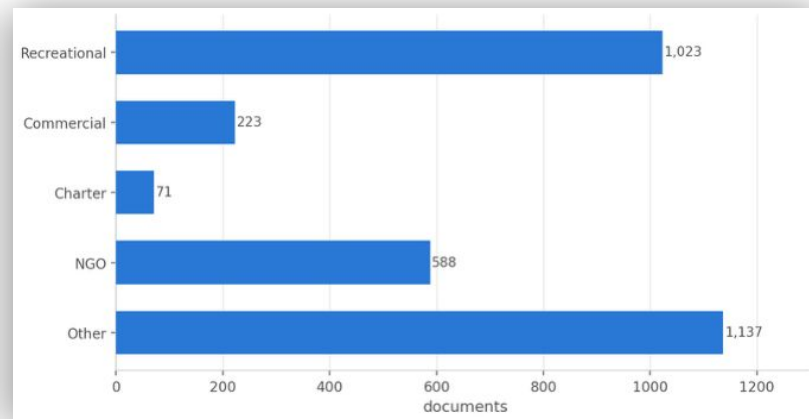
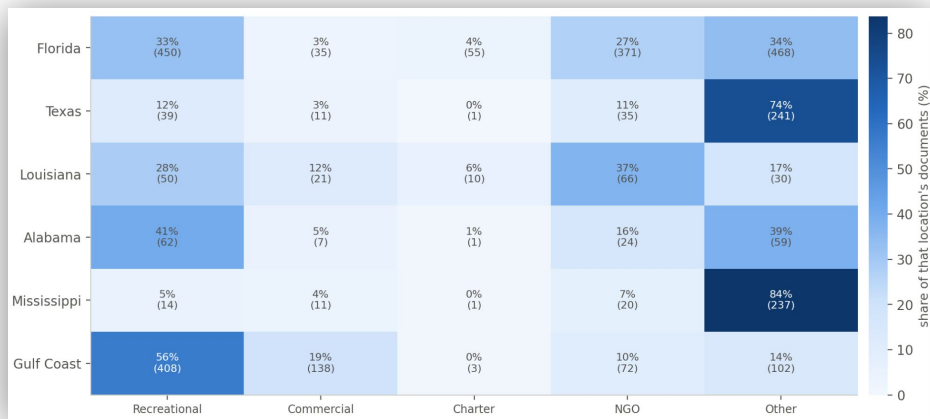


Top-25 Sites by Retrieved Document Count

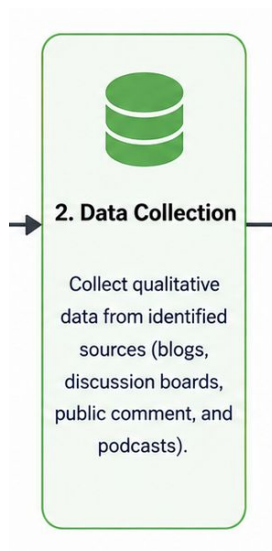
The Hull Truth
Florida FWC Saltwater Sport Fishing Magazine
Mississippi DMR
Texas Parks & Wildlife
Salt Water Sportsman
Sarasota Bay Estuary Program
Saving Seafood
Surfrider Coastal Blog
Gulf of Mexico Fishery Management Council
Healthy Gulf
The Nature Conservancy — Texas
The Nature Conservancy — Louisiana
The Nature Conservancy — Alabama
Ocean Conservancy
Florida Rambler
The Nature Conservancy — Mississippi
SeafoodSource
SuperTalk Outdoors with Ricky Mathews
Florida Sportsman Action Spotter Podcast
Florida Go Fishing
Undercurrent News
Fish Talk Magazine
Alabama Saltwater Fishing Report
Fishcasting the Fishing Podcast

Data Collection (3)

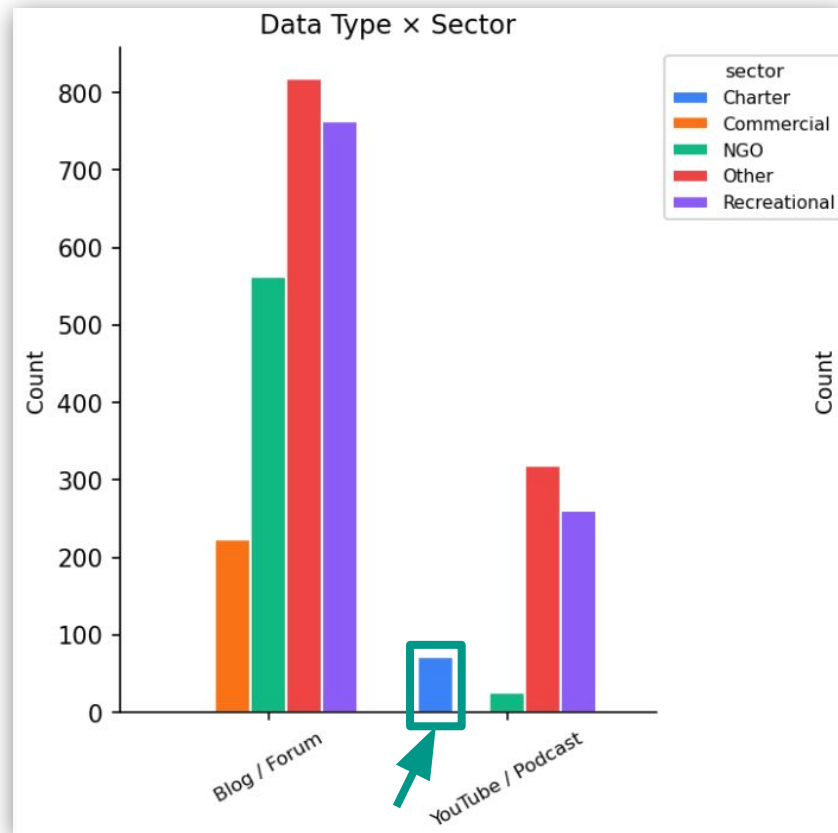
- Recreational angler and media/science/other perspectives dominated
- Sources reflecting perspectives from:
 - TX and MS are lower
 - FL and Gulf Coast are the highest



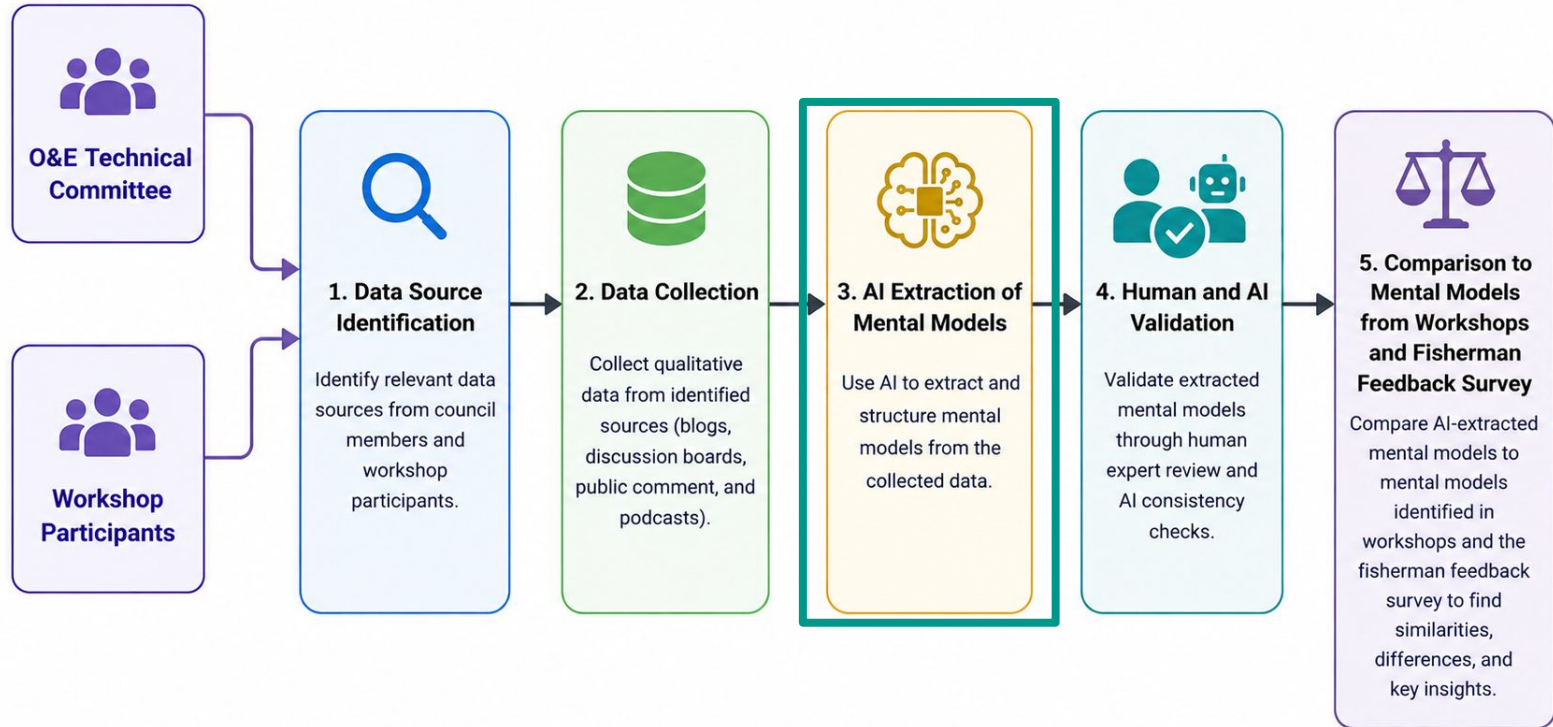
Data Collection (4)



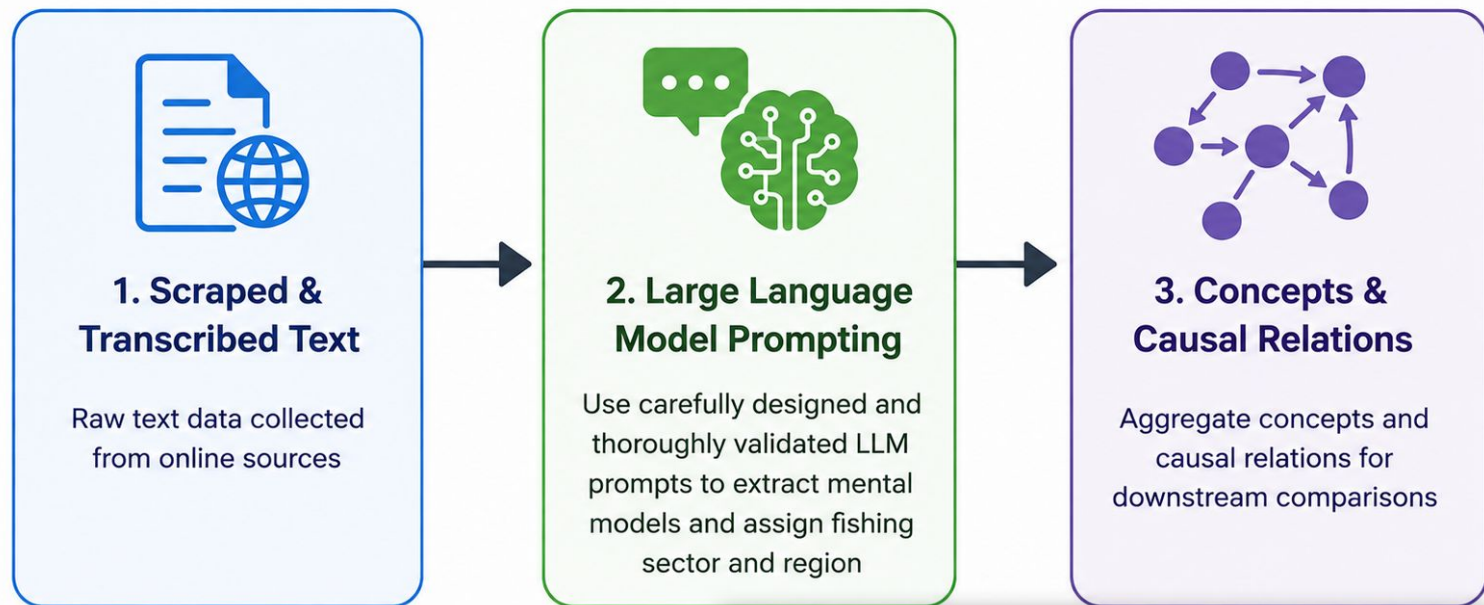
By incorporating **podcasts** we have captured **charter perspectives**.



AI Process Workflow



AI Extraction of Mental Models



Unsupervised Extraction of Causal Models from Interview Transcripts

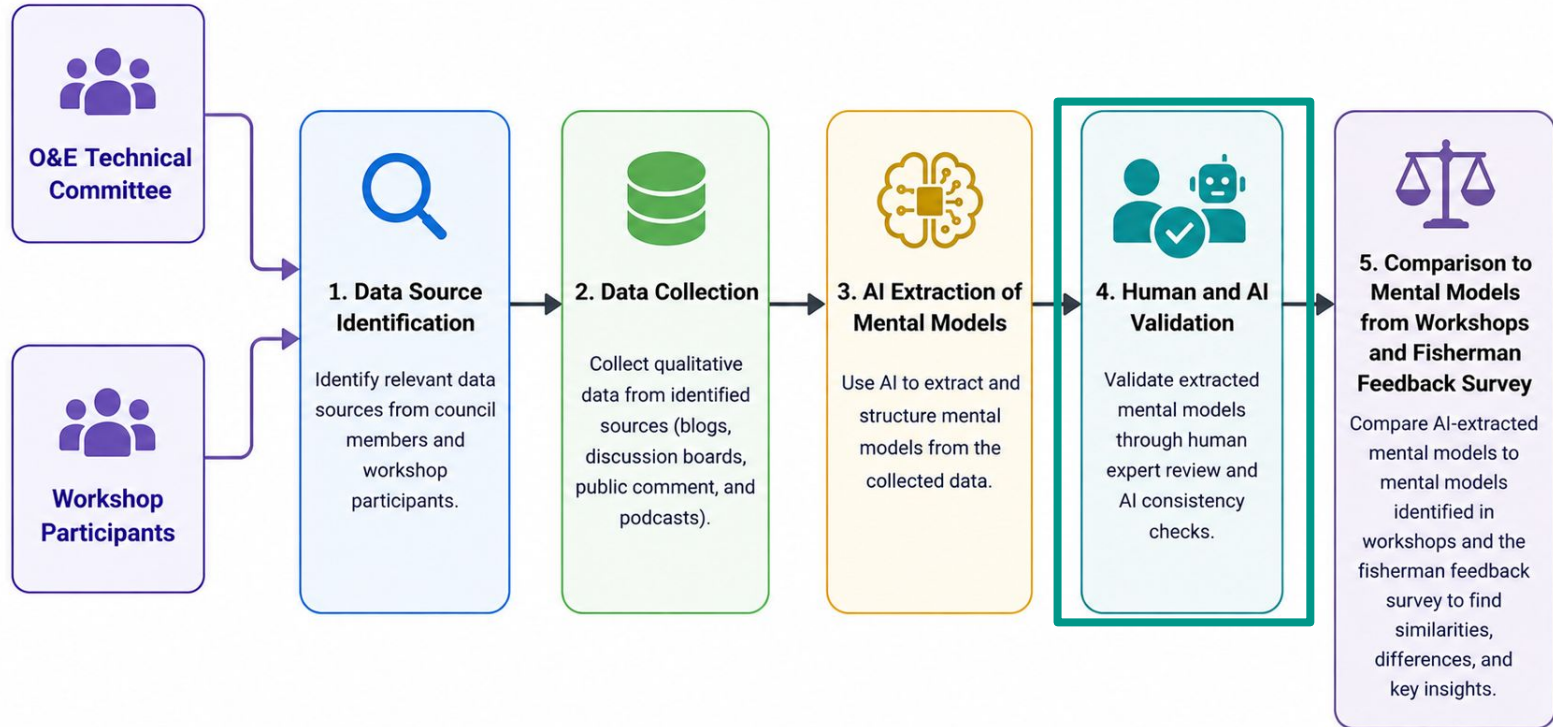
Maryam Berijanjan, C.B. Knox, Willem Klajbor, Kelsi Furman, Sarah L. Gibbs, Carissa L. Gervasi, Rebecca Myhre, Peter Revay, Kuldeep Singh, Mahi Washim, Matthew McPherson, Steven Gray, Dirk Colbry, Jennifer Freya Helgeson, Nathan Brugnone

26 May 2026 (modified: 04 Jul 2026) ACL ARR 2026 May Submission Everyone Revisions BibTeX CC BY 4.0

Dataset	N	Hours	Tokens	Nodes	Edges	+ Edge Density	- Edge Density
Biodiversity	42	50	6958 ± 2047	27.3 ± 10.1	52.2 ± 32.8	9.0% ± 13.5%	3.8% ± 6.0%
FLPP	51	75	5954 ± 2375	28.7 ± 9.4	51.4 ± 19.5	5.9% ± 3.2%	1.5% ± 0.7%
Gulf OSW	31	50	4882 ± 1392	38.6 ± 8.1	60.5 ± 17.4	4.3% ± 1.3%	0.0% ± 0.1%
Red Snapper	52	45	7189 ± 2888	15.7 ± 5.0	11.7 ± 4.7	3.7% ± 1.8%	1.8% ± 1.1%
All	176	220	6370 ± 2466	26.2 ± 11.4	41.1 ± 28.4	5.7% ± 7.1%	1.9% ± 3.2%

Table 1: Summary statistics for all datasets (mean ± SD; **greatest** / **least**).

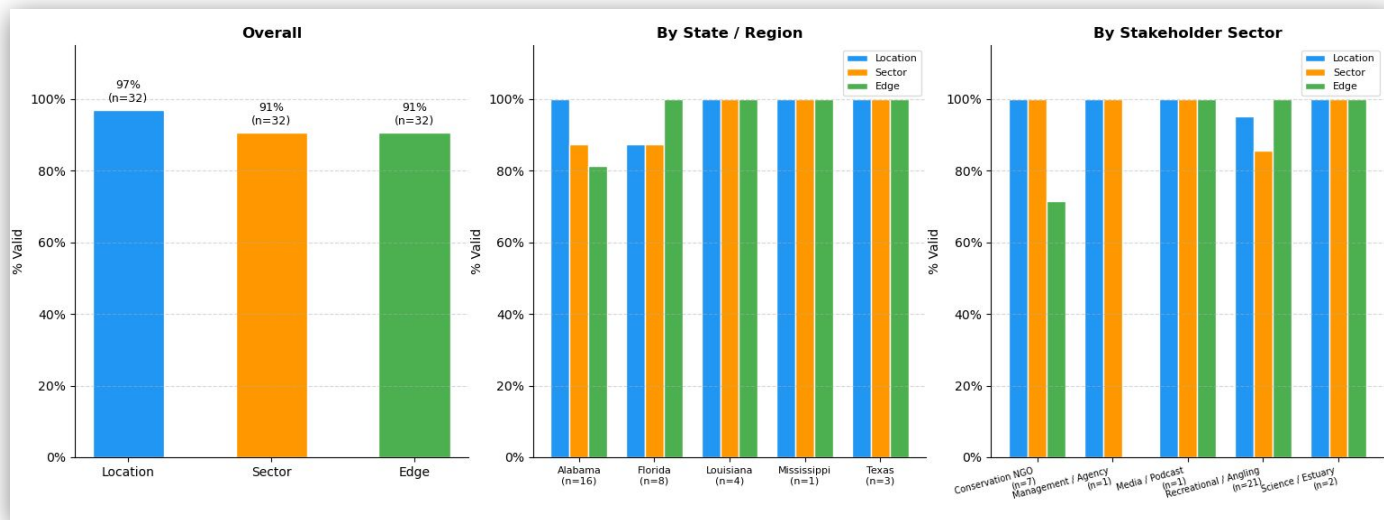
AI Process Workflow



Manual Validation of AI Outputs

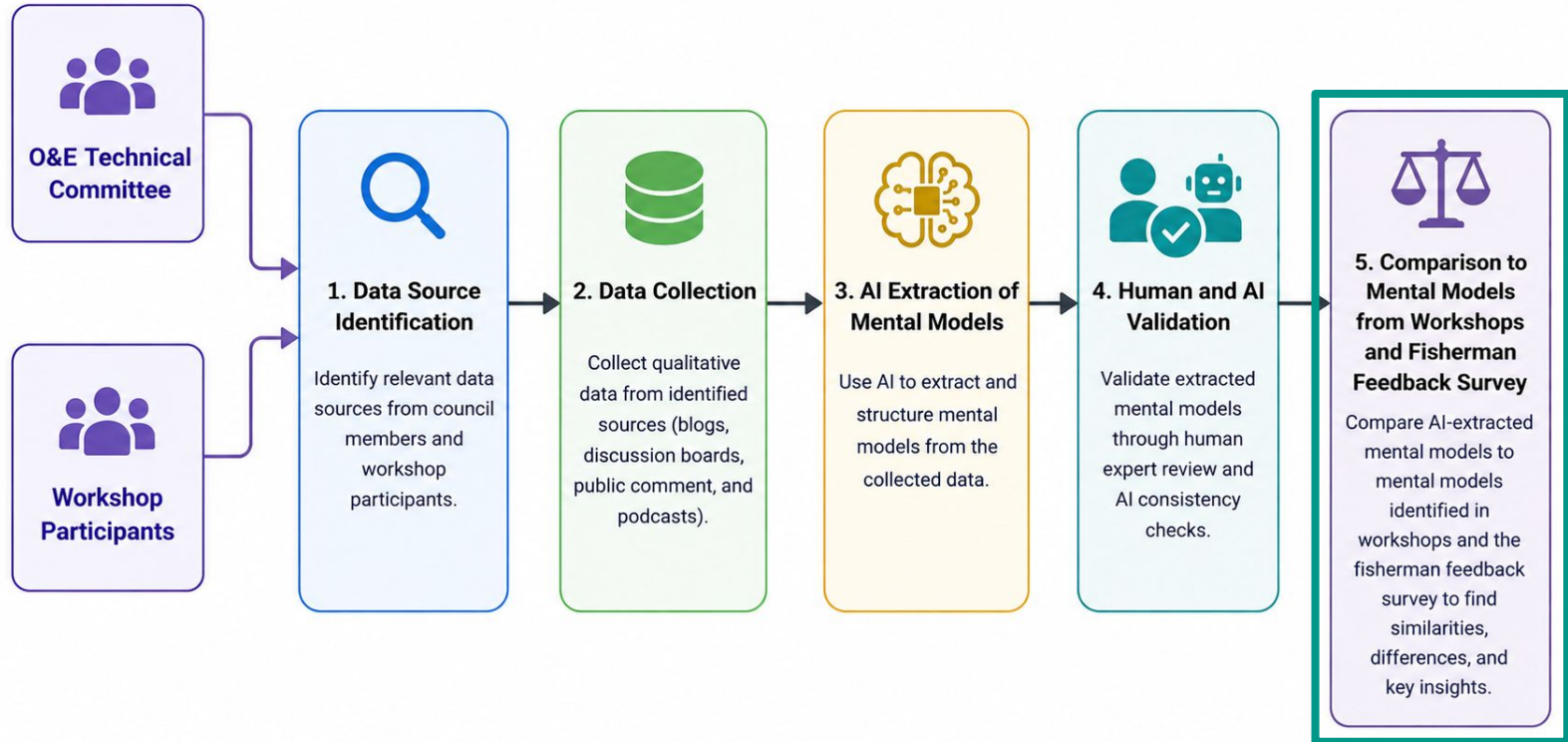
To validate we ask:

- Does the **location** match?
- Is the **sector** correctly noted?
- Is the **causal relation** faithful to the text?



We are in the process of validating with AI. We are **tracking inter-validator reliability with humans** to quantify validation process trustworthiness.

AI Process Workflow



Preliminary Results: Examples

The AI discovered 61,586 unique concepts related to fishery ecosystem issues and 65,835 unique causal relationships. Example concepts and causal relationships from scraped text data.

Concept 1	Effect	Concept 2	Original Text Summary	Sector
dolphins	increase	bay fishing	"We will return in September to try our luck again but will likely just work the Bay bite as we will tomorrow as Flipper will remain offshore"	Recreational
winds and swell	decrease	charters operating	"Only 3 of the billion charters here went out as the Winds from an offshore squall line graced us"	Charter

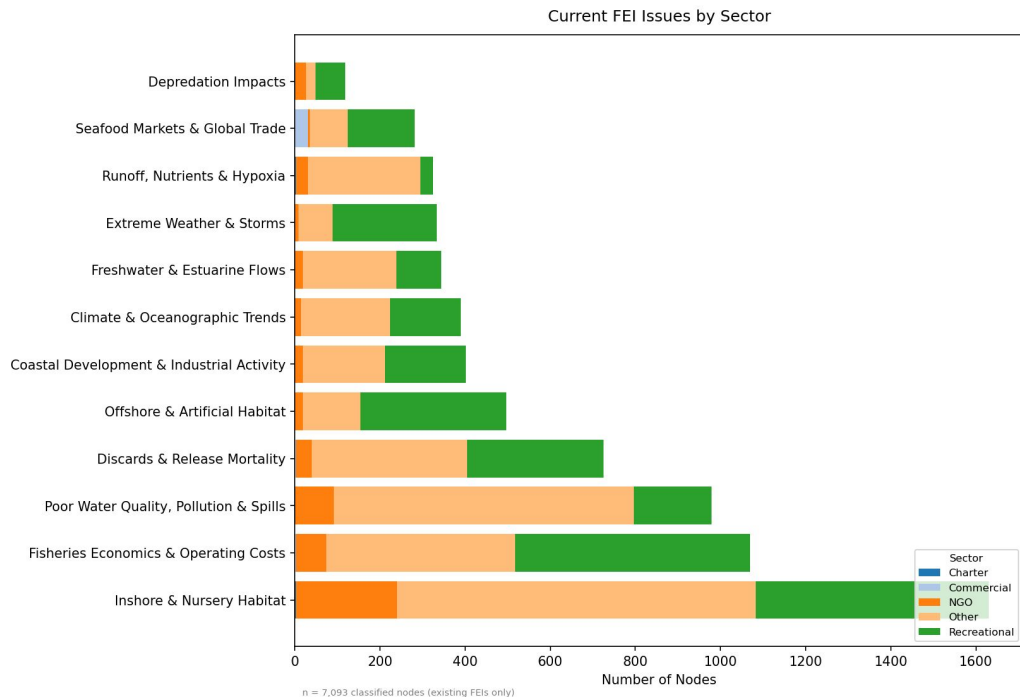
Preliminary Results: Examples (2)

Example concepts and causal relationships from scraped text data.

Concept 1	Effect	Concept 2	Original Text Summary	Sector
red tide	decreases	red drum populations	“impacted by a prolonged red tide ... The approved changes will give these important fisheries additional time to recover from red tide.” (red drum referenced in previous sentence)	Recreational
reef removal by federal agencies	decreases	artificial reefs	“A derrick site ... is at risk of being removed by the Feds.” (reference to artificial reefs in previous sentence)	Recreational

Concept Alignment with Workshop FEIs

A random sample of 17k nodes (~28%) and current alignment with workshop FEIs by sector.



Candidate FEIs Discovered by AI (1)

FEI Topic	Core Issue	Described Drivers & Impacts	Community Needs	Rationale
Recreation, Tourism and Coastal Access Management	Rapid growth in coastal recreation and tourism strains access infrastructure, increases user conflicts, and alters fishing pressure and safety outcomes.	Crowding at ramps, piers, and nearshore sites; limited parking/launch capacity Tourism-driven seasonal pulses that intensify local pressure on resources Wildlife disturbance and safety incidents from inexperienced users Economic dependence on visitor spending complicating management tradeoffs	Targeted investment in access infrastructure and signage Time–area management and zoning to reduce conflicts Visitor education on best practices and safety Coordinated local–state planning for peak-use periods	While ‘Coastal Development & Industrial Activity’ notes working waterfront access, it does not address management of public recreation/tourism systems and associated user dynamics, which repeatedly surface in the proposed list.

Candidate FEIs Discovered by AI (2)

FEI Topic	Core Issue	Described Drivers & Impacts	Community Needs	Rationale
Marine Aquaculture Expansion and Sustainability	Proposed growth of marine aquaculture raises siting, environmental risk, and user-conflict questions alongside opportunities for local seafood supply.	Permitting uncertainty and multi-agency oversight delays Environmental concerns (escapes, disease, benthic impacts) and monitoring needs Spatial conflicts with fishing, navigation, and viewsapes Unclear integration with markets and working waterfront capacity	Clear siting criteria, baseline surveys, and adaptive monitoring Streamlined permitting with safeguards and transparency Best-practice standards, contingency planning, and liability frameworks Extension services and R&D for resilient, low-impact technologies	Aquaculture is not covered by existing FEIs; this theme is distinct from seafood markets and habitat loss by focusing on development pathways, safeguards, and coexistence with wild fisheries.

LLM NEXT STEPS

Broadly-expanded validation:

- Will be conducted on the basis of the best science available (e.g., Kwok et al., 2026) with human validation.
- Will inform improved data curation

In-depth analysis:

- Expanded comparisons with workshop- and survey-based results
- Identification of novel candidate FEIs

Integration

- LLM FCM processing pipeline will be tailored to support Phase 2 efforts

Phase 2:

Impact Assessment and FEI Prioritization

Goals of Phase 2

1. Document data and models available to understand fishery ecosystem issues in the Gulf.
2. Identify key questions which can be answered with the available data and existing models and catalogue knowledge gaps among these fishery ecosystem issues.
3. Publicly document the conceptual models, knowledge gap analysis, and priority questions on the web to synthesize each fishery ecosystem issue and its interactions

These will be done iteratively and collaboratively in support of the Council's ecosystem approach to management and its Fishery Ecosystem Plan.

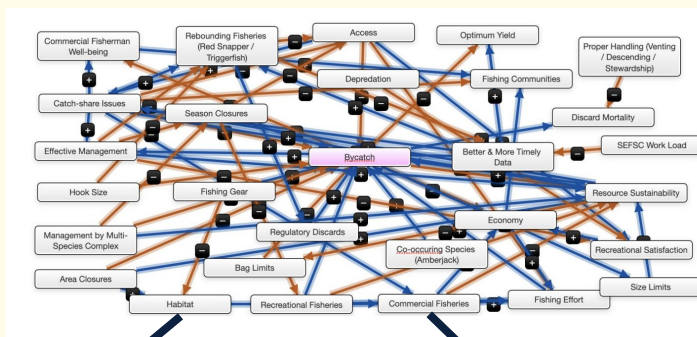
Phase 2 roadmap

Online documentation tables

Human Dimensions

Allocation	Commercial Profits	Discards	Shoreside Support	Fleet Diversity	Management Control	
Recreational Value	Regulatory Complexity	Seafood Production	Technical Interactions	Offshore Wind	Other Links	
Model Element	Justification for Inclusion	Data to support (Y/N/M)	Data - if yes, identify and list out all data sources, analyses, model, Council project etc.	Spatial Component (North/South; Inshore/Offshore; Other - specify)		
Distributional shifts	Fishery and species distributional shifts are detailed in the Allocation table above. Distributional shifts can induce discarding of species for which summer flounder fishermen have no quota (e.g. Northeast Multispecies Groundfish) or permit to fish, or where the bycatch is not economically justifiable to land. Distribution shifts can also change the availability of summer flounder to commercial fishermen and result in changing discard patterns (e.g., quantity, timing, gear interactions)	Y	NEFSC trawl survey, commercial amendment EIS document, 2018 benchmark assessment; publications (e.g. Pinsky et. al. 2017; Dubik et. al. 2018) Commercial VTRs (harvest/effort locations; vessel size); Social Sciences Branch Fishing Footprint maps; MRIP information; annual staff recreational memos	North/South		
Allocation (rec/comm, state)	See Allocation risk factor for detailed discussion of issue. Allocation can induce discarding if a mismatch exists between quota allocation and spatial distribution.	Y	Council funded allocation review project (Hicks & Schrier); MRIP data and commercial landings. Historical allocation across sectors/states are available at http://www.mafmc.org/sf-s-bsb . Recreational/commercial. Commercial landings data and VTR information; MRIP data; commercial amendment EIS document; fishery independent data (NEFSC trawl survey, NEAMAP and other state surveys); NEFSC community vulnerability index	NA		
Recreational fishing mortality control	Recreational management measures to control effort/catch such as minimum size, season, possession limit, hook size etc. can lead to regulatory discards.	Y	AP Fishery Performance Reports; Fishery Info Documents; ASMFC Plan Review reports; MRIP	NA		

DePiper, Ga



Interactive chord diagrams



Scyphers et al. 2021

Conceptual
Model created
from workshop

DePiper, Gaichas, and Muffley, 2020

DePiper, Gaichas, and Muffley, 2020

Next Steps

1. Refine and revise list of potential fishery ecosystem issues with feedback from ETC
2. Build and share preliminary conceptual models and documentation tables
3. Identify key questions for each fishery ecosystem issue
4. Identify data and modeling gaps using data documentation tables to answer key fishery ecosystem issue questions
5. Create website for final conceptual models and data documentation tables for each fishery ecosystem issue

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