

Kelp Restoration Management Plan
Science Advisory Committee Meeting #7
March 19th and 20th, 2025

Meeting 7 Notes Summary

Welcome & Overview

The seventh meeting of the Kelp Restoration Management Plan (KRMP) Science Advisory Committee (SAC) was held virtually on March 19th and 20th, 2025 with ten SAC members (eight on Day 2) and the KRMP Project Team (California Department of Fish & Wildlife (CDFW), Ocean Protection Council (OPC), and California Sea Grant (CASG)). The Project Team provided context, including a reminder of the KRMP development timeline, and instructions to facilitate whole and breakout group discussions focused on translating social-ecological system status information (e.g., states, forecasted trends, indicators and thresholds) into management strategies.

Indicator Thresholds

The SAC continued discussions about ecological and social indicators of kelp health and considerations for identifying thresholds to characterize the Kelp State. Key take-aways from the discussion are provided below:

- Highlighted importance of proactive and consistent data collection and monitoring to inform decision-making around an appropriate management action when public concerns arise
- Feasibility of developing thresholds for social indicators is challenging given uneven and/or unavailable data sources across space, time, and sectors. Social indicators may be most useful in assessing and evaluating management strategies
- Fisheries landings, kelp harvesting data, and environmental drivers (e.g. marine heat waves (MHW), runoff) were identified as critical data sources to signal social-ecological status shifts
- Identified a need for better understanding of cause-effect relationships and predicting future ecosystem responses; suggested integrating new knowledge on ecological/social states, MHW regimes, ecosystem dynamics, and restoration costs/benefits

The group discussed ways to reconcile ecological thresholds with the existing spatial scales of kelp management (e.g., Administrative Kelp Beds). The Administrative Kelp Bed boundaries currently used in kelp management were originally created to manage commercial *Macrocystis*

and *Nereocystis* harvest activities, and thus, may not perfectly align with ecological considerations or suit current needs including harvest and/or restoration activities. Other spatial units (i.e., fishing blocks, counties, ecological/oceanographic regions) may also inform additional considerations for the spatial scale(s) used to manage kelp into the future.

Kelp State Characterization

The group explored different ways to quantitatively identify when a kelp system is in a depleted “red” state, highlighting the importance of accounting for natural ephemeral dynamics of kelp systems, considering temporal and spatial aspects of kelp loss/decline (e.g., % cover cutoffs, duration of low kelp cover, etc.).

- Kelp canopy cover, measured via Landsat, was identified as a key indicator that should be used to determine Kelp State
- Extent/amount (% cover) and duration (years) of kelp decline were identified as two key metrics to delineate kelp beds in a depleted “red” state
- Discussion is ongoing around how fine the resolution needs to be and how to handle small beds that may not be fully captured by satellite data. Ground-truthing methods such as sonar and diver observations were identified as ways to supplement satellite data
- Identified need to compare/validate quantitative thresholds of areas indicated as in a “red” state with perceptions of where kelp systems are in decline or at unprecedented low levels

The SAC also discussed how to approach delineating the other Kelp States (i.e., green vs. yellow vs. orange). Two considerations emerged: 1) all Kelp State delineations be based on extent/amount (% cover) and duration (years) of kelp cover using Landsat data; 2) intermediate Kelp States (i.e., yellow, orange) be based on other factors, such as spatial extent, other kelp-related metrics (e.g., kelp density), and other ecosystem properties (e.g., temperature).

Management Strategies Discussion

The group discussed management strategies to be considered and incorporated into the management framework for the KRMP.

- Overarching management strategies (occurring throughout the management process):
 - Adaptive Management (e.g., monitoring and other data/information collection; assessing impacts of management actions; collating and applying best available science)

- Interagency Partnerships and Coordination (e.g., form and/or maintain partnerships; coordination of resource allocation, permitting, implementation of management actions, etc.)
- Community Engagement, Education/Outreach, & Knowledge Sharing
- Tribal Co-management (e.g., form and/or maintain partnerships/agreements; coordination of resource allocation, permitting, implementation of management actions, etc.)
- Context-specific management strategies (applied in targeted locations):
 - Restoration, including ecological and socioeconomic restoration
 - Harvest management
 - Research to inform management, including management-related research (e.g., testing efficacy of restoration or harvest control methods) and applied ecological, social and economic research (e.g., improve understanding of social, economic and ecological processes that inform management decisions)

Different environmental scenarios (e.g., kelp is depleted, compromised, fine, thriving) were discussed to begin linking management strategies to a given Kelp State. A few considerations were raised, including:

- Strategies need to be spatially scalable and adaptable
- Sequence of strategies matters (e.g., research may come first to understand drivers of Kelp State, then decisions about restoration and harvest)
- Management strategies prioritization should reflect both ecological and practical realities (e.g., resource capacity)
- Emphasis on using remote sensing (e.g., Landsat) to focus efforts where needed
- Further discussion is needed on how strategies vary by bed type (e.g., *Nereocystis* vs. *Macrocystis*) and potential community impact

For context, scenarios discussed:

- Red (Management status: Disaster response, Kelp Ecological State: depleted)
Focus: Requires crisis response
- Orange (Management status: Warning, Kelp Ecological State: compromised)
Focus: Requires targeted critical preparedness & response
- Yellow (Management status: Watchful, Kelp Ecological State: fine)
Focus: Focus on increased monitoring, targeted preparedness and resilience capacity building
- Green (Management status: Preparedness, Kelp Ecological State: thriving)
Focus: Risk reduction & resilience capacity building