Toward a social- ecological ocean observing system for society

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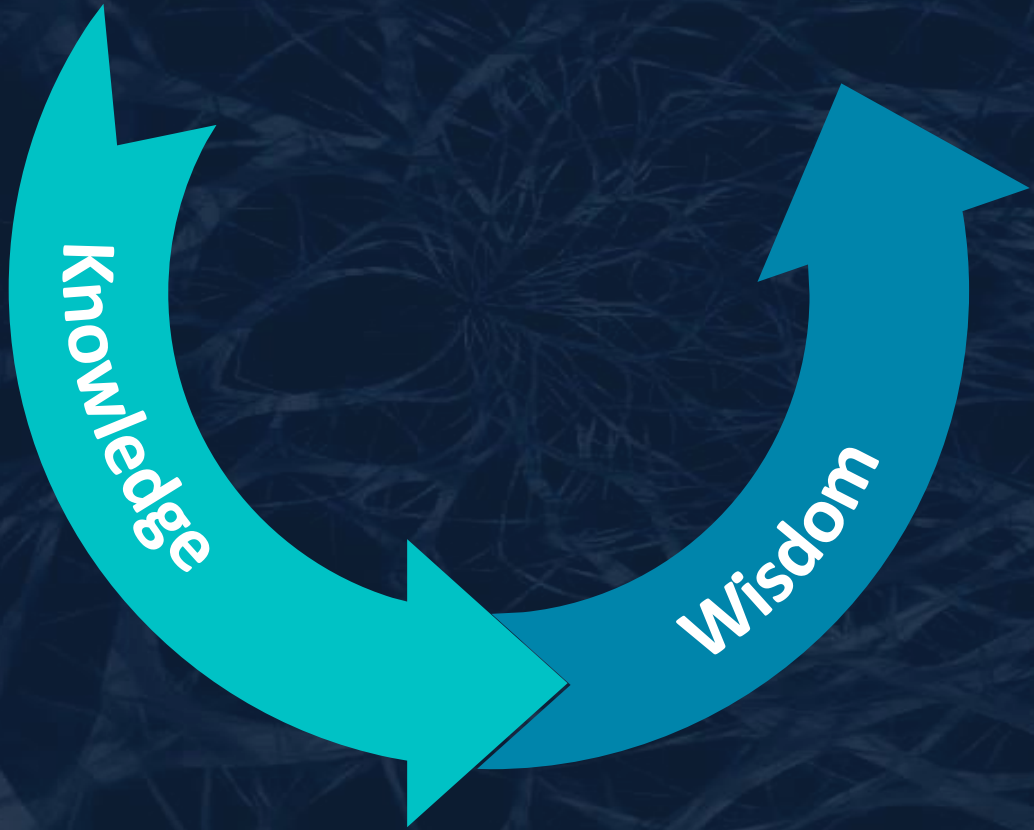
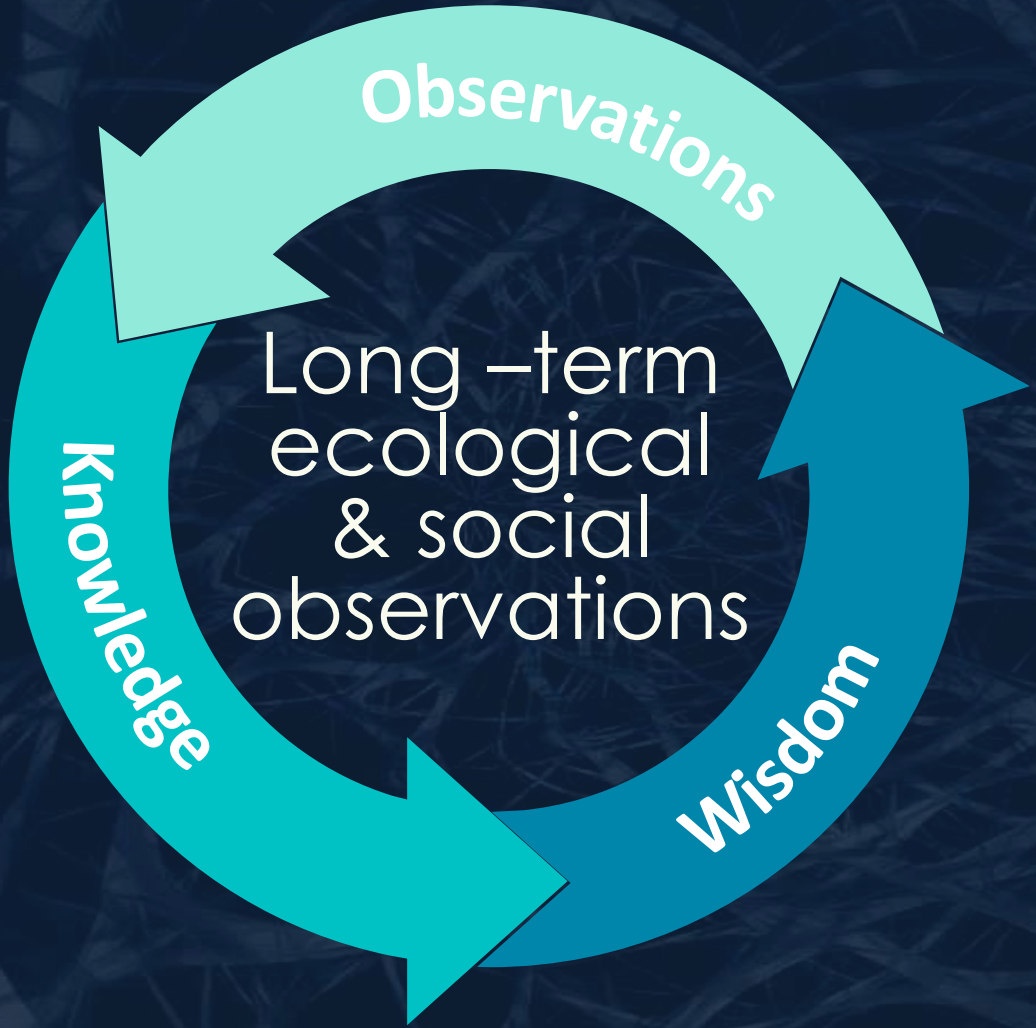
How do we move toward a **future** of **resilient, vibrant marine ecosystems & human communities**?


Knowledge
Wisdom


Observations
Wisdom
Knowledge
Long –term ecological & social observations

Long term social-ecological observations are our **sensory system for society**

Agencies collect many ecological & social variables…

Agencies collect many ecological & social variables…*but these efforts*

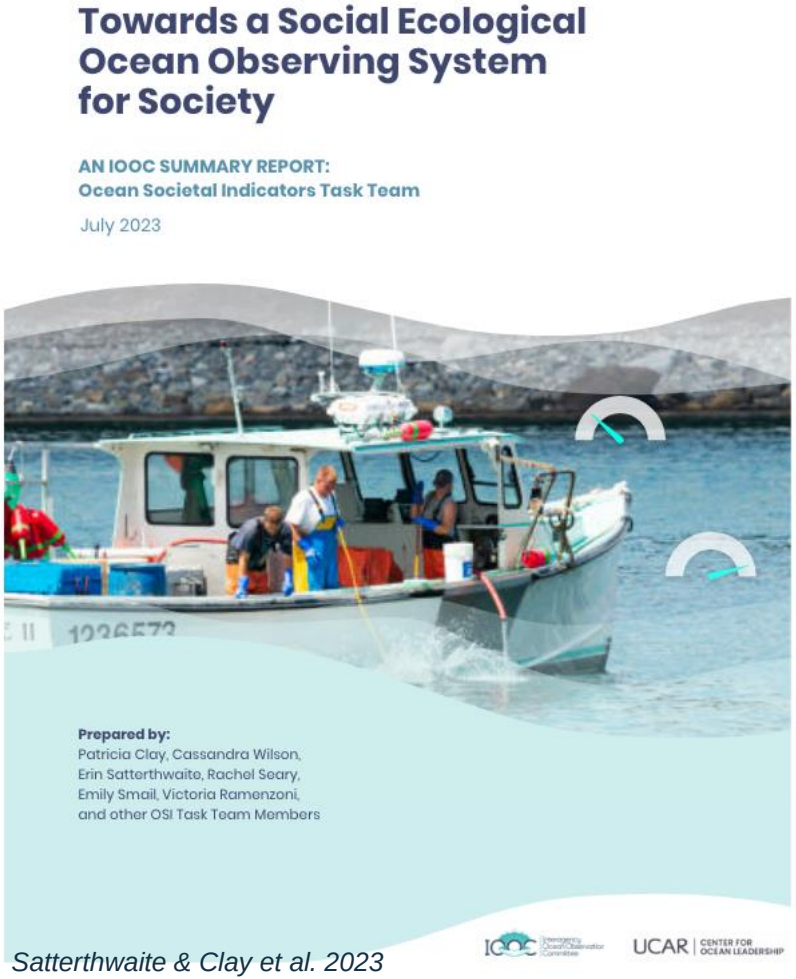
- rarely contribute to a **sustained or broader effort** to address other similar societal concerns

- are often **siloed**

- challenging to **operationalize** the social – ecological connections

Goals

Understand and **address** the **need of connecting social & ecological indicators** within the context of ocean observations



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Interagency Ocean Observation Committee

Objectives

- Produce a **baseline synthesis** of **existing ocean societal indicators in USA agencies**

- Identify types of **ocean-related societal indicators** and data that could be **clearly connected to ecological data from ocean observing systems**

- Identify **gaps, opportunities, and recommendations to connect social indicators with ocean observing programs**

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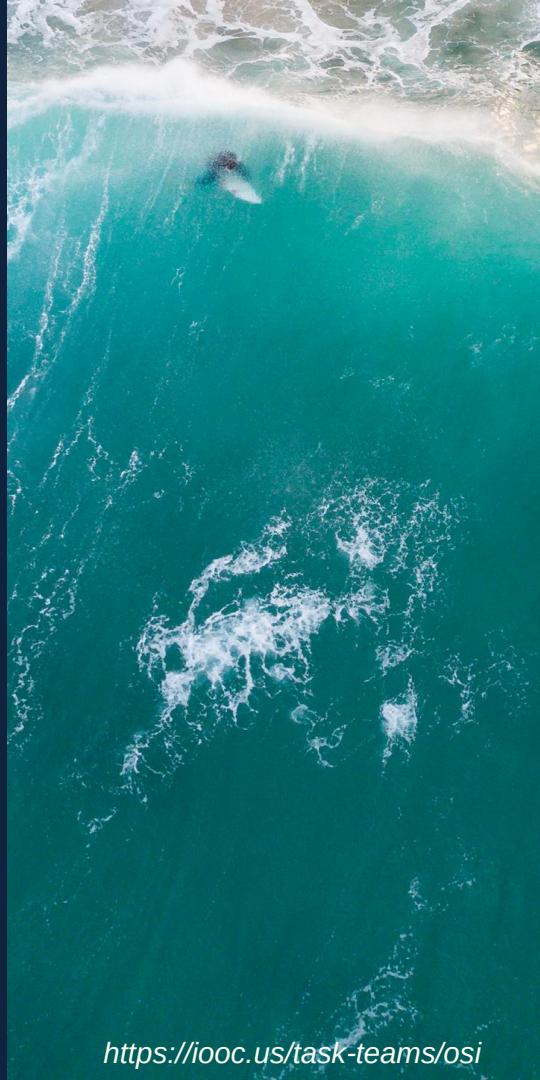
Roundtable, literature review, & database development to analyze indicators

- Hosted **roundtable** to get community input on goals of project
- Collated **publications containing social indicators** about the **ocean, coasts, and Great Lakes** via a survey to social scientists in U.S. federal agencies
- Identified **social & ecological indicators &** analyzed **indicator properties**
- Developed a **database of indicators**
- Iterated on process through **monthly meetings**

7 out of 11 publications had both social & ecological indicators (~63%)

Publications covered topics:

- Marine Spatial Planning (e.g., in Marine Protected Areas)
- Fishing/Ecosystem-Based Management (e.g., in IEAs)
- Ocean energy (e.g., wind farms)
- Social well-being (e.g., of fishing communities)



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366 social & ecological indicators in total

- 91% (333) were social indicators

- **35%** (116) of **social indicators were or could be connected to ecological indicators**

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What do we mean by **'social-ecological connection'**?

Within an indicator

Social part of indicator		Ecological part of indicator
Local values and beliefs	*about*	Marine resources
Coastal community impacts	*from*	Storm surge and sea level rise
Fishing community vulnerability	*due to level of*	Engagement / reliance on fishing

What do we mean by **'social-ecological connection'**?

Between two indicators

Social indicator		Ecological indicator
Fishing activity near wind farm	< – >	Fishing abundance around wind farm
Tourism near coral reef	< – >	Coral reef health
Sea level rise risk	< – >	Sea surface height

Social-ecological connections commonly occurred or could occur around many themes

- awareness/participation
- well-being
- natural resources
- human health
- cultural values
- economic health
- recreation/tourism
- maritime safety
- ocean energy & submarine cables
- carbon storage

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Ocean societal indicators linked to Essential Ocean Variables

Open-access database of indicators

	Indicator Suite/Program	Report/ Where is it Pub...	Indicator Name	Connection?	Ecological	Social	Qualitative; Quantitativ...	If ecological, what is th...	Is there an explicit dire...
1	Analysis of the Effects of ...	https://espis.boem.gov...	Dives	Social - Ecological (dir...		✓	Both	NA	
2	Analysis of the Effects of ...	https://espis.boem.gov...	Visitor interest in seeing ...	Social - Ecological (dir...		✓	Both	NA	
3	Analysis of the Effects of ...	https://espis.boem.gov...	Fish abundance and distri...	Ecological - Social (dir...	✓		Both	Fish abundance and di...	✓
4	Analysis of the Effects of ...	https://espis.boem.gov...	Fish diversity around win...	Ecological - Social (dir...	✓		Both	Fish abundance and di...	✓
5	Analysis of the Effects of ...	https://espis.boem.gov...	Fishing access around wi...	Social - Ecological (dir...		✓	Both	NA	
6	Analysis of the Effects of ...	https://espis.boem.gov...	Fishing activity and practi...	Social - Ecological (dir...		✓	Both	NA	
7	Analysis of the Effects of ...	https://espis.boem.gov...	Fishing pressure around ...	Social - Ecological (dir...		✓	Both	NA	✓
8	Analysis of the Effects of ...	https://espis.boem.gov...	Tourist interest in wind fa...	Social - Ecological (dir...		✓	Quantitative	NA	
9	Analysis of the Effects of ...	https://espis.boem.gov...	Wind farm clustering with...	Social - Ecological (dir...		✓	Quantitative	NA	
10	Analysis of the Effects of ...	https://espis.boem.gov...	Effect of wind farm and c...	Ecological - Social (dir...	✓		Both	Marine Mammal abund...	✓
11	Analysis of the Effects of ...	https://espis.boem.gov...	Effects of wind farm and ...	Ecological - Social (dir...	✓		Both	Marine Mammal abund...	✓
12	How is your MPA doing? :...	https://portals.iucn.org...	Focal species abundance	Ecological - Social (dir...	✓		Quantitative	All biological (unspecifi...	✓
13	How is your MPA doing? :...	https://portals.iucn.org...	Focal species population ...	Ecological - Social (dir...	✓		Quantitative	All biological (unspecifi...	✓
14	How is your MPA doing? :...	https://portals.iucn.org...	Habitat distribution and c...	Ecological - Social (dir...	✓		Both	All habitat (unspecified)	
15	How is your MPA doing? :...	https://portals.iucn.org...	Composition and structur...	Ecological - Social (dir...	✓		Both	All biological (unspecifi...	✓
16	How is your MPA doing? :...	https://portals.iucn.org...	Recruitment success with...	Ecological - Social (dir...	✓		Quantitative	All biological (unspecifi...	✓
17	How is your MPA doing? :...	https://portals.iucn.org...	Food web integrity	Ecological - Social (dir...	✓		Qualitative	All biological (unspecifi...	
18	How is your MPA doing? :...	https://portals.iucn.org...	Type, level and return on ...	Social - Ecological (dir...		✓	Quantitative	NA	✓
19	How is your MPA doing? :...	https://portals.iucn.org...	Water quality	Ecological - Social (dir...	✓		Both	All physical (unspecifie...	✓
20	How is your MPA doing? :...	https://portals.iucn.org...	Area showing signs of rec...	Ecological - Social (dir...	✓		Quantitative	All biological (unspecifi...	✓
21	How is your MPA doing? :...	https://portals.iucn.org...	Area under no or reduced...	Social - Ecological (dir...		✓	Both		✓
22	How is your MPA doing? :...	https://portals.iucn.org...	local marine resource use...	Social - Ecological (dir...		✓	Both		✓
23	How is your MPA doing? :...	https://portals.iucn.org...	Local values and beliefs a...	Social - Ecological (dir...		✓	Qualitative		✓

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Social-ecological connection is occurring but is **not widespread**

- Ensure that **social-ecological connections are explicit** & consider **composite indicators** to capture the complexity of the system
- Prioritize collection, coordination, & development of **social variables/indicators that have direct connections to marine ecological variables**, and vice versa.
- Leverage **existing resources and foster collaborations** to support the integration of social and ecological data
- Collaborate with **existing human dimensions and social-ecological initiatives** to develop joint social-ecological indicators or portfolios of indicators

I hope we can continue to **build** our **integrated social-ecological sensory system for society**

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"**Observation**, not old age, brings **wisdom**"

~Publilius Syrus

CalCOFI

Sea Grant California

SCRIPPS INSTITUTION OF OCEANOGRAPHY

IOOC Interagency Ocean Observation Committee