SOCIAL SCIENCE FOR THE SALISH SEA

An action-oriented research agenda to inform ecosystem recovery

A report to the Puget Sound Partnership, July 9th, 2019

Sara Jo Breslow, Leah Kintner, Stacia Dreyer, Heather Cole, Leif Anderson, Kelly Biedenweg, Nathan Bennett, Jamie Donatuto, Erin Hanson, Emma Norman, Melissa Poe, David Trimbach

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INTRODUCTION

To protect and restore the Salish Sea—the transboundary waters shared by British Columbia's Georgia Basin and Washington State's Puget Sound—we must understand its biology, physical processes, and its people, who both affect and support the environment, and provide the only means for recovering it. Understanding people's diverse perspectives, values and objectives, and how people in the region are constrained or enabled by social and governance systems, will facilitate a more effective and equitable approach to ecosystem recovery. There is growing recognition that to solve environmental problems, we need to also understand their human dimensions.

To address these needs, we convened a transboundary team of interdisciplinary researchers and practitioners to develop an action-oriented social science research agenda that serves the pragmatic ecosystem recovery needs of the region in a project called *Social Science for the Salish Sea*. The aim of this project was to:

- scope a research agenda that responds to the social science information needs of entities leading ecosystem recovery in the region, including governmental agencies, advocacy organizations, and Tribes and First Nations;
- elevate awareness of the diversity of social science fields and their contribution to robust environmental solutions;
- promote the production and use of social science for environmental problem-solving and decision-making at the local, regional and transboundary scales; and
- cultivate a transboundary community of researchers, implementers, and funders who support integrating social science into ecosystem recovery decision making.

The project was initiated in response to the Puget Sound Partnership's stated need for robust social science to inform their ecosystem recovery strategies, and the research agenda was designed to inform and respond to the needs and existing frameworks of entities involved in regional ecosystem recovery efforts, such as the Puget Sound Partnership, The Nature Conservancy, Tribal Nations and First Nations. The project was funded by the Puget Sound Partnership, the Bullitt Foundation, and the University of Washington Canadian Studies Center.

Here we report on the results of the first phase of the Social Science for the Salish Sea project: a proposed research agenda of 33 topics, and of those, our recommendations for the most urgent and impactful topics deserving immediate attention.

PARTICIPANTS

Planning team

The Social Science for the Salish Sea project began as an idea raised during a meeting of the Social Science Advisory Committee to the Puget Sound Partnership in the fall of 2017. Several members of the committee agreed to form a planning team, with our institutional affiliations representing the University of Washington, Arizona State University, and the Puget Sound Partnership. We later invited individuals from The Nature Conservancy and the Northwest Indian Fisheries Commission to diversify our institutional scope (the latter later withdrew due to a shift in work priorities). The planning team met every few months over several years to conceptualize and oversee the project.

Author and advisor teams

A first step was to select an author and advisor team. Authors would contribute greater time and effort, attend three in-person meetings, and serve as co-authors of the final products. Advisors would contribute their expertise in one in-person workshop, and otherwise serve as ad-hoc consultants. Both teams would respond to an online survey to prioritize research topics. We developed criteria to strive toward diversity in multiple dimensions among all participants: institutional, disciplinary, geographic, communities of focus, researcher/practitioner, and demographic (e.g., gender, ethnicity). Members of the planning team each brainstormed a list of candidates and then voted on those we felt were the best fit for the project. While diverse overall, a major limitation of the project is that the resulting group was nevertheless unbalanced in various dimensions (e.g., fewer Canadians, fewer people of color, fewer practitioners; more anthropologists, more women, etc.), and largely reflected the social networks of the planning team.

Table 1. Authors.

Name		*Affiliation*	*Area of Expertise*
Leif	Anderson	Northwest Fisheries Science Center	Economics
Kelly	Biedenweg	Oregon State University	Psychology
Nathan	Bennett	University of British Columbia	Geography
Sara	Breslow*	University of Washington	Anthropology
Heather	Cole*	The Nature Conservancy	International development
Jamie	Donatuto	Swinomish Indian Tribal Community	Environmental health
Stacia	Dreyer*	Arizona State University	Psychology
Erin	Hanson	Tsleil-Waututh Nation	Anthropology, law, policy
Leah	Kintner*	Puget Sound Partnership	Conflict studies
Emma	Norman	Northwest Indian College	Political geography
Melissa	Poe	Washington Sea Grant/University of Washington	Anthropology, geography
David	Trimbach	Oregon State University	Human geography

** Denotes member of the planning team*

Table 2. Advisors.

Name		*Affiliation*	*Area of Expertise*
Natalie	Ban	University of Victoria	Geography, resource management
Larry	Campbell	Swinomish Indian Tribal Community	Cultural resources, history
Mollie	Chapman	University of Zurich	Geography
Patrick	Christie	University of Washington	Marine affairs
Deborah	Curran	University of Victoria	Environmental law
Eric	Delvin	The Nature Conservancy	Ecology
Nives	Dolšak	University of Washington	Political science, marine affairs
Alexandra	Doty	Puget Sound Partnership	Stewardship
Nicole	Faghin	Washington Sea Grant	Planning, law
Libby	Gier	WA Department of Natural Resources	Marine planning and policy
Jessica	Hallenbeck	University of British Columbia	Geography
Jay	Krienitz	WA Department of Fish and Wildlife	Ecosystem restoration policy and planning
Nikki	MacDonald	University of Victoria	Public administration, governance
Lynne	Manzo	University of Washington	Environmental psychology
Catherine	O'Neill	O'Neill Consulting	Environmental law and policy
Evelyn	Pinkerton	Simon Fraser University	Anthropology, resource co-management
Josh	Reid	University of Washington	History
Morgan	Ruff	Tulalip Tribes	Marine affairs
Terre	Satterfield	University of British Columbia	Anthropology
Sam	Sellers	University of Washington	Public health
Sonni	Tadlock	University of Washington	Public health
Coll	Thrush	University of British Columbia	History
Grace	Wang	Western Washington University	Policy, sustainability
Melissa	Watkinson	Washington Sea Grant	Marine affairs
Trina	Wellman	Northern Economics, Inc.	Economics
Christianne	Wilhelmson	Georgia Strait Alliance	Community engagement
Cleo	Woelfle-Erskine	University of Washington	Collaborative river research
Kathleen	Wolf	University of Washington	Environmental psychology

METHODS: DEVELOPING THE RESEARCH AGENDA

Between June 2018 to June 2019 we held three all-day in-person meetings, a number of conference calls, and an online survey to solicit ideas from authors and advisors for a research agenda. Between meetings, we categorized resulting notes into draft frameworks to workshop in subsequent meetings.

Meeting #1: June 14th, 2018, Author team

At the first meeting of the author team, researchers presented how their respective fields contributed to ecosystem recovery, and practitioners presented a variety of implementation frameworks. We used a world café format (theworldcafe.com/) to brainstorm potential research topics pertaining to the frameworks of the Puget Sound Partnership and The Nature Conservancy, plus topics that cross-cut or did not fit these frameworks. We later sorted notes from these discussions into an initial set of potential research categories.

Meeting #2: October 4th, 2018, Author and advisor teams

The second meeting was an all-day workshop for the author and advisor teams. We started by asking the group to respond to the following questions in journaling and small group discussions:

- What are your major concerns regarding the Salish Sea? Your hopes? What are your responsibilities?
- What needs to change, or shift, or needs support in order to address your concerns, actualize your hopes, or meet your responsibilities?
- What kinds of knowledge do you need to understand or implement this change, shift, or support?

Several participants were then asked to propose categorization schemes for the research agenda based on categories generated from the first author meeting and results from the morning's discussions. This created some confusion, however, as the resulting schemes were very different, and either too specific or too broad to usefully structure a research agenda. After much discussion, the group decided to explore grouping topics around "ecosystem recovery goals," to disrupt our tendency to group by discipline. We met in small groups around proposed ecosystem recovery goals in order to test this concept. Finally, we revisited and commented on proposed criteria for prioritizing topics. We captured all notes resulting from this second meeting.

A framework to distill and generate research topics

After the second meeting, we pooled all research topic interests expressed in both meetings and sorted them as to whether they represented ecosystem recovery *goals*, *challenges* or opportunities in achieving these goals, *actions* needed to surmount these challenges or harness these opportunities, or *knowledge* needed to take these actions. This "goals-challenges-actions-knowledge" framework stemmed from the three questions asked during the morning of Meeting #2. It provided a conceptual structure to generate and validate research topics. To topics gleaned from meeting notes, we added topics from several additional sources: results from a previous Puget Sound Partnership workshop (Biedenweg and Nelson, 2014); and topics gleaned from the front pages of the websites of the Puget Sound Partnership, The Nature Conservancy and Northwest Indian Fisheries Commission. We added these to quickly check and ensure that we had covered the major ecosystem recovery goals expressed by at least one major governmental, advocacy, and indigenous organization in the region.

We then organized results into thematic goal areas: social-ecological system goals, human wellbeing as it relates to the environment, other social goals, and ecological goals. The matrix enabled us to identify links between goals, challenges, actions needed, and knowledge needed, and where gaps lay. The gaps suggested where additional ideas for research topics were needed. The resulting "knowledge needed" column became a list of 114 candidate research topics, albeit in need of revision and re-organization.

Table 3. Example of the Goals-Challenges-Actions-Knowledge Framework.
This table illustrates how meeting results were sorted into a conceptual framework; verbiage in this example represents actual notes from our meetings. Gaps in the "knowledge needed" column revealed areas where a potential research topic needed to be generated, based on challenges or actions that had already been identified; gaps in other columns revealed a need to explain how a proposed research topic was connected to ecosystem recovery goals, challenges, and action needs.

GOAL: Human well-being related to the environment		
Broad challenges	*Changes or actions needed*	*Knowledge needed*
Institutional enablers and barriers to connection to nature (e.g., cost of park passes)		Resource access and tenure: who has access, how, and why; jurisdictions you have to go through to access resources
Communities are losing access to marine resources due to privatization	Ensure that community rights and access are considered in decisions	

Meeting #3: March 15, 2019, Author team

During the third and final meeting, authors reviewed and revised the candidate topics for clarity and concision, and made recommendations for which topics to merge, which ones to cut due to their being completely outside our scope (e.g., strictly biophysical topics), and how the resulting topics could be organized into similar themes. We tested a ranking method via an online survey, using the following criteria: alignment with goals; meets research needs; reflects social and geographic diversity of region; feasibility. This survey enabled us to determine that we had too many questions, and too many ranking criteria. We recorded all author recommendations and later used them to re-organize all topics into a set of 33 multi-part topics nested into 4 major ecosystem recovery goals and 9 sub-goals.

We chose to categorize the topics to illustrate how they fit into a larger rationale and as a whole could serve the goals of ecosystem recovery. The categories also served to break down our long list of topics into roughly even, digestible chunks. There are many possible ways to organize research topics. This categorization scheme was derived from qualitatively identifying themes as they emerged from each meeting; inviting proposals for categorization schemes from advisors and authors; using the goals-challenges-actions-knowledge framework to organize these themes by goals; and vetting the final framework in an iterative process with authors. The categories chosen here reflect concepts and terminology commonly used in the arenas of ecosystem recovery and environmental social science.

Survey to identify priority topics

At this stage we had identified a comprehensive list of social science topics for a research agenda. However, we needed to identify priority topics to focus the attention of funders and implementers. We decided that a simple and systematic way to do this would be to survey project participants for their recommendations. We randomized 33 topics in an online survey, asking for each question, how effectively will new research on this topic:

- address the region's most urgent social-ecological challenges?
- fill knowledge needs identified by ecosystem managers and practitioners?
- expand decision-makers' awareness of the social dimensions of ecosystem recovery? and
- attract funding (to conduct the research)?

In addition, optional questions asked about likely funding sources and for any further comments.

These questions were derived from initial criteria proposed in a meeting to the Social Science Advisory Committee to the Puget Sound Partnership, with further input from project participants. The questions reflect the original goals of this project: to serve ecosystem recovery, while emphasizing that the goals of recovery are both social and ecological, and that the project will strive to first serve the most urgent goals; to scope and fulfill the major information needs of practitioners and decision-makers regarding the human dimensions of ecosystem recovery; to elevate awareness and promote the use of social science in environmental problem-solving; and to attract funding support for new areas of environmental social science research.

We sent the survey to all project participants, recusing the planning team. Of 36 recruits, 25 responded, for a 69% response rate. Highest priority topics were identified based on those topics receiving the highest number of "very" or "extremely effective" responses, with ties sorted by those receiving more "moderately" or "slightly effective" responses. This method prioritized topics attracting positive responses, and disregarded small numbers of "not at all" responses. Our rationale for using this selection method was to highlight where existing energy and enthusiasm lay among project participants.

It is important to remember that survey results do not reflect the inherent importance of each topic, nor the Salish Sea public's opinion of which topics are most important. Given the diversity of social-ecological goals and challenges in the region, determining public regional priorities would require a much larger study and is in fact one of our proposed topics for research. Also, although project participants were selected to represent a diversity of disciplines, institutions, geographies and communities in the Salish Sea region, the group was not balanced in these ways so it cannot be viewed as a proxy of the larger region. This imbalance is partly why we report results by sub-group, e.g. to show how Canadian participants prioritized topics differently from Americans. The survey was simply a way to take the temperature of project participants and make a collective recommendation for which research topics to prioritize as a starting point for funding and other modes of support.

Using this method, we identified the most highly ranked topics overall, by criteria, and by various characteristics of the respondents. To analyze results by areas of expertise, we grouped disciplines we assumed shared similar epistemological foundations: anthropology, geography and history; psychology, economics, and behavior change; and ecology and environmental science.

RESULTS

To date, the Social Science for the Salish Sea project has produced 33 research topics organized into 4 major ecosystem recovery goals and 9 sub-goals and has identified a number of these topics as high priorities for immediate attention. Each topic is composed of an overview question followed by sub-questions that reflect, in greater diversity and detail, actual ideas expressed by project participants, plus several additional sources. A full list of topics with all sub-questions, reflecting the comprehensive results of the project, is presented in Appendix 1. All survey results, reflecting priorities by question and characteristics of respondents, is presented in Appendix 2.

Table 4. Summary of research topics organized by ecosystem recovery goals and sub-goals
Overview questions are presented here; details are in Appendix 1. The top 5 priority topics identified in the survey are marked with an asterisk (*), showing where they fit among the goals and sub-goals.

ECOLOGICAL GOALS
Overall goal: Promote healthy ecosystems, including healthy and robust waters, habitats, wildlife populations, food webs, and ecosystem functions
Goal: Motivate human actions, behaviors, and participation in support of ecosystem recovery
1. What factors affect human behaviors conducive to ecosystem recovery?
2. What role does sense of place play in motivating or hindering participation in ecosystem recovery and management?
3. What factors motivate landowners to engage in or resist ecosystem recovery actions? What about land rights-holders, such as Indigenous groups, and other stakeholders, such as the non-landowning public?
Goal: Navigate social, policy, and economic complexity to achieve ecosystem recovery
4. How do ecosystem recovery goals vary across diverse communities (e.g., different socio-economic, cultural, geographic, livelihood, and place-based groups), and what are the trade-offs among them?
5. What are the best available policy levers to achieve ecosystem recovery?
6. What is the current status of, and potential for, collaborating with different industries in ecosystem recovery? (e.g., natural resource industries such as forestry and fishing, ports, pipelines, mines, pulp mills, etc.)
HUMAN WELL-BEING GOALS
Overall goal: Promote environmental conditions and ecosystem policy and management actions that support human well-being, including access to nature and natural resources
Goal: Understand and mitigate the effects of changing environmental conditions on human well-being
7. How is human well-being related to the environment?
8. How is the well-being of different social groups affected by changing environmental conditions and ecosystem recovery?
9. How does, and will, climate change impact the holistic health and well-being of Salish Sea communities? *
10. Why and how have humans become disconnected from nature, and how best can we connect people to green spaces, clean water, and fresh air?
Goal: Improve the effects of environmental policy and management on human well-being
11. How do resource management and conservation affect people in different and differential ways (i.e., economic, psychological, physical, and cultural effects)?
12. To what degree, and how, is access to marine and coastal resources (e.g. fisheries, open space, native foods) changing among different communities in the Salish Sea?
13. In which ways have Indigenous groups been, and continue to be, disenfranchised from resources and resource management across their territories (i.e. across landscapes, both on- and off-reservation), and what are the effects on their well-being?
14. What is the current reliance on shellfish aquaculture and hatcheries (in contrast to wild harvests) among Indigenous and non-Indigenous economies, and what are the implications for aquaculture and hatchery management?
SOCIAL GOALS
Overall goal: Promote equitable, just, and effective social processes: collective action; good governance, including meeting treaty obligations and achieving sovereign Indigenous governance; economic security and vibrancy, and fair allocation of resources; and holistic knowledge production and use
Goal: Produce, share, and use integrated knowledge and conceptual tools
15. Do approaches to knowledge production used for ecosystem-recovery reflect and incorporate multiple ways of knowing (e.g., variations by discipline, local and Indigenous knowledge, etc.) and holistic knowledge systems? Why or why not?
16. How does the temporal scope of the ecological baseline limit or expand understandings of potential trajectories for ecosystem recovery and restoration?
17. Develop and improve social-ecological system monitoring and decision-making frameworks and tools.
18. What environmental education and public engagement opportunities currently exist? How impactful have these opportunities been and what are the gaps that need to be addressed?
Goal: Empower local communities
19. What are strategies to empower local communities?
20. What are the best practices for recruiting and maintaining engagement in collaborative processes that support diverse interests?

21. What mechanisms exist for engaging and transforming intragroup conflicts related to ecosystem management in the Salish Sea?
22. To what degree, and how, are diverse people and their values currently represented in political and decision-making processes, how does representation affect ecosystem recovery outcomes, and how are diverse people affected by these outcomes? *

Goal: Develop coordinated, effective governance

23. How can the diversity of institutions and jurisdictions in the Salish Sea be characterized and better coordinated?
24. What factors contribute to effective co-governance and/or co-management between jurisdictions (including Indigenous and non-Indigenous governments)?
25. Is the legal framework for ecosystem recovery working? *
26. How do power and politics influence decision-making processes and actions taken in the Salish Sea?
27. How can Indigenous knowledge systems and governance (i.e., traditional knowledge, Indigenous science, and Coast Salish legal orders) be meaningfully applied in ecosystems recovery? *

SOCIAL-ECOLOGICAL GOALS

Overall goal: Achieve social-ecological balance by integrating social and ecological goals in transboundary and multi-dimensional approaches

Goal: Advance social-ecological processes for whole system resilience

28. What would it take to create transboundary social-ecological governance processes for the Salish Sea? (E.g., to address potential increase of fossil fuel spills.)
29. What would it take to create a regional Salish Sea cultural identity and community?
30. How can we advance eco-cultural (also called biocultural) approaches to stewardship and restoration?

Goal: Address multidimensional social-ecological challenges

31. How is urbanization and development impacting the Salish Sea social-ecological system, and how can impacts be mitigated and minimized through planning? *
32. Study the food-water-energy nexus: what inter-dependencies exist between food production and consumption (including life cycle analysis), hydropower and river flows, water usage and quality, and protected species viability (salmon)?
33. What are the causes and social-ecological consequences of existing and emergent contaminants? How are causes and consequences interrelated?

Survey respondents

Survey respondents represented 69% of recruits and 62% of project participants, since the 4 members of the planning team did not take the survey. The 25 survey respondents represented an uneven mix of geographic residence and focus, role, areas of expertise, and institutional affiliations (Figure 1.). Respondents included more than twice as many USA residents as Canadian residents; nearly two and a half times as many researchers as participants who identified strictly as practitioners; as many academic-affiliated participants as those identifying with all other types of institutions combined; and areas of expertise, beyond resource management and environmental policy, weighed toward anthropology, marine affairs, and environmental science. (Table 7 and Appendix 2 illustrates how respondents prioritized topics differently.)

Table 5. Characteristics of survey respondents. N=25.

Location of residence		*Geographic scope of knowledge*		*Primary role*	
Canada	7	BC	5	Researcher	13
USA	16	WA	16	Practitioner	5
Other	1	Equally both	3	Equally both	6

Institutional affiliation (multiple answers allowed)		*Area of expertise (1-3 answers allowed)*	
Academic	15	Resource Management	13
Consultant	4	Environmental Policy	12
Governmental	4	Anthropology	5

Tribal/First Nations/Indigenous	3	Marine Affairs	5
Community-based	2	Environmental Science	4
Non-profit	2	Ecology	3
Foundation	0	Economics	3
		Geography	3
		Health	3
		Law	3
		Behavior Change/Social Marketing	2
		Political Science	2
		Psychology	2
		Education	1
		History	1
		Sociology	1

Recommended priority topics

The most highly recommended social science research topic, when considering all criteria and all respondents, was: *"How does, and will, climate change impact the holistic health and well-being of Salish Sea communities?"* This question was also ranked either first or second priority for each criterion, namely in its ability to address our most urgent social-ecological challenges, deliver knowledge needed by practitioners, build social science awareness among decision-makers, and attract funding. In addition, this question was ranked as either first or second priority by 7 sub-groups of respondents: Canadian residents; USA residents; researchers; practitioners; anthropologists, geographers and one historian; ecologists and environmental scientists; and respondents affiliating with indigenous organizations. Psychologists, economists, and behavior change specialists ranked this topic as a 5th priority.

Such a high ranking, even when results are disaggregated, suggests this topic is the clear, consensus research priority for the group as a whole. The full topic with its example related questions, as presented in the survey, is as follows:

> How does, and will, climate change impact the holistic health and well-being of Salish Sea communities?
> *Example related questions:*
> - How is human well-being connected to local ecological food webs, and how are these food webs changing with climate impacts?
> - How will climate change affect rural communities and urban populations differently?
> - How can the vulnerabilities and adaptive capacities to climate change among different groups, communities and sectors within the Salish Sea be characterized?

- What social and institutional responses or adaptations can be taken to maintain or increase social-ecological resilience and well-being in the face of climate change?

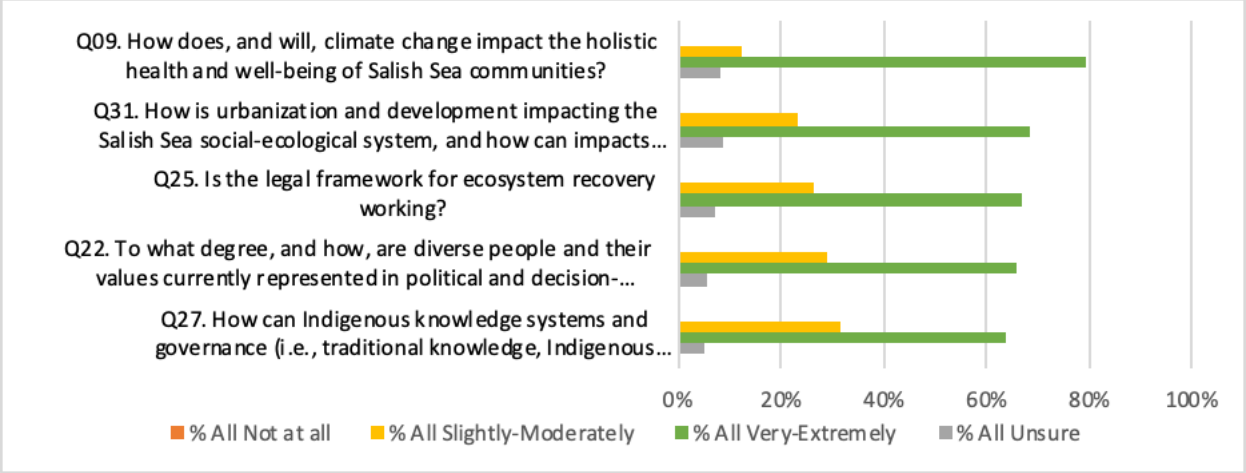
As noted by one respondent, this topic dovetails with many issues raised in the other 32 topics. The wording is still broad and will need to be refined to transform it into a tractable set of research questions.

The five most highly ranked topics out of 33 total possibilities are listed in Table 6. The table additionally shows the criteria and sub-groups for which a topic ranked within their top 5. The full topics with related sub-questions are presented in Appendix 1. Figure 1 shows how each of the most highly ranked topics were evaluated according to all criteria overall.

Table 6. Five highest priority research topics identified by all project participants across all criteria. Second and third columns show the criteria and subgroups for which this topic also ranked within their top 5. Numbers in parentheses refer to the topic numbers listed in Table 4. *"Urgency"=addresses the region's most urgent social-ecological challenges; "Knowledge Needed"=fills knowledge needs identified by ecosystem managers and practitioners; "Builds Awareness"=expands decision-makers' awareness of the social dimensions of ecosystem recovery; "Funding Likely"=will attract funding to conduct the research.

Topic	*In top 5 of these criteria**	*In top 5 of these subgroups*
How does, and will, climate change impact the holistic health and well-being of Salish Sea communities? (9)	All criteria	All groups
How is urbanization and development impacting the Salish Sea social-ecological system, and how can impacts be mitigated and minimized through planning? (31)	Urgency Knowledge Needed Funding Likely	Americans Researchers Anthro/Geo/Hist Indigenous Affil
Is the legal framework for ecosystem recovery working? (25)	Urgency Knowledge Needed Builds Awareness	Americans Practitioners Anthro/Geo/Hist Psyc/Econ/Behav Ecol/EnvSci
To what degree, and how, are diverse people and their values currently represented in political and decision-making processes, how does representation affect ecosystem recovery outcomes, and how are diverse people affected by these outcomes? (22)	Urgency Builds Awareness	Americans Practitioners
How can Indigenous knowledge systems and governance (i.e., traditional knowledge, Indigenous science, and Coast Salish legal orders) be meaningfully applied in ecosystem recovery? (27)	Builds Awareness Funding Likely	Canadians Researchers Anthro/Geo/Hist Ecol/EnvSci

Figure 1. Evaluation of priority topics by respondents for overall effectiveness in all criteria, N=25



Additional priority topics by criteria and sub-groups of respondents

When results were broken out by criterion and various sub-groups of respondents, additional priorities emerged. These are listed in Table 7. Note that four of the topics ranked in the top five by Canadian participants differed from those chosen by the group as a whole; and three of the topics ranked in the top five by participants affiliated with an Indigenous organization, and by those identifying as anthropologists, geographers or a historian, also differed from the whole group's top five. These results illustrate how research priorities may differ on each side of the border, across communities, and across disciplines. These differences warrant further attention and show how disaggregating results in this way is important in order to support a diversity of Salish Sea communities and interests.

Table 7. Additional priority topics by criterion and sub-group of respondents. Numbers refer to the topic numbers listed in Table 4. *Canadian residents and "Other" (N=8), Researchers (N=13), Psyc/Econ/Behav (N=7;), Indigenous Affiliated (N=3), Practitioners and "Both" (N=11), American residents (N=16), Anthro/Geo/Hist (N=9), Ecol/EnvSci (N=6).

Topic	*In top 5 of these criteria (N=25)*	*In top 5 of these subgroups (N varies)**
How is the well-being of different social groups affected by changing environmental conditions and ecosystem recovery? (8)	Urgency	Canadians Researchers
In which ways have Indigenous groups been, and continue to be, disenfranchised from resources and resource management across their territories (i.e. across landscapes, both on- and off-reservation), and what are the effects on their well-being? (13)	Funding	Canadians Researchers
What are the causes and social-ecological consequences of existing and emergent contaminants? How are causes and consequences interrelated? (33)	Funding	Psyc/Econ/Behav Indigenous Affil
How do ecosystem recovery goals vary across diverse communities (e.g., different disciplinary, socio-economic, cultural, geographic, livelihood, and place-based groups), and what are the trade-offs among them? (4)	Awareness	Indigenous Affil
What are the best available policy levers to achieve ecosystem recovery? (5)	Knowledge	Practitioners

Study the food-water-energy nexus: what inter-dependencies exist between food production and consumption (including life cycle analysis), hydropower and river flows, water usage and quality, and protected species viability (salmon)? (32)	Funding	---
What are strategies to empower local communities? (19)	Knowledge	---
What factors motivate landowners to engage in or resist ecosystem recovery actions? What about land rights-holders, such as Indigenous groups, and other stakeholders, such as the non-landowning public? (3)	---	Americans Practitioners Anthro/Geo/Hist Ecol/EnvSci Indigenous Affil
What factors contribute to effective co-governance and/or co-management between jurisdictions (including Indigenous and non-Indigenous governments)? (24)	---	Anthro/Geo/Hist Canadians
How can the diversity of institutions and jurisdictions in the Salish Sea be characterized and better coordinated? (23)	---	Anthro/Geo/Hist
What would it take to create transboundary social-ecological governance processes for the Salish Sea? (E.g., to address potential increase of fossil fuel spills.) (28)	---	Canadians
How do resource management and conservation affect people in different and differential ways (i.e., economic, psychological, physical, and cultural effects)? (11)	---	Ecol/EnvSci
What factors affect human behaviors conducive to ecosystem recovery? (1)	---	Psyc/Econ/Behav

DISCUSSION

With this initial research agenda, how far have we progressed toward our original goals?

Our first goal was to, "*scope a research agenda that responds to the social science information needs of entities leading ecosystem recovery in the region, including governmental agencies, advocacy organizations, and Tribes and First Nations."* We produced a prioritized list of 33 topics pertaining to the human dimensions of ecosystem recovery in the region, creating the structure and scope for a comprehensive social science research agenda. As several participants noted, these topics are not yet *research questions*: further discussion and revision will be necessary to transform these topics and sub-topics into researchable plans that generate knowledge valued by both researchers and practitioners, at usable scales. As a team, we found it especially challenging to match researchers' social science interests to practitioners' ecosystem recovery goals since our needs and goals are defined differently. Of particular concern, on the one hand, is to revise questions to avoid leading statements and preconceptions, and on the other, to deliver the practical knowledge needed by practitioners and avoid defaulting to disciplinary concerns. These steps may be taken in a future iteration of this project, or by research teams once they are ready to pursue one or more of the topics.

We sourced the topics from a group of 40 project participants representing 4 nations, including the U.S. and Canada and 2 Indigenous nations; approximately 15 distinct disciplines across the social sciences

and humanities; and 5 major types of institutions, including 8 universities, 6 federal or state governmental agencies, 3 Indigenous organizations, 2 advocacy organizations, and 1 consulting firm (Tables 1 and 2). Despite making a good faith effort to recruit a diversity of participants in these multiple dimensions, there were nevertheless clear imbalances in our group: Americans and researchers outnumbered Canadians and practitioners by more than two to one; no Canadian governmental agencies were represented; no immigrant or non-indigenous communities of color were represented; and Indigenous organizations, NGOs, and businesses were distinctly under-represented in this effort. This, combined with the fact that we solicited topics for the agenda from all participants during only one 6-hour workshop, leads us to our major limitation: the topics, and the prioritization of these topics, as scoped, only represent the views of this project team, and cannot be generalized. A different, broader, and more diverse team using a different process may have scoped a different set of topics. Topic #4, *"How do ecosystem recovery goals vary across diverse communities (e.g., different socio-economic, cultural, geographic, livelihood, and place-based groups), and what are the trade-offs among them?"* will be an important question to consider for another iteration of the research agenda, and alongside the other topics we recommend. Fully meeting our first goal to deliver a research agenda serving the needs of the range of implementing bodies in the region would require a more comprehensive process, and could be developed as a next step, e.g., through a survey to all practitioners in the region asking for their knowledge needs and priorities, alongside the goals the broader population. We present this research agenda as a starting point for discussion, dissection, and ideally, further development. It is a framework that may assist practitioners and researchers in clarifying their needs and focusing their research.

Our second and third goals were to *"elevate awareness among these entities of the diversity of social science fields and their importance to robust environmental solutions" and to "promote the production and use of social science for environmental problem-solving and decision-making at the regional scale and beyond."* The environmental field has conventionally looked to the disciplines of economics and psychology when seeking to understand the "human dimensions" of environmental issues. These fields generally share the quantitative, hypothesis-driven approach of the biophysical sciences which have historically guided environmental management. The current focus on ecosystem service valuation, human wellbeing assessment, and behavior change reflect this relationship. Likewise, the topic, "What factors affect human behaviors conducive to ecosystem recovery?" was identified as a high priority by our participants with expertise in human behavior, psychology and economics. The Social Science for the Salish Sea project is part of a recent effort (e.g., Breslow et al. 2016, Pascual et al. 2017) to bring a greater diversity of social science perspectives to environmental problem-solving. Social scientists expand how environmental problems are defined and show how different types of knowledge are useful in solving them.

When asked for the types of social science knowledge needed for ecosystem recovery, our multi-disciplinary and multi-institutional participants offered many ideas. These reflected our wide range of assumptions about the goals of ecosystem recovery, its major challenges, and the changes needed to achieve it. The Goals-Challenges-Actions-Knowledge framework (Table 3) enabled us to weave together these multiple "theories of change" into the resulting research agenda. Conventionally the environmental field has focused on how people cause environmental problems, and how to change their

actions and behavior. More recently, attention has expanded to include concern for how environmental changes, and the role of management in those changes, in turn affects people, with the concept of human well-being (Millennium Ecosystem Assessment 2005). As evidenced by the Puget Sound Partnership's vital signs, ecosystem recovery goals have expanded to include human well-being goals in addition to ecological goals.

Our research agenda captures these conceptual developments in the major categories of "Ecological Goals" and "Human Well-being Goals" (Table 4). To these, our multi-disciplinary team adds two major goals: "Social Goals" and "Social-Ecological Goals." The latter reflect major conceptual developments in the social sciences and humanities that have yet to enter the environmental mainstream. Considerable social science research is devoted to understanding not just how environmental changes directly affect people but rather to how environmental science, policy, and management are themselves social processes that affect people; and to how social and ecological processes are inter-dependent and even co-created. In other words, we understand that *ecosystem recovery is a social process*, and that to be successful, it must result in a resilient ecosystem--*as well as a resilient society* by virtue of how it is designed and implemented. Similarly, we understand that our social and our ecological challenges are *interdependent*, and that to address them we must scope social-ecological research toward generating social-ecological solutions. That four of our five most highly prioritized topics for research fall into the "Social Goals" and "Social-Ecological Goals" categories (Table 4) illustrates the commitment of social scientists to building a more complete picture of ecosystem resilience--and how to get there.

In advancing a resilient *social*-ecological system as a goal, our research agenda reflects a major focus of the social sciences and humanities: the diversity of people--and the hierarchies, inequities, and injustices among us. Two of our 5 priority topics reflect this concern: the relationship between diversity of representation and outcomes in environmental decision-making; and how indigenous knowledge and governance may be integrated into ecosystem recovery. Infused across the agenda are questions of how environmental conditions and management affect different people in different ways; the effects of hierarchical relationships of power; local empowerment as a solution; and how diverse voices, knowledge, and governance systems could be fully integrated into ecosystem recovery efforts. The agenda illustrates that social scientists are well-positioned to support the new and urgent attention to issues of diversity, equity, and inclusion in the environmental field, including at the Puget Sound Partnership and The Nature Conservancy.

Our fourth goal was to, *"cultivate a transboundary community of researchers, practitioners, and funders who support this mission."* This project connected researchers and practitioners with different national, cultural, institutional and disciplinary backgrounds, and with different specialized languages, epistemologies, areas of interest, and workplace norms. Coming together to communicate and agree on a collective research agenda required time, patience and flexibility, expansive thinking, and a generosity of spirit. At our one and only in-person workshop for the whole group, intense conversations revealed a hunger for cross-boundary and cross-disciplinary problem-solving, and a sting of frustration that we barely had time to acknowledge the complexity of the issues before us, as well as the thorniness of our

differences, before having to retreat back to our respective countries and jobs. A unique community with much potential has been seeded, but additional gatherings are needed to cultivate it.

An unanticipated challenge that deserves mention is that increased border security presented a major logistical and equity hurdle as we tried, and failed in at least one case, to navigate the legal and bureaucratic complexities of compensating Canadians for their time and travel to U.S.-based meetings. This is an issue that needs further attention if we wish to promote more transboundary collaborations.

The planning team was a microcosm of the larger group: during our many hours of conversation we grappled with different expectations for the project as academics and practitioners. Where academics tend to prioritize new ideas, accuracy, and nuance, practitioners tend to prioritize mandates, timeliness, and ease of communication. We had to find a balance, deciding what we were willing to forego in order to keep working on the project together, and at the same time learning that we were not opposites: both groups contribute expertise and original ideas, and grapple in practical ways with real-world problems. We worked through some of these differences as a planning team in order to present an efficient work plan for participants.

As one participant reflected, our effort to bring such a wide range of social scientists and practitioners together to come to a collective research agenda was ambitious and daunting--and this was both its challenge and its strength. Our epistemological differences were so deep that a topic considered the "norm" in one field, and the focus of current conversations, could be considered entirely "niche" in another field, or even unwanted in the agenda. The jolt of encountering such a difference makes us realize we are in a bubble and reminds us not to take certain theories and methods for granted. The experience is humbling, but the added value of the project is that it has better prepared us for interdisciplinary collaboration.

CONCLUSION

With this first effort to create a social science research agenda for the Salish Sea we hope to inspire support for new research that illuminates the human causes and consequences of environmental change and identifies socially feasible, equitable, and efficient pathways to ecosystem recovery. We furthermore hope to build awareness of the value of social science in advancing social-ecological resilience. To harness the energy and enthusiasm of our new transboundary community, and achieve the multi-dimensional priorities outlined in this research agenda, we will need to support opportunities for transboundary and transdisciplinary collaboration. We will need to continue learning how to link research to policy and practice, we will need a system for sharing data and outputs, and ultimately, we will need the means to implement and scale up insights.

The next phase of this project will be to create a "roadmap" for the research agenda that charts who would most likely fund research on each topic and which type of researcher or research team would most effectively conduct the research, from a masters student in need of a disciplinary thesis topic to a multi-year transdisciplinary research team. We plan to solicit additional feedback on the agenda from the Puget Sound Partnership's Science Panel and attendees at the 2020 Salish Sea Ecosystem

Conference. Our final step as an author team will be to report to a worldwide audience on our process, results, and lessons learned in a peer-reviewed publication. We will then invite participants and partners to assist us in translating and amplifying the results of this project for multiple audiences via more accessible media such as blogs, presentations, and videos. Finally, we will encourage regional agencies and organizations to further develop and integrate our recommendations for social science research into their respective planning efforts.

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Appendix 1. Goals and Research Topics

ECOLOGICAL GOALS

Overall goal: Promote healthy ecosystems, including healthy and robust waters, habitats, wildlife populations, food webs, and ecosystem functions

<u>Goal: Motivate human actions, behaviors, and participation in support of ecosystem recovery</u>

1. What factors affect human behaviors conducive to ecosystem recovery?

Example related questions:

- What individual and group characteristics influence people's adoption of desired behaviors? What prohibits people from adopting behaviors?
- How do institutional structures, strategic activities, and policy mechanisms, including regulations and incentives, influence the effectiveness of behavior change initiatives for individuals and different demographic groups?
- How do current economic structures and opportunities shape and constrain people's options and behaviors vis a vis ecosystem recovery?
- How does the built environment influence individual and group behaviors vis a vis ecosystem recovery?
- What behaviors, by which stakeholder groups, have the largest impact on ecological goals?
- *Added by a survey respondent:* How can practitioners overcome barriers to behavior adoption? What amount of behavior adoption is necessary for there to be a shift in social norms?

Survey respondent comments:

- I think this question best encapsulates the challenge for social scientists interested in Salish Sea recovery. With that said, I think some discussions to narrow/focus this question to tailor it more appropriately for funding agencies will be needed.
- Lots of behavior research out there that could be applied to get close to an answer without needing much new research.

Proposed funding sources, to date:

- Real Estate Foundation (Canada) -- this funding source could apply to numerous questions here (https://www.refbc.com/grants)

2. What role does sense of place play in motivating or hindering participation in ecosystem recovery and management?

Example related questions:

- What is “sense of place”? How is sense of place related to human wellbeing?
- How does sense of place vary by community, geography, and experience in the Salish Sea region?
- *Added by a survey respondent:* Consider multiple types and scales of sense of place.

Survey respondent comments:

- Several sense of place studies recently completed or currently under way. There is limited added value compared to other questions.

- This topic is likely to grow in importance and urgency with the increasing in-migration to the region that is predicted by demographers
- This, along with a better understand of place meanings and place attachments are crucial for understanding participation in ecosystem management and recovery!

Proposed funding sources, to date: NA

3. What factors motivate landowners to engage in or resist ecosystem recovery actions? What about land rights-holders, such as Indigenous groups, and other stakeholders, such as the non-landowning public? (Ask related questions of these groups as well.)

Example related questions:

- How do social and cultural connections and networks influence landowner stewardship, and what barriers and bridges exist to enable shared goals for ecosystem recovery?
- How does sense of place affect landowner stewardship?
- What legal and economic options are most effective to incentivize landowner stewardship beneficial to ecosystem recovery?
- How do property rights and changing land values affect what landowners decide to do with their land?
- Does the potential for increasing the economic value of ecosystem amenities (e.g., flood control, scenic beauty, water or air quality), motivate landowners' engagement in ecosystem recovery?

Survey respondent comments: NA
Proposed funding sources, to date: NA

<u>Goal: Navigate social, policy, and economic complexity to achieve ecosystem recovery</u>

4. How do ecosystem recovery goals vary across diverse communities (e.g., different disciplinary, socio-economic, cultural, geographic, livelihood, and place-based groups), and what are the trade-offs among them?

Example related questions:

- How are urban and rural communities different in their ecosystem recovery goals, and what social factors affect these differences?
- How are Indigenous and non-Indigenous communities different in their ecosystem recovery goals, and what social factors affect these differences?
- How are ecosystem recovery goals influenced by different baselines and indicators used by different groups?
- What tradeoffs are people willing to make to meet ecological goals? How can we understand and evaluate the tradeoffs among diverse stakeholder values?
- What factors most influence public and/or political support for ecosystem recovery actions?

Survey respondent comments:

- This seems like a relatively low-hanging fruit as it builds from much of the indicator work
- Trade off questions will be very interesting to explore.

Proposed funding sources, to date:

- Government

5. What are the best available policy levers to achieve ecosystem recovery?

Example related questions:

- Have policy levers been formally evaluated for effectiveness, and what are the outcomes?
- What are the challenges to integrating and implementing multiple policy levers?
- What policy mechanisms mobilize collective action?
- *Added by a survey respondent:* What kinds of policy levers or policy mixes might be effective for different kinds of specific goals?

Survey respondent comments:

- What is a policy lever? Is this referring to different public policies? Different institutions pursuing a particular policy? I worry this is jargon without a clear referent in this setting.
- Urgency is key here because i think there is a time lag on this - same as with the legal route.
- Too vague

Proposed funding sources, to date: NA

6. What is the current status of, and potential for, collaborating with different industries in ecosystem recovery? (e.g., natural resource industries such as forestry and fishing, ports, pipelines, mines, pulp mills, etc.)

Example related questions:

- How does the geopolitical and political economic landscape shape ecological goals and restoration activities in the region?
- What are the big economic sectors, activities and actors in the region? What are their interrelationships and their implications for ecosystem recovery?
- What incentives are effective at the corporate scale?
- *Added by a survey respondent:* What are the implications for business or industry to participate in ecosystem recovery efforts or stewardship of natural resources? What are effective methods for engaging with and collaborating with these industries and businesses? Are there non-Salish Sea examples of this being done effectively? What (if any) are the unintended consequences from public perception? Do industries such as the ones listed above have a sense of place where they work? What is the role of sense of place in their understanding of what they do and what conservation is?

Survey respondent comments:

- I am not optimistic about this sort of collaboration happening in today's environment

Proposed funding sources, to date: NA

HUMAN WELL-BEING GOALS

Overall goal: Promote environmental conditions and ecosystem policy and management actions that support human well-being, including access to nature and natural resources

<u>Goal: Understand and mitigate the effects of changing environmental conditions on human well-being</u>

7. How is human well-being related to the environment?

Example related questions:

- What benefits (psychological, spiritual, health, economic, cultural, etc.) do different people derive from nature (e.g., across varying demographics and Indigenous affiliations)?
- How does a resource-based economy influence psychological and physical health?
- What is the relationship between immigrant subsistence cultural practices (e.g., squid jigging) and human well-being?
- How does sense of place vary among Salish Sea residents? To what extent is variation in senses of place associated with length of residency, type of attachment, type of dependence or landscape preferences?
- Whose well-being is prioritized, emphasized, and/or foregrounded within regional restoration efforts or discussions? Why? How?
- *Added by a survey respondent:* How does quality of experience relate to wellbeing? What happens when quality (e.g. overcrowding) compromises experiences?

Survey respondent comments:

- The question posed here is a broad one, and one that has been explored in other geographic settings. I'm unclear as to why a funding agency would be attracted to exploring this question in the Salish Sea without clearly articulating what makes us distinct from other settings. I would advise trying to focus some of these questions on local/regional practices that are unique or common in the Salish Sea region as a way of trying to make this more appealing to funders.
- I don't think this has as much added value at this point, considering all the recent work with wellbeing.
- This feels like an area with a lot of research and knowledge already; specific research related to this region would likely not be different than in other regions
- As a resident of Salish Sea, very important but cannot comment on the research impact

Proposed funding sources, to date: NA

8. How is the well-being of different social groups affected by changing environmental conditions and ecosystem recovery?

Example related questions:

- How does environmental degradation and conservation create uneven and disproportionate impacts on specific communities of the Salish Sea region? Consider the region's sociodemographic diversity, such as unique cultural values, local seafood consumption and ecosystem-engagements by Indigenous groups, immigrant communities and others.
- What are the relationships between natural resource conditions in different place-based communities and economic conditions, such as employment and income levels, and how do these interdependencies represent relative economic risk or security to these communities?

Survey respondent comments:

- This is a critically important topic, but one that is being tackled by several other groups - Public Health and Ecology, for example. Not as much added value to start something new.

Proposed funding sources, to date:

- Government, industry

9. How does, and will, climate change impact the holistic health and well-being of Salish Sea communities?

Example related questions:

- How is human well-being connected to local ecological food webs, and how are these food webs changing with climate impacts?
- How will climate change affect rural communities and urban populations differently?
- How can the vulnerabilities and adaptive capacities to climate change among different groups, communities and sectors within the Salish Sea be characterized? What social and institutional responses or adaptations can be taken to maintain or increase social-ecological resilience and well-being in the face of climate change?

Survey respondent comments:

- Very important question/theme that touches on many of the other issues raised in the other questions. This is definitely a question for exploration, but some discussion will be needed about how to narrow the focus to make it more tractable.

Proposed funding sources, to date: NA

10. Why and how have humans become disconnected from nature, and how best can we connect people to green spaces, clean water, and fresh air?

Example related questions:

- How does the built environment, as part of increasing urbanization, positively or negatively impact our connection to nature?
- How best are the human well-being benefits of connections to nature communicated to the end-beneficiaries to promote experiences with (or in) nature?
- *Added by a survey respondent:* What are existing connections to nature by different groups and how can these connections be fostered and/or preserved?

Survey respondent comments:

- I see this as an important research question of academic interest, but not as one that is ideally suited for this particular project, given the abundance of more targeted and focused questions on the Salish Sea
- Not sure about added value.
- Excellent question.
- Loaded question. Why assume people are disconnected from nature? Would be better to examine existing connections to nature by different groups and how can these connections be fostered and/or preserved.
- This would need to be studied with particular race / class groups as the focus, and other questions do this better.

Proposed funding sources, to date: NA

<u>Goal: Improve the effects of environmental policy and management on human well-being</u>

11. How do resource management and conservation affect people in different and differential ways (i.e., economic, psychological, physical, and cultural effects)?

Example related questions:

- How are sectors dependent on natural resources (fisheries, agriculture, timber, mining, tourism) affected by restoration actions?
- What are the effects of current ecosystem management practices (e.g., regarding culturally important species) on Indigenous peoples and other subsistence harvesters?

- What are the economic benefits and costs (market, non-market, use, non-use, etc) of recovery actions and stewardship activities to different groups?
- In what contexts do externalities and other economic market failures create ecosystem degradation or otherwise impede ecosystem recovery goals? What approaches are best suited to address these?
- *Added by a survey respondent:* What are effects on conflict between user groups (e.g. wood in river for restoration creates navigation hazards for rafting community)?

Survey respondent comments:
- Note that 2 of the 4 examples involve economic framing, not sure if this was intentional?

Proposed funding sources, to date:
- Washington Sea Grant RFP
- Real Estate Foundation of BC (https://www.refbc.com/grants) among others

12. To what degree, and how, is access to marine and coastal resources (e.g. fisheries, open space, native foods) changing among different communities in the Salish Sea?

Example related questions:
- Who (e.g., individuals, groups, and corporations) has ownership and harvesting rights to natural resources in the region?
- Who is gaining and who is losing access to resources and space due to privatization and other influences?
- How do jurisdictional processes affect access to resources? What historical and contemporary issues have impacted these jurisdictional processes, including where they occur?
- What are the historic and ongoing processes by which Indigenous groups are, and have been, disconnected from the land and water, and what are the implications for their well-being?
- *Added by a survey respondent:* How is increasing pressure and crowding from recreational interests on public lands impacting treaty rights, management of resources/areas, and public experience of remote/natural areas (sense of place - where is solitude)?

Survey respondent comments:
- This is an important topic for the reasons above; however, because research here potentially threatens to challenge the status quo distribution of access, entitlements, and property rights, funding may be more difficult to secure

Proposed funding sources, to date:
- Washington Sea Grant, NOAA

13. In which ways have Indigenous groups been, and continue to be, disenfranchised from resources and resource management across their territories (i.e. across landscapes, both on- and off-reservation), and what are the effects on their well-being?

Example related questions:
- How are Indigenous groups and others restoring their connections to resources and resource management, and what opportunities exist to further this work?
- What factors influence perceptions of ecological health and degradation? How does this impact how people use waterways over time and across generations? How can confidence in health of waterways and ecosystems be restored to resume social, cultural, and economic uses of

waterways, including Indigenous rights to harvest, conduct cultural activities, and transfer this knowledge to future generations?

Survey respondent comments: NA

Proposed funding sources, to date:
- While Indigenous peoples comprise a small subsection of the Salish Sea region population, federal agencies are madnated to provide funding to Tribes, and several private foundations are also interested in supporting indigenous projects.
- Government
- In Canada, there are many funding opportunities for this kind of work across federal, academic, and non-profit organizations, including working in partnership with these organizations. Too many to name but often there are programs out of University of Victoria, West Coast Environmental Law, grants from the Real Estate Foundation, and communities often have access to federal and often provincial opportunities
- Tribes and First Nations might fund this
- BIA funding partnering with tribes

14. What is the current reliance on shellfish aquaculture and hatcheries (in contrast to wild harvests) among Indigenous and non-Indigenous economies, and what are the implications for aquaculture and hatchery management?

Example related questions:
- How and why have shifts from wild to aquaculture harvests occurred historically?
- *Added by a survey respondent:* In what ways do indigenous and non-indigenous groups rely on shellfish aquaculture and how is this different from their reliance on/use of wild shellfish? Go beyond just economies to think of the cultural, social and recreational reliance too.
- *Added by a survey respondent:* How does this shift on either side of the border, and what are the factors that have created these similarities or differences?

Survey respondent comments:
- This seems like it could be bundled with an earlier question on changes in indigenous resource use patterns, but on its own, doesn't strike me as an essential research topic.
- BC government has attempted to force shellfish aquacuture on Indigenous nations, as a way of downloading costs, but this has met with very limited success.
- Rather specific; some of the other areas of inquiry seem more pressing
- This may be an interesting one for a transboundary research question because on the Canadian side, you see less reliance on shellfish aquaculture and hatcheries. In part because the Fraser River, the Indian River and a few others still have strong salmon runs. So the framing of this question strikes me as quite US-centric but also could result in a fascinating compare/contrast on either side of the border. I guess I flag this, but I'd leave this in. Perhaps an "example question" could be: How does this shift on either side of the border, and what are the factors that have created these similarities or differences? (Just another note-- you see a difference in Indigenous-led aquaculture on this side due to the different ways Canadian and US law regulates Indigenous resource rights)
- Not sure this question is framed in a way that will support meaningful management changes

Proposed funding sources, to date:
- WSG Aquaculture Grants
- Government agencies like NSERC in Canada

SOCIAL GOALS

Overall goal: Promote equitable, just, and effective social processes: good governance, including meeting treaty obligations and achieving sovereign Indigenous governance; economic security and vibrancy, and fair allocation of resources; and holistic knowledge production and use

Goal: Produce, share, and use integrated knowledge and conceptual tools

15. Do approaches to knowledge production used for ecosystem-recovery reflect and incorporate multiple ways of knowing (e.g., variations by discipline, local and Indigenous knowledge, etc.) and holistic knowledge systems? Why or why not?

Example related questions:

- How does a scientific lens get reinforced in ecosystem recovery? What is the role of technical experts (e.g. in agencies) in reinforcing this status quo?
- What opportunities exist to engage holistic knowledge systems in ecosystem recovery?
- What are the opportunities for boundary-spanning professional training in social-ecological system recovery?

Survey respondent comments:

- This area of research seems very intertwined with the other question, How is the well-being of different social groups affected by changing environmental conditions and ecosystem recovery?
- Requires significant culture change within academic institutions and government departments

Proposed funding sources, to date: NA

16. How does the temporal scope of the ecological baseline limit or expand understandings of potential trajectories for ecosystem recovery and restoration?

Example related questions:

- How might we expand the temporal scope of ecological baselines to more accurately capture potential trajectories of ecosystem health? What implicit biases or other factors inform ecological baselines (e.g., multigenerational perspectives, electoral cycles, project lifespans)? How do various groups understand temporal scope of ecosystems recovery?
- How are Indigenous and non-Indigenous communities different in their baselines, indicators, and restoration goals?
- What disciplines can inform ecological baselines, indicators of ecological health, and restoration goals? (e.g., environmental sciences, Indigenous knowledge, oral history, archaeology, paleoecology, anthropology.)

Survey respondent comments:

- I think this question needs to be reframed a bit differently. In my mind, there are two things going on. First, there are ecological/biophysical differences in terms of the appropriate time frames needed to examine certain problems (dealing with OSS pollution may require a different time horizon than orca conservation, for instance). Second, there are sociocultural differences between different groups (indigenous vs non-indigenous, resource users vs. non-users, etc.) in terms of the time frames through which they understand Salish Sea problems and how they should be envisioned.

Proposed funding sources, to date:

- Foundations

17. Develop and improve social-ecological system monitoring and decision-making frameworks and tools

Example related questions:

- What are best practices for determining goals, targets and monitoring in the social-ecological system that promote accountability, effectiveness, and progress?
- How could we monitor and track progress on human wellbeing and social-ecological goals, and targets, using indicators and other approaches'?
- How could we holistically and explicitly integrate human dimensions and social science considerations with biophysical targets and goals to ensure well-informed decision-making by funders and policy makers?
- What framework connecting human wellbeing to ecosystem health is best suited to the Salish Sea?
- In what ways does a human wellbeing framework influence the selection of recovery goals, indicators and strategies?
- How do psychological shifting baselines influence monitored indicators for human wellbeing? (specifically, perceptions of environmental governance, sense of place, psychological well-being)
- How is information used at the sub-regional vs. regional scale, and how could we provide data that is best used at each scale, considering extraterritorial influences?
- *Added by a survey respondent:* What existing frameworks exist, and how can these be leveraged, improved, or built upon to track the progress of future socioecological challenges?

Survey respondent comments:

- There are several projects tackling bits of this, but a cohesive picture could add substantial value.
- I feel like there's already a lot out there, but integrating across the entire Salish Sea would be good
- These modeling approaches are usually top down and seem to have been deployed a lot already.

Proposed funding sources, to date: NA

18. What environmental education and public engagement opportunities currently exist? How impactful have these opportunities been and what are the gaps that need to be addressed?

Example related questions:

- What are the shared goals of education and outreach programs? Are they conducted in isolation from one another? How can these practices be better connected? How can these types of activities be connected for greater collective mobilization efforts that emphasize participation?
- E.g., What is the public awareness of Indigenous fishing, harvesting, and treaty rights? What are strategies to build a culturally-fluent population?
- E.g., How best are nature benefits communicated to the end-beneficiaries to promote experiences with (or in) nature?
- *Added by a survey respondent:* What environmental education and outreach programs are most affective in achieving their goals? How are the outcomes measured and tracked over time? What are the long term actual vs. intended outcomes of environmental education?
- *Added by a survey respondent:* What has been the impact of these education and engagement programs?

Survey respondent comments:

- I think this is an important question, but in my mind, it strikes me as a lower priority than some of these other issues. With that said, there may be ways with small amounts of money to create curricula or other tools for outreach to certain populations regarding these issues.

Proposed funding sources, to date:
- Victoria Foundation
- Government, industry, community

<u>Goal: Empower local communities</u>

19. What are strategies to empower local communities?

Example related questions:
- What factors or strategies create empowering processes that stimulate creating new knowledge, making changes, and taking action at the local level?
- What are determinants of empowerment (for different groups, e.g., children)?
- How can institutions support and empower local communities? (E.g., so the community sets its own agenda and owns the solutions)
- What are the historical legacies that have led to current inequities in the region? How are these currently manifested and reinforced? What does the spatial or geographical mapping of these inequities tell us?
- *Added by a survey respondent:* What are the existing barriers to local community empowerment (e.g. existing regulations, decision-making processes, etc.)?

Survey respondent comments:
- "Empowerment" is a pet peeve word of mine, because it means too many things to different people. I would advise trying to use more specific language and/or examples to draw out what is meant here.
- I don't know that we need more research on this - it is fairly well studied globally. We need better application of this research.
- Many of these answers already lie within local communities
- "Local" usually signifies settler, not Indigenous

Proposed funding sources, to date:
- Private Foundations

20. What are the best practices for recruiting and maintaining engagement in collaborative processes that support diverse interests?

Example related questions:
- What are factors that lead to collective action?
- What does a network analysis tell us in regard to how collaboration is currently taking place, and how we may improve coordination to achieve ecosystem recovery aims?
- To what extent are collaborative processes truly collaborative, representative, and equitable?
- How do variations in collaborative structures influence ecological, social, and social-ecological goals, and what are the challenges (e.g., institutional, participatory, and/or cross-cultural barriers)?

Survey respondent comments:

- I think we know the answers to this at a large scale, and we have a few studies that currently identify specifics at Puget Sound scale. It's more about applying this information.
- Under-researched area in this context
- I'd avoid specifying methods in these questions, e.g., network analysis.
- This one seems like navel gazing on the part of state agencies, would rather see funds support grassroots initiative

Proposed funding sources, to date: NA

21. What mechanisms exist for engaging and transforming intragroup conflicts related to ecosystem management in the Salish Sea?

Example related questions:

- What environmental conflicts currently exist within the Salish Sea? How are they contributing to a degraded system?
- What are the contexts, background, drivers, and consequences of these conflicts?
- How do conflicting narratives, goals, and actions around ecosystem management contribute to these conflicts?

Survey respondent comments: NA
Proposed funding sources, to date: NA

22. To what degree, and how, are diverse people and their values currently represented in political and decision-making processes, how does representation affect ecosystem recovery outcomes, and how are diverse people affected by these outcomes?

Example related questions:

- How could diverse people and their values be better represented?
- What and whose knowledge systems, values, agendas, and place-meanings (or senses of place) are currently represented? How do these differences affect how they are represented?
- What are the current structures, both formal and informal, that are used to promote diverse representation? Who gets invited to the table? Are diverse people and voices represented in a genuine and meaningful way? How is “community” defined? How do different decision-making spaces and places create different senses of belonging?
- What is the degree of Indigenous engagement (including peoples from both recognized and unrecognized communities)?
- How can immigrant communities be included? What is the political sociology of immigrant community inclusion in political and decision-making processes?
- How can individuals and communities with limited capacity to participate be represented (e.g. due to factors such as accessibility and perceptions thereof, patriarchy, trust, fealty, degree of civic engagement, sense of place)?
- How can future generations be included in political and decision-making processes?

Survey respondent comments:

- I understand what is trying to be articulated here, but I would strenuously take issue with the wording of this question. People are not "diverse" or "not diverse". Diversity is a characteristic of populations, not of individuals. An individual who has darker skin is not "diverse" while someone with lighter skin is not "not diverse". I think if there are particular diversity characteristics of populations or subgroups that we feel are important to be emphasized

(nationality, race, ethnicity, gender, age, wealth, geography, resource use habits, etc.), then these should be clearly articulated when framing this question.
- Work should be done to center this question in the agendas of practitioners and managers
- Aside from tribes, where are other community groups and people of color in our recovery effort?

Proposed funding sources, to date:
- Foundations, NGOs, Academic

Goal: Develop coordinated, effective governance

23. How can the diversity of institutions and jurisdictions in the Salish Sea be characterized and better coordinated?

Example related questions:
- To what extent are different governance structures, institutions and processes (decision-making, policy, and/or management) coordinated across scales? Where are there scalar matches and/or mismatches?
- How can the current level of institutional and organizational fragmentation and coordination in the Canadian Salish Sea be characterized and improved?

Survey respondent comments:
- Key area - challenging to get governments to address as not seen as immediate benefit, likely better support through applied research frameworks
- This question should be rephrased to center Indigenous governance--my review assumes that reworking

Proposed funding sources, to date: NA

24. What factors contribute to effective co-governance and/or co-management between jurisdictions (including Indigenous and non-Indigenous governments)?

Example related questions:
- In which ways have Indigenous groups been, and continue to be, critical, alternative, and leading voices of opposition or resistance to state-based natural resource management and broader environmental challenges in the Salish Sea region?
- *Added by survey respondent:* In what circumstances is co-management is appropriate, and what is the applicability of such circumstances to the conditions in the Salish Sea region?

Survey respondent comments:
- I want to posit that co-management or co-governance may not be an effective way to manage at least some of the resources in the Salish Sea region. Instead of exploring the effectiveness of these regimes, I would suggest taking a step back and asking in what circumstances co-management is appropriate, and the applicability of such circumstances to the conditions in the Salish Sea region.
- Indigenous voices have been prioritized in Canadian Research; all universities are trying to hire Indigenous faculty, and there are specific Indigenous research programs now.
- This would be a useful tool/knowledge also for NGO's who don't have any legal obligations to Indigenous communities, yet seem to speak on their behalf without their inclusion
- Consider framing the example question here in a more open way.

Proposed funding sources, to date:
- SSHRC
- Government of Canada - Crown and Indigenous Relations, DFO, Transport

25. Is the legal framework for ecosystem recovery working?

Example related questions:
- What is the full suite of legal mandates that exist related to Salish Sea ecosystem recovery and how do these legal mandates conflict or align with policy and budget mandates?
- What is the rate of compliance for recovery regulations and how are these regulations enforced?
- *Added by survey respondent:* Is the legal framework for ecosystem recovery actually facilitating desirable ecological outcomes? To what degree are legal processes and frameworks aligned to ecological goals?

Survey respondent comments:
- I think this is a very important question, but I would want to make this question a bit clearer in terms of aims. The secondary questions above focus on issues of process, and whether these processes are functioning as intended institutionally. However, there is a broader question as to whether the legal framework for ecosystem recovery is actually facilitating desirable ecological outcomes, which has to do both with process as well as the alignment of legal frameworks to ecological goals. This needs to be drawn out more clearly.
- THIS ONE!
- Re-phrase: what do you mean by "working"?

Proposed funding sources, to date: NA

26. How do power and politics influence decision-making processes and actions taken in the Salish Sea?

Example related questions:
- What is the role of different types of power, such as corporate power, political power, and relational power, in decision-making?
- Who has power in current political and decision-making processes? (E.g., who has power to sue? Who decides what to restore?)
- What are the political and psycho-social factors that lead elected officials to implement recovery actions in their watershed, and be transparent about their decision-making?
- How does political climate influence granting for social-ecological system recovery research and implementation?
- To what extent do institutional and informal power dynamics create uneven burdens or opportunities to participate in stewardship of the Salish Sea?
- In what ways are these decision-making processes equitable and inequitable? How can we shift toward more equitable processes?
- *Added by survey respondent:* Who has jurisdiction and what power politics leads them to exercise it?

Survey respondent comments:
- How is this issue different in the Salish Sea than other region? Good to have more knowledge but not sure if it would be worth the investment
- This is an intriguing and important subject for investigation

- There has been a systemic reluctance to address the politics of the issue both in academics and government

Proposed funding sources, to date: NA

27. How can Indigenous knowledge systems and governance (i.e., traditional knowledge, Indigenous science, and Coast Salish legal orders) be meaningfully applied in ecosystems recovery?

Example related questions:

- How do Indigenous groups in the Salish Sea region manage natural resources in accordance with their own laws, governance and jurisdiction?
- How are Indigenous laws, governance and jurisdiction recognized, or not, and what are the implications for ecosystem recovery?
- How do different legal systems shape Indigenous governance on either side of the international border?
- What tools and methods are needed to operationalize Indigenous governance?
- *Added by survey respondent:* How can Indigenous knowledge underpin or be the basis for recovery?

Survey respondent comments:

- This is so similar to other areas of inquiry identified in this survey, in my view
- This question is nicely written: both open and also clear.

Proposed funding sources, to date:

- Federal Government, Academic, Foundations

SOCIAL-ECOLOGICAL GOALS

Overall goal: Achieve social-ecological balance by integrating social and ecological goals in transboundary and multi-dimensional approaches

<u>Goal: Advance social-ecological processes for whole system resilience</u>

28. What would it take to create transboundary social-ecological governance processes for the Salish Sea? (E.g., to address potential increase of fossil fuel spills.)

Example related questions:

- What governance strategies exist to reframe geopolitical frameworks to align with socio-ecological-cultural frameworks?
- What can we learn from case studies of cross-border governance (Indigenous, state/provincial, and/or national)?
- How might transboundary social-ecological governance processes include human-wellbeing as an equal goal in ecosystem recovery?
- How could we incorporate longer temporal frames (backward and forwards), and develop future-oriented public policy?
- How do processes and changes occurring beyond the scale of the Salish Sea influence the social-ecological system?
- *Added by survey respondent*: What are barriers and opportunities, or what are success factors in other places, for such collaboration?

Survey respondent comments:

- Funding may be especially difficult to secure, given the considerable hurdles that exist to actual and effective coordination and governance across nation-state boundaries
- I think this would be very successful and of great interest to decision-makers but I personally think other things are more pressing

Proposed funding sources, to date:

- Federal government, provincial/state government, international NGO, international governance orgs., foundations

29. What would it take to create a regional Salish Sea cultural identity and community?

Example related questions:

- How can we align values, decisions, and actions consistent with social-ecological system resilience?
- What might a historically- and environmentally-informed regional culture look like? How does a transboundary social-ecological community act?
- What has been and might be the contribution of artists, writers, and musicians to social-ecological resilience?

Survey respondent comments:

- This question stuck out when reading the list separately as being one that I was asking myself "why is this important"? What is the significance of having a Salish Sea cultural identity? I don't feel I have a good sense of that at the moment.
- This is a wonderful topic! Maybe it's novelty would attract funding but don't know from where.
- I think social marketing can pretty well answer this question. Of course a market analysis would contribute, but research without a commitment to implementation doesn't seem worth it.
- But not at the risk of loss or appropriation of Indigenous cultures
- Very important question - requiring bold action to get funders and decision-makers to consider research
- I am skeptical of regional culture as a homogenous thing-- how would this not end up replicating bioregional (white) perspectives?

Proposed funding sources, to date: NA

30. How can we advance eco-cultural (also called biocultural) approaches to stewardship and restoration?

Example related questions:

- What are the characteristics and extent of historical and contemporary biocultural landscapes and ecosystems (e.g., clam garden features, traditional mariculture benefits to intertidal community assemblages, species selection and fishing weirs, marine mammal harvests and predator control, tidal forests and cultivation of wetland plant communities)?
- What are the barriers and opportunities for expanding eco-cultural restoration approaches in the Salish Sea? (e.g. laws and regulations, resource access and ownership, social and cultural disruptions, social change, technological change, etc.)
- Given the culturally-specific practices of eco-cultural interactions, are there different roles appropriate for Tribes/First Nations and settlers/newcomers in supporting the expansion of these initiatives?
- *Added by survey respondent:* Consider issues of scale and scalability.

Survey respondent comments:

- What concerns me about this question is a perception (perhaps a misperception) I have between the practices detailed in the secondary questions, which are largely done at small scales, and the very large scale of the challenges in the Salish Sea region. I would want to make sure that any research question on this topic emphasizes issues of scale and scalability
- This is also similar to the question related to multiple form of knowing, in my view

Proposed funding sources, to date:

- Again, in Canada, many funding opportunities for this kind of work at the moment through academic institutions, non-profits, and often government initiatives if conducted in partnership with Indigenous nations.

<u>Goal: Address multidimensional social-ecological challenges</u>

31. How is urbanization and development impacting the Salish Sea social-ecological system, and how can impacts be mitigated and minimized through planning?

Example related questions:

- How does planning and development, including pollution, affect human health, and security from environmental harm? What planning and development practices better maintain and promote human and ecological health?
- What are the relative costs and benefits of green (and blue) and grey approaches to infrastructure and how best can these infrastructure projects be implemented, where beneficial?
- How are private and public decisions about the sustainability of infrastructure (green vs grey) affected by different management actions or education? How do these different infrastructure types affect human and ecological health, and resource access?
- What are the major social characteristics associated with different shoreline protection and armoring approaches (e.g., demographic, geographic, economic)? How are landowner behaviors affected by different shoreline management and policy changes?
- *Added by survey respondent:* What are the different socioecological consequences of urbanization in cities, and development in rural areas, e.g. converting farmland to subdivisions?

Survey respondent comments:

- This question is crucial, but I would take issue with the framing. The question, as worded, sees "urbanization and development" as a singular, when I would argue that they are two very different processes and need to be treated as such. Urbanization in the Seattle region has very different socioecological consequences than the development of new subdivisions and associated conversion of farmland in Skagit County, and this needs to be made clearer.

Proposed funding sources, to date:

- Municipalities, ports

32. Study the food-water-energy nexus: what inter-dependencies exist between food production and consumption (including life cycle analysis), hydropower and river flows, water usage and quality, and protected species viability (salmon)?

Example related questions:

- What land use management changes affect river flows (variability), flooding, and fish survival? How are the costs and benefits of these changes distributed among different groups?
- How can agricultural viability be ensured while also strengthening environmental stewardship practices that protect land and water?
- How do different portfolios of power generation and other utilities affect natural resources and resource access?

Survey respondent comments:

- As framed, the question seems likely to involve primarily natural sciences with social sciences playing a more subservient role

Proposed funding sources, to date:

- Utilities, hydro, and flood districts
- Hopefully everyone - utilities in particular, perhaps

33. What are the causes and social-ecological consequences of existing and emergent contaminants? How are causes and consequences interrelated?

Example related questions:

- What human behaviors are producing existing and emergent contaminants?
- What is the relationship between existing and emergent contaminants with regional industries and economic growth (past and present)?
- How have these contaminants been addressed or regulated in the region and how has that been received in the region?
- How are emergent contaminants interrelated with health practices (e.g., pharmaceutical use), and physical health?
- *Added by survey respondent:* To what degree do residents understand how their behaviors increase or decrease contaminant flow? To what degree do they care? How can we increase their awareness and stewardship?

Survey respondent comments:

- Focus on studies regarding whether residents understand how their behaviors increase or decrease contaminant flow and whether they care; seek to understand how to increase their awareness and stewardship

Proposed funding sources, to date:

- better linkage with state Toxics funding to other programs?

Appendix 2. Survey Results.

Overview

Top 5 Overall Priority Topics

N	Criteria	Topic
25	All	Q09. How does, and will, climate change impact the holistic health and well-being of Salish Sea communities?
25	All	Q25. Is the legal framework for ecosystem recovery working?
25	All	Q31. How is urbanization and development impacting the Salish Sea social-ecological system, and how can impacts be mitigated and minimized through planning?
25	All	Q22. To what degree, and how, are diverse people and their values currently represented in political and decision-making processes, how does representation affect ecosystem recovery outcomes, and how are diverse people affected by these outcomes?
25	All	Q27. How can Indigenous knowledge systems and governance (i.e., traditional knowledge, Indigenous science, and Coast Salish legal orders) be meaningfully applied in ecosystems recovery?

Additionally in Top 5, by Criteria

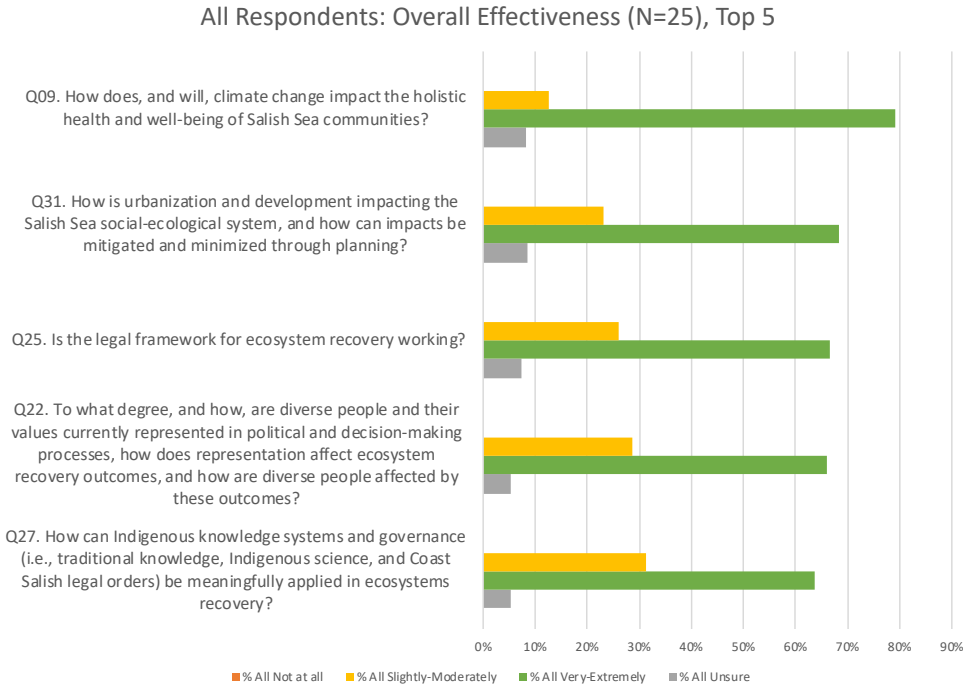
N	Criteria	Topic
25	Urgency	Q08. How is the well-being of different social groups affected by changing environmental conditions and ecosystem recovery?
25	Funding	Q13. In which ways have Indigenous groups been, and continue to be, disenfranchised from resources and resource management across their territories (i.e. across landscapes, both on- and off-reservation), and what are the effects on their well-being?
25	Funding	Q33. What are the causes and social-ecological consequences of existing and emergent contaminants? How are causes and consequences interrelated?
25	Awareness	Q04. How do ecosystem recovery goals vary across diverse communities (e.g., different disciplinary, socio-economic, cultural, geographic, livelihood, and place-based groups), and what are the trade-offs among them?
25	Knowledge	Q05. What are the best available policy levers to achieve ecosystem recovery?
25	Funding	Q32. Study the food-water-energy nexus: what inter-dependencies exist between food production and consumption (including life cycle analysis), hydropower and river flows, water usage and quality, and protected species viability (salmon)?
25	Knowledge	Q19. What are strategies to empower local communities?

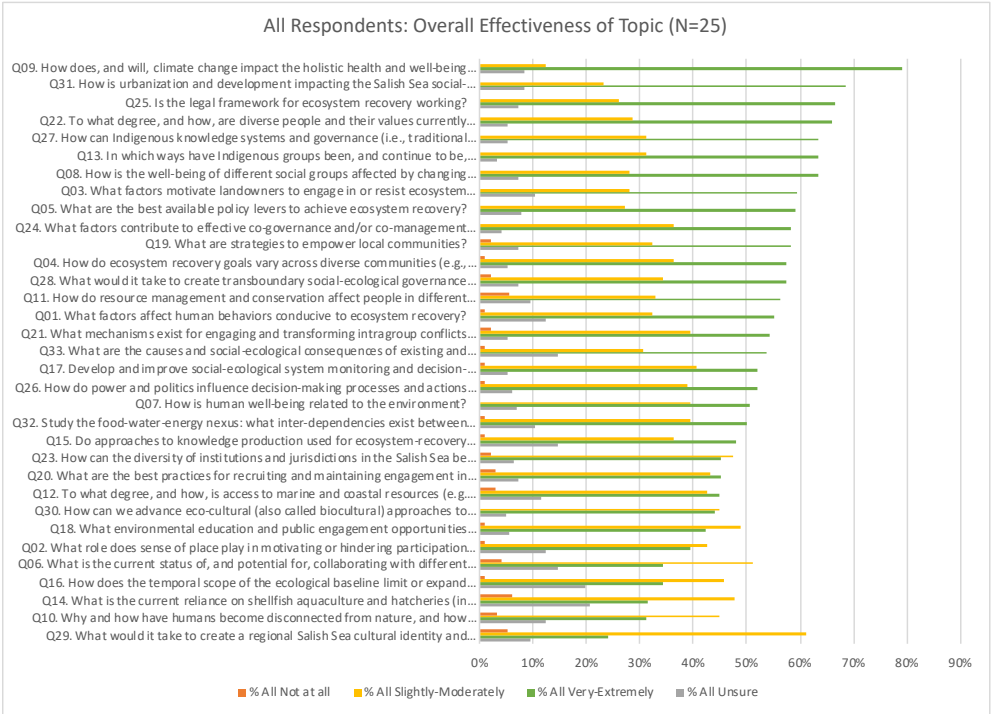
Additionally in Top 5, by Group

Groups	Topic
Americans Practitioners Anthro-Geo Ecol-EnvSci Indigenous	Q03. What factors motivate landowners to engage in or resist ecosystem recovery actions? What about land rights-holders, such as Indigenous groups, and other stakeholders, such as the non-landowning public?
Anthro-Geo Canadians	Q24. What factors contribute to effective co-governance and/or co-management between jurisdictions (including Indigenous and non-Indigenous governments)?
Anthro-Geo	Q23. How can the diversity of institutions and jurisdictions in the Salish Sea be characterized and better coordinated?
Canadians	Q28. What would it take to create transboundary social-ecological governance processes for the Salish Sea? (E.g., to address potential increase of fossil fuel spills.)
Ecol-EnvSci	Q11. How do resource management and conservation affect people in different and differential ways (i.e., economic, psychological, physical, and cultural effects)?
Psych-Econ	Q01. What factors affect human behaviors conducive to ecosystem recovery?

Overall Effectiveness

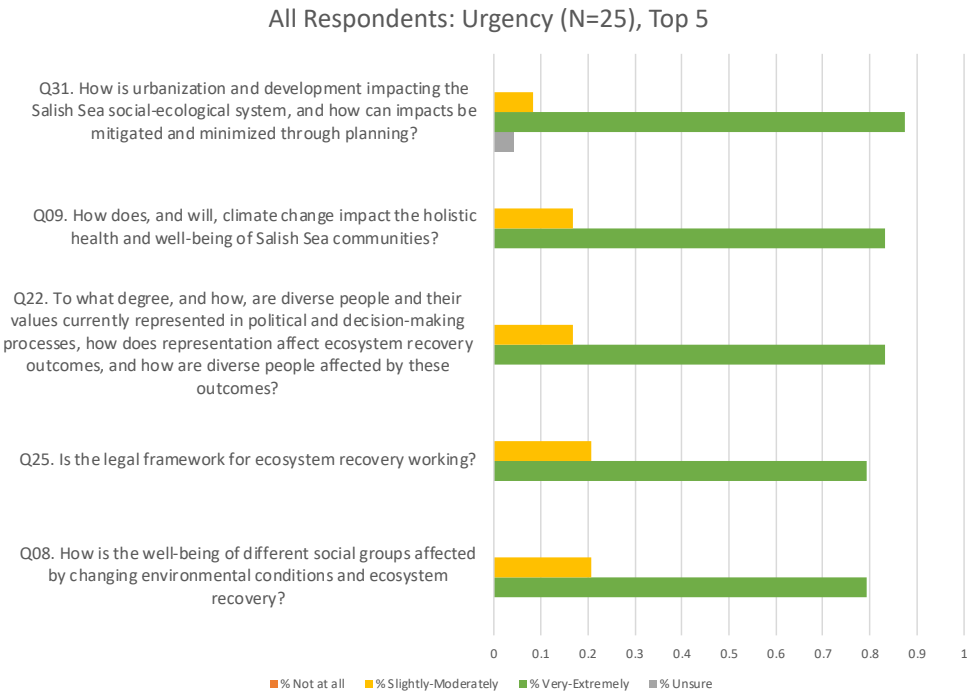
How effectively will new research on this topic address the region's most urgent social-ecological challenges, fill knowledge needs identified by ecosystem managers and practitioners, expand decision-makers' awareness of the social dimensions of ecosystem recovery, and attract funding (to conduct the research)?

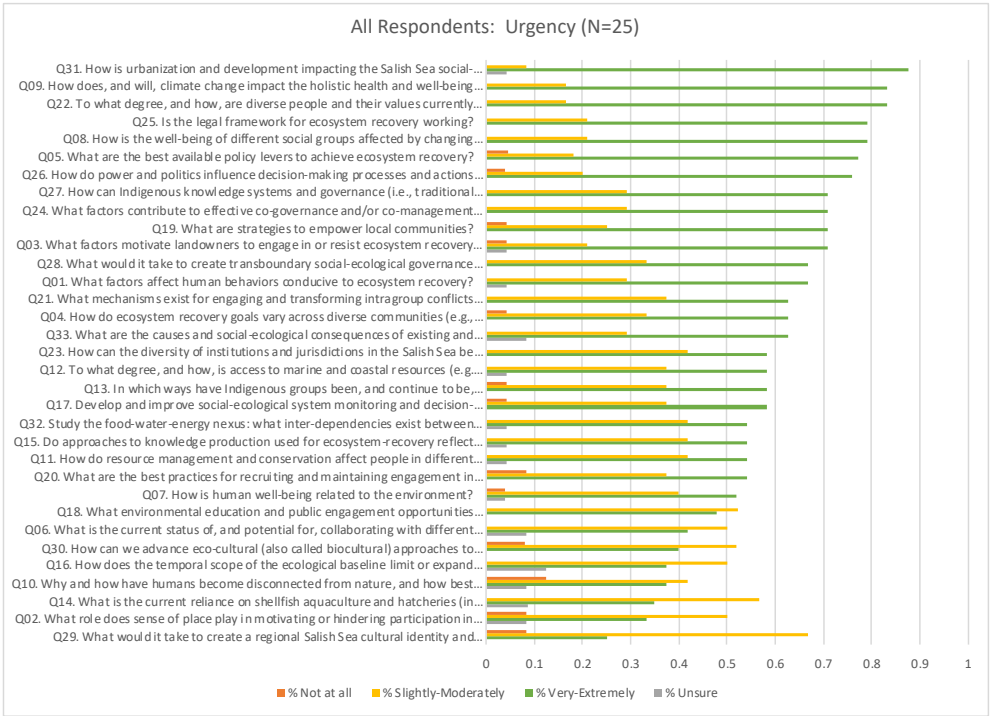




Urgency

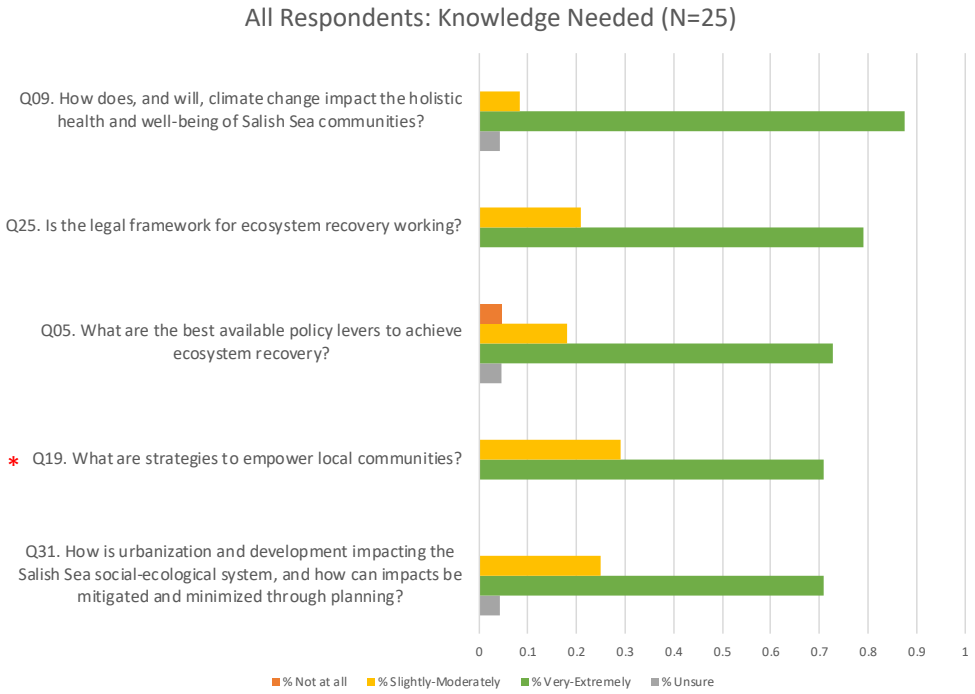
How effectively will new research on this topic address the region's most urgent social-ecological challenges?





Knowledge Needed

How effectively will new research on this topic fill knowledge needs identified by ecosystem managers and practitioners?



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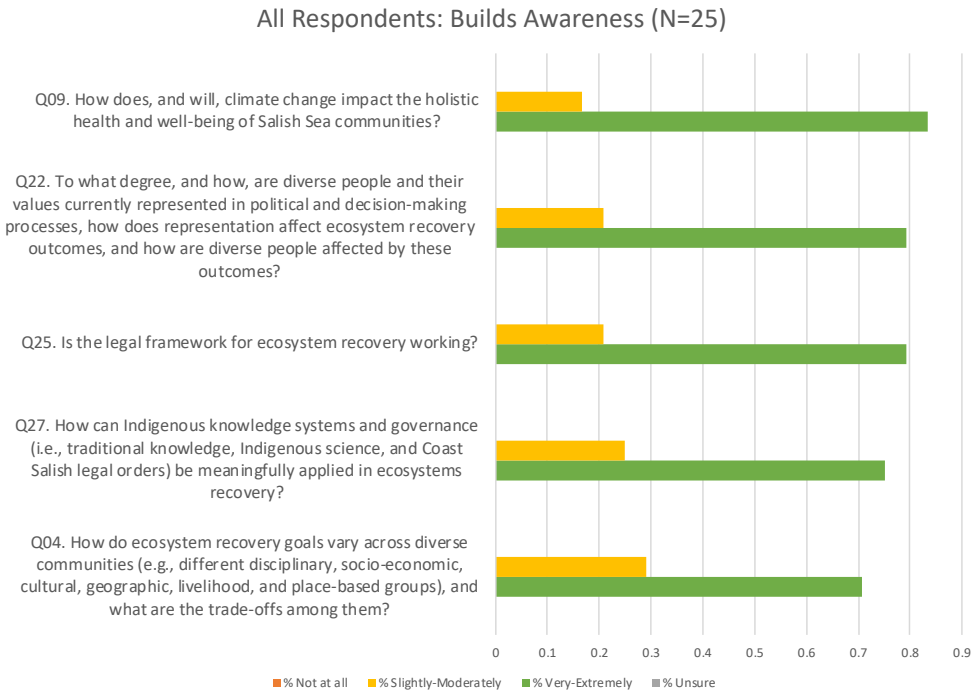
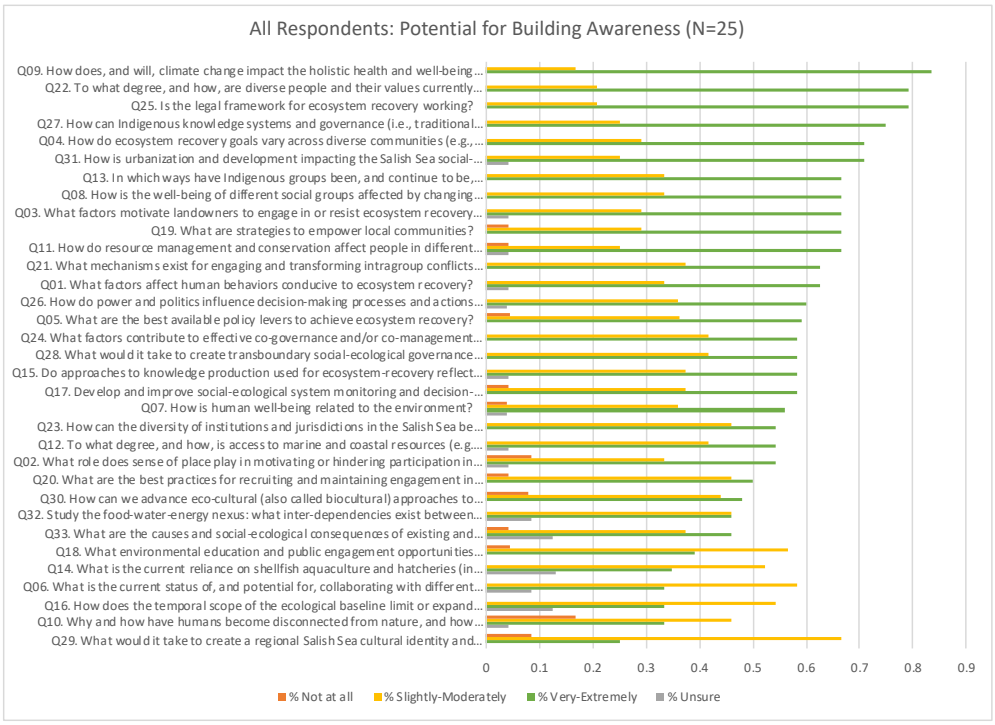
Builds Awareness

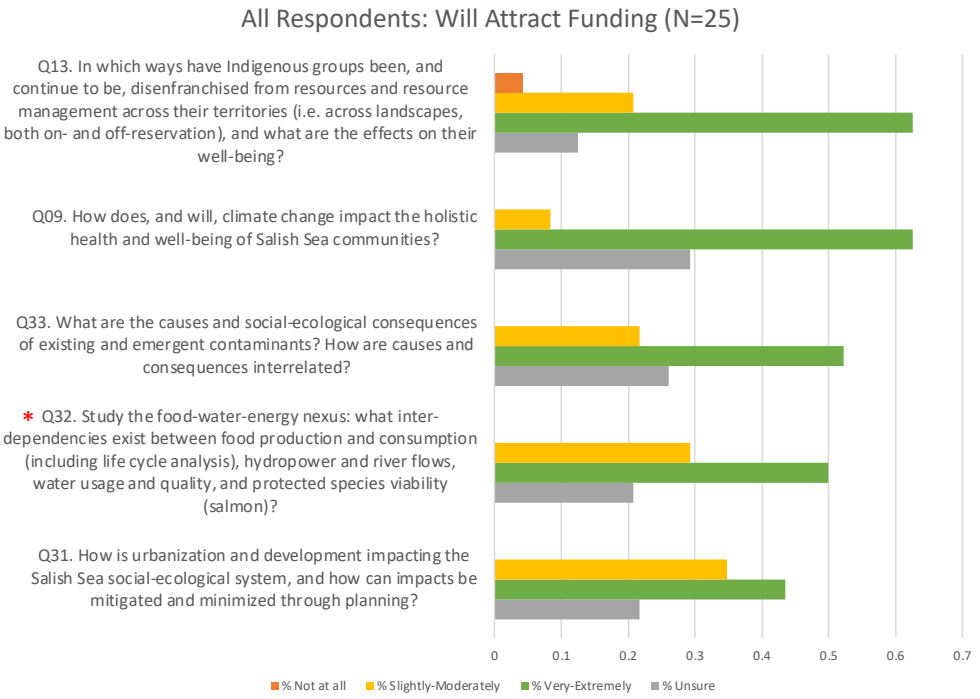
How effectively will new research on this topic expand decision-makers' awareness of the social dimensions of ecosystem recovery?





Will Attract Funding

How effectively will new research on this topic attract funding (to conduct the research)?



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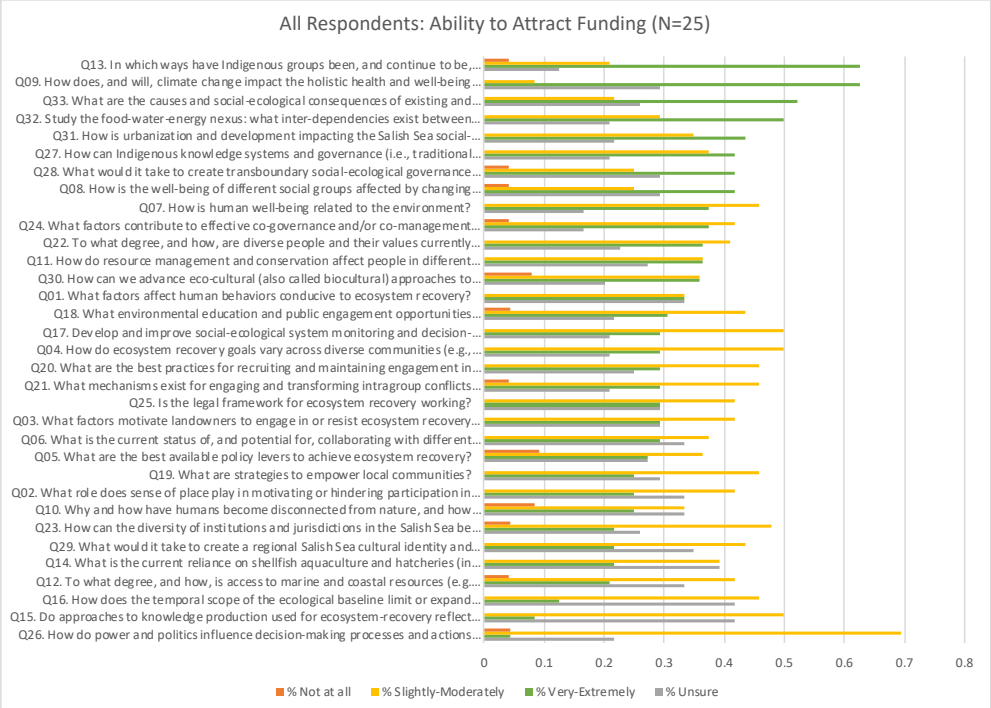
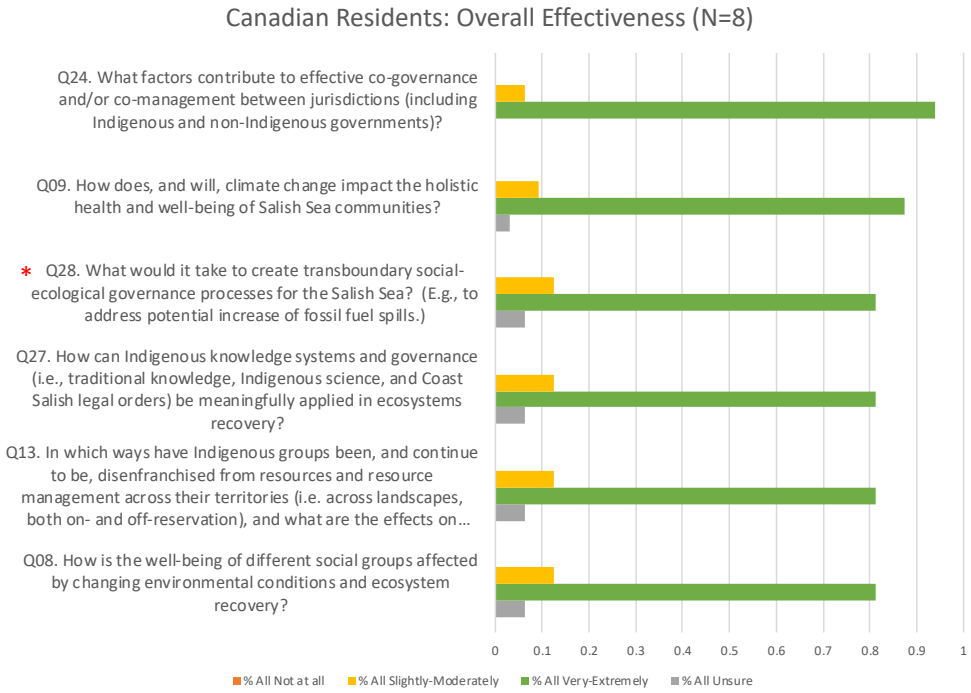


Canadian Residents



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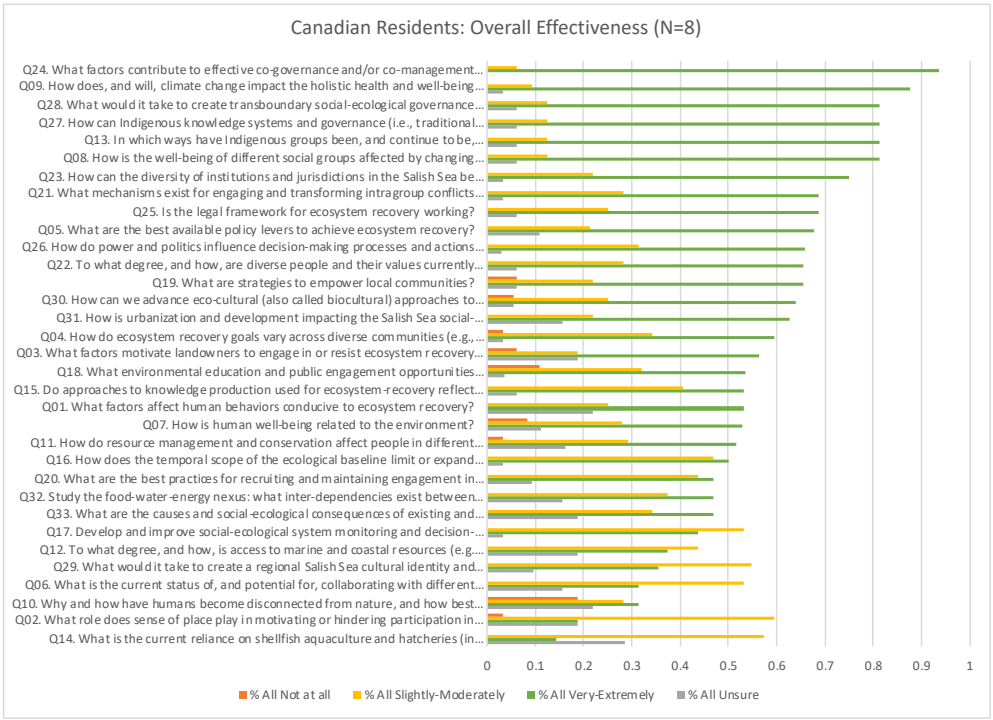
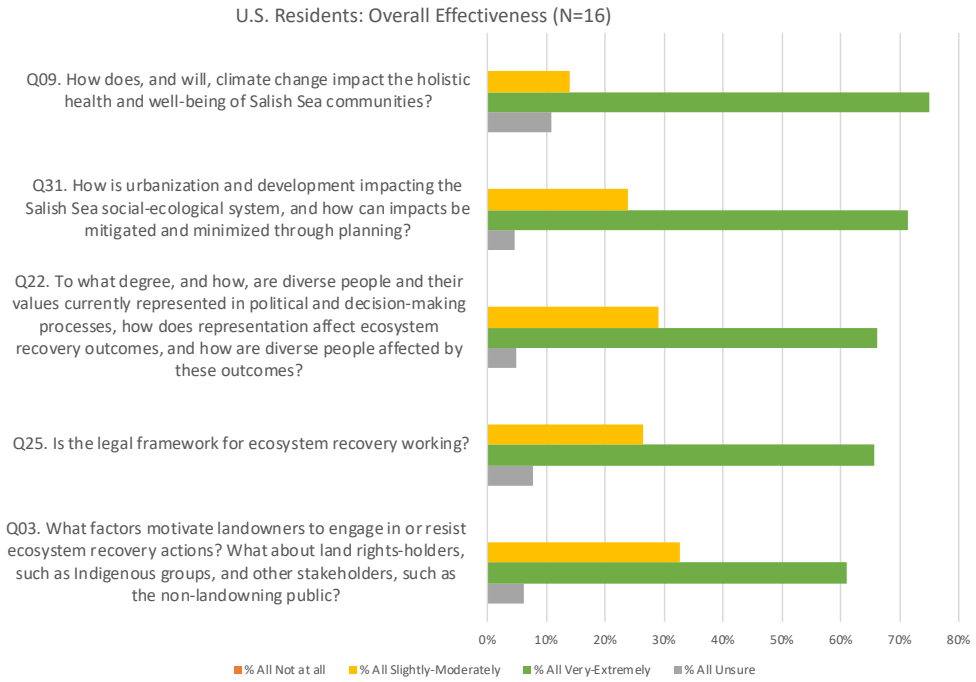
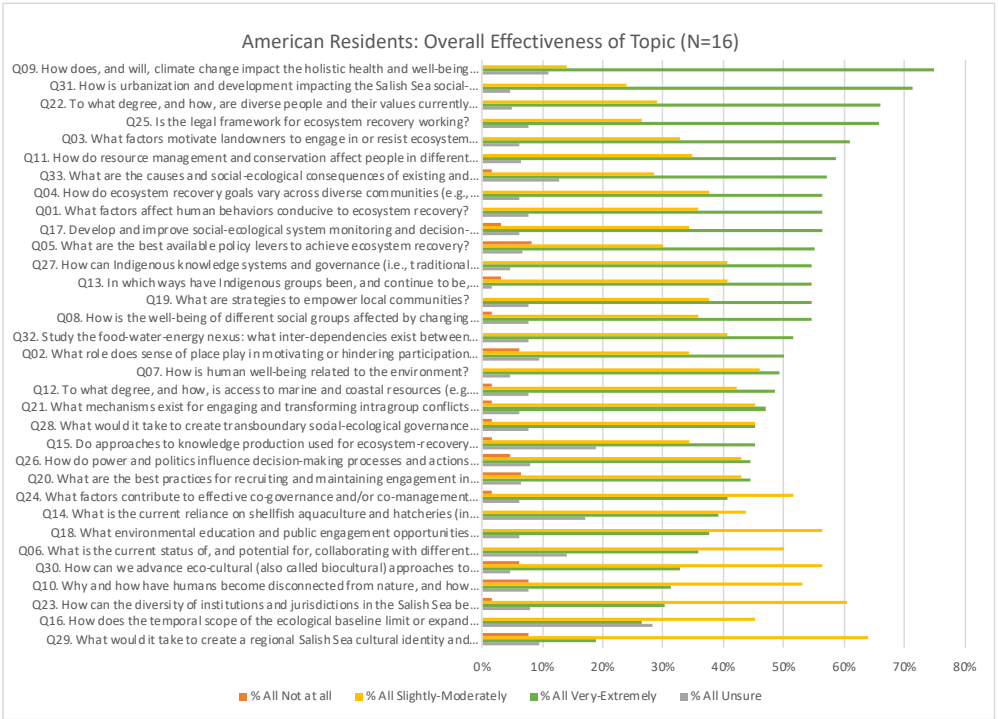


U.S. Residents





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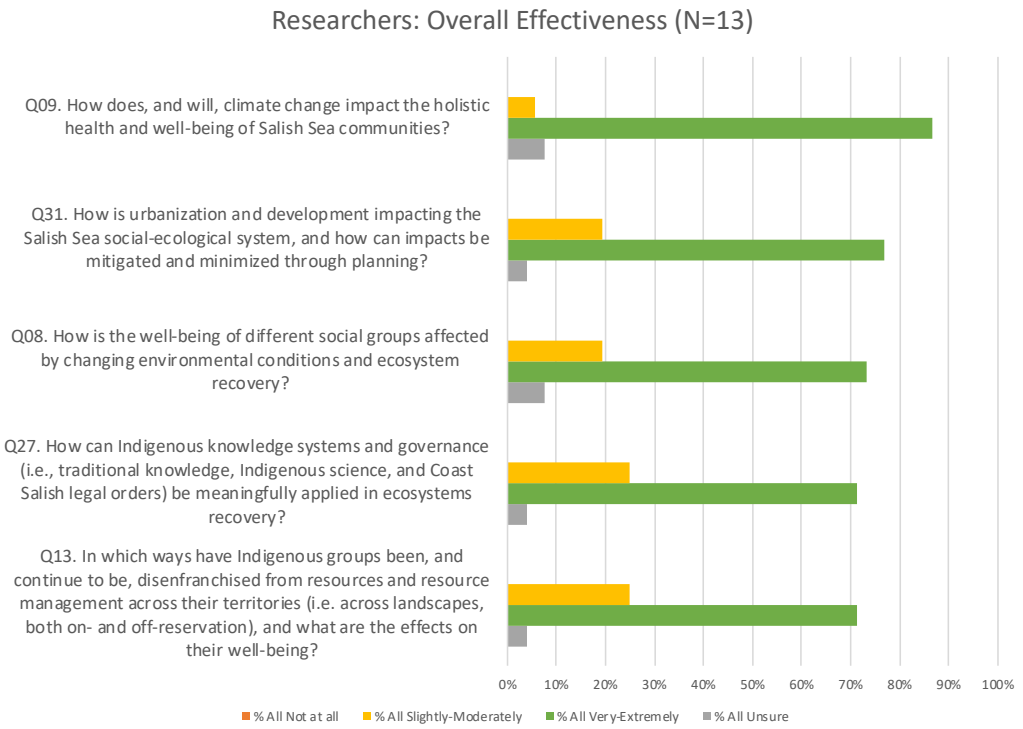
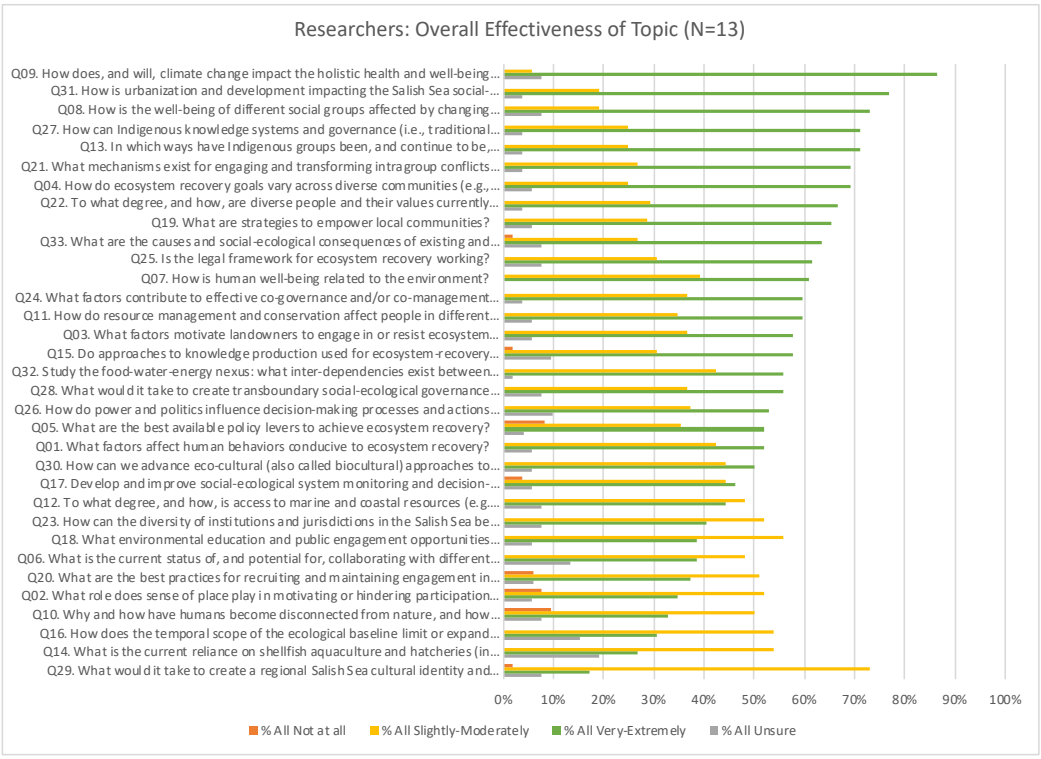
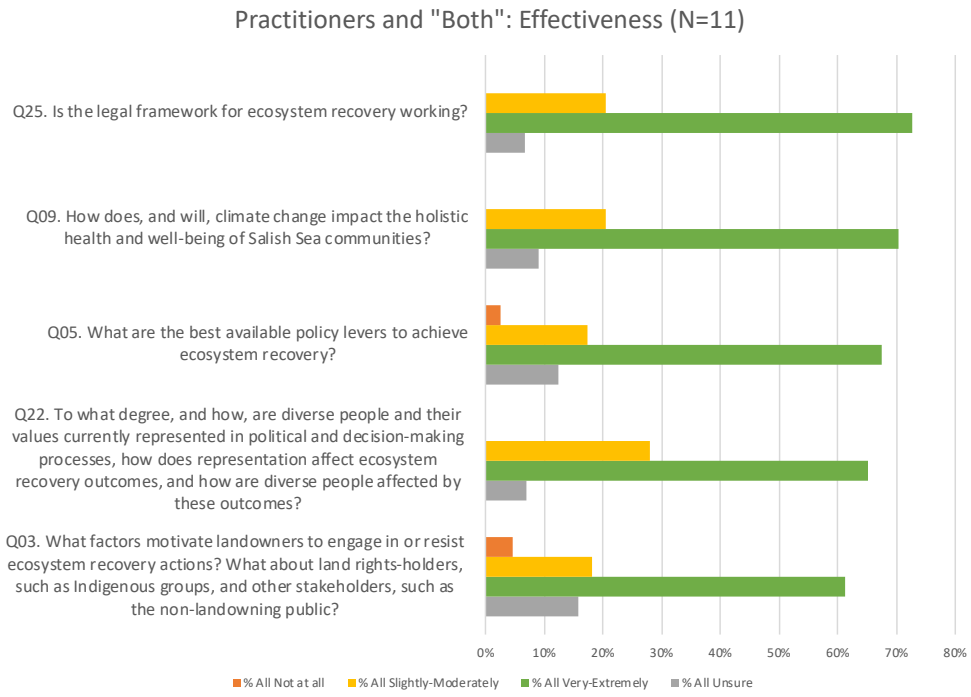
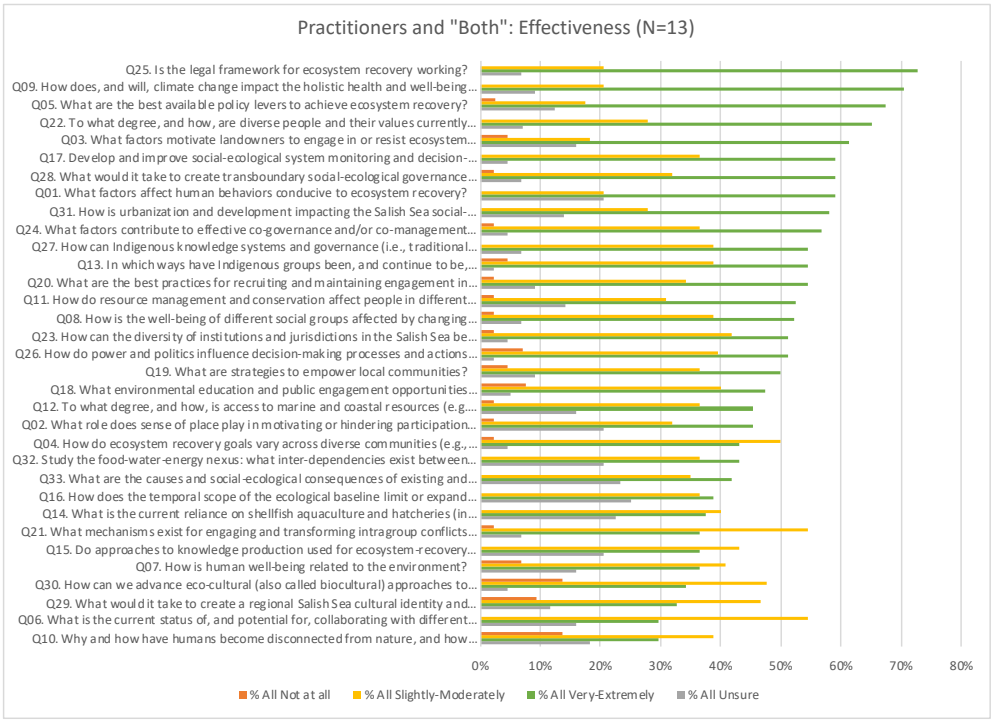


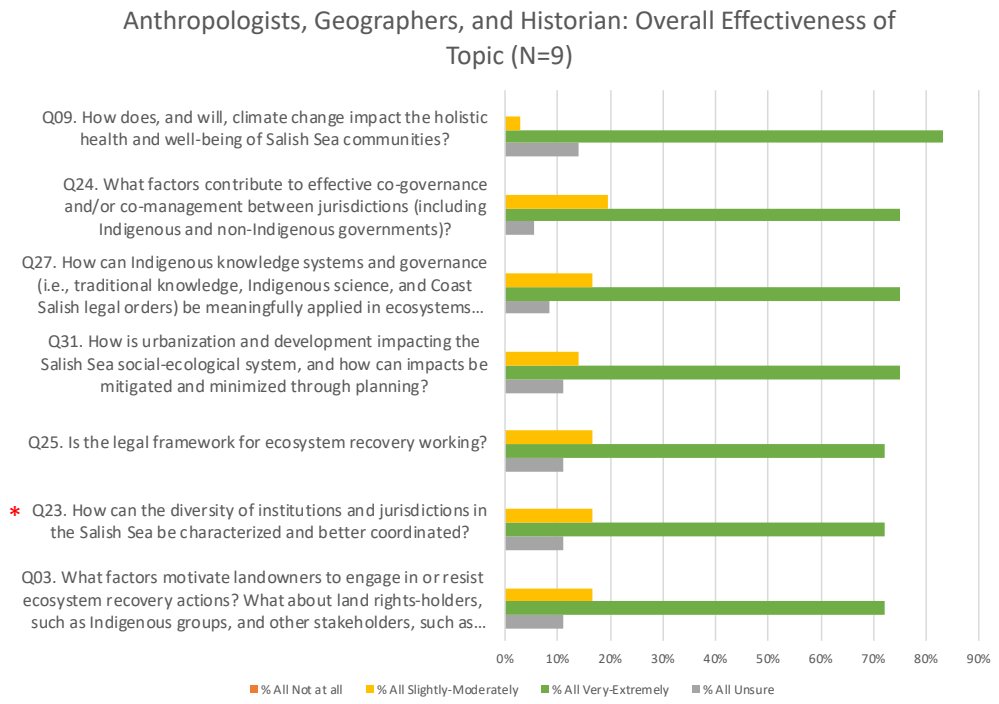


Practitioners & “Both”





Anthropologists, Geographers, and Historian



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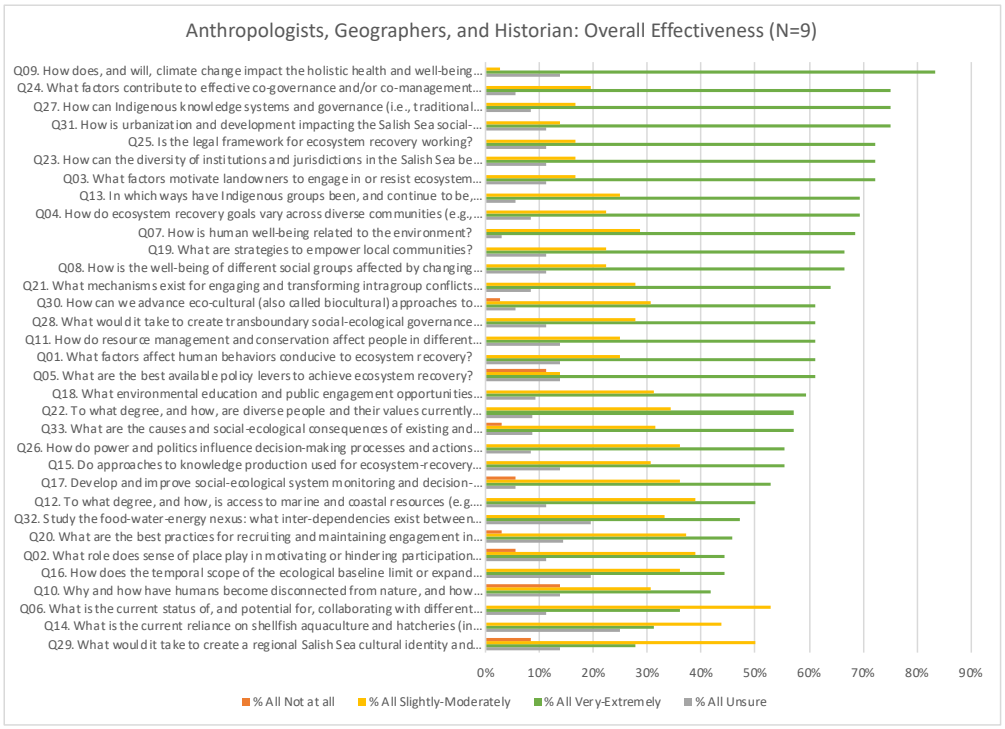
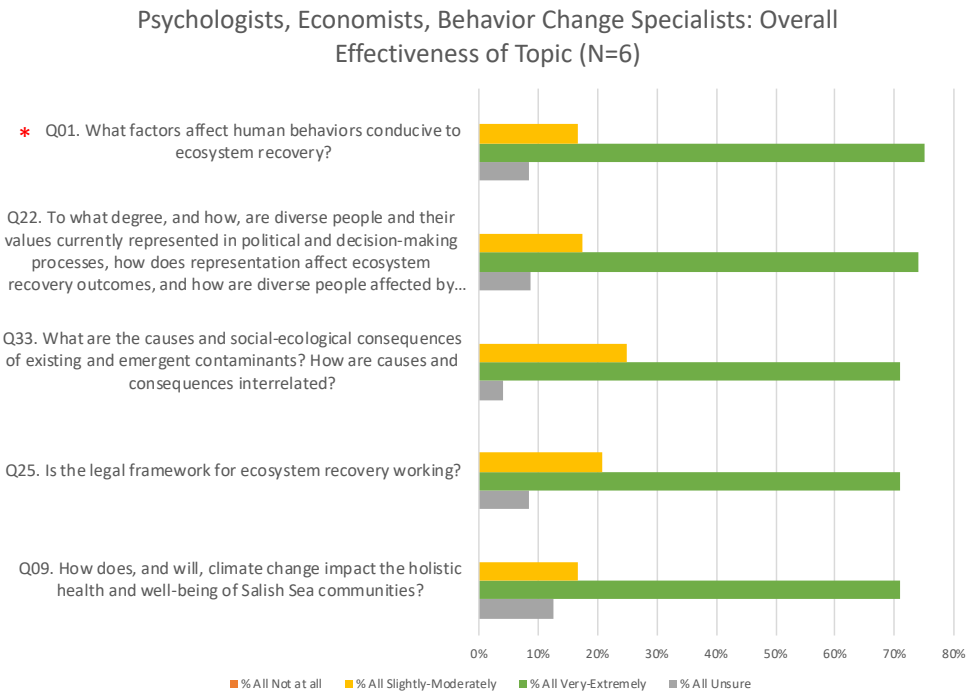


Psychologists, Economists, Behavior Change Specialists



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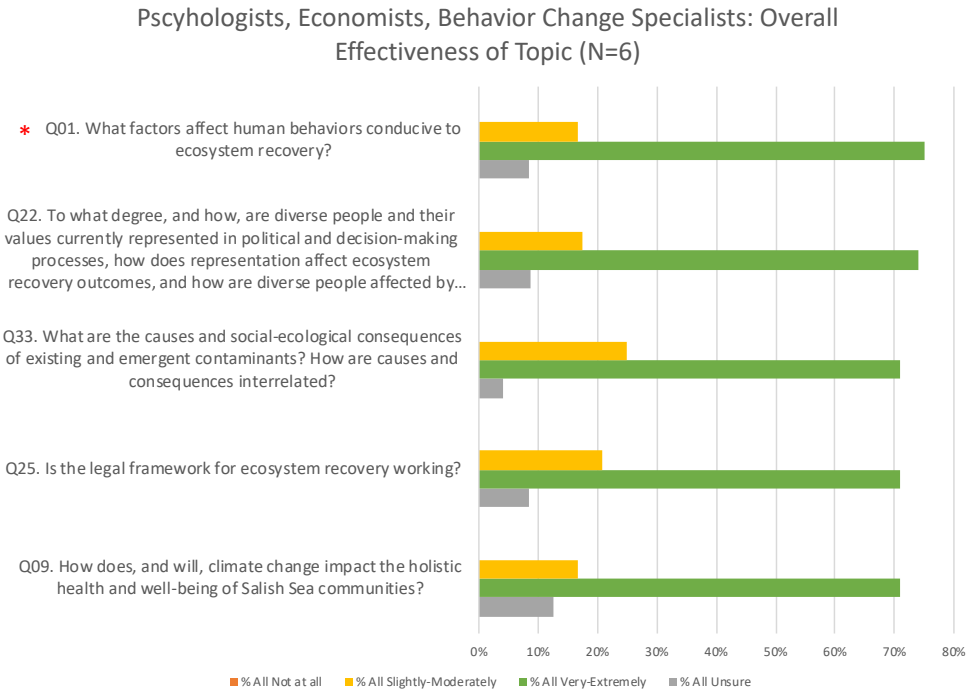

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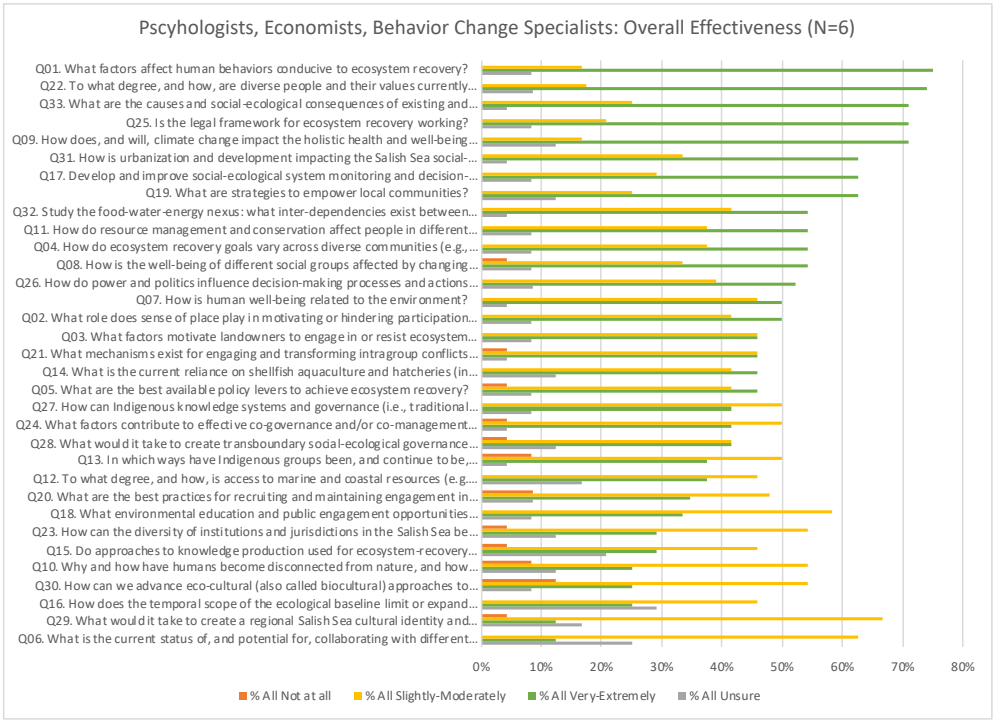
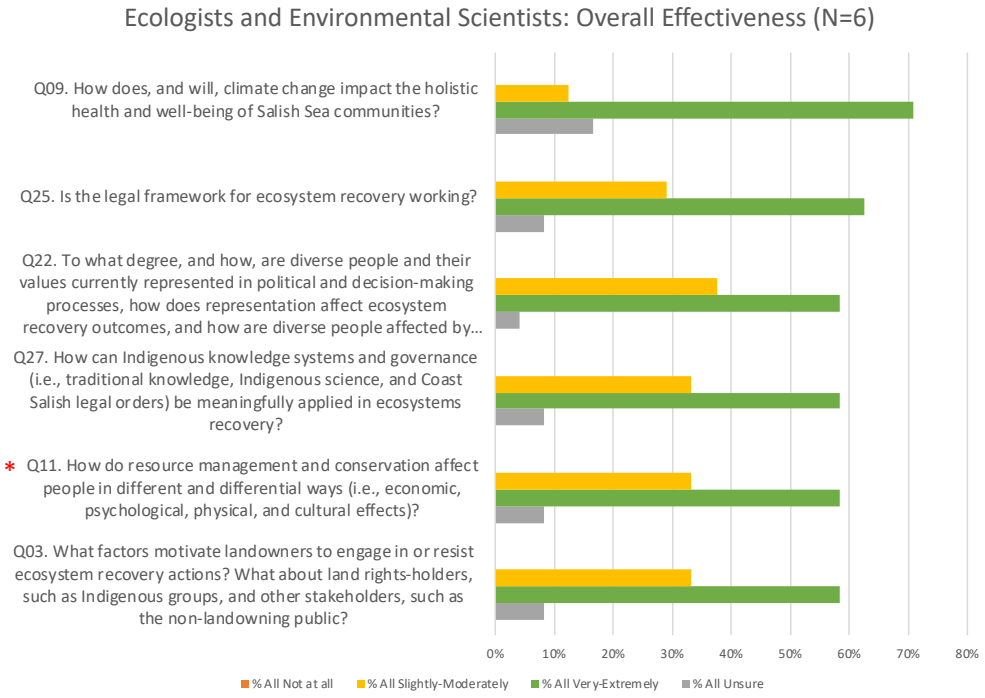
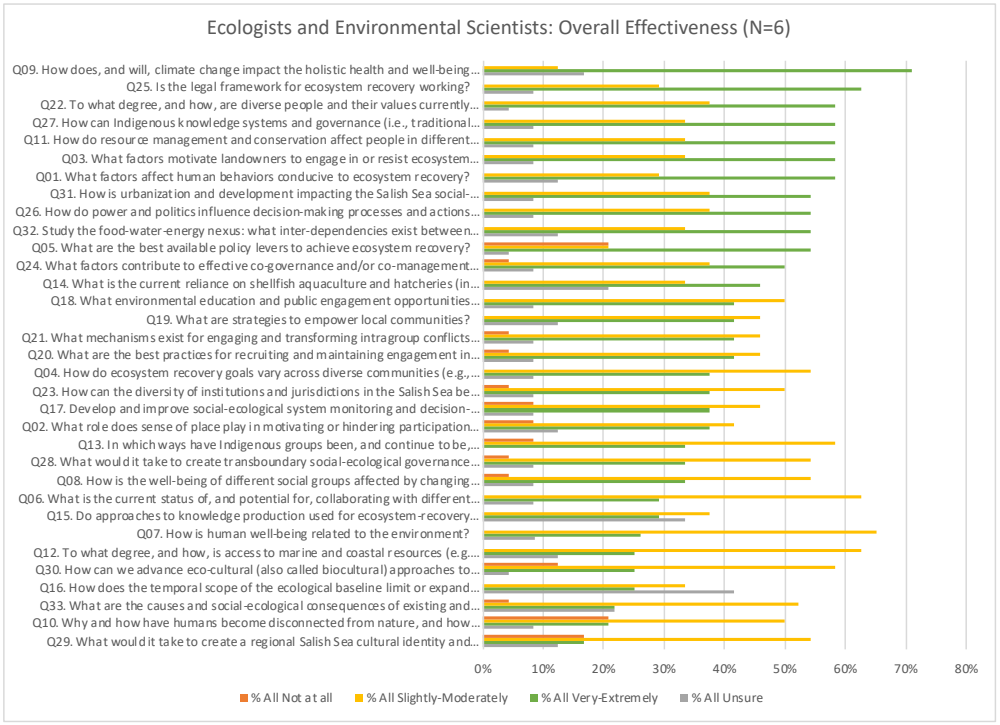


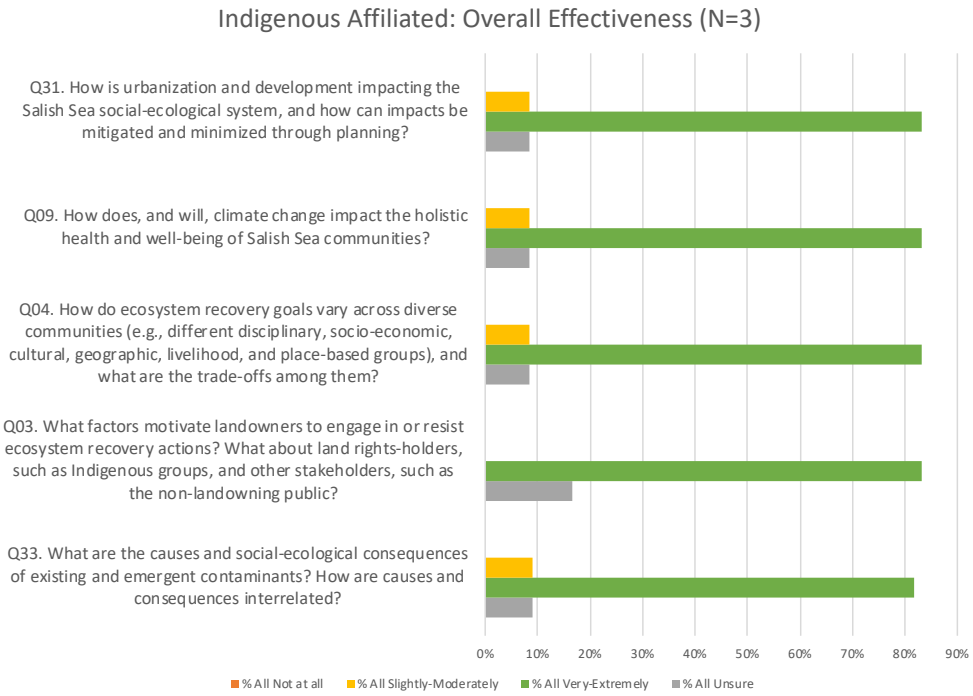
Ecologists and Environmental Scientists

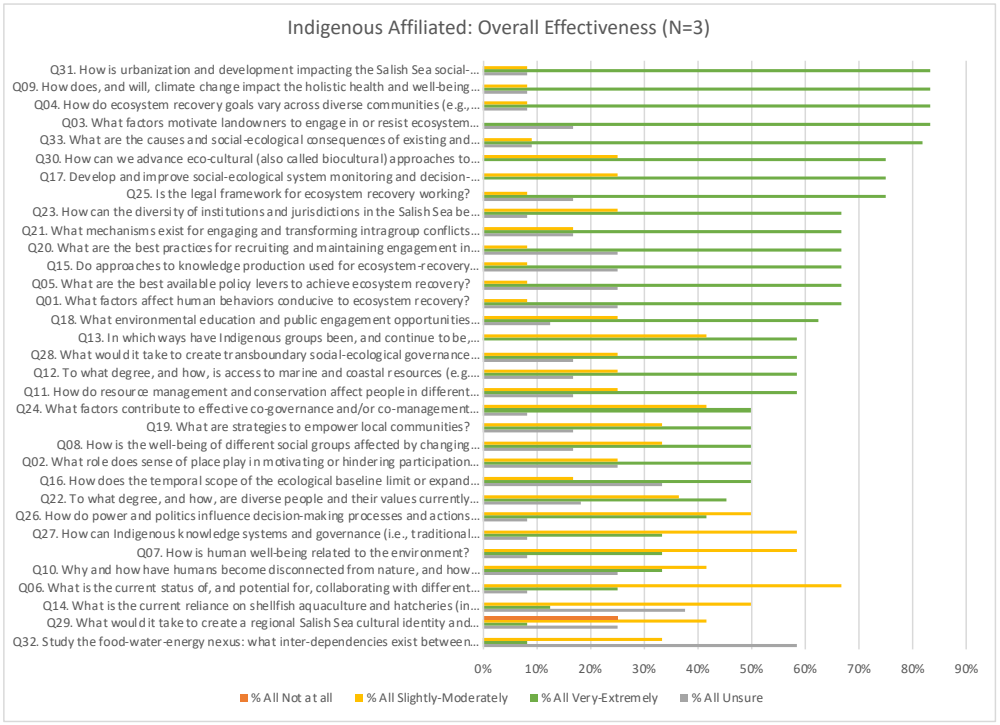


* = topic not selected in other top 5 lists



Indigenous Group Affiliation




Indigenous Affiliated: Overall Effectiveness (N=3)
Q31. How is urbanization and development impacting the Salish Sea social-...
Q09. How does, and will, climate change impact the holistic health and well-being...
Q04. How do ecosystem recovery goals vary across diverse communities (e.g.,...
Q03. What factors motivate landowners to engage in or resist ecosystem...
Q33. What are the causes and social-ecological consequences of existing and...
Q30. How can we advance eco-cultural (also called biocultural) approaches to...
Q17. Develop and improve social-ecological system monitoring and decision-...
Q25. Is the legal framework for ecosystem recovery working?
Q23. How can the diversity of institutions and jurisdictions in the Salish Sea be...
Q21. What mechanisms exist for engaging and transforming intragroup conflicts...
Q20. What are the best practices for recruiting and maintaining engagement in...
Q15. Do approaches to knowledge production used for ecosystem-recovery...
Q05. What are the best available policy levers to achieve ecosystem recovery?
Q01. What factors affect human behaviors conducive to ecosystem recovery?
Q18. What environmental education and public engagement opportunities...
Q13. In which ways have Indigenous groups been, and continue to be,...
Q28. What would it take to create transboundary social-ecological governance...
Q12. To what degree, and how, is access to marine and coastal resources (e.g....
Q11. How do resource management and conservation affect people in different...
Q24. What factors contribute to effective co-governance and/or co-management...
Q19. What are strategies to empower local communities?
Q08. How is the well-being of different social groups affected by changing...
Q02. What role does sense of place play in motivating or hindering participation...
Q16. How does the temporal scope of the ecological baseline limit or expand...
Q22. To what degree, and how, are diverse people and their values currently...
Q26. How do power and politics influence decision-making processes and actions...
Q27. How can Indigenous knowledge systems and governance (i.e., traditional...
Q07. How is human well-being related to the environment?
Q10. Why and how have humans become disconnected from nature, and how...
Q06. What is the current status of, and potential for, collaborating with different...
Q14. What is the current reliance on shellfish aquaculture and hatcheries (in...
Q29. What would it take to create a regional Salish Sea cultural identity and...
Q32. Study the food-water-energy nexus: what inter-dependencies exist between...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
% All Not at all
% All Slightly-Moderately
% All Very-Extremely
% All Unsure