

Kelp Restoration and Management Plan Community Working Group Meeting #5 Thursday, May 22, 2025 | 8:30am - 4:00pm | Santa Rosa, CA Summary

Overview

The Kelp Restoration Management Plan (KRMP) Community Working Group (CWG) convened its fifth meeting in person on May 22, 2025, in Santa Rosa, California, following a joint session with the Science Advisory Committee (SAC) the previous day. In attendance were 20 KRMP CWG members and the KRMP Project Team (i.e., California Department of Fish and Wildlife (CDFW), Ocean Protection Council (OPC), California Sea Grant, and Strategic Earth Consulting). The focus of this meeting was to reflect on the previous day's meeting with the SAC, reflect on the CWG's qualitative descriptions of kelp forest health and how those definitions may inform management efforts, and discuss the process for identifying and developing recommendations and feedback on the KRMP. Background materials and an agenda were shared in advance to help support a productive meeting.

Discussion: Day 1 Reflections

The CWG reflected on the previous day's joint meeting with the SAC, including what new information they'd learned, what needed further discussion, and their interest in continuing to collaborate with the SAC. The group reviewed a summary of the joint exercise in which CWG and SAC members developed qualitative descriptions of kelp forest health, categorized as "**thriving**," "**fine**," "**compromised**," or "**depleted**". This shared understanding of kelp forests across health states set the stage for the CWG to engage in a two-part discussion and exercise to identify and prioritize specific management strategies and actions tailored to each kelp health category.

Discussion: Management Strategies

The CWG participated in an interactive exercise designed to simulate how the state might evaluate the health of kelp forest ecosystems and then allocate resources toward specific management actions as part of KRMP implementation. Using flip charts, each representing a management strategy for the KRMP — Tribal co-management, community education/outreach, inter- and intra-agency coordination/partnerships, restoration, harvest, and research/monitoring — CWG members identified priority management action(s) under each level of kelp health. During the exercise, CWG members were encouraged to collaborate and discuss their ideas with one another, and then the group shared and discussed the exercise and their reflections as a full group.

After identifying management strategies for each level of kelp health state category, each CWG member received five sticky dots, each valued at \$4 million, and were asked to place these dots on the management strategies that were most important across the different kelp

states, indicating their community's priorities. Strategic Earth tallied the dots and presented a summary of the CWG's spending priorities for discussion (Table 1). The CWG's priorities for management strategies shifted as kelp health changed. The CWG engaged in a discussion around each management strategy and provided insights on their responses to these exercises.

Management Strategy	Thriving	Fine	Compromised	Depleted
Tribal Co-management	4	1	1	1
Community engagement, education/outreach, and knowledge sharing	4	3	1	1
Inter- and intra-agency coordination/ partnerships	7	3	1	0
Restoration	4	11	9	7
Harvest management	2	1	0	0
Research to inform management	15	4	3	3

Table 1. Results of the CWG's interactive exercise of resource allocation of sticker dots (each representing \$4 million dollars) for different management strategies by the status of kelp forest health ("thriving," "fine," "compromised," or "depleted"). The table shows that CWG members generally support prioritizing research when kelp forests are thriving and restoration be prioritized in the intermediate kelp states.

Tribal Co-management

Across all conditions of kelp ecosystem health—unless otherwise noted—CWG members consistently emphasized a set of actions that should be implemented across the spectrum of kelp health. Central to these actions is the establishment of co-management agreements directly between Tribal governments and relevant government agencies. These agreements must be formalized as Memoranda of Agreement (MOAs), rather than the less binding Memoranda of Understanding (MOUs), to ensure authentic partnerships are backed by committed programming and funding. Importantly, these agreements should not be reactive but instead proactively developed and applied regardless of the kelp ecosystem's current

health status. Tribal inclusion must be integrated into all stages of planning and decision-making processes, including at the onset of planning.

Building Tribal capacity is also a key priority. CWG members stated that ongoing education about the ecological and cultural importance of kelp ecosystems—including its role as a traditional food source—should be prioritized. The state should also offer technical training in scuba diving, environmental monitoring, and data collection to support greater Tribal engagement in kelp research and restoration. Dedicated funding should be allocated specifically for educating Tribal youth to build long-term capacity and foster stewardship. Furthermore, sustainable harvest practices should be a continual point of discussion, with Tribes positioned as leaders and guides on sustainable kelp harvesting practices.

Some CWG members advised that Tribal sovereignty be recognized and honored throughout this work, including recognition of Tribal rights in historical use areas, ensuring subsistence harvesting is permitted at all levels of kelp health status except “depleted,” and protecting kelp forests against the monetization of these practices. Tribes should have the authority to approve land and water management activities — including fire management, coastal development, and regulation of freshwater inputs like estuaries — since they directly affect kelp ecosystems. Data sovereignty is equally critical. Tribes must have the power to determine what Tribal data is collected, how it is used, and with whom it is shared. However, some CWG members stated that data collected through public funds should be made publicly available.

Agencies and organizations working in Tribal territories must build relationships directly with the local Tribal communities. This includes utilizing Tribal maps and intentionally seeking partnerships with local Tribal members. Public education about Tribal relationships with kelp ecosystems can also be advanced through storytelling workshops, media production, and other forms of exposition—whether written or film-recorded—that share cultural knowledge and values with non-Tribal audiences. These methods are powerful tools for building mutual understanding and respect. Non-Tribal communities are increasingly recognizing the value of Tribal knowledge and seeking insights on subsistence harvesting to understand the state of the resource. When kelp forests are “compromised,” it becomes especially important to support Tribal-led restoration projects and invest in collaborative initiatives that bring together Tribes, agencies, and local communities to restore and steward kelp ecosystems. In addition, allocating a portion of fishing and harvesting proceeds to Tribes during periods of kelp stress can support equity and stewardship.

Community Engagement, Education/Outreach, and Knowledge Sharing

Before launching a local kelp restoration project, CWG members emphasized the importance of understanding the area’s history and the communities connected to it. This foundational understanding should be supported by dedicated funding for training local volunteers and knowledge sharing to ensure meaningful participation by local communities. Educating both coastal and inland populations about the value of kelp forests—before a crisis occurs—is equally important. Outreach through media and public engagement should highlight the

numerous benefits that kelp ecosystems provide and what is at risk if they decline, therefore helping to build public support for research, protection, and restoration efforts.

CWG members stated that community access and involvement in kelp forest monitoring and management should be expanded through increased educational events and opportunities that bring people into direct contact with kelp forests. Mechanisms must also be in place for communities to report observations or concerns, particularly from those who are regularly on the water, such as commercial and recreational fishers and boat captains. These individuals can provide real-time information through tools like logbooks or mobile apps, supporting early detection of kelp health changes. CWG members shared that clear and accessible opportunities for citizen science—such as monitoring and data collection—should be established early on, allowing community members to contribute meaningfully even when kelp forests are thriving.

As kelp ecosystems begin to show signs of stress or enter a “compromised” state, CWG members believe it is critical to implement a strong crisis communication plan. This plan should rely on timely, widespread communication tools—such as newspapers, radio, and signage—rather than slower, less accessible formats like town halls. Simultaneously, communities should be mobilized into task forces or groups ready to engage in restoration work, share best practices, and collaborate on knowledge exchange. Research priorities should be quickly identified and shared with stakeholders, and non-governmental organizations should be invited to develop projects that address emerging challenges.

Given delays in the availability of some data sources, CWG members explained that agencies such as CDFW and their partners must be able to respond quickly to changes in the kelp ecosystem. This requires removing regulatory or procedural barriers that hinder the implementation of effective management strategies and may impede the deployment of management activities. In the event of a “depleted” state, actions may include launching restoration projects—including those led by communities—restricting access to remaining kelp forests, and educating the public about missed early intervention opportunities. Additional measures, such as implementing a tourism-based “kelp tax,” could help fund future restoration and awareness efforts.

Inter- and Intra-agency Coordination/Partnership

CWG members emphasized that effective coordination among agencies and partners must begin while kelp ecosystems are still healthy. Early investment in open communication, collaboration pathways, and shared responsibilities helps ensure that agencies and communities can act quickly and effectively as kelp ecosystem health conditions change. This includes data sharing, with the important caveat that Tribes should retain full authority over their own data. Strong inter-agency cooperation can help distribute workloads, reduce redundancy, and improve overall responsiveness. As kelp health declines, formal multi-agency task forces with clearly defined roles and responsibilities should be activated, modeled after successful emergency response frameworks.

To support accelerated restoration efforts, CWG members advised that standardized project blueprints or pre-approved methods should be developed and made available for community use. Streamlining the permitting process is also essential, and agencies should work in parallel on approvals rather than requiring applicants to navigate slow, sequential steps. CWG members explained that, where appropriate, shifting approval authority to municipal governments could further shorten timelines and reduce delays.

Restoration

Timing is critical to the success of kelp restoration. Many CWG members agree that initiating restoration when kelp ecosystems are “thriving” may be premature, while waiting until they are “depleted” may be too late. The most effective window for intervention and action is when kelp is in a “fine” or “compromised” state. However, what constitutes “restoration” can vary for each situation. For example, many CWG members see monitoring—by Tribes, the CDFW, partners, non-governmental organizations, and citizen scientists—as a vital, ongoing action across all health statuses, including “thriving,” and may be the only management action required in certain circumstances.

CWG members explained that effective restoration requires identifying and understanding the root causes of kelp decline and tailoring strategies accordingly. For instance, interventions should differ depending on whether the primary stressor is overgrazing or warm water. Restoration should also be informed and guided by robust, long-term baseline data on kelp distribution and oceanographic conditions, which require more frequent and depth-varied monitoring. Ecosystem-level integrity—rather than isolated forest patches—should be the focus of restoration efforts. Prioritizing connected, resilient reef systems and distinguishing between persistent and ephemeral forests can increase the impact of restoration. Physical reef enhancement, such as adding substrate and increasing seabed diversity, may also improve ecosystem connectivity.

As kelp health declines, CWG members stated that it becomes increasingly important for restoration strategies to focus on supporting kelp-associated species and broader food web dynamics. Lessons from aquaculture research may inform restoration strategies, although regulatory complexities make integrating aquaculture into wild restoration challenging. Hatchery-based tools such as kelp production lines and out planting should be considered, particularly in “compromised” and “depleted” conditions, if the kelp bed is dispersal-limited (e.g., nearest spore source is too far). A streamlined permitting process—including pre-approved techniques and a dedicated research and monitoring permit—would help accelerate restoration, especially during declining health phases. Special considerations may be needed in permitting when kelp reaches “compromised” status to ensure a timely response.

Urchin removal as a restoration tool elicited a wide range of views from CWG members. Tribal representatives emphasized letting nature take its course and avoiding harm to living beings, while others supported a market-driven and coordinated approach to urchin removal during

“fine” and “compromised” health statuses. In “depleted” states, all approaches—including commercial removal and ecosystem-based management—were seen as potentially necessary. Predator reintroduction and modifying grazer behavior, such as through land-based food subsidies or suppression efforts, were also discussed as options as kelp health declines.

Additional strategies include activating a kelp hatchery network, facilitating kelp migration, and confronting hard decisions about whether to restore or abandon certain forest areas in “depleted” states. To safeguard genetic diversity, CWG members advised that cryopreservation and gametophyte banking could be more seriously pursued during poor health states like “compromised” and “depleted.” Although still in the process of being studied and understood, these tools could provide critical biological insurance for the future of California’s kelp ecosystems.

Harvest Framework

CWG members stated that kelp management strategies should distinguish between bull kelp and giant kelp due to their unique life histories and ecological roles. In addition to species-specific approaches, considering the connectivity between kelp forests is essential for designing responsible and effective harvesting frameworks. This holistic perspective supports sustainability across the broader ecosystem.

When kelp ecosystems are “thriving,” CWG members believe harvesting should be allowed. This period presents an opportunity to welcome new harvesters into the industry and collect and share harvest-related data with the broader kelp community. It is also a time to address regulatory inconsistencies—such as the difference between commercial vessel and business entity regulations—to ensure transparency and fairness.

CWG members explained that as kelp health moves into the “fine” category, it becomes appropriate to consider limiting harvest and adjusting practices as needed. Establishing clear parameters—such as trigger points for area closures or openings, harvest limits, and definitions of kelp decline or recovery—is essential for proactive and adaptive management. As conditions worsen into “compromised” or “depleted,” CWG members hold varied perspectives on the need for harvest restrictions. Some advocate for seasonal limits or reduced harvest in heavily impacted areas, while others believe closures may be symbolic if kelp is already absent. Alternatives like limited entry permits, biomass-based quotas for legacy permits, or temporary closures may offer more targeted and effective responses to kelp health.

CWG highlighted that managers need to recognize that additional closures—especially beyond existing no-take Marine Protected Areas (MPAs)—may not address the true drivers of kelp decline if harvesting isn’t the primary stressor. Moreover, subsistence harvest, which supports food access for Tribal and local communities, should not be restricted, as it provides critical sustenance for families. Potential sustainable harvest limits discussed include 2% of biomass for bull kelp and 5% for giant kelp. As kelp health declines, integrating aquaculture—such as

combining kelp with shellfish and other seaweed farming—could be explored as a complementary management strategy to support ecological and economic resilience.

Research to Inform Management

CWG members believe that prioritizing research that preserves genetic diversity (e.g., such as biobanking) is ideal when kelp forests are “thriving” to preserve existing genetic diversity before kelp health declines. By acting early, CDFW and its partners can secure valuable genetic resources before any ecosystem decline occurs. This period also provides an opportunity to deepen our understanding of kelp forest health by integrating existing and new data sources, and by developing ecologically representative metrics and key performance indicators (KPIs) to define what constitutes a healthy kelp forest. Research during this time should focus on understanding factors that support kelp persistence and connectivity, as well as quantifying biodiversity, understory algae, and kelp density.

Genetic research, including transplantation and potential DNA editing or genetic modification of kelp, requires thoughtful communication and transparency. Community concerns, such as fears of “frankenkelp,” must be acknowledged, and the implications of these emerging technologies clearly explained. For CDFW, the appropriateness of transplantation depends on both scale and the existing genetic landscape. Although the California Code of Regulations, Title 14, currently prohibits transgenic species from being released into waters of the state, that regulation may evolve. CWG members requested a current list of genetic research techniques and projects under consideration in California.

Across all kelp health statuses, Tribal knowledge must be respected and regarded as subject matter expertise. Additionally, there is a need to better understand the ecosystem services and human benefits associated with kelp forests. Research should explore kelp's contributions to fisheries, socioeconomic wellbeing, coastal protection (e.g., erosion reduction), water quality, and its role in broader coastal processes. This includes assessing the impacts of stressors like oil spills, fires, agricultural and urban runoff, and the interactions between kelp, fire, river mouths, and sand dunes. The ecological role of kelp wrack as habitat should also be considered.

As kelp transitions from “thriving” to “fine,” research should begin to assess the rate of change and identify specific stressors that differentiate the two states. In “compromised” and “depleted” conditions, research should focus on evaluating and refining restoration strategies such as kelp transplanting, modifying grazer behavior, and assisted migration. Determining the feasibility, spatial scale, and intensity of these interventions is essential to understanding what is needed to bring kelp forests back to healthier conditions.

Discussion: Explore KRMP Recommendations

The charge of the CWG is to help inform the design and development of the KRMP. The Project team and CWG discussed the outputs required to fulfill this charge, which include initial recommendations to inform the first draft of the KRMP. As scope and time allow, the CWG will

also have the opportunity to review the draft KRMP framework before its completion. The SAC will develop a quantitative framework to understand, monitor, address, and manage California's kelp forests, while the CWG's role is to provide community perspectives to inform the KRMP. Informed by CWG meetings over the last year, the CWG began to translate their discussions into draft recommendations that will be refined in future meetings.

The discussion around draft recommendations encompassed ecosystem-based management, kelp harvest management, kelp restoration, Tribal co-management, community engagement, and research. CWG members emphasized the importance of clarifying the extent of subsistence harvest, identifying research priorities such as species introductions, and using scientifically vetted restoration tools. There was strong interest in integrating and supporting community volunteer networks (e.g., Reef Check) to augment and support the state's management efforts. Funding, training, public education about kelp, and coordination between state agencies and communities will be necessary to sustain these networks in the long term. The group also discussed leveraging funding sources beyond state agency budgets to support community-based action.

Members emphasized that the KRMP should be adaptive and responsive to new information and approaches. Suggestions included establishing clear pathways for transitioning from strategic planning to implementation, streamlining the permitting process, and ensuring timely access to data sources. They also proposed collaboration with other agencies, including the State Water Board, to address land-based impacts like water quality, flow, and contaminants. Some participants underscored the need to hold polluters accountable and ensure mitigation costs are covered by those causing harm. Finally, while artificial reefs are currently outside the KRMP scope, several members noted strong interest in recommending them as a priority.

Looking Forward

The KRMP CWG is anticipated to convene two meetings in 2025-2026; their timing is yet to be determined. The next meeting is expected to focus on developing recommendations to be incorporated into the first draft of the KRMP. The final meeting is expected to review and comment on an outline of the draft KRMP. All meeting summaries and outcomes from CWG meetings are shared with CDFW and OPC to ensure community insights are incorporated into the KRMP. Future CWG meetings will continue to be informed by the KRMP SAC meetings, California Fish and Game Commission meetings, OPC meetings, Tribal discussions, etc.

Next Steps

CWG Members will continue to consider and refine a suite of draft recommendations and liaise with their communities to ensure their broader community perspectives are incorporated into each CWG meeting discussion. The next meeting is tentatively planned for Fall 2025.

If you have questions, comments, or would like additional information, please contact kelp@wildlife.ca.gov. If you would like to request government-to-government Tribal

consultation on the KRMP, please contact kelp@wildlife.ca.gov. Updates, informational materials, upcoming opportunities, and events will be highlighted on the [KRMP Website](#).

Attendees¹

Claire Arre, MPA Collaborative Network
Capt. David Bacon, WaveWalker Charters, Coastal Conservation Association
Doug Bush, The Cultured Abalone Farm LLC
Grant Downie, Commercial Sea Urchin Diver
Gary Fleener, Hog Island Oyster Company
Tom Ford, The Bay Foundation
Jan Freiwald, Reef Check California
Severino Gomes, Alternate, Kashia Band of Pomo Indians
Jacob Harris, Ocean and Coastal Stewardship Program Manager at Amah Mutsun Land Trust
Rietta Hohman, Greater Farallones National Marine Sanctuary (NOAA Affiliate)
James Jungwirth, Naturespirit Herbs LLC
Maria Elena Lopez, Coastal Band of the Chumash Nation
Tristin Anoush McHugh, The Nature Conservancy
Anna Neumann, Noyo Harbor District
Andrea Paz-Lacavex, University of California, Santa Cruz
Dave Rudie, California Sea urchin Commission
Joshua Russo, Watermen's Alliance
Marc Shargel, Living Sea Images
Javier Silva, Sherwood Valley-Noyo Pomo
Patrick Webster, Underwater Photographer

¹ Kathryn Beheshti, Jess Gravelle, and Tyler McKinney were not present at the meeting