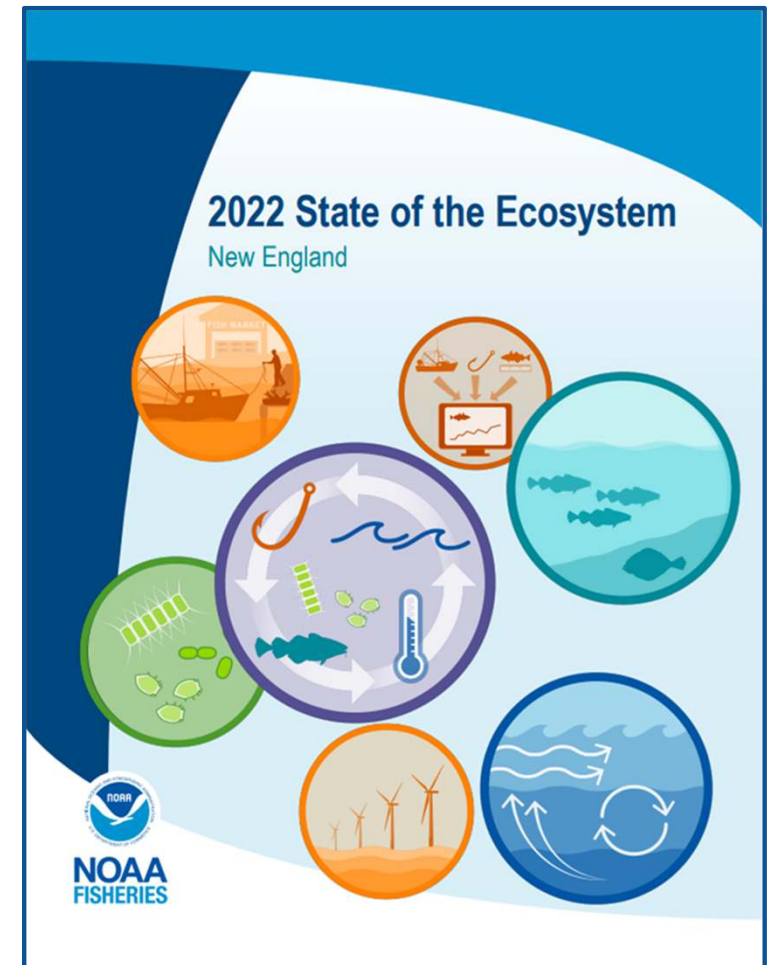


Preliminary conceptual model

Background & methods

What is a conceptual model?

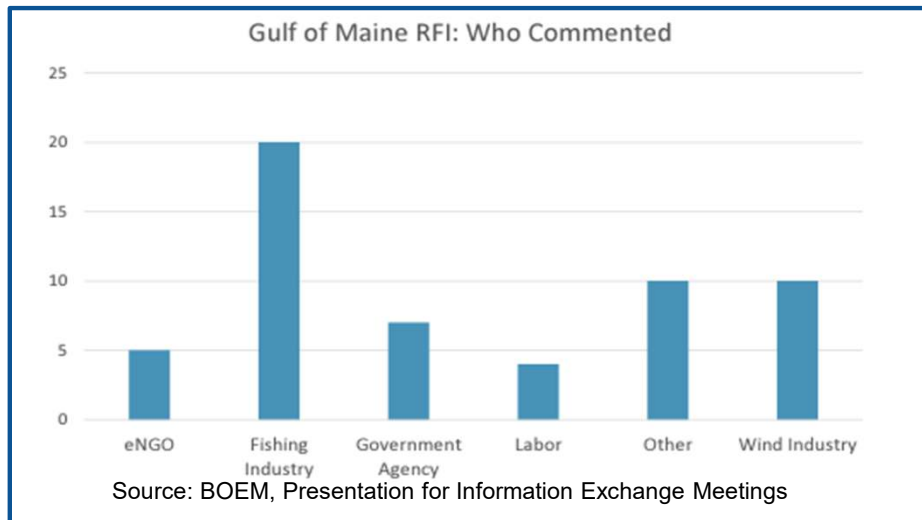
- A **conceptual model** describes and identifies connections in the system
 - Diagram of the **important processes and interactions** that occur in the Gulf of Maine
- Develop **understanding of key elements** of the system from multiple perspectives, help organize and direct research
 - **Identify indicators** that will inform understanding of the system
 - Indicators will be available for environmental impact statements on the offshore wind projects



Preliminary conceptual model development

Analyzing public comments

- Gathered all fishing industry public comments submitted to BOEM
- Analyzed and organized by themes
 - For example: gear, safety, fishing access
- Collating references cited in letters for a database of resources and research that provide evidence



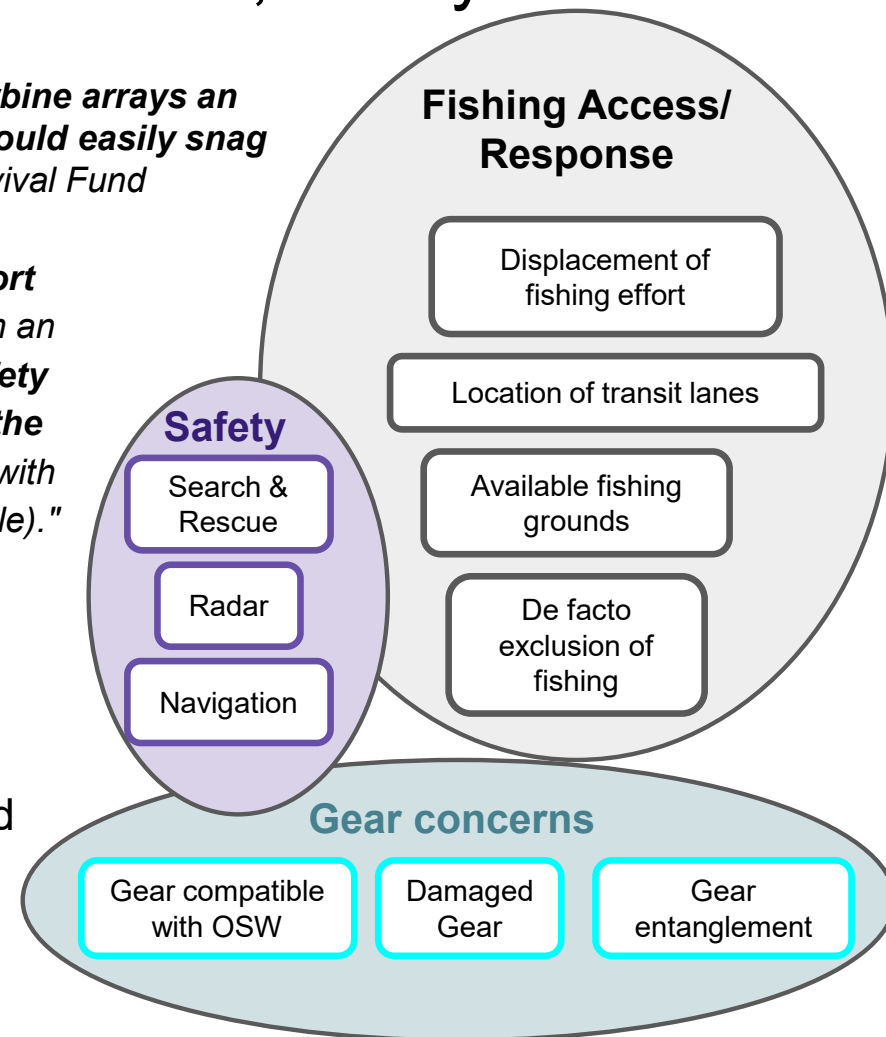
Code System	Fishing Industry
> Siting Location & Design	28
Shoreside communities	4
Mitigation	40
IPFs	17
Marine mammals	10
Fisheries Biology/Ecology	9
Habitat	20
Oceanographic Impacts	8
∨ Fisheries	81
Costs/compensation	2
Displacement/effort/access	12
Future use	4
Safety/Navigation	8
fishing ports/communities	6
Species	2
Fishing location/activity	20
Regulations/Management	12
Complex/unique ecosystem	11
Leasing Process	85
> Research & Data Needs	107

Themes: Fisheries access, gear concerns, safety

*“Offshore wind will make scallop **fishing in and around floating turbine arrays an impossibility**, as scallop vessels utilize a towed dredge system that **could easily snag the suspended cables or sunken anchors.**” – Fisheries Survival Fund*

*“Offshore wind **can cause significant displacement of fishing effort** from historic and current grounds, as fishermen may be excluded from an area through various channels, including liability insurance, or **for safety reasons**, or because their **gear type simply isn’t compatible with the installation** of the turbines (e.g. towing a net through a floating array with inter-array cables suspended in the water column would not be possible).”
– Maine Fisheries Working Group*

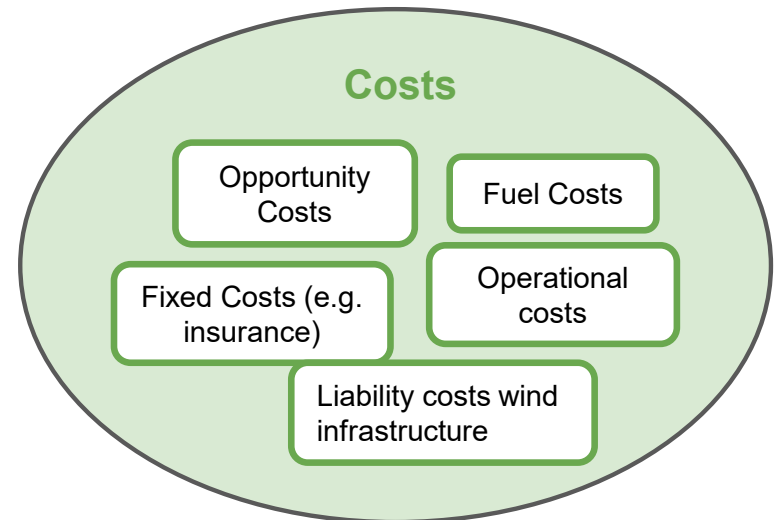
How can we measure the impact of offshore wind development on fisheries access, maritime safety, and fishing gear?



Theme: Costs

*"Offshore wind farms may **obstruct traditional transit routes**, requiring fishermen to steam further to their grounds and **increasing the costs** on an already narrow margin business." – Maine Fisheries Working Group*

How can we measure the potential impact of offshore wind on fisheries operational costs?

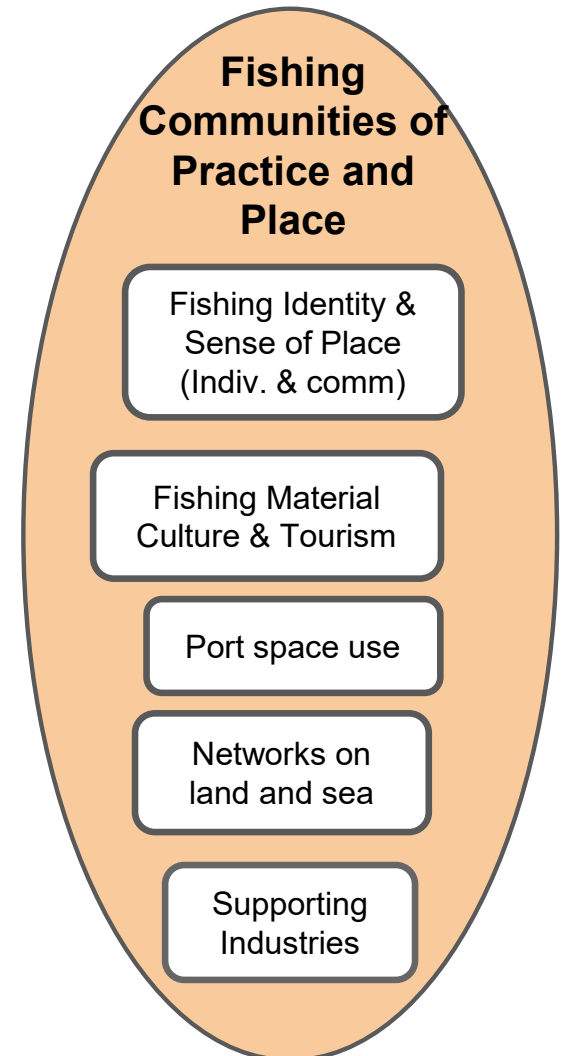


Theme: Fishing communities

*"Many visitors come to Maine to eat lobster and enjoy the views of our working harbors as they travel the coast. Commercial and recreational fishing, aquaculture, and the seafood supply chain, as well as tourism-based hospitality businesses, **depend on the continued success of Maine's marine economy.**"*

– Maine Fisheries Working Group

How can we measure impacts on shoreside communities?



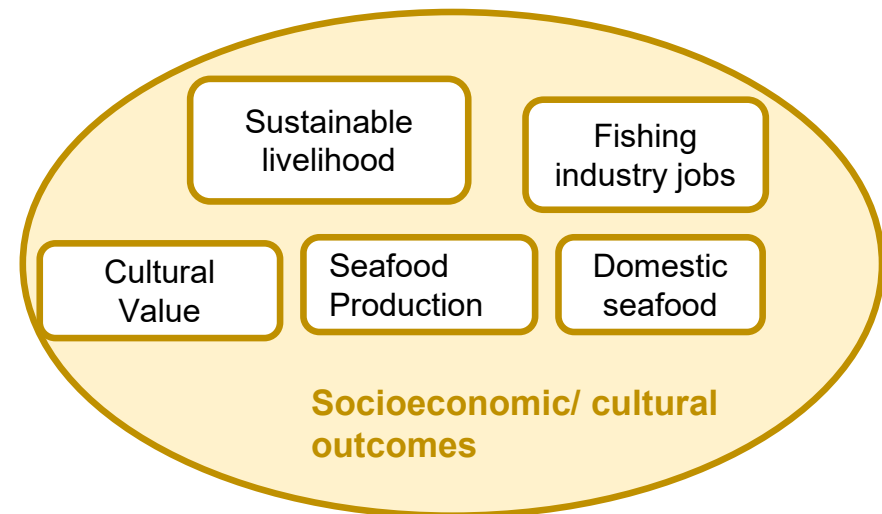
Theme: Fishing industry outcomes

*"The fishing industry in the Gulf of Maine is a billion dollar industry **supporting tens of thousands of jobs** across three states, accounting for 21% of the US domestic seafood market." – Massachusetts Seafood Collaborative*

*"The **next generation of young fishermen and women** in northern New England are **facing several uncertainties** including impending regulatory changes in the lobster industry, restrictive capital requirements needed to enter the commercial fishing industry and the deterioration of our working waterfronts in northern New England"
– New England Young Fishermen's Alliance*

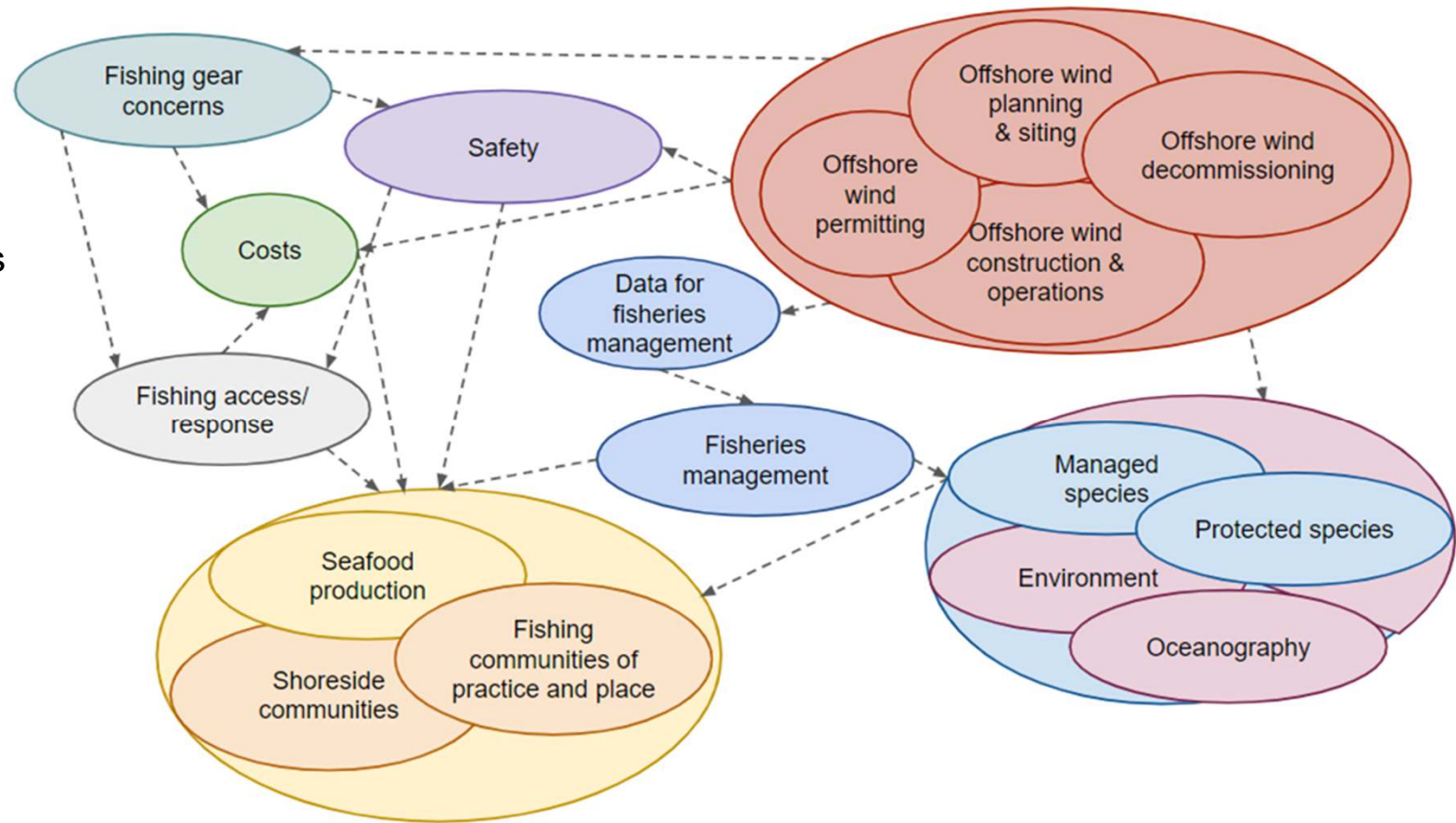
How can we measure the status of the Gulf of Maine fishing industry?

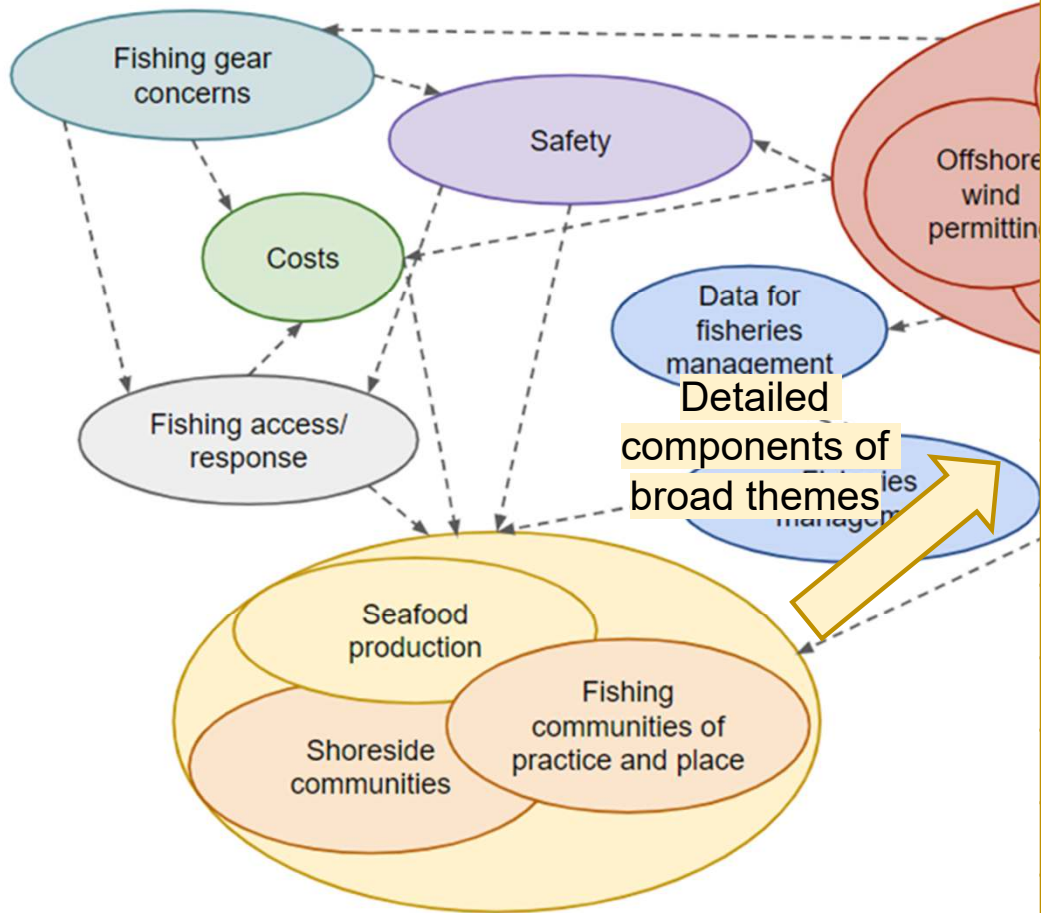
How can we measure the impact of offshore wind on the Gulf of Maine fishing industry?



Simplified conceptual model

- Used the themes to start a preliminary conceptual model
- Made connections based on comments
- Focused on fisheries as a starting point
- Comments from virtual and in-person stakeholder meetings not yet incorporated





Fishing & shoreside communities
Fishing identity & sense of place (individual and community)
Fishing material culture & tourism
Port space use
Networks on land and sea
Supporting industries
CPUE
Sustainable livelihood
Cultural value
Seafood production
Fishing industry jobs
Domestic seafood
Fish available where fishing can occur
Abundance of fish stocks

Concern about impacts of wind on communities & the ecosystem

Fishing & shoreside communities
Fishing identity & sense of place (individual and community)
Fishing material culture & tourism
Port space use
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Supporting industries
CPUE
Sustainable livelihood
Cultural value
Seafood production
Fishing industry jobs
Domestic seafood
Fish available where fishing can occur
Abundance of fish stocks

Managed & protected species, environment, oceanography
Species of concern: lobster, groundfish, scallop, shrimp, right whales, forage fish, seabirds, salmon, sharks, tuna, highly migratory species, sea turtles, marine mammals, sturgeon, protected species
Spawning
Migration
Recruitment of larvae and juveniles
Trophic interactions
Habitat for early life stages, benthic and pelagic habitats
Upwelling
Currents
Climate change
Sedimentation
Bathymetry
Abundance of stocks

Offshore wind impacts fisheries management & operations

Offshore wind	Fisheries management	Fishing access/response	Fishing gear concerns
Operation & maintenance	Seasonal closures	Displacement of fishing effort	Damaged gear
Turbine installation	Closure areas	Available fishing grounds	Gear entanglement
Cable burial depth/covering	Habitat protection areas and EFH	De facto exclusion of fishing	Gear compatible with offshore wind
Vessel traffic	Catch limits	Location of transit lanes	
EMF	Data for fisheries management		Costs
Anchorage	Biological and fisheries data		Opportunity Costs
Noise	Scientific surveys	Safety	Fuel
Mortality	Commercial vessel tracking and observation	Search & Rescue	Fixed Costs
Site surveying	Fisheries vessel target species	Navigation	Operational Costs
Cable construction	Fisheries vessel size	Radar	Liability and insurance

Feedback & discussion

- Many of the current scientific data streams cover large areas like the entire Gulf of Maine and cannot address the full socioeconomic impacts of offshore wind development on fishing communities.
- The results of the IEA will help fisheries and ocean managers avoid, minimize, and mitigate the impacts of offshore wind on the fishing industry and monitor the effects of offshore wind on fishing.
- Your participation is extremely important in helping improve the offshore wind planning process.
 - Local ecological knowledge
 - Spatial and temporal resolution of data
 - Scales of impact: individuals, groups, society

