SUMMARY

Coastal Conflicts and Cross-Sectoral Engagement:
Learning from disputes over science in coastal and ocean systems

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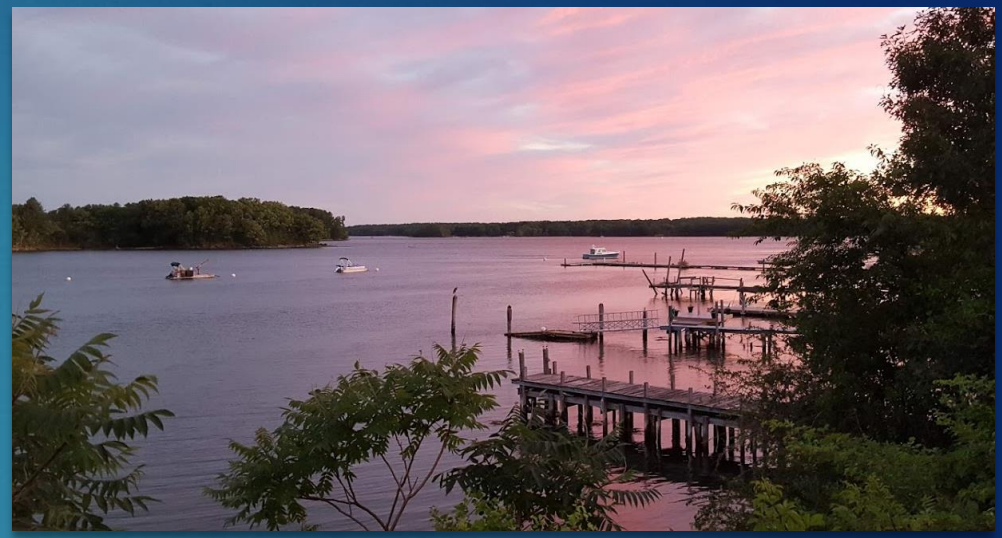

Summary Document Purpose

- The purpose of this slide deck is to summarize the findings from my dissertation research in a shorter form than the full document.
- This version is being made available for interested entities to consider in their work, students/researchers to review, and interviewees as a report back on the findings.
- Full dissertation is available: https://scholars.unh.edu/dissertation/2495/
- I am currently working on submitting various papers for publication in scholarly journals that will hopefully be published at a later date.
- Addt'l presentations/summaries for each case are available on request.
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Research Question

How do cross-sectoral engagement opportunities influence science intensive disputes over the management of coastal and ocean resources?

Abstract

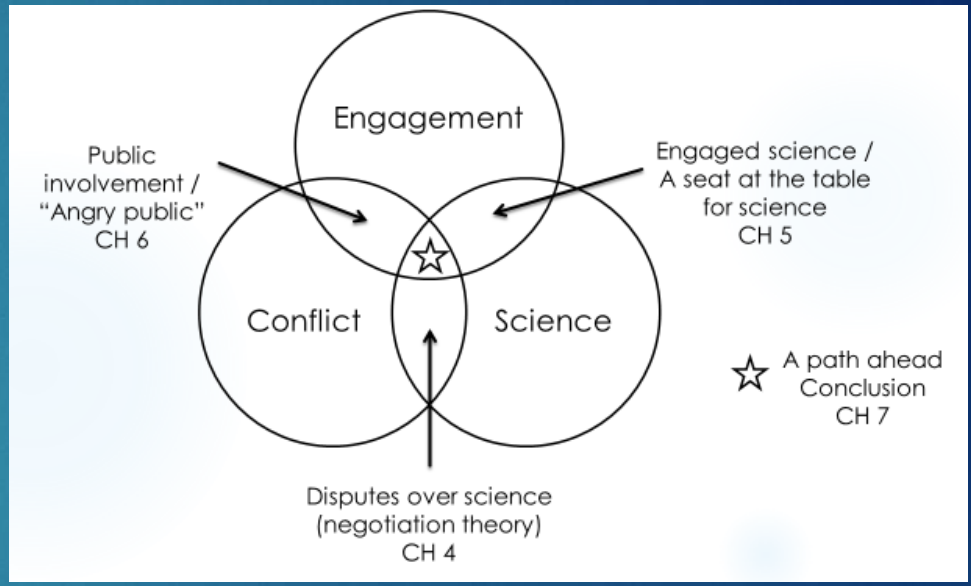
It is widely accepted that public policy decisions that account for scientific and technical advice are likely to improve outcomes for all. With more data and information available though, it is becoming increasingly difficult to even agree on the baseline facts. This research explores the question: ***How do cross-sectoral engagement opportunities influence science intensive disputes over the management of coastal and ocean resources?*** To address this question, I studied two cases in New England: 1) marine fisheries management (Northeast Multispecies Complex aka groundfish) and 2) estuarine water quality management (Great Bay, New Hampshire). Informed by participant observation and semi-structured interviews with researchers, managers, and the regulated community within each case, findings from this research are presented in three analyses: 1) examining the potential role negotiation theory can play in better understanding these dispute cases; 2) understanding how science is used within the existing processes as well as whether there is interest in and potential for more collaborative approaches; and 3) understanding the impacts of engaging across different groups of perspectives. Taken together, the findings from these analyses show that when done well, cross sectoral engagement activities help to develop relationships, open lines of communication, and expand individual and collective understanding of the issues at hand (not driven by just one group view). These types of engagement activities also create space for creative solutions. While decisions will ultimately still need to be made and "value claimed," processes that enable a more complete picture and an expansion of the ideas at the table will ultimately be more resilient and adaptive in the face of change. These approaches can be hampered by poor process design, power imbalances, lack of resources, use of legal tools in adversarial as opposed to collaborative approaches, limited familiarity with potentially beneficial approaches from negotiation (mutual gains and/or principled), and lack of training and/or exposure to other perspectives or ways of thinking. Taken together, efforts to think differently about systems approaches, changes to research processes, new perspectives on stakeholder engagement, and multi-partner collaborative efforts might help make the jump towards progress in social-ecological systems.

Definitions

- **"cross-sectoral engagement":**
  - Opportunities for individuals working in or representing different stakeholders or groups within a social-ecological system to interact in a meaningful way. This could include (but is not limited to) training workshops, public councils/forums, cooperative research, etc.
- **"science intensive disputes":**
  - Conflicts that are defined in part by a specific challenge to the science used in the situation. This includes cases where a lawsuit has been threatened and/or filed that challenges the validity of the science involved.
- **"management of coastal and ocean resources":**
  - Living and non-living resources found across the spectrum of land-side coastal areas (the inland boundary of the U.S. coastal zone as defined by each state) out through waters under the jurisdiction of coastal nations (EEZ) are considered coastal for the purposes of this research. Their management includes the range of policies, law, regulations, and practices that govern associated human uses.

Outline

1. Introduction
2. Theoretical Background
3. Methods and Case Overviews
4. Can you live with it? Using negotiation theory to better understand disputes in coastal and marine social-ecological systems
5. A seat at the table for science: Collaborative approaches to bridge the science-policy divide
6. An "angry public" no more? Engagement across groups as a tool to address disputes over science in coastal and marine social-ecological systems
7. Conclusion



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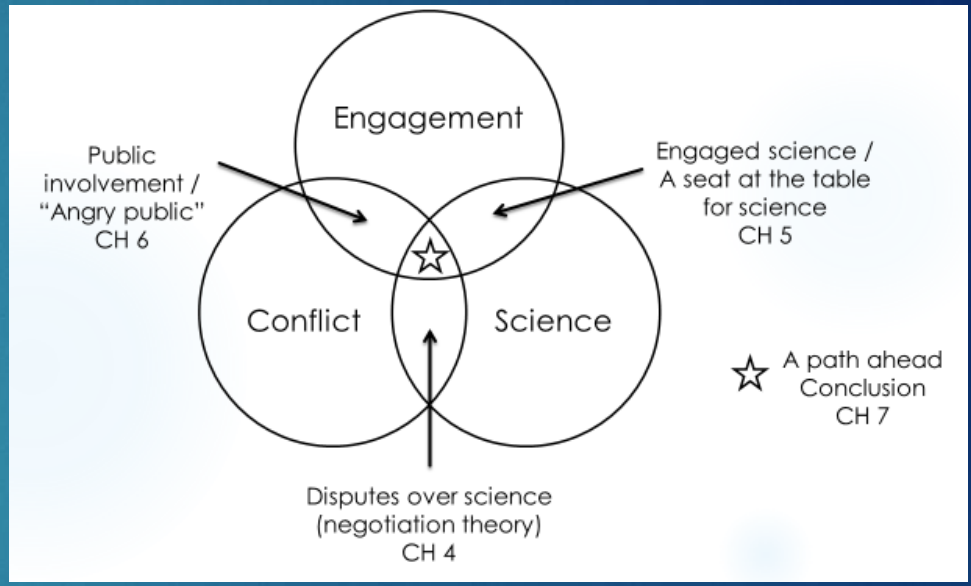
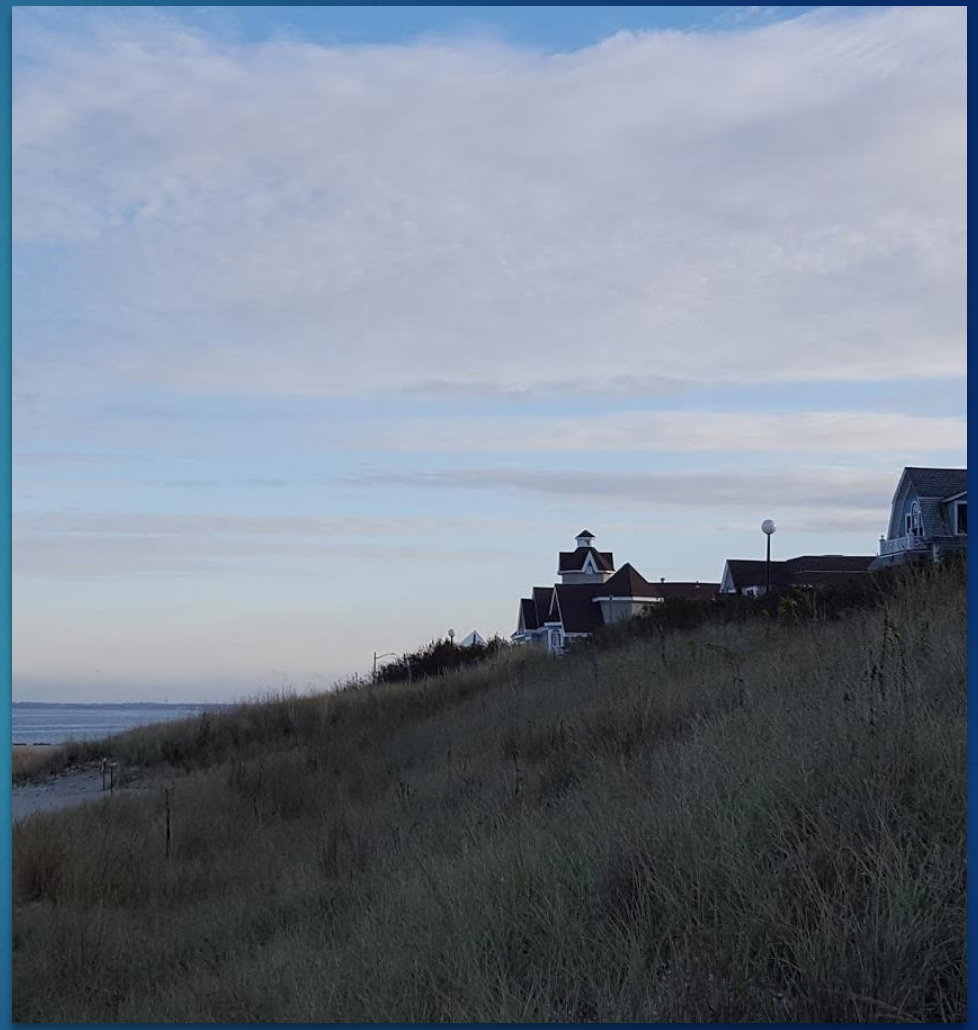


See pages 16-69

Theory and Context

- Social – ecological systems
  - (Bruckmeier, 2016; Cox, 2014; Levin et al., 2013; McGinnis & Ostrom, 2014; Ostrom, 2007)
- Feedback in social – ecological systems
  - (Cvitanovic et al., 2015; Dyball & Newell, 2015; Ford, 2009; Levin et al., 2013)
- Science for public policy
  - (Hoffman, 2012; National Research Council (2008); Ozawa, 2009; Theodoulou, 2013)
- Science for sustainability
  - (Cash et al., 2003; Dunn & Laing, 2017; Posner et al., 2016; Sarkki et al., 2015).
- Negotiation and conflict resolution
  - (Fisher, Ury, & Patton, 2011; Matsuura & Schenk, 2017; Ozawa & Susskind, 1985; Susskind & Field, 1996)



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Joint Fact Finding Overview

Table 2.1. Synthesis of approaches to Joint Fact Finding (text within body of the table is drawn directly from the noted sources).

	Ozawa & Susskind (1985)	Ehrmann & Stinson (1999)	Karl et al. (2007)	Adler (2014)	Susskind (2014)	Matsuura & Schenk (2017a)	Susskind, Field, & Smith (2017)
Scope/ Assess	frame the research questions	Define issues of concern	Prepare for JFF Scope the JFF process	Start Scope	Scope the dialog	Assess the need for JFF Convene multi-stakeholder process	Assess the need for JFF Convene the stakeholder process
Define	select the researchers specify the method of inquiry	Define questions to be asked and methods of analysis	Define the most appropriate methods of analysis Define process for getting information	Plan Convene	Jointly chose experts Define the appropriate method of analysis Clarify roles and responsibilities	Scope the research agenda	Define the scope of the study
Conduct	monitor the work		Conduct the study	Research and deliberate Align Produce		Conduct the research	Conduct the study
Review		Define limitations of analysis and methods	Evaluate the results of JFF	Deliver	Assess tentative findings together	Evaluate the results	Evaluate the results of the study
Use		Define the best way to proceed	Communicate the results of the JFF process		Communicate results.	Communicate the results	Communicate the results of the JFF process

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Table 2.2. Negotiation theories and science for sustainability conceptual interaction (see pages 51 and 104)

		Science for Sustainability (Cash et al., 2003)		
		Credibility	***Legitimacy***	***Salience***
Mutual Gains (Susskind and Field, 1996)	*"acknowledge the concerns of the other side"*	Tension in accounting for other scientific perspectives and generating repeatable outputs for decision makers impacts credibility of science within the scientific community.	Inability to account for differences impacts perceptions of the legitimacy of science among stakeholders.	Acknowledgement of concerns can lead to science that is more salient to the actual management issues at hand.
	"encourage joint fact finding"	Joint processes can create spaces for scientists who might otherwise poke holes in each others work to bring their knowledge together.	Joint processes benefit the acceptance of the results by increasing the perceived legitimacy of the process.	Joint processes have the benefit of being tied directly to management needs, but risk hyper focus on certain concerns.
	"offer contingent commitments to minimize impacts if they do occur, promise to compensate knowable but unintended impacts"	Thinking of science as a negotiation can increase the credibility by helping scientists prepare for system responses that don't match expected outcomes.	Involvement of other groups can improve the perception of science by building in contingencies based on other groups concerns.	Science that already accounts for the possibility of unexpected outcomes is more likely to maintain a seat at the table in management processes.
	"accept responsibility, admit mistakes, and share power"	Sharing power can be difficult in settings with very different structures of perceived authority (i.e. scientists, managers, regulated entities).	Sharing power in a scientific setting opens up the black box and can increase perceived legitimacy.	Sharing power is essential to designing research and monitoring that meets applied needs.
	"act in a trustworthy fashion at all times"	Acting in a trustworthy manner builds opportunities for enhanced credibility	Acting in a trustworthy manner with other scientists as well as with managers and regulated entities builds legitimacy	Acting trustworthy may increase the likelihood of people invited into applied venues that can increase the salience of future work for scientists.
	"focus on building long-term relationships"	Processes that remind participants (inc. scientists) of the importance of building relationships can enhance credibility.	A transparent and inclusive scientific process builds relationships that can be drawn on in the long term.	Different models of funding science/research lend themselves to different relationship structures and relevance to the issue at hand.
Principled Negotiation (Fisher, Ury, and Patton, 2011)	*"Separate the people from the problem"*	Differentiating disagreements about science questions from those about policy solutions can open doors	While people connected with an issue may exhibit behaviors that make them difficult to involve, their inclusion is essential to the perceived legitimacy of the process and outcomes (including science).	"I didn't understand what we were really asking of science and how hard that is to do.
	"Focus on interests not positions"	"Positions" exist in science and can decrease credibility if perceived to outlive the weight of evidence.	"Positions" in science can also derail efforts and decrease views of the legitimacy of the work.	There is a tension between research to support positions and research that is "salient" to the issue at hand.
	"Invent options for mutual gain"	Science can be the source of new ideas that benefit the system if developed in ways that are viewed as credible.	Science can be the source of new ideas that benefit the system if developed in ways that are viewed as legitimate.	Science can be the source of new ideas that benefit the system if developed in ways that are viewed as salient to the issue at hand and the local context.
	"Insist on using objective criteria"	Objectivity and transparency build credibility	Objectivity and transparency build perceptions of legitimacy by helping those impacted see how science decisions were made.	Objectivity and transparency can help build connections to conduct science that is more salient to the issue at hand.

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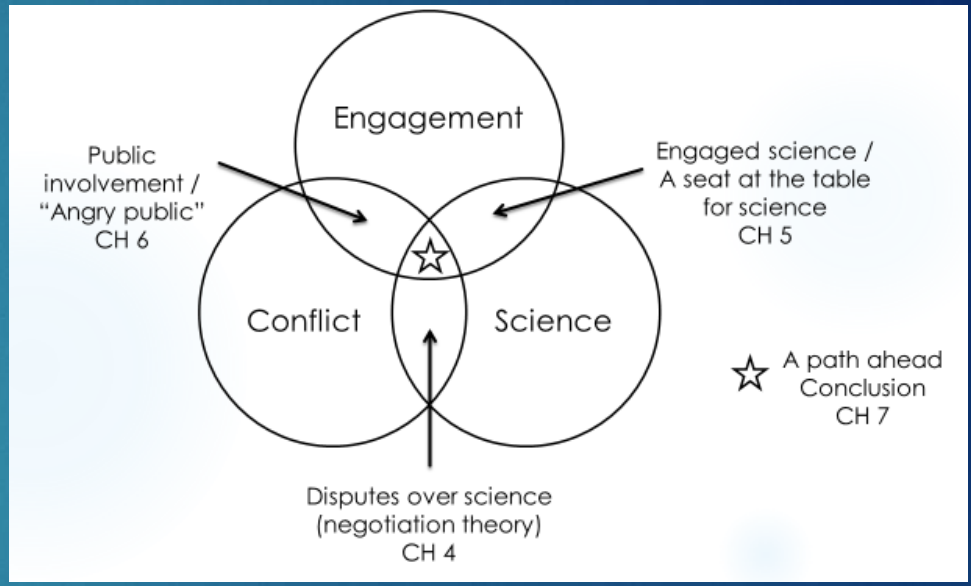

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Methods

- Case study method (Burawoy, 1998; Yin, 2013)
  - New England Groundfish Management
    - Stock assessment science challenges
  - Estuarine Water Quality Management (Great Bay, NH)
    - Nutrient loading, impairment status
- Data Collection (Emerson et al, 2011; Seidman, 2013)
  - Participant observation (29 public events)
  - In depth semi-structured confidential interviews (34 people)
- Analysis
  - Nvivo 12 QDA and Excel to support analysis using a priori theoretical codes and grounded theory (Adu, 2016; Bazeley & Jackson, 2013; Emerson et al., 2011; Gale, et al. 2013; Saldana, 2016; Small, 2011; Strauss & Corbin, 1998; University of Aukland, 2017).
- Drawing on multiple disciplines:
  - sociology, anthropology, public (env) policy, negotiation and dispute resolution, systems approaches (ie. social-ecological systems)

	Scientists	Managers	RegCom	Total
New England Groundfish Mgmt.	7	7	5	19
Great Bay Water Quality Mgmt.	7	4	4*	15
TOTAL	14	11	9	34

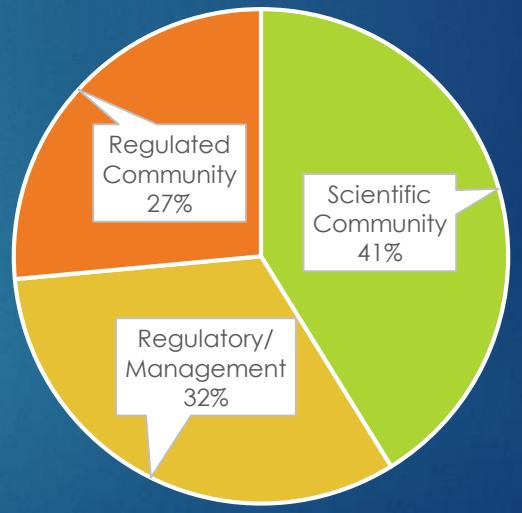
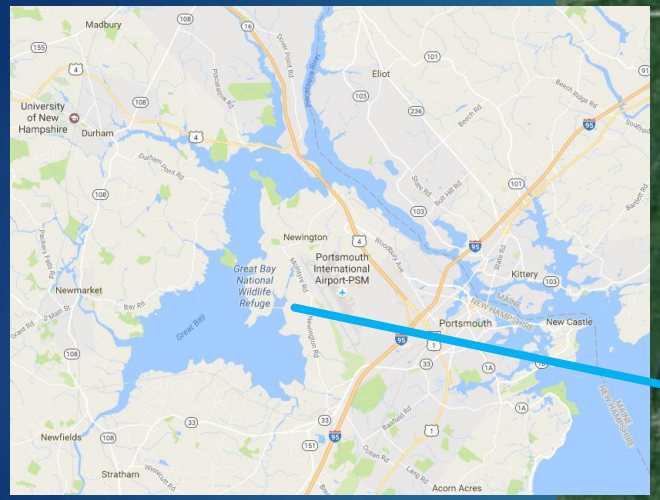


Figure & Table: Distribution of interviewees

See pages 70-94

Study Area – Site Selection and Rationale

Estuarine water quality management (Great Bay, NH)



★ = UNH

Québec City
NEW BRUNSWIC
Fredericton
Montreal
Sherbrooke
Saint Joh
MAINE
VERMONT
Portland
NEW HAMPSHIRE
Albany
MASSACHUSETTS
Boston
Providence
CONNECTICUT

Marine Fisheries Management (New England groundfish)

Case Overviews

	U.S. Marine Fisheries Management (Northeast Multispecies Complex)	Estuarine Water Quality Management (Great Bay, NH)
Ecological context	coastal/offshore; population dynamics; habitat; species interactions; climate	estuarine/nearshore; hydrodynamics; biogeochemistry; multiple watersheds
Social/ cultural/ economic context	historic, cultural, economic, food systems, etc.	cultural, recreational, economic, multiple jurisdictions, etc.
Actors/ Stakeholders (orgs/types)	NOAA (reg., science, partnerships), fishermen, industry groups, ENGOs, academic researchers, etc.	EPA (reg., science, partnerships), municipalities, ENGOs, state agencies, academic researchers, etc.
Legal/ policy context	Magnuson Stevens Act primary, others	Clean Water Act primary, Coastal Zone Management Act, others
Scientific context of dispute	Stock assessment science used to set catch limits	Scientific report used to determine impairment status
Legal Challenge to Science	Massachusetts v. Pritzker (2013)	Dover v. NHDES and Dover v. EPA
Required public engagement	Under MSFCMA and NEPA	Under CWA and NEPA + DES/NH requirements
Cross sectoral engagement examples	Marine Resource Education Program (MREP); NH SeaGrant gear workshops; cooperative research	Piscataqua Region Estuaries Partnership workshops; Great Bay NERR Coastal Training Program

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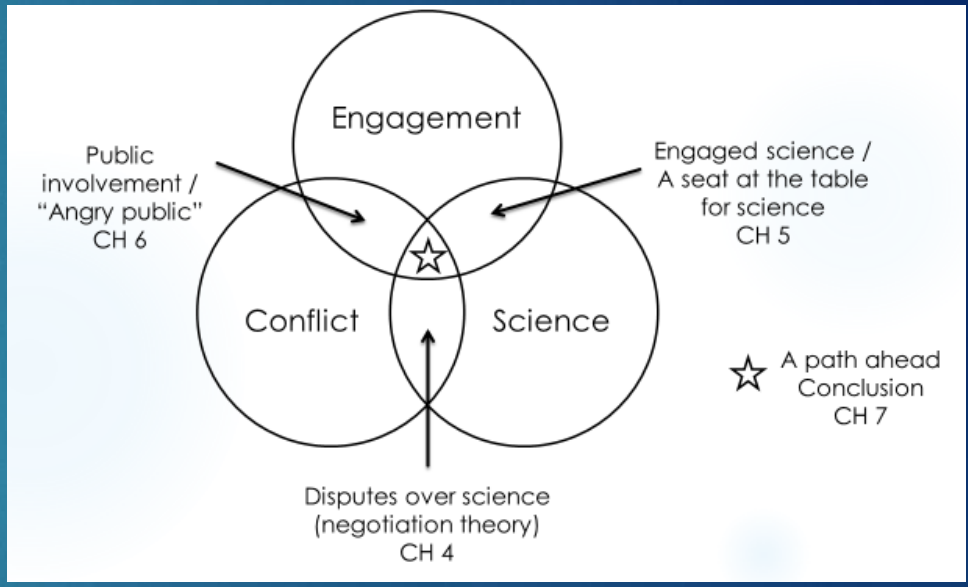

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Negotiation: Context

- Goal: using negotiation theory to better understand disputes
- Science as a negotiation
- Two theories of negotiation:
  - principled negotiation (Fisher et al. (2011)):
    - "Separate the people from the problem
    - Focus on interests not positions
    - Invent options for mutual gain
    - Insist on using objective criteria."
  - mutual gains approach (Susskind and Field (1996):
    - "Acknowledge the concerns of the other side,
    - encourage joint fact-finding,
    - offer contingent commitments to minimize impacts if they do occur, promise to compensate knowable but unintended impacts,
    - accept responsibility, admit mistakes, and share power,
    - act in a trustworthy fashion at all times,
    - focus on building long-term relationships."

Negotiation: Results (1)

- Perceived divisiveness as context
- Average = 3.67 (scale 1-5)
- Groundfish dispute perceived to be more divisive than Great Bay
- Highest = groundfish regulated
- Lowest = Great Bay regulated
- Managers generally viewed same (3.7 vs. 3.75)

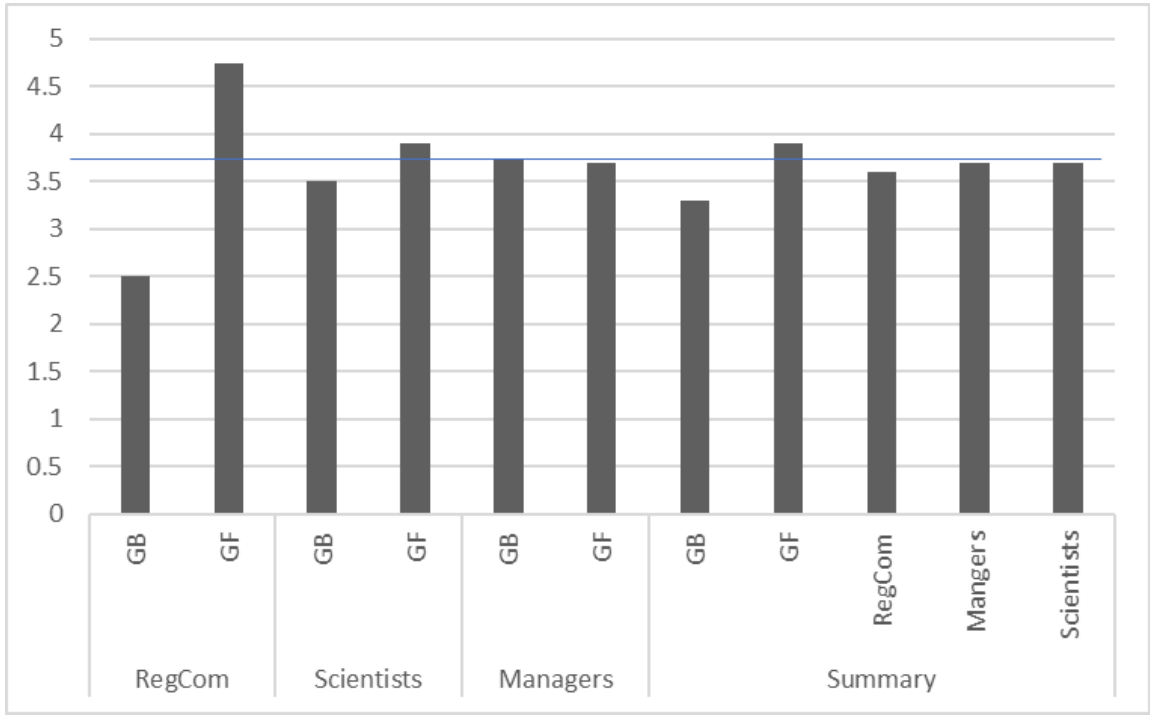

Figure. Summary of interview responses on how divisive the disputes over management of the resources in their respective cases are (scale of 1-5, 1 = not very divisive, 5 = very divisive).

Negotiation: Results (2)

- Principled Negotiation (examples):
  - *"they staked out their positions and they said, 'This is right.' **They created their talking points and stuck to them** for a while, and I think [group] and others have done a good job in having them **come to the table** and give up some of those positions."*
  - *"The only way you can move forward is to **create a space** where it's okay to explore alternatives before you decide things. **There's a deep hesitancy to do that**."*

- Mutual gains approach (examples):
  - *"the scientists, I thought, were honest and took responsibility for what happened and did their best to explain why"*
  - *"… the reason there is no trust is because **you can't possibly be right all the time**. … in order to trust the system, [regulated community has] got to see that their input is taken into account. Not all the time, but at least once in a while."*

Negotiation: Results (3)

- Impact of legal processes:
  - Views that lawsuits where driven by:
    - perceived imbalances in impacts of a decision (typically financial),
    - frustration (feeling unheard, perceived failure of process),
    - lack of transparency or communication, feeling caught off guard,
    - not getting outcome you wanted, or
    - perception that it's less costly to pay lawyers than accept financial impact of change.
  - Example quotes:
    - *"when the lawyers started becoming involved **… we held our cards very close** to the vest and so **we shared less** information than we probably would have otherwise. We were very careful about what we said or what we wrote."*
    - *"I think that impacts the way they present themselves in meetings. **It breeds a very certain black-and-white type of approach to things**, … they don't have the luxury of being like, 'Well, maybe. I don't know. Maybe I was wrong. I don't know.'"*

Negotiation: Results (4)

- Perceptions of impediments as path to negotiated solutions
- Scientific uncertainty viewed as more of an issue for managers and regulated communities than for scientists
- All viewed narrow focus on system components as issue

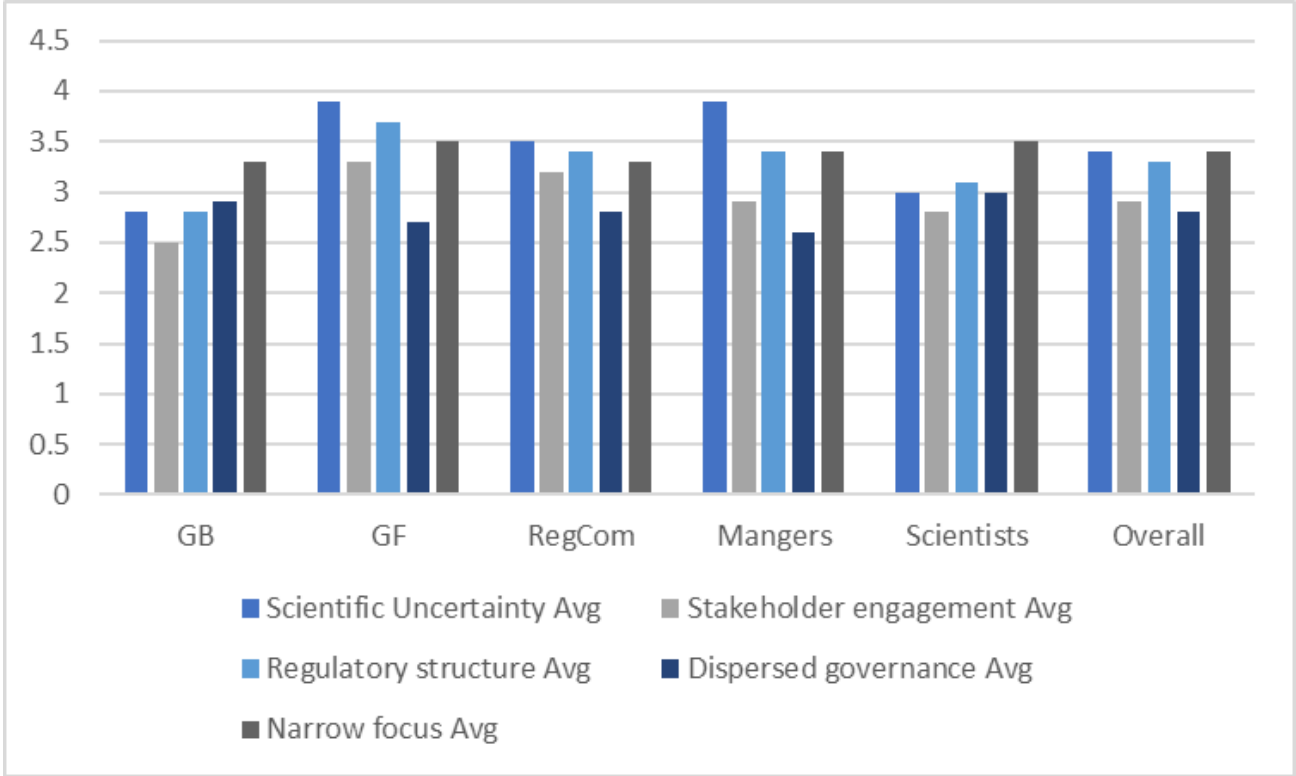

Figure: Respondent rating of their perception of how much certain items were impacting the ability to move forward through the conflicts in each of their respective cases (scale of 1-5, 1 = low impact, 5 = significant impact)

Negotiation: Discussion / Conclusion

- Evidence of mutual gains and principled negotiation
- Elements that make it difficult to move away from traditional hard bargaining approaches
- Impact of legal processes – adversarial elements, limitations on creativity, different end goals (focus on disagreement or on areas of agreement?), court processes can't resolve underlying issues
- Benefits of viewing science as the product of a negotiation
  - E.g. saving face, avoid surprises, etc.
- Benefits of negotiation mindset to creating space to build relationships

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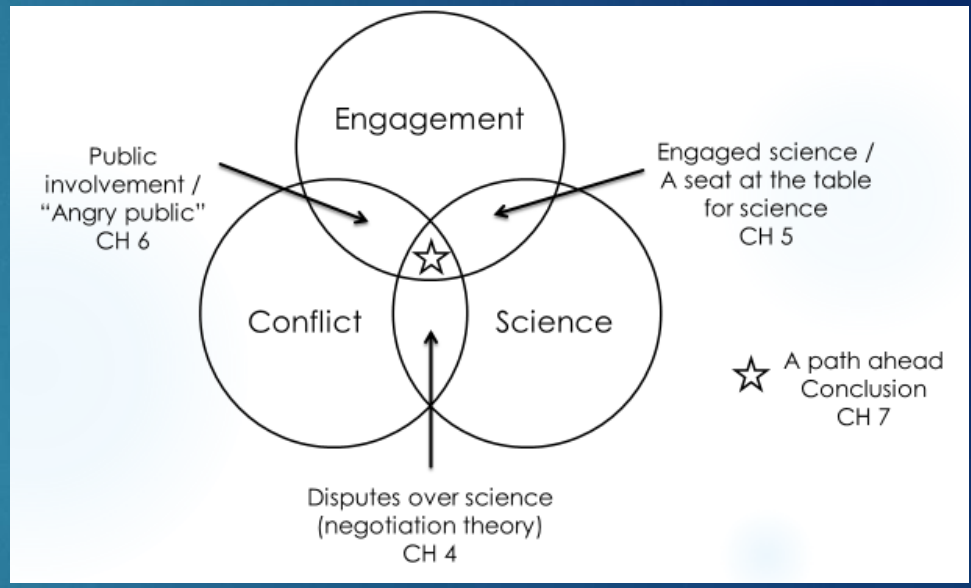

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Science-Policy: Context

- Goal: Exploring how collaborative approaches to science may be able to bridge the science-policy divide

- Science for sustainability (Cash et al., 2003; Posner, McKenzie, & Ricketts, 2016):
  - Definitions of effectiveness involve more than just the solution,
  - Effectiveness focused in on credibility, legitimacy, and salience:
    - Credibility refers to the scientific adequacy and scholarly rigor;
    - Legitimacy acknowledges that the production of the information has been "respectful of stakeholders' divergent values and beliefs, unbiased in its conduct and fair in its treatment of opposing views and interests;"
    - Salience accounts for the "relevance" of the science or information to the issue at hand.
  - The role of "boundary work."

Science - Policy: Results (1) - Three Words to Describe (joint)

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		Three words to describe Mgmt – Themes	Three words to describe Science – Themes
RegCom	GB	in slow transition, positive trend, needs more improvement	evolving/progressing, has gaps, more data needed
	GF	broken, in need of repair, unresponsive	more data needed, too complex, inconsistent
Sci	GB	improving, lacks resources, difficult	needs better organization, misaligned, pretty good
	GF	improving, troubled, inefficient	more data needed, good people, biased
Managers	GB	complicated, collaborative, heading in right direction	evolving/in flux, under resourced, incomplete
	GF	evolving, resource limited, contentious	improving but still incomplete, inconclusive
Summary	GB	complicated; improving; needs more improvement	Incomplete; progressing
	GF	contentious; challenging; uncertainty	needs more (data, comprehensive approach, coordination, resources, etc)
	Reg	needs improvement	needs more data
	Sci	contentious; work in progress	needs to be more comprehensive; needs more data
	Mgmt	complicated; contentious; needs more science	incomplete; in flux; evolving

KEY: GB = Great Bay; GF = Groundfish – Reg = Regulated Community; Sci = Scientific Community; Mgmt = Management/Regulator Community

Science - Policy: Results (2) - Stop, Continue, Start (joint)

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		Stop – Themes	Continue – Themes	Start – Themes
RegCom	GB	Pitting communities against each other; working individually	Working together; PREP	More opportunities to exchange ideas and learn; collect data across parties; have one guiding plan
	GF	Complexity of regulatory process; sectors; current assessment process	NEFMC; Collaborative research; Research on interactions	Collecting/using localized data; using fisheries dependent data; multi-species mgmt.
Scientists	GB	Fighting / $ on lawsuits / legal arguing; discharges / releases; development	cooperation/collaboration; PREP; optimizing treatment	comprehensive but adaptive approach; education; LID as standard
	GF	illegal activities; inaccurate reporting; inaccurate behavior w/ observers	MREP; cooperative research / collaboration	Incorporation of collab research; venues for sharing perspectives; centralized landings data; Monitoring improvements
Managers	GB	fighting / $ on lawsuits; questioning the science; hyper focus on one pollutant	Being sincere about collaboration; SOOE process; public engagement	More holistic science; more investments; more non-point focus
	GF	excessive lawsuits; micro managing; misreporting of data	Cooperation/collaboration; spawning protections; public input	Expand collab research; improve monitoring; incorp industry data meaningfully
Summary	GB	Fighting	PREP, SOOE, broad engagement	Comprehensive/holistic science; opportunities to exchange / collab
	GF	No pattern	Cooperation / Collaboration across all (research, MREP, etc).	Using industry data; expanded collab research; venues for sharing perspectives
	Reg	No pattern (case specific items)	Opportunities to work together	Involving regulated entities; using data from mult. Sources
	Sci	No pattern (case specific items)	Collaborative approaches	Collaboration
	Mgmt	Time/$ on lawsuits	Collaborative approaches	Sincere and expanded collaboration

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Science - Policy: Results (3) - Management / Science Change (joint)

See page 125

		Mgmt Change -Themes	Science Change – Themes
RegCom	GB	$; stormwater/nonpoint approach	$; timely publications; communication
	GF	Stock assessments; communication; data collection; MSA-NOAA- Council roles	Year round / continuous / localized sampling w/ fishing vessels; use fishery dependent data
Scientists	GB	Comprehensive look; $ to involve stakeholders; reduce Nitrogen	Comprehensive assessment; research to address mgmt. needs; stable / increased $; improve monitoring/modeling feedback
	GF	Stock assessment process / accuracy; sectors; integrated data collection; monitoring	Stock assessment process; more collab w/ industry; more $ and more/better data
Managers	GB	Focus on more than just WWTP; more resources	More $, research, groups, monitoring, etc
	GF	Alternative assessment methods; American consumer habits; increase collaborative research; monitoring	Alternative assessment methods; $ for EBM; increase collaborative research; monitoring and industry surveys
Summary	GB	More resources ($ for mon, $ for loans, $ for stakeholder engagement)	More funding (long-term monitoring, etc).
	GF	Stock assessment process	Include industry and industry data
	Reg	No pattern (case specific items)	more data (and more use of existing data)
	Sci	No pattern (case specific items)	More comprehensive; more tie to mgmt.; more $; more monitoring
	Mgmt	More monitoring and research	More collaboration; use of other data sources; more resources

KEY: GB = Great Bay; GF = Groundfish – Reg = Regulated Community; Sci = Scientific Community; Mgmt = Management/Regulator Community

Science - Policy: Results (4)

- Credibility
  - *"other scientists feel that we're just **making what's a difficult job even more difficult**. And managing [issue] is difficult. When you don't accept the science, it just makes the job more difficult. And so, they think it's making trouble."*
  - *"there are a handful of **obstructionist, fierce defenders of the status quo**, which is not to me what science is about. I mean, science evolves constantly as your knowledge increases, you have to change your views."*
- Legitimacy
  - *"they **haven't been involved enough** in the research to actually trust the science"*
  - *"if you don't believe our data, **imagine how we feel** about your science."*
- Salience
  - *"I think it's worked best when whatever mechanism there is for gathering data is designed in a way to answer the management question. And that's not always been the case especially in [x] where **a lot of policies have been put into place based on monitoring programs which are not designed to answer the questions**."*
- Interaction between themes:
  - *"sometimes simpler is better, but unfortunately as a scientist, **you don't get a lot credit for simple**"*

Science - Policy: Discussion (1)

Figure 5.1. Conceptual model for intersection of credibility, legitimacy, and salience in support of use of science. *While credibility is generally viewed as the perception within the scientific community, these elements are visible to others and impact the overall perception.

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Science-Policy: Discussion (2)

- Challenges:
  - participants "mistak[e] different research approaches and competencies for faulty or unintelligible scholarship" (Khagram et al., 2010).
  - "disciplinary chauvinism" (Younglove-Webb et al., 1999)
  - New / sophisticated approaches might hold weight in academic circles, but may not assist managers (Ferguson et al., 2016).
  - Those with technical knowledge may need to be reminded that their role is to "educate not intimidate" (Ozawa, 2009).
- Benefits:
  - Questions are not designed to embarrass experts, but rather to help all parties understand the findings and their implications (Susskind et al., 2017).
  - Iterative processes to create more useable science (Ferguson et al., 2016; Posner et al., 2016).
  - More inclusive structures meet immediate scientific and management needs, but also have larger cultural and democratic value.
  - Mechanism to address collective interests (more data, inclusion, applied work, etc).

Science-Policy: Conclusion (1)

- Current approaches are not adequately integrating "science, values, and interests" into decision-making (Karl et al., 2007).
- Value of confidential stakeholder interviews
- Desire to collaborate, to contribute data
- Credibility and salience feed perceptions of legitimacy
- "Enabling co-creation, then – or operationalizing it – means finding practical ways to work together, to deal with our different experiences, aspirations and expectations as well as the uncertainties of the future" (van Kerkhoff, 2017).

Science-Policy: Conclusion (2)

- Importance of designing context specific approaches informed by research and practice.
- Possible steps:
  - Consider the social-ecological context within which the issue sits
  - Determine the scale and relevant authorities for action
    - Consider bringing in others if the authority lies outside your purview
  - Determine external bounds on your process
  - Consider existing efforts and gaps
  - Select or adapt existing frameworks
  - Implement with continual review

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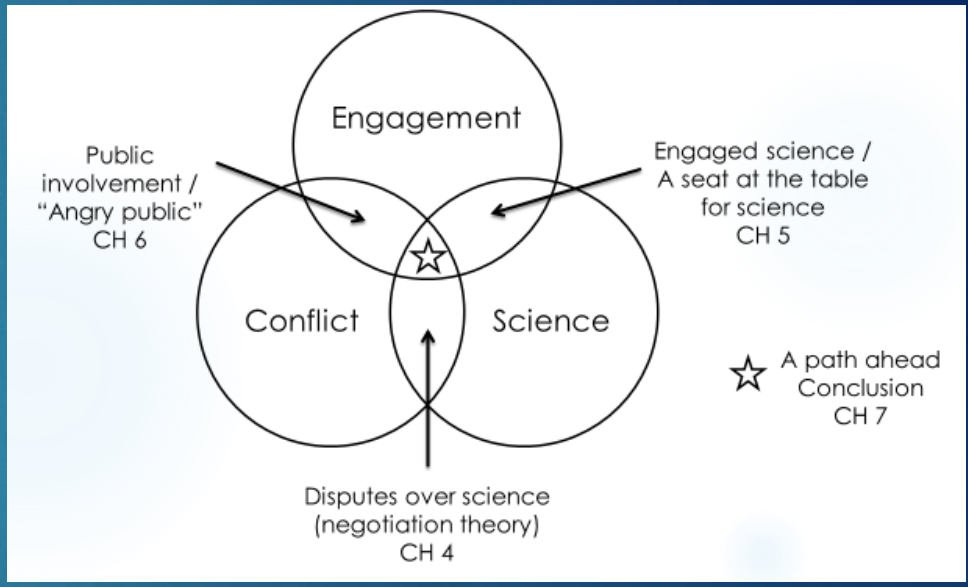
2. Theoretical Background
3. Methods and Case Overviews
4. Can you live with it? Using negotiation theory to better understand disputes in coastal and marine social-ecological systems
5. A seat at the table for science: Collaborative approaches to bridge the science-policy divide
6. **An "angry public" no more? Engagement across groups as a tool to address disputes over science in coastal and marine social-ecological systems**
7. Conclusion



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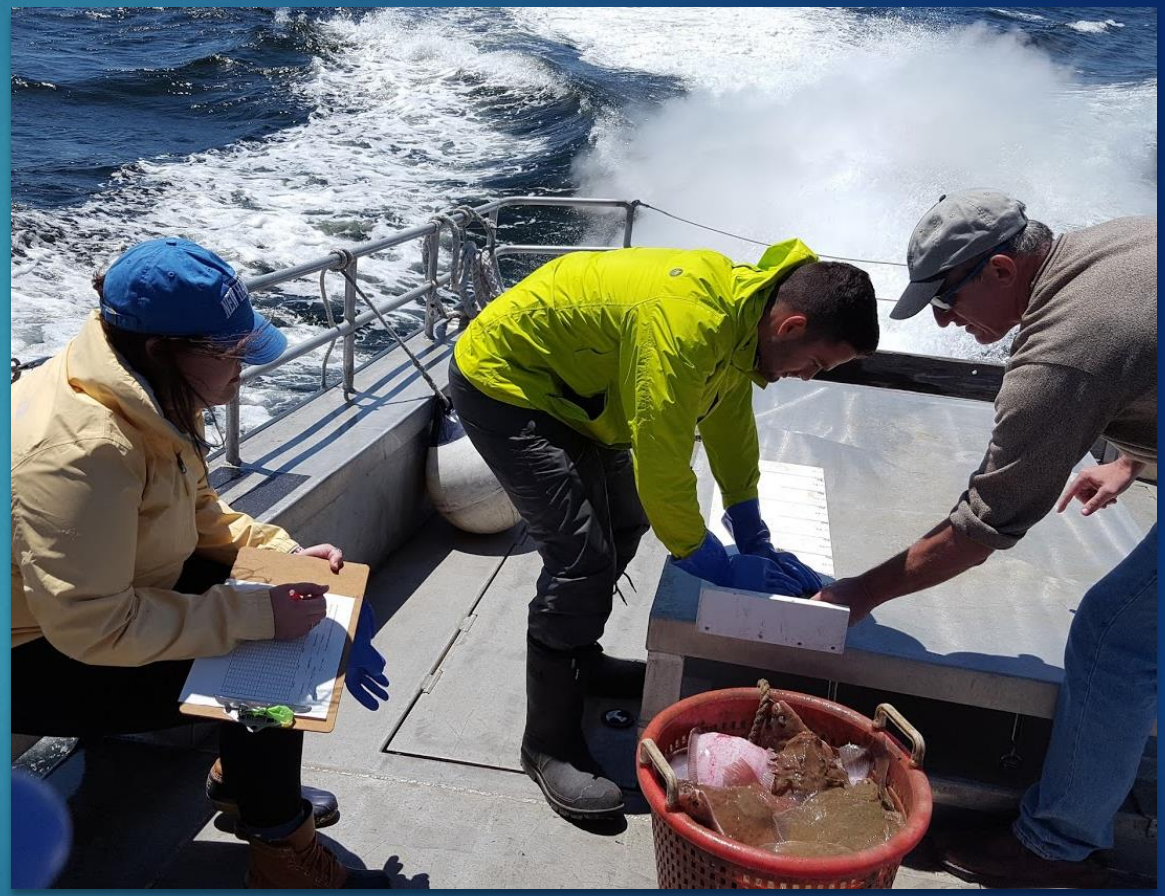
Engagement: Context

- Goal: Understanding impact of engagement across groups
- Susskind and Field (1996) set out two dire consequences for decision-makers not concerning themselves with the "angry public:"
  - 1) a decline in American competitiveness on the international stage
  - 2) "an erosion of confidence in our basic institutions"
- Decisions informed by science, but also views and values of those impacted
- Challenge of designing processes to connect



Engagement: Results (1)

- Types of Events Reported:
  - Technical / Science Advisory
  - General Advisory
  - Research Projects
  - Workshops
  - Conferences / Forums
  - General Public Events
  - Associations
  - Outreach Events
- Perceived impact highest for managers

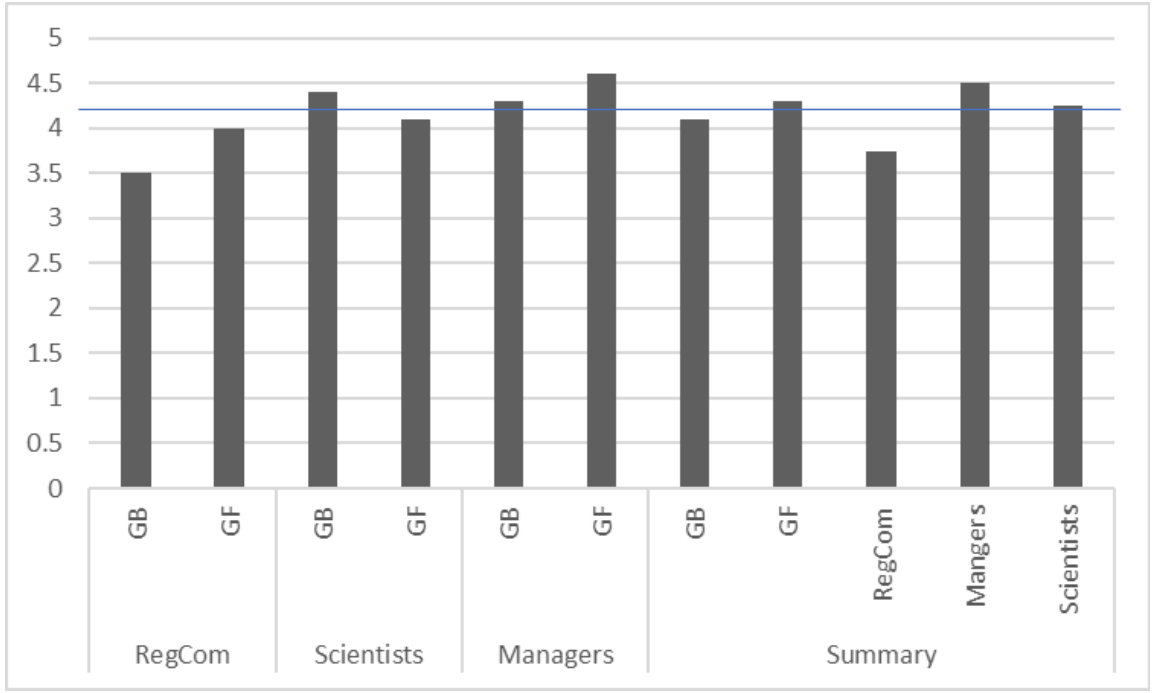


Figure. Respondent ratings of their perception of how participation in cross-sectoral events impacted their engagement with others (scale of 1-5, 1 = no impact, 5 = significant impact).

Engagement: Results (2)

Excerpt from Table 6.3. Themes of responses when respondents were asked to reflect on the impact of the various cross-sectoral engagement activity on their interactions with subsets of types of people.

		RegCom	Gov't Sci	Non-profit Sci	Academic Sci	Managers	Non-profits
Summary	GB	Some neg / some pos interactions; learned decision processes	Difficult job; care about work	Variable	Learned about work; funding challenges; mixed interactions	Learned about structures; see what's coming	Varied
	GF	Hard to generalize; capacity for dialog	Varied views	Varied views	Generally positive; impact of funding/ training on efforts	Learned about views;	Wide variation; different objectives and strategies
	RegCom	Respect for peers; lots of different opinions; talking more	Need more interaction; varied	Varied	Generally positive; mixed views	Learn what's coming; build relationships; understand roles/goals	Variation; national agendas & preconceived notions
	Sci	Hard to generalize; still figuring out	High stakes; multiple hats; can be narrow view	Variable	Mixed; different views.	Provided context and contacts; Mixed	Wide variation in roles and objectives
	Manage	Increased respect; better understanding	Difficult job; increased respect; facilitated connections	Not all agenda based	Better understanding of work; impact of funding; opportunity to connect	Learned about structures; helped see common ground; increased respect	Learned how they work / what concerns are.

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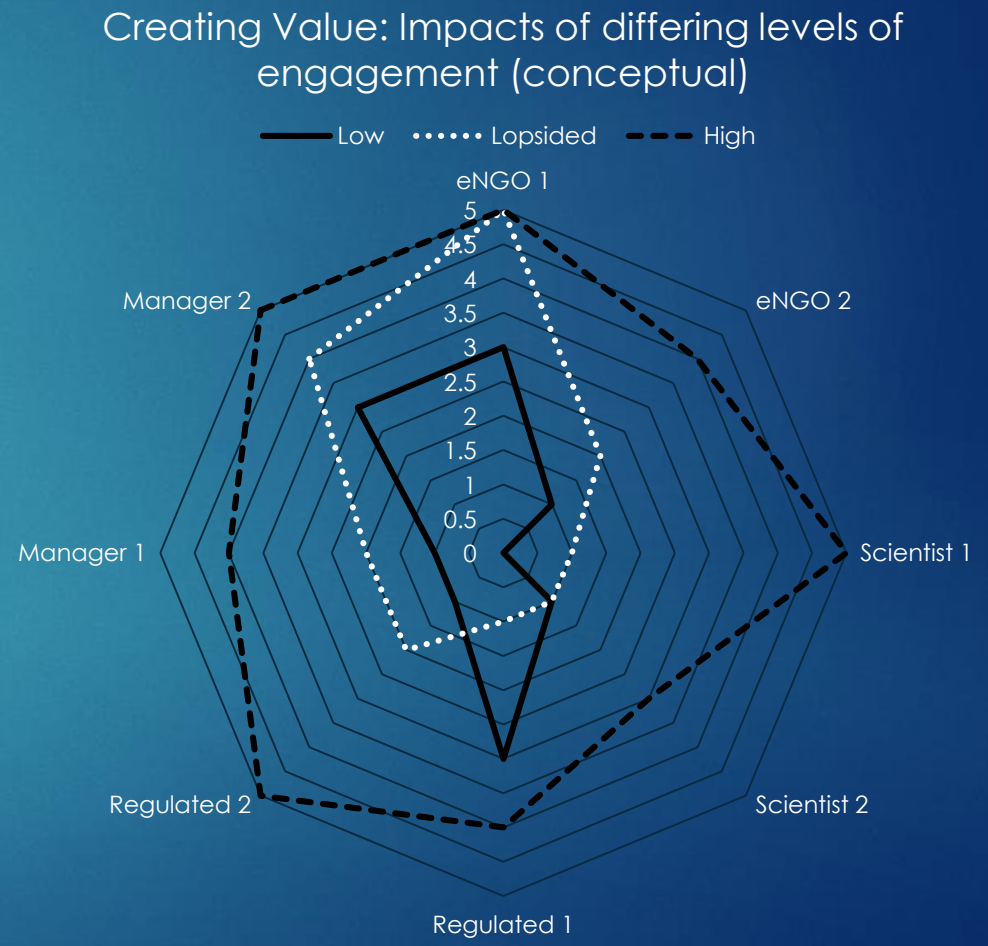
Engagement: Results (3)

- Emergent themes:
  - Empathy – e.g. "***people are putting their personal stories out*** *there [and that] definitely changed my perception.*"
  - Humility – e.g. "*So part of me says, yes, maybe we should get back to the drawing board and* ***throw away our pride for a minute*** *and just say it's fine. That didn't work. Let's start something new.*"
  - Respect (presence) – e.g. "*I think* ***I've gained more knowledge, more respect for scientists*** *and for how hard some of them work. And for how hard they really try to do right for a whole collective process*"
  - Respect (lack) – e.g. "*I've seen people be so rude to each other, it's astounding.* ***When they disagree over the science, they have to personally attack each other***"
  - Trust – e.g. "*it takes a while because collaboration, embedded in that word is relationships, embedded in that word* ***is trust, and that takes time***."

Engagement: Discussion / Conclusion (1)

- Importance of regular interaction
- Risks of poorly designed processes
- Impact of location
  - "always prefer the dock"
- Acknowledging context (history and concerns)
- Opportunity for new set of relationships



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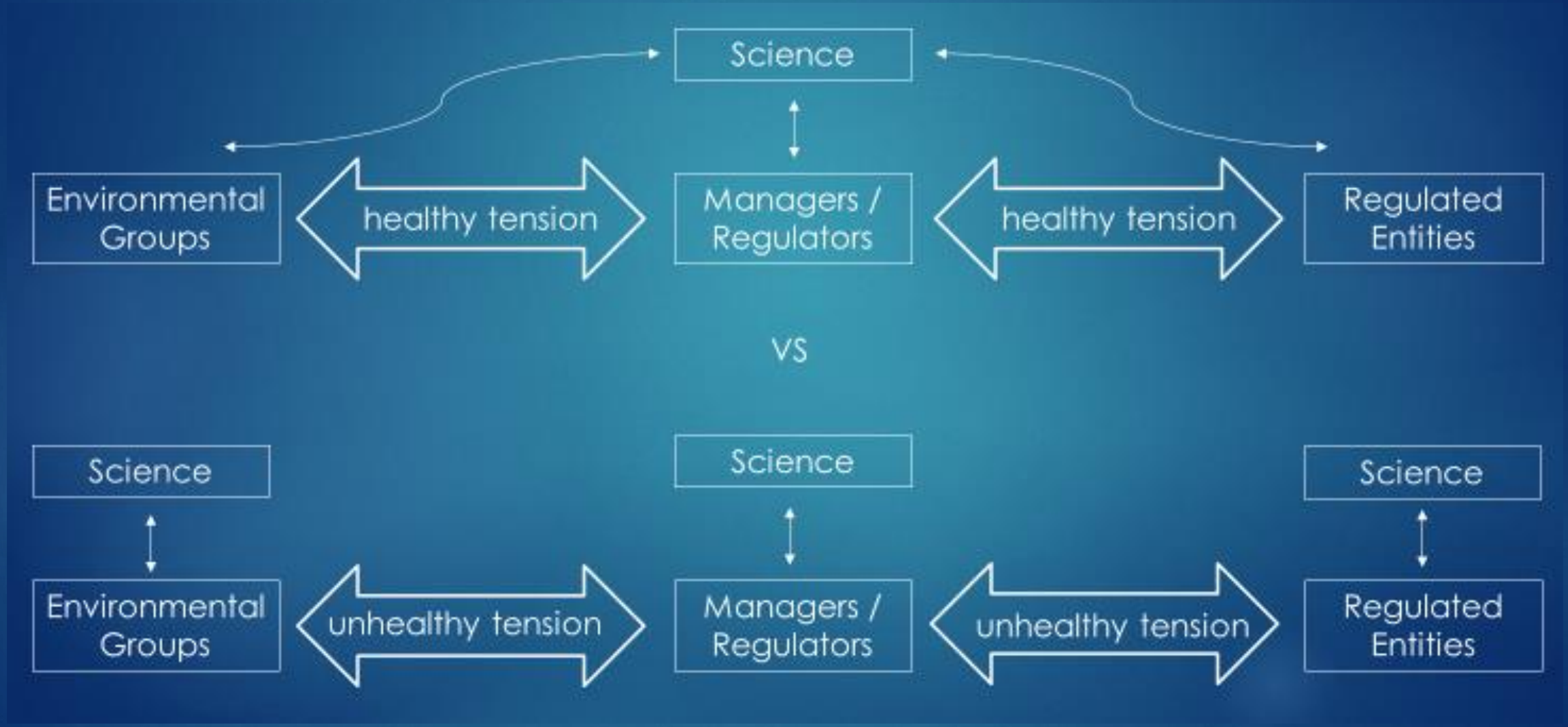
Engagement: Discussion / Conclusion (2)



Modified from Figure 6.2. Conceptual model of the healthy tension between different perspectives and the role that science can play in interacting with and supporting all sides versus separate science supporting different perspectives.

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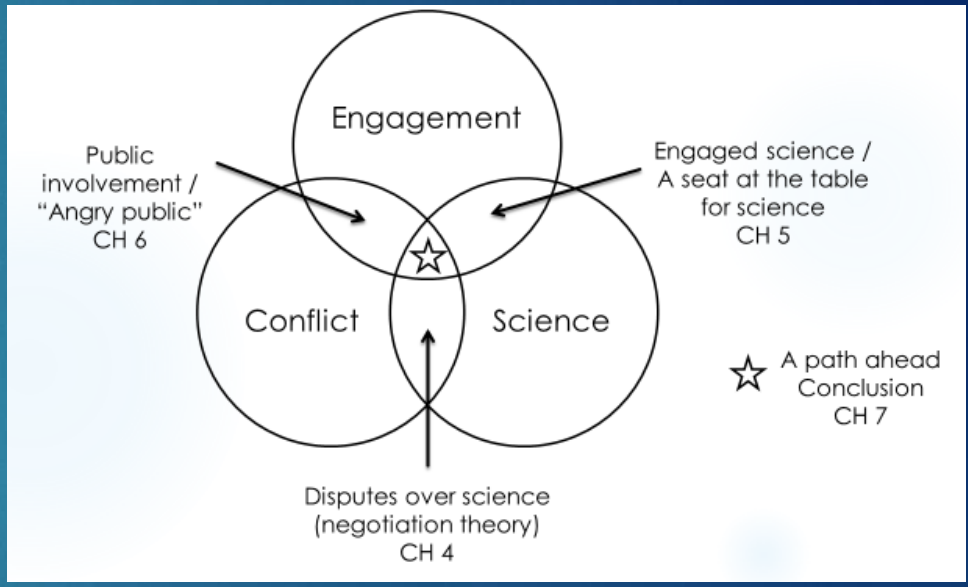

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Conclusion: Summary of Findings (1)

- Research Question: How do cross-sectoral engagement opportunities influence science intensive disputes over the management of coastal and ocean resources?
- Cross sectoral engagement activities help to:
  - develop relationships,
  - open lines of communication,
  - expand individual and collective understanding of the issues at hand, and
  - create space for creative solutions.
- These approaches can be hampered by:
  - poor process design,
  - power imbalances,
  - lack of resources,
  - use of legal tools in adversarial as opposed to collaborative approaches,
  - limited familiarity with potentially beneficial approaches from negotiation (mutual gains and/or principled), and
  - lack of training and/or exposure to other perspectives or ways of thinking.

Conclusion: Summary of Findings (2)

- By examining the potential role negotiation theory can play in better understanding these dispute cases (chapter four), it becomes possible to see other drivers for the disputes that expand out beyond just science and include resource allocation and impact questions that are influenced by the science in these and other related cases. This can also be used to enable participants to look for new approaches in how they interact with the science but also with other parties when viewed as a multiparty, multi-issue negotiation.
- Understanding how science is used (chapter five) within the existing processes as well as whether there is interest in and potential for more collaborative approaches also opens up doors to think about how science can have a better seat at the table (or a seat at all in cases where it has been excluded).
- Lastly, understanding the impacts of engaging across groups (chapter six) provides important insights to learn from each other, but also about the possibilities of designing approaches that more readily address the needs of participants and issues at stake. There continues to be a need to focus on using the best available science, while also acknowledging that the iterative nature of science can be a source of conflicts.
- These findings show that cross sectoral engagement efforts can help science be viewed as more credible, legitimate, and salient while also exposing more people to the practice of science, ideally increasing trust and therefore improving science without getting mired in unnecessary conflict.

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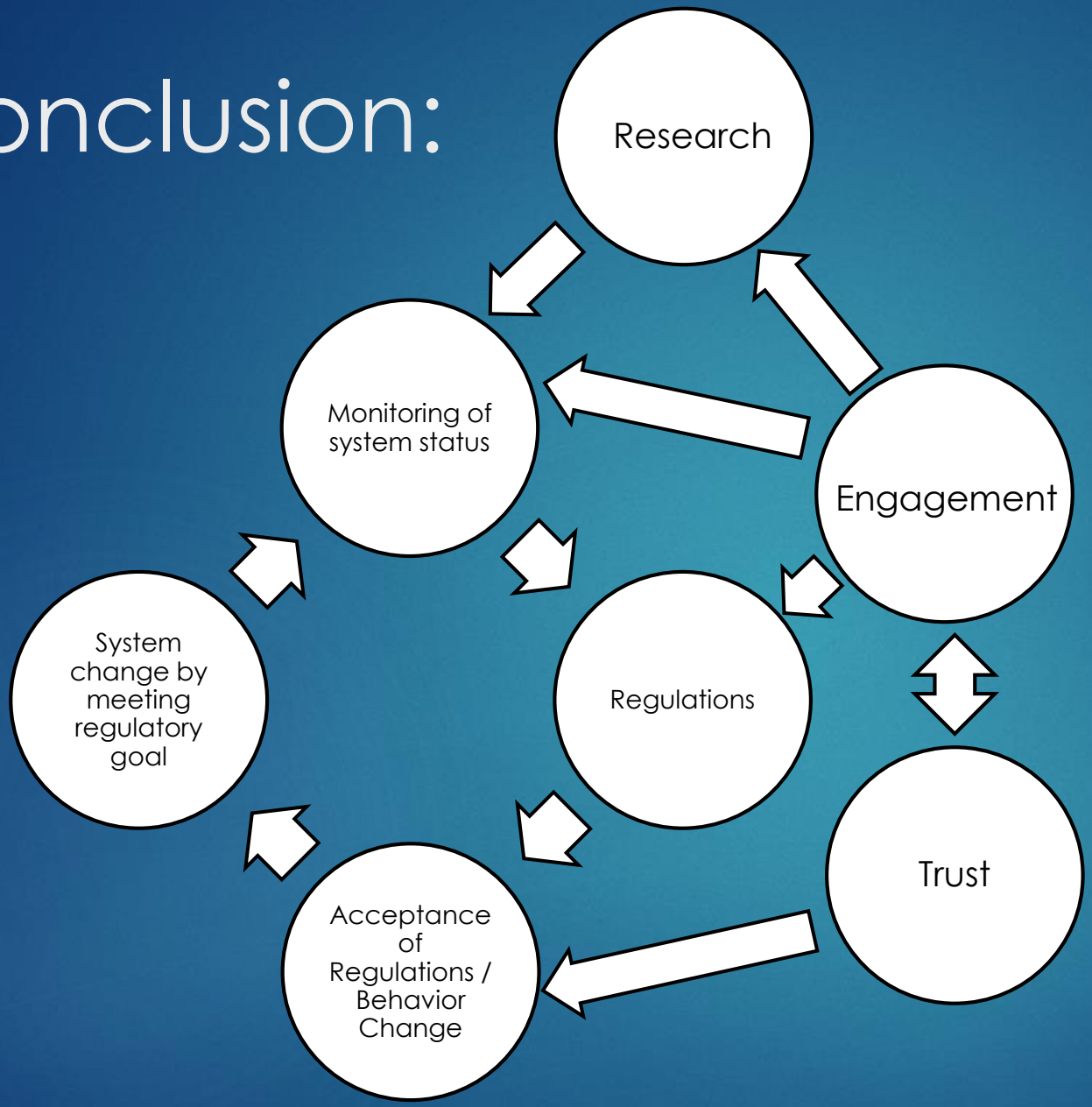
Conclusion:



- Cross sectoral engagement efforts can help science be viewed as more credible, legitimate, and salient while also exposing more people to the practice of science, ideally increasing trust and therefore improving science without getting mired in unnecessary conflict.
- Efforts to think differently about systems approaches, changes to research processes, new perspectives on stakeholder engagement, and multi-partner collaboratives might help make the jump towards real change in social-ecological systems.

Figure 7.2 Conceptual model of the interaction of science, management, and engagement in complex social-ecological systems.

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Generalized Recommendations (part I)

- Enhance systems thinking and nesting of issues within their larger context. For example, in the two cases presented here, broader use of the *State of our Estuaries* report and the *Status of the Ecosystem* reports might serve to underscore the interlinkages between system processes within and across the social and ecological components.
- Conduct mutual gains and principled negotiation training more widely, including with scientists to explore the view that science discussions and other settings are negotiations and it is possible to be more prepared.
- Increase use of existing data from multiple sources. This can serve to increase the understanding of the system, but also increase perceived credibility and legitimacy.
- Ensure that funding structures and academic hierarchies reward collaborative approaches.
- Continue to move away from the deficit model of education and engagement to one that engages more productively and on more equal footing across parties.

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Generalized Recommendations (part II)

- Managers should acknowledge other impacts and be transparent when management action is being taken because it is the most expedient way to bring change as opposed to the only impact. For example, in the two cases presented here, there was a sense that going after WWTF and after fishermen is the easiest thing to do. It may be the most expedient management lever even when there are other impacts.
- Consider mediation as a first step in collaboration approaches versus a last-ditch effort. Use the tools of legal training but to build value, not tear the system apart.
- Consider the needs for predictability in management and science. In both cases analyzed here, the negative repercussions of "surprises" were felt because both cases need predictability – one for taxpayers (are they going to have to upgrade again?) and one for fishermen/industry (what can they target / market, etc.).
- Consider how managers and scientists are trained and the role of supervisors and mentors in exposing new actors to developing an understanding of the system. Early exposure to those who have different views can be foundational in developing an ability to work together and find solutions in the future. A large portion of respondents noted that they first attended an event or activity with participants from a range of groups because they were told to by a boss. It would be beneficial for people to attend these events as part of their schooling when there is more opportunity to explore.

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Bringing It Together

Acknowledgements

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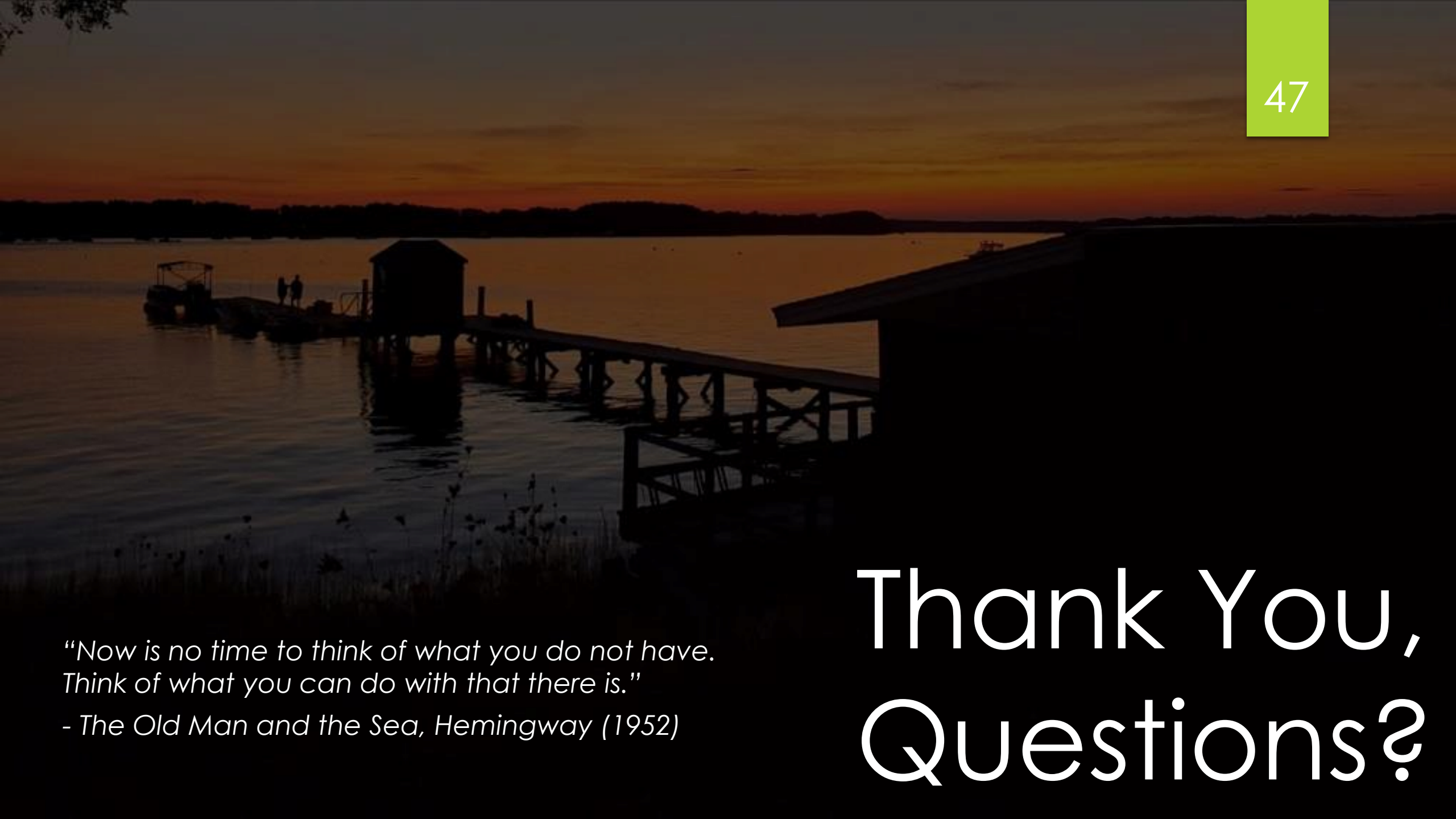

Thank You, Questions?

"Now is no time to think of what you do not have. Think of what you can do with that there is."

- The Old Man and the Sea, Hemingway (1952)