Kelp Conservation and Recovery Plan
Management Workshop

Objectives:

1. *Identify priority research and monitoring actions to inform management/regulatory changes to better protect kelp.*
2. *Identify currently available management tools that can further help conservation and restoration of kelp.*
3. *Assess opportunities for additional tools that can further kelp conservation and restoration.*

Location: Columbia Room - Capitol Building, 416 Sid Snyder Avenue SW, Olympia, WA
Date/Time: Thursday, June 13, 2019 10:00 am – 4:30 pm
The meeting space will be open for check-in, coffee and chatting starting at 9:30 am

10:00-10:30	**Welcome and introductions** Meeting goals and agenda review Group introductions Kelp Conservation and Recovery Plan	Dana Oster, NW Straits Commission Dan Tonnes, NOAA
10:30-11:15	**Puget Sound kelp: roles, trends & stressors** Review of regional trends, ecology, ecosystem services and stressors	Max Calloway, Puget Sound Restoration Fund
11:15-11:30	**Break**	
11:30-12:00	**Kelp data gaps and actions** Review high priority kelp knowledge gaps and priority actions	Dana Oster, NW Straits Commission
12:00-1:00	**Lunch (not provided)**	
1:00-1:30	**Management framework** Review understanding of current framework	Max Calloway, Puget Sound Restoration Fund
1:30-2:30	**Human activities and kelp** In small groups discuss scenarios of human activities and kelp	
2:30-2:45	**Break**	
2:45-3:15	**Human activities and kelp group reporting** Review breakout group discussions	
3:15-4:00	**Kelp management mad libs** Complete the mad libs sentences and report back to the group	
4:00-4:30	**Meeting wrap up/ next steps**	

Puget Sound Kelp Conservation and Recovery Plan
Management Workshop June 13, 2019

Attendees:

Name	Organization
Betsy Peabody	Puget Sound Restoration Fund
Brandon Clinton	US Army Corps of Engineers
Brian Allen	Puget Sound Restoration Fund
Camille Speck	Washington Dept. of Fish and Wildlife
Casey Palmer-McGee	Samish Indian Nation
Cinde Donoghue	Washington Dept. of Natural Resources
Craig Burley	Washington Dept. of Fish and Wildlife
Dan Tonnes	NOAA- National Marine Fisheries Service
Dana Oster	Northwest Straits Commission
Eleanor Hines	Whatcom Marine Resources Committee
George Stearns	Puyallup Tribe
Gus Gates	Surfrider Foundation
Helen Berry	Washington Dept. of Natural Resources
Jamey Selleck	NOAA- National Marine Fisheries Service
Jamie Kilgo	Washington Dept. of Natural Resources
Jenna Judge	Puget Sound Partnership
Jodie Toft	Puget Sound Restoration Fund
Juliana Houghton	US Army Corps of Engineers
Kalloway Page	University of Washington
Kristin Swenddal	Washington Dept. of Natural Resources
Lalena Amiotte	Washington Dept. of Natural Resources
Lucas Hart	Northwest Straits Commission
Max Calloway	Puget Sound Restoration Fund
Nam Siu	Washington Dept. of Fish and Wildlife
Naomi Gebo	Washington Dept. of Natural Resources
Neil Harrington	Jamestown S'Klallam Tribe
Nicole Jordan	Northwest Straits Commission
Pamela Sanguinetti	US Army Corps of Engineers
Phil Green	San Juan Marine Resources Committee
Phill Dionne	Washington Dept. of Fish and Wildlife
Rich Childers	Washington Dept. of Fish and Wildlife
Steve Copps	NOAA- National Marine Fisheries Service
Steve Rubin	United States Geologic Survey
Tom Mumford	Marine Agronomics
Tom Ostrom	Suquamish Tribe

Links:

Presentation links:

Puget Sound Kelp Conservation and Recovery Plan Introduction:
http://nwstraits.org/media/2803/kelpplan_intro6-13-19.pdf

Puget Sound Kelp Trends, Roles, and Stressors:
http://nwstraits.org/media/2802/calloway_kelproletrends6-13-19.pdf

Kelp Data Gaps, Actions, and Goals: http://nwstraits.org/media/2801/kelp_gaps_actions_goals6-13-19.pdf

Updated Management Framework Diagram:
http://nwstraits.org/media/2798/kelpmanagementframeworkdiagram-v7.pdf

Workshop Objectives and Key Takeaways

Objective 1: Identify priority research and monitoring actions to inform management/regulatory changes to better protect kelp

Breakout discussions and prioritization activities highlighted three primary research and monitoring needs that support a number of management/regulatory strategies to better protect kelp:

1. **Quantify physical stressors' impacts on kelp growth, condition, and trends**

   Discussion focused on water temperature, nutrient pollution, sediment transport, and shoreline improvements (direct project footprint and indirect impacts). Data on impacts to kelp will assist with some of the following management opportunities:

   a. Prioritize the top tier of most impactful stressors to focus management actions and regulatory protection.
   b. Implement total maximum daily loads (TMDLs) for nutrients and other pollutants in reaches with proximity to kelp beds.
   c. Quantify kelp impact water quality thresholds to inform National Pollution Discharge Elimination System (NPDES) and other discharge permits/regulations for point and non-point sources when possible.
   d. Avoid, minimize and compensate for negative impacts to kelp beds e.g. establishing effective buffers.
   e. Generate spatial distribution maps of kelp populations and map with known stressor sources and areas of higher stressors for large-scale management guidance and planning.

2. **Develop functional assessments to quantify kelp forest ecological functions**

   With a focus on strengthening our understanding of kelp forests as ecosystem foundations (nursery habitat, food-web subsidies, biodiversity support) and engineers

(ocean acidification amelioration, nutrient pollution mitigation, natural breakwater). A more complete understanding of kelp forest ecological functionality will assist with some of the following management opportunities:

a. Increase the ability of existing regulations to protect kelp by documenting functions that must be protected or mitigated. Inform mitigation guidance (both avoidance and compensatory mitigation).
b. More fully apply ESA protections and regulations to kelp habitats that support ESA listed species.
c. Generate political will to support regulation changes.
d. Develop communication strategy targeting regulators, managers, policy makers and the general public focused on the critical nature of kelp habitats.

3. **Describe kelp distributions and trends**

A clear understanding of historic and current distributions of bull kelp and understory kelp is needed to assist with some of the following management opportunities:

a. Designate kelp protected or priority areas.
b. Better implement spatially explicit management strategies and site level reviews.
c. Identify candidate bull kelp restoration sites.
d. Develop recreational kelp harvest management strategy to assess impacts and locations.

Additional research needs discussed included: fisheries management, restoration methods, and kelp aquaculture. Details on these topics can be found in the full Kelp Management Mad Libs results.

Objective 2: Identify currently available management tools that can further help conservation and restoration of kelp

Breakout discussions and prioritization activities identified a number of state and federal management tools currently available for kelp protection. With limited exceptions, regulations and management tools generally address all species of kelp and afford equal protection to kelp as to eelgrass. However, in practice, participants felt that eelgrass was granted greater protection due to greater awareness of its ecological benefits. The list is not exhaustive, it contains the tools identified by participants that can assist in kelp conservation. Many workshop participants felt that application of the tools below could be strengthened to further protect and recover kelp.

1. Washington Department of Natural Resources (DNR) tools:
    a. Aquatic reserves
    b. Aquatic land leases, management strategy, and withdrawal letters

2. Washington Department of Fish and Wildlife (WDFW) tools:
    a. Hydraulic Project Approvals (HPAs)
    b. Recreational shellfish and seaweed licenses
    c. Harvest enforcement

3. Washington Department of Ecology tools:
    a. Shoreline Management Act (SMA)/ Shoreline Master Program (SMP)
    b. Discharge permits, TMDLs
    c. Nutrient reduction program

4. Federal tools (US Army Corps of Engineers, EPA, NOAA):
    a. Clean water act, NPDES
    b. No net-loss mitigation rule
    c. US Army Core of Engineers eelgrass and macroalgae vegetation survey guidance (in final development)
    d. Essential fish habitat, critical areas, and ESA species protections

Objective 3: Assess opportunities for additional tools that can further kelp conservation and restoration

Breakout discussions and prioritization activities identified opportunities for additional tools and gaps in current regulations that can further protect kelp. The opportunities are summarized in seven categories:

1. Improve definitions, regulatory permitting framework, and enforcement
    a. Develop tools that explicate the functions and values of kelp so that regulators can more fully implement avoidance of impacts and mitigation.
    b. Assess and adjust recreational harvest codes and management
    c. Better enforce current rules and regulations for recreational harvest.
    d. Close loopholes for shoreline development such as exemptions for maintenance projects.
    e. Include kelp and “attached” vegetation in the Army Corps of Engineers’ “rooted vegetated shallows” definition
    f. Consider programs with stronger frameworks in other states, such as the Coastal Zone Management Act implementation in California.
    g. Streamline or change permitting process for scientific collection authorization
    h. Streamline permitting framework for kelp aquaculture

2. Develop criteria and identify protected/priority areas for existing and future kelp
    a. Designate protected kelp beds and identify priority areas for restoration
    b. Strengthen stressor reduction and mitigation regulations in protected kelp habitat areas
    c. Use landscape scale kelp distributions for spatial planning and management

3. Communication/Education

a. Promote interagency involvement, education, and coordination
b. Educate decision makers and the public about the importance of kelp forests
c. Coordinate regional research and monitoring
d. Address social impacts of kelp loss (fisheries, recreation, etc.)

4. Stressor thresholds and impact reduction
    a. Use quantitative data to improve and set thresholds and water quality standards specific to kelp (lethal and sub lethal impacts)
    b. Establish coordinated long-term monitoring on relationship between stressors and kelp trends

5. Coordinated long term monitoring and survey methods toolkit
    a. Develop best management practices for monitoring and managing kelp
    b. Standardize survey guidelines
    c. Develop multi-year survey requirements

6. Develop functional assessment tools
    a. Create guidance for assessment (e.g. wetlands guidance)
    b. Provide impact-specific guidance

7. In kind and in place mitigation
    a. Create mitigation banks of kelp protection and restoration projects
    b. Develop restoration/mitigation guidance

Meeting wrap up/ next steps

The timeline for the current plan is as follows:

- Draft plan available for peer review and public comment summer/fall 2019
- Puget Sound Kelp Conservation and Recovery Plan completed end of 2019

The group discussed how to continue the work of the Kelp Conservation and Recovery Plan after the current NOAA funding for the Northwest Straits Commission to lead the effort ends in December 2019.

- Create a final survey to assess ability and willingness of recovery plan workshop attendees in assisting with continued coordination.
- Communicate with key interest groups who were not present in the meantime (before December 2019).
    - Participants are encouraged to reach out to colleagues in local governments and the Department of Ecology to express the need for their involvement in this process.
    - Incorporate more non-profit groups in continued recovery and communications efforts

- Public outreach and education are urgently needed. Northwest Straits Commission can take on a portion of this effort, but all participants of this and previous kelp workshops are encouraged to engage in kelp outreach and education activates when possible, focusing on:
    - Education and outreach should highlight concrete conservation and recovery actions
    - The urgency of kelp forest loss in the Puget Sound
    - Adopting a "learn from the past" mentality focusing on the loss of other marine habitats in the Puget Sound region

- Puget Sound Restoration Fund is working with NOAA to continue work on kelp restoration methods and research
- Department of Natural Resources work will continue research describing long-term regional trends and monitoring of select individual forests
- Puget Sound Partnership:
    - Puget Sound Ecological Monitoring Program (PSEMP) is in a good position to help with coordination and communication following the November deadline. Jenna Judge agreed and suggested forming a subgroup.
    - The Partnership may be a good candidate to maintain higher-level communication between managers within separate agencies.
    - Add kelp to the vital signs and develop an implementation strategy

Long Notes:

Kelp Conservation and Recovery Plan

Presentation summarized how the kelp conservation and recovery plan began and what the process has been for the 2-year project.

- Today's workshop is the fourth in a series to better understand the science and state of kelp in Puget Sound, and to bring together the state of the science and current regulatory framework.
- A draft plan will be available for peer review and public comment later in summer or early fall 2019.

Presentation slides are available here: http://nwstraits.org/media/2803/kelpplan_intro6-13-19.pdf

Puget Sound kelp: roles, trends & stressors

- Max Calloway presented on Puget Sound kelp, stressors, and trends.
- Presentation slides are available here: http://nwstraits.org/media/2802/calloway_kelproletrends6-13-19.pdf

Group Discussion:

- We have a big collective job of telling the full story of kelp, why it's important, what to be looking for and how we find ways to conserve and restore it.

- More information on the stressors and why/how they are stressing the kelp.
- Modeling efforts would be helpful for managers.
- Temperature seems to be a big factor influencing kelp resiliency.
- Researchers are looking at the microbiome which might be affected by stressors.
- The group agreed there is a need to coordinate on index sites more and perhaps couple monitoring efforts with other monitoring activities including ocean pH levels, temperature, biodiversity, etc. The list below is the preliminary list of Index sites where kelp monitoring of some kind is currently underway. A later task will identify methods, dates, frequency, and needs for additional sites.

Index Sites:

DNR:

- Shading study of understory kelp- Nisqually Reserve
- Kelp harvest study- Libbey Beach, Whidbey Island
- Sequim (Clallam County)
- Indian Island (Jefferson County)
- Squaxin Island (Mason County)
- Smith and Minor Island
- Salt Creek/Tongue Point
- Salmon Beach (Tacoma Narrows, Pierce County)

USGS:

- Kelp stressors-Elwha nearshore subtidal dive surveys 2008-2019
  Dam removal, seastar wasting, sediment

Puget Sound Restoration Fund:

- Elliott Bay Marina Breakwater (King County)
- Magnolia (King County)
- Jefferson Head (Kitsap County)
- Tyee Shoal (Kitsap County)

Northwest Straits Commission and Marine Resources Committees kelp kayak surveys of kelp area:

- Whatcom MRC- (SW Lummi Island, Aiston Preserve, Cherry Point, Alden Bank)
- Skagit MRC-(Shannon Point, Biz Point, Coffin Rocks)
- Snohomish MRC- (Edmonds, Mukilteo, Meadowdale, Hat Island)
- Island MRC- (Ben Ure Island, Hoypus Point, Polnell Point, Ebeys Landing, Possession Point, Camano Island State Park)
- Jefferson MRC- (North Beach)- outfall impact reference site
- Clallam MRC- (Freshwater Bay, Clallam Bay)
- San Juan MRC- (Fawn Island, Reef Island, Pole Pass)

Kelp data gaps and actions

- Dana Oster presented on the general outline of the Puget Sound Kelp Conservation and Recovery Plan, and how the high priority data gaps and actions identified in previous workshops support the goals of the plan.
- Presentation slides are available here: http://nwstraits.org/media/2801/kelp_gaps_actions_goals6-13-19.pdf

Q: What specific things can be regulated (that we know of for certain)?
A: Regulators need specific information on the impacts of stressors before they can enforce regulation. We need more information on stressors before implementation of regulation can take place. Example: An over water structure should be 'x' distance from kelp.

Q: What are the impacts you feel you have enough information on

- ► Shading

Not enough information:

- o Nutrients
- o Sediment
- o Temperature
- o Turbidity
- o Impacts within and beyond the footprint of structures or projects
- o Indirect impacts

Group Discussion:

- Given what scientists know, if there is a stressor, it will likely affect all genetically similar kelp the same in Puget Sound.
- There is some kelp restoration work being done in Australia in which temperature is the culprit. In that region, restoration efforts are focused on researching replacing the kelp species with temperature resistant species.
- We need to assess and quantify kelp forest ecosystem value to accurately compensate for impacts and losses.
- Dive into the functions kelp is providing so it can be quantified (similar to the eelgrass habitat). Call it out in the criteria for goal 4 & 5.
- Regulators fall back on ESA species to identify protection prioritization. Function of kelp should be identified and tied to ESA species when applicable.

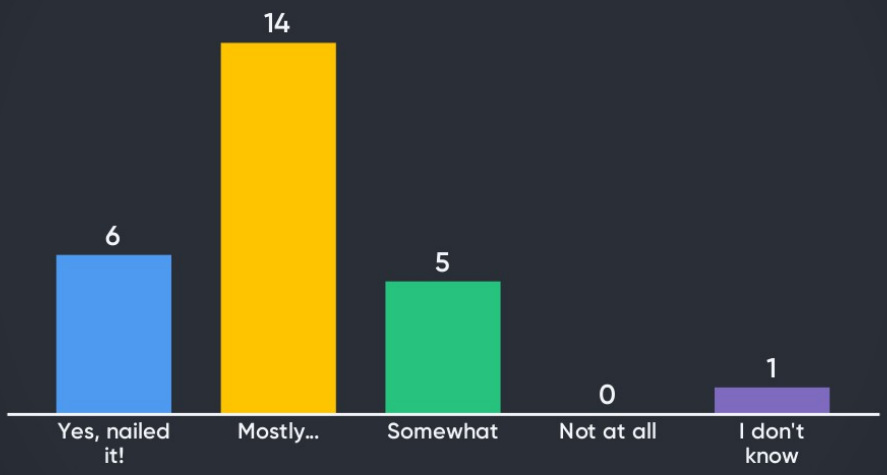
Management framework

- The group agreed it is essential to have broad participation across the agencies/groups that are responsible for various aspects of kelp management.
- After the management framework was presented, participants provided edits to the management framework diagram. The revised diagram can be seen here:

Poll results:

Does the management framework seem correct?

Mentimeter



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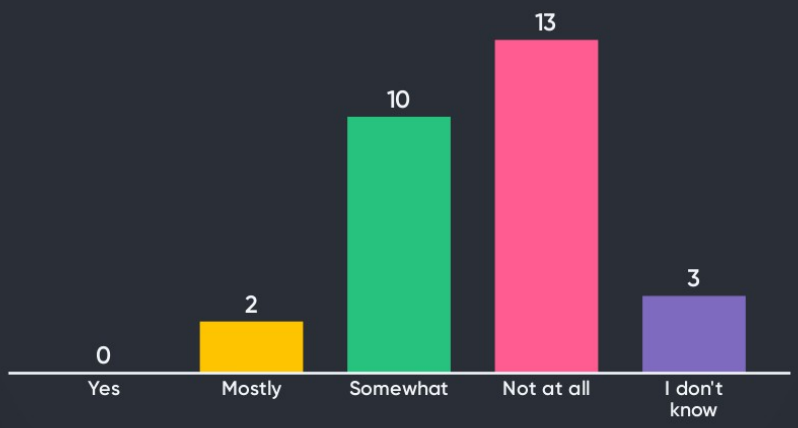
Do you think the current regulations adequately protect kelp?



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Breakout Group Discussions

Breakout groups selected at least two examples of human activities or other aspects of kelp management and discussed existing tools that protect kelp and tools that are needed to better protect kelp. The following activities were selected for further discussion:

- Improvements (land-use, degradation)
- Protected areas
- Aquaculture
- Point source/non-point source
- Fisheries management
- Recreational harvest
- Navigation

Question 1: What existing tools are there to minimize (avoid, conserve) impacts to kelp? Are these tools being used effectively? Please differentiate between gaps in regulations, implementation, enforcement or other components of the larger management framework.

- Kelp is generally afforded the same protection as eelgrass in regulations (with some possible exceptions.) But awareness and enforcement are much lower.
- ACOW River and Harbor Act protects all lands, they have to remain navigable and functioning.
- Compensatory mitigation for new projects (ACOE).
- Federal management “2008 mitigation rule” to avoid impacts and minimize. Applicant has to demonstrate that they will mitigate.

    - "Did they minimize" is too philosophical of a question (what counts as demonstrated minimization?)
- Hydraulic Project Approvals (HPA's)- managed by Washington Department of Fish and Wildlife (WDFW), Authority
    - WDFW new (#1579) increased enforcement capability for HPAs.
- Washington Department of Natural Resources (DNR)- leasing and other authorizations, withdrawal letters and special designations such as aquatic reserves
- Upland owners have rights to tidelands use and 70% of tidelands are privately owned, so land ownership is an important tool.
- Cabezon protection and/or catch limits to maintain predator control (on grazers)
- 401 & 404 for constructing outfalls
- Discharge permits
- Interim/macroalgae survey guidelines (WDFW)
- Low Impact Development and raingardens
- Seaweed/shellfish licenses
- National Pollutant Discharge Elimination System (NPDES) permit- clean water act
- Department of Ecology's Nutrient Reduction Program (https://ecology.wa.gov/Water-Shorelines/Puget-Sound/Helping-Puget-Sound/Reducing-Puget-Sound-nutrients/Puget-Sound-Nutrient-Reduction-Project)
- Protected areas are established and managed by a wide range of groups to meet diverse goals

Question 2: Where are gaps or opportunities within regulations to improve protection of kelp? What scientific information is needed to support the proposed management tool?

Permitting/mitigation:

- ID functions of kelp (human and ecological) –identification of kelp functions so that impacts can be adequately mitigated or fees charged.
- Bottom caveat: "if we're trying to manage at the permit desk, we'll lose."
- Need to purchase lands to lock up rights for conservation.
- Banks for kelp mitigation – like California Banks for eelgrass and in lieu fees
- In kind and in place mitigation (or as close as possible).
- Quantitative data for mitigation
- Change "rooted" to mean "attached" in US ACE definitions
- Guidance on functions of kelp
- Include kelp in evaluation process
- Guidance on how to apply regulations without supporting data
- 'Maintenance' is a back door to many improvements. Exempted by nationwide permit (NMFS is currently trying to close this loophole through defining baseline and impact fees).
- CZMA is implemented/enforced weakly in WA. It has the potential to be a strong tool (see CA and gulf coast)
- Need better protection against construction impacts, such as turbidity

Bigger picture management/Cumulative impacts:

- Reserves generally don't have sufficiently authority to preclude a wide range of uses. We need the authority to fully protect areas, but no individual agencies have this scope of authority (for example, navigation, fishing).
- Permits need to consider cumulative impacts of stressors on kelp
- ESA tends to look at projects individually, this losses cumulative perspective
- Broaden the scope and understand the cumulative impacts of kelp loss
- Improve scientific links to salmon and protected species
- Address social impacts of losing kelp

Education and outreach:

- Educate on benefits of kelp and value to salmon
- "Hearts & Minds" campaign for legislative and public awareness

Priority protection areas:

- Identify priority areas for protection/ Spatial planning
- Purchase rights
- Protect areas for future kelp restoration with potential habitat
- What size matters for protecting kelp beds? What constitutes a kelp bed to need mitigation?
- Puget Sound wide protocols/ survey guidelines
- Find ways to fully protect areas (most groups have ability to protect against a subset of stressors)

Stressor management:

- Expand discharge permits
- Identify nutrient needs of kelp
- Gaps- exceedance threshold specific to kelp or other plants/SAV
    - Increases in turf barrens with increase in nutrients and urban cover
    - Nutrient requirements & thresholds by species
    - Piecemeal management=problem
    - Coordinated framework needed!
- What are enforcement or compliance tools for regulators
- (outfalls) lets provide spatial designations on distributions (areas for conservation, restoration potentials)
- How is boating impacting kelp?
    - Props mow down bull kelp canopies (photosynthetic and reproductive structures on surface canopies).
    - Increase wave energy.

Recreational harvest/scientific collection/kelp aquaculture:

- Need spatial and temporal management for recreational harvest
- Build enforcement capacity and modify rules so that enforcement is easier (such as considering changing harvest limits to be based on volume, which is easier to assess in the field).
- Conduct a harvest impacts assessment

- Better define/ standardize harvest guidelines/permits
- Improve procedures for obtaining authorization from DNR for scientific and display collection
- Where should kelp aquaculture be allowed and what are the potential impacts to native kelp and the ecosystem?

Kelp Management Mad Libs

Workshop participants completed the three following sentences. The results for each sentence are grouped into categories and tallied.

We need to know_____(scientific information) so that we can do_____(management/policy tool) to better protect kelp.

	Science needs	Management action linked to research needs	votes
Stressors- WQ, shoreline improvements, climate change, biological	Prioritization of the most important/harmful kelp stressors (if appropriate, by region.)	Target management efforts to address most deleterious stressors	27
	Stressor thresholds and impacts	implement measures to decrease pressures and strengthen regulations	
		set TMDLs, NPDES, and other regulations	
	linkages among pressure, stressors, and kelp condition	prioritized pressure/stressor reduction	
		regulate point and non-point sources respond to climate change effects	
	stormwater/sewer - where outfalls	abatement of old outfalls, water quality	
	point-non-point water quality-kelp thresholds (min & max) nutrients/contaminants, sediments (ouvial & light reduction)- seasonality effects on different life stages		
	how to minimize the impacts of outfalls	develop leases and manage aquatic land uses	
	overwater structures- shading extent, light requirements	quantify impacts and make a case for needing to avoid minimize and compensate for impacts	
	how kelps impacted by work in the waters (shading, water quality, dredging, construction, etc). How big of a buffer is needed	stewardship measures, develop regulations	
	the scale of impacts	planning on an appropriate scale	
	changing ocean impacts to kelp	develop protection measures	
	Puget Sound temperature regimes	identify areas of kelp refugia	

ecological function/ salmon/ cumulative impacts	species dependence on kelp/ cumulative impacts to foodweb	raise awareness within agencies	15
	community richness & diversity	regulatory habitat management	
	ecological function & how much ecological function has already been lost	regulate development	
	functions of kelp	engage hearts and minds of the public and decision makers	
	how to quantify aquatic resource functions for kelp	develop functional assessments to quantify impacts and mitigation guidance (definition and mitigation)	
		better enforcement of regulations	
	Kelp connection to salmon (ESA species)	ESA related kelp conservation	
		expand on education and outreach	
Distributions/ trends	Distributions- where kelp currently is and where it has been historically or could be	designate protected areas or priority areas to reduce stressors	13
		spatially-explicit management	
		more informed regulatory and non-regulatory actions	
	what areas are a priority for protection and recovery	site level reviews in a landscape context	
		develop leasing and land management decisions	
		target conservation areas	
	understory kelp distribution and abundance and change analysis	so county/local planners will reference that information when considering applications (both to consider individual permit application and more landscape scale planning)	
	species specific distributions	figure out BMP for kelp harvest	
kelp harvest/ fisheries	how much kelp is harvested	manage harvest	4
		harvest reform/spatial management	
	creel data	manage take	
restoration	genetic information	inform restoration methods and planning	4
	if/how kelp restoration/mitigation can be successful	develop mitigation guidance for compensation of impacts (hierarchy- preservations enhancement, creation of kelp bed)	
		in kind and in place mitigation	
		mitigate and authorize restoration	

We have_____currently in place to minimize impacts to kelp.
(management tool)

DNR
aquatic reserves
withdrawal letters
Seaweed harvest regulations
aquatic land leases and management strategy
WDFW
HPAs
shellfish/seaweed licenses
seaweed harvest enforcement
Ecology
SMA/ SMPs
discharge permits
nutrient reduction program
TMDL
Federal
critical areas
essential fish habitat
ESA
clean water act
NPDES
no net loss- 2008 mitigation rule
eelgrass-macroalgae vegetation survey guidance

We need _____ to improve protection of kelp. Short-term □ Long-term □
(management tool)

Category (votes)	**Tools we need**	**Short term**	**Long term**
Improve definitions, regulatory permitting framework, and enforcement (12)	to connect evidence to regulations	x	x
	enforcement		x
	better understanding and regulated seaweed licenses		x
	permitting changes		x
	federal regulations language/interpretation of (non rooted) rules to include attached plants		
	clarify Army Corps definition of SAV		
	scientific collection authorization	x	
	streamlined permitting framework for farming kelp		x
	better regulatory/permitting framework, esp aquaculture		x

	recreational harvest codes		x
	include kelp in the Corps definition of "vegetated shallows" and the Clean Water Act. AS is, the current definition of "vegetated shallows" refers to only "rooted" vegetation		
	better enforcement of current rules	x	
Develop criteria and identify protected/priority areas for existing and future kelp (11)	to be able to designate "potential" habitat as "protected" (for example, if kelp substrate is available but does not yet contain kelp, we should have a tool to protect the potential habitat	x	
	regulations and actual protection that doesn't allow traffic within a kelp bed		x
	mapping of kelp and species abundance/life stages/use		
	change analysis on existing video data from historic to present understory kelp		
	direct/defacto conservation areas/reserves		x
	marine spatial planning		x
	ecosystem based/comprehensive MRAs		x
	to identify priority kelp areas		
	better land use planning		x
	an understanding of metapopulation dynamics		x
	priority conservation areas		x
Communication/Education (7)	increase coordination between local regulators and state/federal govt - enable ability to tackle cumulative impacts	x	x
	increased awareness/education/engagement from public agencies		
	communities, local jurisdictions, public to understand importance of kelp	x	x
	agency initiative (WDFW, DNR, ECY)	x	
	education/outreach/advocacy/leadership	x	
	local SMPs/Ecology		x
	public education/outreach strategy	x	x
Stressor thresholds and impact reduction (6)	storm water management		x
	water quality monitoring	x	x
	research findings on stressors		
	WQ standards specific to kelp- lethal & sublethal impacts (e.g. temperatures that affect soros, sedimentation)		
	quantitative data to improve and set thresholds	x	x
	water quality rules	x	x
Coordinated long term monitoring and	BMPs for monitoring and managing		
	survey protocols	x	
	standardize survey guidelines		
	long term monitoring and program		x

standardize survey protocols (5)	multi-year survey requirements (like eelgrass requirements in CA related to CZA)		x
Develop functional assessment tools (4)	impact-specific guidance	x	
	guidance (C/E, SMAs, etc)	x	x
	functional assessment tools	x	
	guidance (like wetlands guidance)		x
In kind and in place mitigation (3)	mitigation banking		x
	restoration/mitigation guidance based on success/risk research of kelp restoration/mitigation		x
	in kind and in place mitigation actions	x	x