KELP PLAN ACTION WORKSHOP
Notes

March 1 and 2, 2023

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INTRODUCTION

The Northwest Straits Commission hosted the Kelp Plan Action Workshop on March 1 and 2, 2023, at the Washington Department of Ecology's Northwest Region Office in Shoreline, WA, to convene kelp partners to collectively assess the status, lessons learned, and next steps for actions within the Puget Sound Kelp Conservation and Recovery Plan (Kelp Plan). Forty-six individuals from community organizations, Tribes, federal, state, and county agencies, universities, and non-government organizations (NGOs) engaged in kelp conservation and recovery efforts in the Puget Sound region attended the workshop.

Information collected from the workshop will be synthesized and included in a June 2023 Kelp Plan review. Workshop notes and materials are provided below.

PARTICIPANTS

Name	Organization
Sarah Albright-Garland	US Army Corps of Engineers
Caitlyn Blair	NW Straits Commission
Katie Byrnes	WA Conservation Action
Brenda Campbell	The Pew Charitable Trust
Emily Carrington	UW
Josh Carter	Port Gamble S'Klallam Tribe
Cynthia Catton	WA DNR
Meg Chadsey	WA Sea Grant
Carolyn Chase	Department of Ecology
Danielle Claar	WA DNR
Ken Collins	Island County MRC
Lamai Cox	WWU
Matthew Curtis	WDFW
Megan Dethier	UW, Friday Harbor Labs
Robin Fales	UW, Friday Harbor Labs
Andrea Fieber	Seattle Aquarium
Cynthia Harbison	WA DNR
Hilary Hayford	Puget Sound Restoration Fund
Kathleen Hurley	Port of Seattle
Robert Kiel	-
Michael Kollins	Vashon Kelp Forest LLC
Alyssa Lind	Seattle Aquarium
Dayv Lowry	NOAA Fisheries

Name	Organization
Rebecca Mahan	Clallam County DCD
Gary Morishima	Quinault Mgmt. Center
Thomas Mumford	Marine Agronomics LLC, UW
Nicole Naar	WA Sea Grant
Kurt Nelson	Tulalip Tribes
Dana Oster	NW Straits Commission
Casey Palmer-McGee	Samish Indian Nation DNR
Zachary Randell	Seattle Aquarium
Leah Robison	NW Straits Commission
Jackie Selbitschka	Reef Check
Jamey Selleck	NOAA
Max Showalter	WA DNR
Allie Simpson	NW Straits Commission
Elizabeth Spaulding	WA DNR
Kimberle Stark	King County DNR & Parks
Jodie Toft	Puget Sound Restoration Fund
Dan Tonnes	NOAA
James Trask	WA Scuba Alliance
Brooke Weigel	UW, Friday Harbor Labs
Tina Whitman	Friends of the San Juans
Jeff Whitty	NW Straits Commission
Megan Williams	Seattle Aquarium
Todd Woodard	Samish Indian Nation

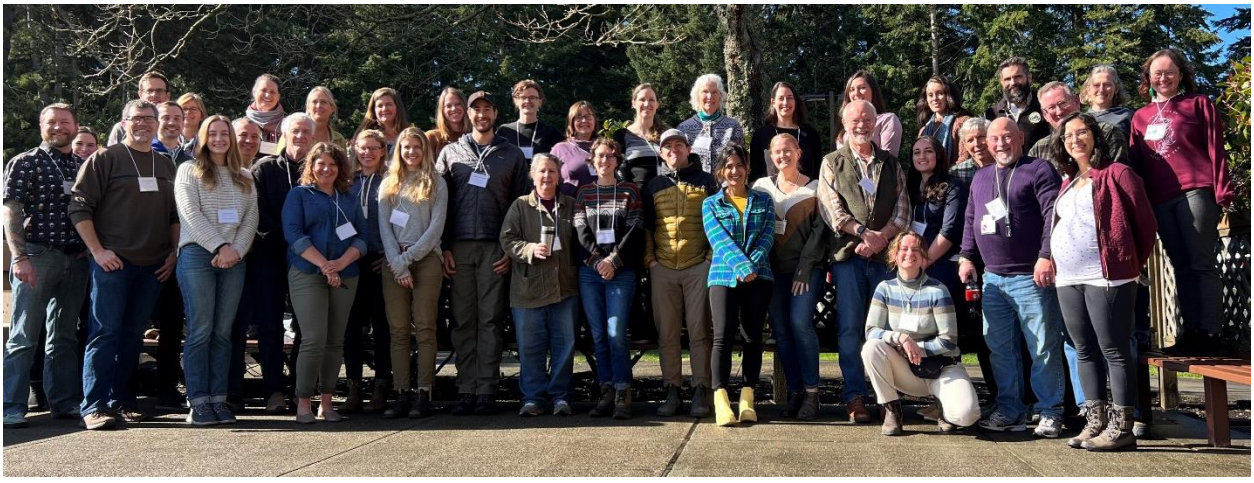

Figure 1. Day 2 workshop participants (i.e., our kelp forest of feather boas, bull kelp, sugar kelp, sea palms, and sea cabbages). PC: Caitlyn Blair

LINKS TO PRESENTATIONS, FLIP CHARTS, AND USEFUL INFORMATION

- *Kelp Plan Action Workshop – Workshop Packet*: Packet that contains the agenda, *Kelp Plan Action Inventory*, *Activity Sheet*, and a link to the *Puget Sound Kelp Project Inventory*
- *Kelp Plan review PowerPoint slides*
- *Kelp Plan Action Workshop – Flip chart photos*
- *Puget Sound Kelp Conservation and Recovery Plan*

WORKSHOP PLENARY NOTES

MARCH 1

Introduction/Welcome presentation: Jeff Whitty (NWSC) provided a welcome and introduction to the workshop

- Kelp Plan Coordination Advisory Committee introduction (alphabetical)
    - Helen Berry/Danielle Claar (WA DNR), Megan Dethier (UW, FHL), Hannah Faulkner/Matthew Curtis/Liz Bockstiegel (WDFW), Margot Hessing-Lewis (Hakai, Kelp Node), Rietta Hohman (NOAA, CA), Jordan Hollarsmith (NOAA, AK), Dayv Lowry (NOAA, WA), Mike McHugh/Kurt Nelson (Tulalip Tribes), Tom Mumford (Marine Agronomics), Dana Oster (NWSC), Zach Randell (Seattle Aquarium), Elizabeth Spaulding (WA DNR), Jodie Toft/Hilary Hayford (PSRF), Jeff Whitty (NWSC), Todd Woodard (Samish Indian Nation)
        - The Kelp Plan Coordination Advisory Committee was responsible for the action status scores workshop participants reviewed
- Workshop Committee introduction (alphabetical)
    - Dayv Lowry, Nicole Naar, Dana Oster, Zach Randell, Elizabeth Spaulding, Jeff Whitty
- Workshop introduction
    - Purpose of workshop is to get a consensus on the status of actions within the Kelp Plan and to identify ways to advance these actions
    - Information from the workshop will be synthesized in a report that will be available in June 2023, which will be used as a baseline to help monitor the Kelp Plan and used to guide parties interested on advancing Kelp Plan actions
- Workshop objectives
    - Share the *Kelp Plan Action Inventory* to familiarize workshop participants with the Kelp Plan's actions
    - Share the *Puget Sound Kelp Project Invent*ory to familiarize workshop participants with what and how the Kelp Plan actions are being addressed
    - Solicit input and establish a consensus on the status of each action from the Kelp Plan
    - Solicit input on lessons learned from each Kelp Plan action to generate a list of top themes
    - Identify next steps needed to get actions 'on track'

Puget Sound Kelp Conservation and Recovery Plan Intro presentation (prepared by Dana Oster): Nicole Naar presented an overview of the Kelp Plan

- Kelp Plan is a collaborative effort with a lot of motivation and drive, and which takes a village to care for and grow
- Kelp Plan identifies goals and action items that provide a research and management framework for coordinated action to recover and protect kelp habitat. It is a rich resource and includes the main plan, knowledge review (Appendix A), and an overview of cultural value of kelp to Northwest Tribes (Appendix B).
- Originated from NOAA's Rockfish Recovery Plan, which identified kelp as critical habitat for Endangered Species Act (ESA) listed rockfishes
- Kelp Plan focusses on inland marine waters east of Victoria Sill and the San Juan basin (following the boundaries of the Distinct Population Segments for both species of rockfish included in the Rockfish Recovery Plan)
- Kelp Plan was developed over three years and resulted in a framework of 6 goals and 65 actions
- Examples of people/projects undertaking various actions within the goals of the Kelp Plan were provided

Activity review presentation: Jeff Whitty (NWSC) introduced three activities that participants would complete in teams during each day's three breakout sessions. These activities included: reviewing and adjusting scores assigned to the status of Kelp Plan actions by the Kelp Plan Coordination Advisory Committee, generating lesson learned for Kelp Plan actions and groupings of actions, and generating next steps for Kelp Plan actions. Table 1 defines scores discussed in the action status exercise.

Table 1. Scores (0-4) and scoring criteria for all Kelp Plan actions.

	(0) Unknown - *Scorer uncertain and/or action definition may need additional consideration*
	(1) Not started - *Action has not been started/no progress has been made*
	(2) Off track - *Action started but no strong movement forward; action not likely to be accomplished without a vast increase in effort (e.g., develop new projects, large scale-up of pilot or small projects, etc.)*
	(3) Progressing - *Action moving forward and likely to be achieved with a minor to moderate increase in effort of projects (e.g., adding species, adding locations, increasing engagement, etc.)*
	(4) On Track - *Action completed OR current ongoing efforts will achieve intended action with time*

Breakout Sessions 1-3: Workshop participants were split into five breakout teams. Each team discussed actions of one Kelp Plan goal (i.e., Goal 1: Understand and reduce stressors or Goal 5: Restoring kelp forests) for the day. Breakout session notes are provided below (p. 7-22). Photos of flip chart notes from the breakout sessions are available in list of useful links above (p. 3).

Gallery Walk and Open Discussion: Workshop participants walked around and reviewed summaries from other breakout teams. Following this, all workshop participants had an open discussion about the summaries and what they discussed during the day. Open discussion comments included:

- Tom Mumford (Marine Agronomics): Increase communication between regulatory entities and researchers; make sure this is a two-way communication. What structure could better enable policy, managers, and researchers communicate?

- Matt Curtis (WDFW): WDFW kelp state of knowledge coming shortly to help inform current status of all WA kelp spp.
- Jodie Toft (PSRF): Kelp supergroup – can the leads from the different groups come together and align, coordinate, etc.?
- Cynthia Catton (WA DNR): Despite COVID we've made huge progress – much of the work is sequenced; certain knowledge gaps need to be filled before other steps can be achieved. This sequencing is reflected in the robust project inventory, particularly with the scope of research and monitoring. At a good point from which to expand.

MARCH 2

Welcome back presentation: Jeff Whitty (NWSC) briefly reviewed highlights from March 1

- Importance of creating linkage and interface between policy, research, and management
- A lot of progress has been made with Kelp Plan actions in only 3 years
    - Timing of some actions is sequential, i.e., can't complete one before another
    - Some actions are multifaceted, e.g., have both research and management components that may take longer to complete

Breakout Sessions 4-6: Workshop participants underwent the same processes for breakout sessions and activities as in day 1 for Kelp Plan goals 2: Deepen understanding of the value of kelp to Puget Sound ecosystems and integrate into management, 3: Describe kelp distribution and trends, 4: Designate kelp protected areas, and 6: Promote awareness, engagement, and action. Breakout session notes are provided below (p. 7-22). Photos of flip chart notes are available in the list of useful links above (p. 3).

Gallery Walk and Open Discussion: Workshop participants walked around and reviewed summaries from other breakout teams. Following this, all workshop participants had an open discussion about the summaries and what they discussed during the day. Open discussion comments included:

- Certain actions were downgraded once the team was in the details about specific projects, which revealed a scope that was perhaps more limited than initially thought.
- Jamey Selleck (NOAA): Had many changes today (Goal 3), but often centering around canopy vs understory. The processes and methods did not apply equally to canopy vs understory.
- Jodie Toft (PSRF): One member of the Advisory Committee admitted a wide overview level of knowledge, and it was the in-person, cross-section conversation that allowed us to drill down into action-specific particulars.
- Nicole Naar (WA Sea Grant): Education and sharing research and conservation should indeed be readily shared.
- Elizabeth Spaulding (WA DNR): Data integration is important. How do we format data so that it is accessible and analyzable?
- Jamey Selleck (NOAA): Re-evaluate our collective plan of attack. Look at it from a hypothesis-driven perspective . . . is this the right approach? Is the juice worth the squeeze?
- What is a metric of ecosystem service? What are these terms we're using? They need to be defined to make specific, actionable goals.

Closing Plenary: In closing, Dayv Lowry (NOAA), Todd Woodard (Samish Indian Nation), and Cynthia Catton (WA DNR) provided reflections from the workshop. Jeff Whitty (NWSC) provided a list of next steps that would follow the workshop.

- Reflections:
    - Dayv: Necessity of in-person, organic conversations. More feedback required, especially from those not present.
    - Todd: Many new people are present. Forcing kelp to have its moment. Value of Indigenous knowledge, ability to weave together multiple ways of knowing.
    - Cynthia: Who is the champion? We are in a room full of champions. Some of these goals don't have a champion, or people may not be present.
- Next Steps
    - Meeting notes and workshop information will be sent out to participants and made available online
    - A synthesis of workshop information will be made available in a June 2023 review of the Kelp Plan

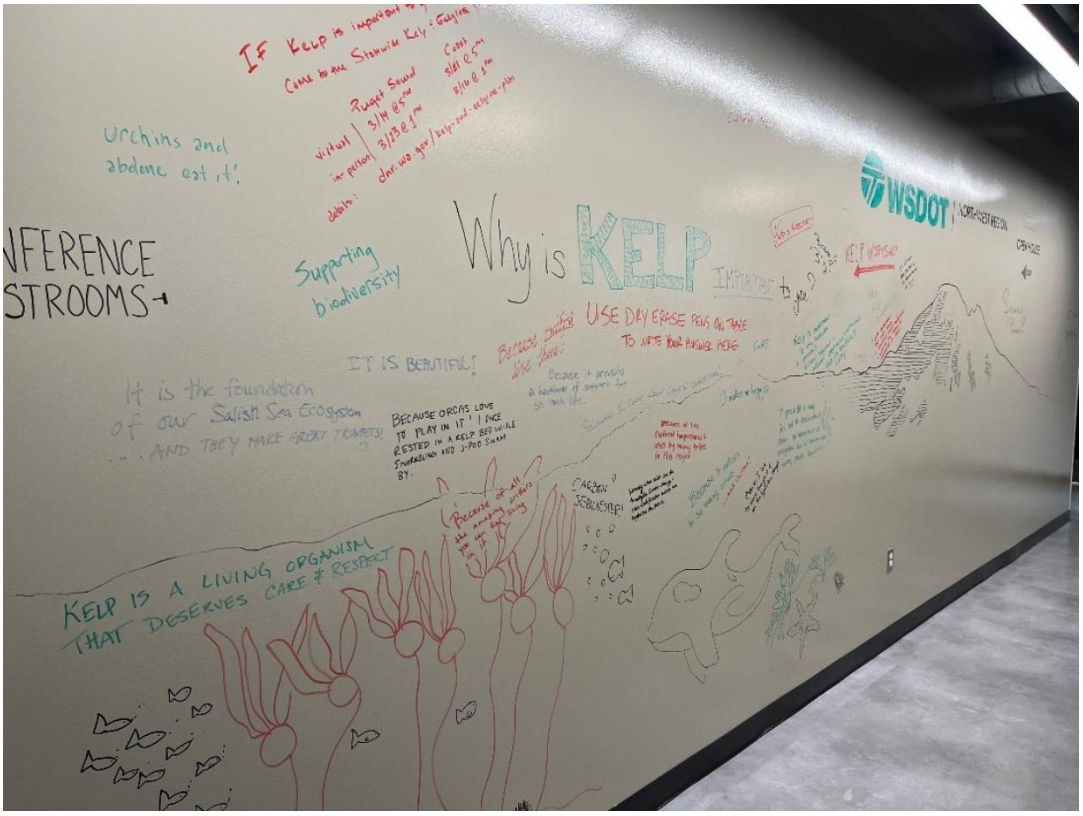

Figure 2. Participants were asked to answer, "Why is kelp important to you?" PC: Caitlyn Blair

BREAKOUT SESSION NOTES

Breakout teams reviewed status scores of Kelp Plan actions, which were developed by the Kelp Plan Coordination Advisory Committee, and generated lessons learned and next steps for Kelp Plan actions. Summary notes include a list of actions the teams reviewed, original and changed action status scores, lessons learned that were deemed of greatest use by the team, and top priority next steps. Listed summary notes address the respective action cluster (i.e., grouping of typically similar actions) unless a specific action is provided at the end of the note (i.e., re: 1.10). Photos of flip chart notes are available in the list of useful links above (p. 3).

GOAL 1A – Understand and reduce kelp stressors

ACTIONS

Cluster I (Implement and enforce available protections for kelp)

1.4. Fully implement and enforce available protections for kelp through existing regulations, programs, and policies (DOE SMA Guidance, Local SMPs, WDFW HPA, DNR Aquatic Use Authorizations, mitigation programs, NMFS ESA and EFH consultations).

- **1.4.1.** Fully consider kelp in programs that respond to and prevent chemical and oil spills (e.g., DOE Geographic Response Planning).
- **1.4.2.** Develop tools to support planners' ability to review/access policy regulations that assist in decision-making.
- **1.4.3.** Develop and implement long-term research and monitoring actions using rigorous scientific and adaptive management principles to determine the effectiveness of current regulations and protection actions.

Cluster II (Form workgroups to implement and address policy gaps; identify priority stressors)

1.1. Form interagency workgroups to increase collaboration and information sharing across management organizations to improve implementation and to address policy gaps.

1.3. Identify priority stressors that negatively affect Puget Sound kelp on a sub-regional scale to target management actions.

Cluster III (Address gaps in and update existing regulations and implementation programs)

1.5. Increase protection by addressing key gaps in existing regulations and implementation programs.

- **1.5.1.** Improve kelp-specific mitigation guidance and implementation.
- **1.5.2.** Add an explicit reference to kelp in existing regulations that include kelp protection but do not reference kelp specifically. (e.g., CWA Section 404 definition of Vegetated Shallows, DNR's definition of submerged aquatic vegetation, and WDFW's Priority Habitats and Species list).
- **1.5.3.** Update survey guidelines and foster coordination among the organizations that conduct site-level surveys, such as the WDFW Macroalgae Habitat Interim Survey Guidelines and the Coastal Zone Training Program.
- **1.5.4.** Form an interagency workgroup to review the kelp aquaculture permitting process and develop best management practices, such as cultivating native species, avoiding the spread of pathogens, and avoiding the use of harmful pesticides and other chemicals.

ACTION STATUS

TABLE 1A. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1	
		All kelp	Canopy	Under-story	Adjusted score	Notes
1	1.4	2	2	2	-	
	1.4.1	1	1	1	-	
	1.4.2	2	2	2	-	
	1.4.3	1	1	1	-	
2	1.1	3	3	2	4	5 of 7 known active workgroups are interagency workgroups
	1.3	3	3	2	2	Temperature poorly understood; focused primarily on bull kelp; subregional scale needs work
3	1.5	2	2	2	-	
	1.5.1	2	2	2	-	
	1.5.2	1	1	1	-	
	1.5.3	2	2	2	-	
	1.5.4	3	3	2	1	

LESSONS LEARNED

Cluster I (Implement and enforce available protections for kelp)

- Sequence matters! Need science/research to inform regulations. Murch harder to have regulations first.

Cluster II (Form workgroups to implement and address policy gaps; identify priority stressors)

- Excessive enthusiasm has led to clutter in the kelp community! Time to organize ourselves.

Cluster III (Address gaps in and update existing regulations and implementation programs)

- We are early on for many of these actions and will need to avoid unfunded mandates.

NEXT STEPS

Cluster I (Implement and enforce available protections for kelp)

- Continue work for the Kelp Policy Workgroup (Dana Oster [NWSC] and Pew). Hopefully likely to include: 1) creating document like the Shoreline Design Guidance to clarify what rules are and how to negotiate them; 2) crosswalk best available science to inform gaps that hold back better

implementation; 3) adding language to Washington Administrative Code (WAC) for Shoreline Management Act (SMA), and others that direct agencies to add protections for kelp.

Cluster II (Form workgroups to implement and address policy gaps; identify priority stressors)

- Create kelp super groups to connect leads of all workgroups.
- Improve understanding of and outreach about who has jurisdiction over what aspects of kelp (agencies, Tribes) (re: 1.1).
- Language revisions needed for action 1.1 (e.g., change "interagency" to include Tribes) (re: 1.1).
- Do the science, especially with understory kelp (re: 1.3).
- Crosswalk stressors to management actions (re: 1.3).

Cluster III (Address gaps in and update existing regulations and implementation programs)

- Craft regulatory implementation pathways (re: 1.5).
- Update wording of action 1.5.1 (change "improve" to "develop").
- Include kelp in NOAA's Puget Sound Nearshore Habitat Conservation Calculator (re: 1.5.1).
- Analyze needed updates and DO THEM NOW (re: 1.5.2).
- Create training program for folks doing surveys and use surveys as part of Before-After-Control Impact (BACI) analysis (re:1.5.3).
- Completely reword action 1.5.4 (re: 1.5.4).

GOAL 1B – Understand and reduce kelp stressors

ACTIONS

Cluster I (Increase kelp harvesting education, invasive macroalgae research, and incorporation of kelp and other trophic consideration in fisheries management planning)

1.7. Support sustainable kelp harvest by informing recreational harvesters about regulations and sustainable kelp harvest methods.

1.8. Strive to incorporate kelp and other trophic considerations into fisheries management planning.

1.9. Explore invasive macroalgae (including *Sargassum muticum* and *Undaria pinnatifida*) control alternatives, ecological roles, and long-term management considerations related to climate change.

Cluster II (Research and reduce human impacts on kelp)

1.2. Inform future management actions through continued research on the impacts of current and historical human activities on kelp forests (e.g., nutrient and sediment loading thresholds and impacts, turbidity effects on kelp recruitment, substrate availability, and impacts from recreational and commercial boating activities).

1.6. Reduce anthropogenic nutrient and sediment loading (e.g., stormwater and WWTP permitting, and TMDL planning).

1.6.1. Coordinate and share research with the Nutrient Reduction Program planning and implementation program, led by the DOE.

Cluster III (Research and apply findings of interactions between kelp and abiotic variables)

1.10. Investigate climate change impacts to improve management decisions, such as prioritizing locations for kelp protected areas, restoration sites, and mitigation activities.

1.10.1. Include kelp habitat in regional and local climate adaptation strategies and planning.
1.11. Investigate local effects within kelp beds on seawater chemistry (Pfister et al. 2019) and consider potential management opportunities for these benefits.
1.12. Investigate the development of temperature-tolerant strains of native kelp species for potential use in restoration and mitigation outplanting.

ACTION STATUS

TABLE 1B. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1		Team 2	
		All kelp	Canopy	Under-story	Adjusted score	Notes	Adjusted score	Notes
1	1.7	3	2	2	2	Skeptical of progress of 1.7	2	Outreach material not well distributed
	1.8	2	2	1	-		-	Research not integrated into management yet
	1.9	1	1	1	-		-	
2	1.2	3	3	2	3-	Some work but also gaps	2	Needs prioritization; Is research happening; No connection to mgmt
	1.6	2	2	2	-		-	
	1.6.1	1	1	1	-		-	
3	1.10	3	3	2	-		-	Monitoring correct parameters on locations for prioritization. Nearly 4; need impacts ON kelp.
	1.10.1	1	1	1	2-	See San Juan MRC's MSA to include bull kelp	-	
	1.11	2	2	2	-		3 (3, 1)	
	1.12	2	2	1	-		- (3, -)	

LESSONS LEARNED

Cluster I (Increase kelp harvesting education, invasive macroalgae research, and incorporation of kelp and other trophic consideration in fisheries management planning)

- The rules are clear, but they need to be promoted and enforced (re: 1.7).
- Need clarity on how to integrate and connect plans (re: 1.8).
- Research is urgently needed on interactions between sargassum and kelp (re: 1.9).

Cluster II (Research and reduce human impacts on kelp)

- Existing research lacks cohesiveness to inform management.
- Connect research, management, and regulatory actions.
    - Co-develop applied research questions.
- Engage a diversity of stakeholders in research and management questions.

Cluster III (Research and apply findings of interactions between kelp and abiotic variables)

- Need to consider regional differences when assessing impacts of climate change on kelp.
- Science is progressing! Continue; take stock; reprioritize.
- Management must be informed by climate change research.

NEXT STEPS

Cluster I (Increase kelp harvesting education, invasive macroalgae research, and incorporation of kelp and other trophic consideration in fisheries management planning)

- Address baseline gaps.
- Encourage enforcement/aggressive outreach (re: 1.7).
- Clarify exactly HOW kelp could be incorporated into fisheries management (re: 1.8).
- Ecological research about sargassum/invasive algae in Salish Sea (re: 1.9).

Cluster II (Research and reduce human impacts on kelp)

- Make connections between interactions to inform management (multiple stressors).
- Require co-development of project/proposal for funding.

Cluster III (Research and apply findings of interactions between kelp and abiotic variables)

- Connect research to management.
- Target climate research to inform management.

GOAL 2 – Deepen understanding of the value of kelp to Puget Sound ecosystem and integrate into management

ACTIONS

Cluster III (Ecological value of kelp)

2.1. Determine and quantify functional roles of kelp habitats for associated species and provide guidance to managers for regulatory implementation, such as endangered species habitat conservation.

2.1.1. Monitor the use of kelp forests as nurseries, migration corridors, refuges, and high-quality forage grounds for salmonids, rockfish populations, forage fish, pinto abalone, and killer whales.

2.1.2. Utilize local ecological knowledge to assess the value of kelp forests as fishing areas.

2.1.3. Use isotopic and biochemical analysis of Puget Sound species and other tools to assess kelp contributions to nearshore, deep water, and terrestrial food webs.

2.2. Calculate the value of kelp ecosystem services for use in developing mitigation guidance.

ACTION STATUS

TABLE 2. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1		Team 2	
		All kelp	Canopy	Under-story	Adjusted score	Notes	Adjusted score	Notes
3	2.1	3	3	2	2	Understory is big component and is a 2	2	There's more to quantifying than just food webs and spatial co-occurrence
	2.1.1	3	3	2	2	Wide range of species; rockfish, pinto abalone feel like progress; forage fish, salmon southern resident killer whales - very seasonal, location and methods vary	-	
	2.1.2	2	2	2	-		-	
	2.1.3	2	2	2	-		-	
	2.2	1	1	1	-		-	

*This is action cluster 3 from the goals 2&4 breakout sessions

LESSONS LEARNED

Cluster III (Develop restoration techniques)

- Identify audience to split out actions for end user (varying levels of detail needed) (re: 2.1.1).
- Clearly defining terms leads to better science.

NEXT STEPS

Cluster III (Develop restoration techniques)

- Reword action 2.1; include social and economic value and reword to broader audience (not just managers) (re: 2.1).
- Clarify research questions - hold salmon and kelp symposium (re: 2.1.1).
- Rephrase - recognize agency of Tribes as owners of Indigenous knowledge (re: 2.1.2).
- Fund postdoc for fisheries study (re: 2.1.2).
- Identify pathway for kelp in NOAA's Puget Sound Nearshore Habitat Conservation Calculator (re: 2.2).
- Integrate spatial data on kelp, fishing, and other species (consumers, residents, etc.).

GOAL 3 – Describe kelp distribution and trends

ACTIONS

Cluster I (Expand and share canopy and understory kelp monitoring)

3.1. Update and expand information on the current extent of canopy-forming and understory kelp.
3.2. Make distribution and trends data available to agencies and the public for use in spatial planning, project planning, and regulatory implementation.

Cluster II (Increase knowledge of historical distribution and genetic structure of kelp; form research and monitoring workgroup)

3.4. Expand understanding of historical distributions and trends by compiling historical information sources and exploring traditional ecological knowledge.
3.5. Identify the genetic structure of kelp populations, including connectivity, dispersal, and population dynamics.
3.6. Form a research and monitoring workgroup to increase collaboration and information sharing across organizations.

Cluster III (Coordinate canopy and understory kelp monitoring)

3.3. Coordinate and expand efforts to strategically monitor canopy-forming and understory kelp throughout Puget Sound and build collaborations between organizations.

- **3.3.1.** Continue and expand surface monitoring of Puget Sound canopy-forming kelp.
- **3.3.2.** Develop Puget Sound-specific subtidal monitoring protocol, and establish a network of partners conducting subtidal kelp index site monitoring (e.g., Reef Check, PSRF)
- **3.3.3.** Encourage compatibility among protocols to support data synthesis, linking ecological functions, and relationships to local stressors.

3.3.4. Collaborate with the Puget Sound Partnership to expand the eelgrass Vital Sign to incorporate kelp indicators (such as kelp canopy area and understory kelp distributions).

ACTION STATUS

TABLE 3. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1		Team 2	
		All kelp	Canopy	Under-story	Score	Notes	Score	Notes
1	3.1	3	3	2	2+	Needs a lot more for understory or separate	-	
	3.2	3	4	2	-		-	
2	3.4	3	3	2	-		-	
	3.5	2	2	1	-		- (3, -)	
	3.6	3	3	3	-		4	Done
3	3.3	3	3	2	- (-, 2)		-	
	3.3.1	4	4	-	-		-	
	3.3.2	3	3	3	-		-	
	3.3.3	3	3	2	2 (2, 2)	3 for data synthesis; 2 for linking/ stressors	-	
	3.3.4	3	3	1	2+ (4, -)	needs more than just a light lift for understory	- (4, -)	

LESSONS LEARNED

Cluster I (Expand and share canopy and understory kelp monitoring)

- Canopy doing well, understory needs more focus/guidance/methods/strategy.
- Kelp Vital Sign indicator.

Cluster II (Increase knowledge of historical distribution and genetic structure of kelp; form research and monitoring workgroup)

- Manage expectations and effort for understory.
- Genetic diversity questions loom large.

Cluster III (Coordinate canopy and understory kelp monitoring)

- There is no single approach.
- Need to drive data integration.

NEXT STEPS

Cluster I (Expand and share canopy and understory kelp monitoring)

- Methods for understory that informs management.
- Data integration, understory!

Cluster II (Increase knowledge of historical distribution and genetic structure of kelp; form research and monitoring workgroup)

- Have a strategic plan for understanding understory kelp.
- Traditional ecological knowledge (TEK) best practices.
    - Continue to integrate traditional and western scientific knowledge (re: 3.4).
    - More studies on TEK/Indigenous science guiding/policy restoration/compensation; Research/more studies on TEK/Indigenous science working with other ways of knowing to guide policy/restoration conservation (re: 3.4).
    - Continue to develop and seek out meaningful pathways w/ Indigenous knowledge keepers.
    - Prioritize learning about TEK and free prior and informed consent (FPIC) to build trusting relationships with Tribes.
    - Solicit best practices from similar Indigenous environmental discovery.
- Translate genetics – complete genetic work, at least on understory kelp.

Cluster III (Coordinate canopy and understory kelp monitoring)

- Prioritize and strategize goals of sub-actions.
- Fund data integration/analysis for subtidal.

GOAL 4 – Designate kelp protected areas

ACTIONS

Cluster I (Use of protected areas for kelp)

4.1. Protect kelp habitat in existing and new reserves, refuges, and protected areas.

4.1.1. Increase the protection of existing kelp forests through organizations like DNR and USFWS.

4.1.2. Use withdrawal letters and set standards for lease agreements to ensure the protection of kelp forests (DNR).

Cluster II (Recreational kelp harvesting)

4.2. Assess the extent of recreational kelp harvest and its potential impacts, and develop spatial management plans and strategies to reduce potential impacts from projected kelp harvest activities.

4.2.1. If necessary, identify priority enforcement needs relating to permits and recreational harvest activities to support existing protections.

ACTION STATUS

TABLE 4. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1		Team 2	
		All kelp	Canopy	Under-story	Adjusted score	Notes	Adjusted Score	Notes
1	4.1	3	3	2	-		2	Programs in place but need large effort
	4.1.1	2	3	2	-		2	What about EPA, local govs, Tribes?
	4.1.2	0	0	0	2	DNR used withdrawal letter for the Snohomish kelp and eelgrass protection zone.	2 (2, 2)	Snohomish kelp and eelgrass withdrawal order
2	4.2	2	2	2	-		2-	Lots of work needed
	4.2.1	2	2	2	1	b/c nothing in the inventory, and no movement on a kelp endorsement	2- (-, 1)	Lots of work needed

*These are action cluster 1 and 2 from the goals 2&4 breakout sessions

LESSONS LEARNED

Cluster I (Use of protected areas for kelp)

- Need to refresh actions/subaction wording.
- Collaborative enforcement of existing rules needed.

Cluster II (Recreational kelp harvesting)

- Barrier: enforcement not happening, current levels of outreach isn't working.
- Rules in place, monitoring/enforcement lacking.

NEXT STEPS

Cluster I (Use of protected areas for kelp)

- Define tools of actions that preserve kelp at regional/place-based level.
- Define metrics of success for preservation of kelp, and monitor.
- Engage local entities, Tribes, and more.

Cluster II (Recreational kelp harvesting)

- Review access/consumption/impact with environmental justice lens.
- Develop plans and strategies to strengthen targeted education and outreach (re: 4.2).
- Enforce existing recreational harvest (consider cross-deputizing Tribes and local entities) (re: 4.2.1).
- Add kelp endorsement fee on shellfish license (re: 4.2.1).
- Find way to estimate recreational harvest.

GOAL 5 – Restore kelp forests

ACTIONS

Cluster I (Restoration funding)

5.3. Fund and implement restoration activities at priority sites.

5.3.1. Target restoration-funding sources for stressor reduction and population enhancement projects.

5.3.2. Reach out to restoration funding sources to include funding for kelp restoration.

5.3.3. Use compensatory mitigation as a tool to restore goods and services provided by kelp forests.

Cluster II (Developing and implement spatial plan for restoration and mitigation)

5.1. Develop a spatial plan identifying regions and sites for priority restoration actions and mitigation.

5.1.1. Target management actions that reduce stressors at priority restoration sites.

5.1.2. Reintroduce kelp through outplanting at sites that are recruitment limited.

5.1.3. Develop a mitigation bank of priority locations for kelp enhancement and restoration projects, and for when in-situ mitigation is not viable.

Cluster III (Develop restoration techniques)

5.2. Continue development of kelp restoration techniques for use in enhancement projects and mitigation.

5.2.1. Develop best management practices for designing, installing, and maintaining compensatory mitigation sites and restoration projects.

5.2.2. Define measurable project success standards to include ecosystem goods and services and long-term persistence of kelp forest.

5.2.3. Develop monitoring protocols to verify project success/compliance.

5.2.4. Support the development of local kelp seed banks for use in genetically appropriate restoration.

ACTION STATUS

TABLE 5. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1		Team 2	
		All kelp	Canopy	Under-story	Score	Notes	Score	Notes
1	5.3	2	2	1	-		-	
	5.3.1	2	2	1	-		-	
	5.3.2	2	2	1	-		-	
	5.3.3	1	1	1	-		-	
2	5.1	3	3	2	4/2	Development= 4 Implementation = 2	2.5	Process started, but focus is state-wide. Need big effort to tailor to Puget Sound
	5.1.1	2	2	1	-		-	
	5.1.2	1	1	1	-		-	
	5.1.3	1	1	1	-		-	
3	5.2	3	3	2	-		2	We only have 1 strategy for 1 spp.
	5.2.1	2	2	1	-		-	
	5.2.2	3	3	1	-		-	
	5.2.3	3	3	1	2		-	
	5.2.4	3	3	2	2		-	

LESSONS LEARNED

Cluster I (Restoration funding)

- Need baseline, then prioritize, then money.
- Need more refined objectives under subaction.
- Under current DNR rules, no commercial farm can do restoration.
- We are trying to do restoration, do basic research, and demonstrate proof of concept simultaneously -> lack of certainty makes pursuing traditional funding sources hard.

Cluster II (Developing and implement spatial plan for restoration and mitigation)

- Ecosystem Based Management (EBM) is needed to avoid unintended consequences.
- Permitting process for restoration projects is extremely difficult.
- Which sites are recruitment limited and why?
- Lack of info about existing outplanting and mitigation sites.
- Army Corps of Engineers only has mitigation banking for wetlands.

Cluster III (Develop restoration techniques)

- Beware unintended consequences, but don't let perfection be enemy of the good.
- Who is monitoring the monitoring across projects?
- Need comparative data from different sites within Washington; at the same time, we can leverage protocols and information from other places.

NEXT STEPS

Cluster I (Restoration funding)

- Define conservation vs mitigation vs restoration.
- Include land based and freshwater partners linked to stressors.
- Create a database of existing mitigation projects.
- Integrate biogeophysiochem into reports and maps.
- Aggregate joint funding priorities to avoid internal competition.
- Publish a restoration guide w/ best available science.
- Apply to NOAA's Saltonstall-Kennedy grant, ag-related restoration funding.
- Incorporate compensatory mitigation for kelp into NOAA's Puget Sound Nearshore Habitat Conservation Calculator.

Cluster II (Developing and implement spatial plan for restoration and mitigation)

- Synthesize stressors in GIS context.
- Streamline restoration permitting process.
- Include land-based and freshwater partners linked to stressors.
- Conduct research on recruitment limitation.
- Create a database of existing outplanting and mitigation banking sites.

Cluster III (Develop restoration techniques)

- Synthesize efforts -> standards, best management practices.
- Fund a project to monitor across projects.
- More research on status and genetics of understory species.
- Share lessons learned, best management practices for restoration techniques.
- Decide on a rule about # plants, geographic distance for kelp seed for restoration projects.

GOAL 6 – Promote awareness of, engagement, and action

ACTIONS

Cluster I (Educational tools)

6.1.4. Develop curricula and other educational tools focused on Puget Sound kelp ecosystems for K-12 classrooms and other education forums (e.g., aquariums, science centers, reserves).

6.1.6. Develop public educational materials and maps on how boaters and outdoor recreation groups can minimize their impacts to kelp (e.g., parks, boat launches, marinas).

Cluster II (Build research capacity and coordinate knowledge sharing)

6.2. Build research capacity and coordinate knowledge sharing of ongoing kelp recovery projects and research gaps.

6.2.1. Create and maintain a regularly scheduled forum for information sharing and knowledge gathering between Tribal, federal, state, and local entities.

6.2.2. Coordinate kelp conservation actions and research activities with the Salish Sea International Kelp Alliance, British Columbia, and states of Oregon and California.

6.2.3. Coordinate knowledge sharing through regular participation in conferences, workshops, publications, social media, etc.

Cluster III (Sharing information on ecosystem value of kelp and concern for kelp losses)

6.1. Share information on (1) the value and role of kelp ecosystems as critical nearshore habitat and food web support (for forage fish, rockfish, salmon, and killer whales) in Puget Sound; and (2) the growing concern regarding significant losses to bull kelp canopies.

6.1.1. Educate decision-makers (federal, state, and local entities) regarding the value of kelp, local declines, and the needs articulated in the Kelp Plan.

6.1.2. Work with Tribal partners to elevate the prominence of traditional ecological knowledge regarding kelp.

6.1.3. Encourage partners (e.g., Tribes, anglers, commercial fishermen, Washington Public Port Association, industry, recreational harvesting groups, and NGOs) to help tell the story of kelp to local communities and decision-makers.

6.1.5. Carry out targeted outreach and advocacy to develop support for the implementation of the goals outlined in the Kelp Plan.

ACTION STATUS

TABLE 6. Original action status scores and Team 1 and Team 2 (i.e., breakout teams that reviewed the actions) suggested score changes for All kelp, Canopy, and/or Understory kelp. Canopy and Understory scores were only reviewed if time allowed. Any changes to Canopy and/or Understory kelp scores are listed after the All kelp score and are presented as: (Canopy kelp score, Understory kelp score), for example (3, 1). See Table 1 for score definitions.

Cluster #	Action #	Original status score			Team 1	
		All kelp	Canopy	Under-story	Score	Notes
1	6.1.4	2	2	2	-	Status depends on goal (broad but inclusive vs. immersive but less accessible); x-box games development ROV; no k-12 curricula developed yet; focused on experimental education (5 senses); kelp summer camp
	6.1.6	2	2	1	1	No one aware of the programs… no one has seen signs or info @ marinas, beaches, etc.
	6.1.5	3	3	3	-	Policy-makers and regulators are paying attention, "everyone loves kelp"
2	6.2	4	4	3	-	
	6.2.1	3	3	3	4 (4, -)	What about the Kelp Science and Policy Forum; "We have a lot of kelp - related meetings"; Are there missing connections? Lots of projects focused on this
	6.2.2	3	3	2	4 (4, 3)	Kelp Node includes AK through Baja + Hawaii; Indigenous Aquaculture Hub is not on survey -> include canopy and understory kelp
	6.2.3	4	4	3	-	
3	6.1	4	4	3	3 (3, -)	No K-12 curricula; Information sharing has been a MAJOR challenge; Downgraded many sub-actions; We're mostly preaching to the choir
	6.1.1	3	3	3	-	This is fairly easy lift…the what/why is easier than the how; strongest at state, fed then local (ESA listing?)
	6.1.2	2	2	2	3 (3, 3)	Big lift but not off track. Is onus on Tribes (3ish) or other partners (2ish). Moving at speed of trust/capacity
	6.1.3	4	4	3	3 (3, -)	Partners are Tribes, aquaria, agencies; What about anglers, recreational fisheries? Industry?

LESSONS LEARNED

Cluster I (Educational tools)

- Tradeoffs between experts sharing content knowledge/enthusiasm and feasibility of developing curricula developed by teachers (breadth vs. depth; short vs long-term).
- Need for targeting specific groups using diverse tactics (self-interest, fear, empathy).
- Top-level (decision-makers are enthusiastic); middle level (implementers) need more support.

Cluster II (Build research capacity and coordinate knowledge sharing)

- There is A LOT of effort, some of which is overlapping. Need to clarify what each project, initiative, etc. are doing and how to decrease duplication.
- Communications needs funding and capacity/staffing to do this well.

Cluster III (Sharing information on ecosystem value of kelp and concern for kelp losses)

- Do we need to "elevate" TEK or listen to/include what is already there (e.g., Samish Indigenous Scientific Knowledge -> Kelp Vital Sign)
- How is local community defined? Who are we reaching and who are we missing?

NEXT STEPS

Cluster I (Educational tools)

- In the short term, get experts into classrooms and add kelp to Bay Watershed Education Training priorities. In the long-term, train grad students in curriculum development and outreach.
- Update/modify existing resources/programs (there are many!) to include kelp.
- Provide info and training for middle-level staff at agencies/county offices.

Cluster II (Build research capacity and coordinate knowledge sharing)

- Create a kelp SUPER GROUP.
- Include educators in the forums, venues, communication channels.

Cluster III (Sharing information on ecosystem value of kelp and concern for kelp losses)

- Regular training/tours for decision makers and regulators focused on kelp.
- Track basic demographic info about who is being reached in local communities (zip code, gender, race/ethnicity) (link to environmental justice!).