



State of California – Natural Resources Agency  
DEPARTMENT OF FISH AND WILDLIFE  
Marine Region  
1933 Cliff Drive, Suite 9  
Santa Barbara, CA 93109  
[www.wildlife.ca.gov](http://www.wildlife.ca.gov)

**GAVIN NEWSOM, Governor**  
**CHARLTON H. BONHAM, Director**



June 13, 2022

Wade Crowfoot, Secretary for Natural Resources  
Chair, Ocean Protection Council  
California Natural Resources Agency  
1416 9th Street, Suite 1311  
Sacramento, CA 95814

**RE: Support of Funding for Enhanced Kelp Canopy Monitoring**

Dear Secretary Crowfoot:

The Department of Fish and Wildlife (Department) has worked closely with Ocean Protection Council (OPC) staff and supports authorization of funding for the project entitled: Enhanced Kelp Canopy Monitoring, Agenda Item #5.

The Department is the primary agency responsible for managing California's kelp forest resources. Kelp forests are critically important ecosystems in California, providing a broad suite of services, including support of commercial and recreational fisheries, and hold cultural and economic significance to California's Tribes and coastal communities. Historically, the Department has relied on aerial plane-based surveys to monitor kelp canopy coverage statewide. Remote sensing via Landsat satellite imagery has emerged as a cost-effective tool to monitor kelp canopy cover at 30-meter resolution, dating back to 1984, and has been used to document the severe and persistent declines of bull kelp canopy along the entirety of California's northern coastline. Notably, the Department relied heavily on Landsat-derived canopy data to inform the recent regulatory changes to commercial bull kelp harvest.

Refined spatial resolution of kelp canopy monitoring has become increasingly important for managing kelp harvest and for assessing the efficacy of scaled pilot restoration projects. The latter of which is critical to informing the development of a California-specific 'Restoration Toolkit,' a core component of the statewide Kelp Restoration and Management Plan which is currently in its early developmental stages.

The proposed project entitled "Enhanced Kelp Canopy Monitoring" would use PlanetScope imagery to provide high-resolution (3-meter) statewide kelp canopy maps, and explore methodologies for mapping canopy cover with ultra-high resolution (0.5-meter) imagery. Together, end-products from the

*Conserving California's Wildlife Since 1870*

Wade Crowfoot, Secretary for Natural Resources

June 13, 2022

Page 2

proposed remote sensing advancements broaden the spatial scales at which the Department can reliably assess the status of California's valuable kelp resources. Further, development of a fully automated approach to PlanetScope image processing will reduce the cost to the State for long-term kelp monitoring and result in more timely data acquisition, improving the State's ability to develop and implement an effective adaptive management approach. Finally, leveraging PlanetScope data to analyze kelp canopy dynamics will improve scientific understanding of kelp recovery and resilience, addressing key knowledge gaps identified in the OPC Kelp Action Plan.

OPC support is critical to the success of the Enhanced Kelp Canopy Monitoring project and its application to the development of a statewide Kelp Restoration and Management Plan. If you have any questions or need additional information, please contact me at [R7RegionalMgr@wildlife.ca.gov](mailto:R7RegionalMgr@wildlife.ca.gov).

Sincerely,



Craig Shuman, D. Env.  
Marine Regional Manager

ec: Kirsten Ramey, Program Manager  
Marine Region  
[Kirsten.Ramey@wildlife.ca.gov](mailto:Kirsten.Ramey@wildlife.ca.gov)

Kristen Elsmore, Senior Environmental Scientist, Specialist  
Marine Region  
[Kristen.Elsmore@wildlife.ca.gov](mailto:Kristen.Elsmore@wildlife.ca.gov)



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL OCEAN SERVICE**

**Greater Farallones National Marine Sanctuary**  
991 Marine Dr., The Presidio  
San Francisco, CA 94129

June 9, 2022

Secretary Crowfoot  
Chair, Ocean Protection Council  
*Sent Via Email:* COPCpublic@resources.ca.gov

RE: **Item 5** Support (Kelp Canopy Monitoring)

Dear Secretary Crowfoot:

National Oceanic and Atmospheric Administration, Greater Farallones National Marine Sanctuary (GFNMS) is a place of special significance, which was designated to protect its ecological and cultural integrity for current and future generations. GFNMS manages the waters and submerged lands off the coast of San Mateo, Marin, Sonoma and Mendocino counties as well as the waters surrounding the Farallon Islands. As directed by the National Marine Sanctuaries Act, the primary mandate of the sanctuaries is protection of sanctuary natural and cultural resources and ecological values by protecting the estuarine and marine environment.

GFNMS supports disbursement of up to \$650,000 to the University of California Los Angeles (UCLA) to continue the development of a novel, remote-sensing based approach for kelp canopy monitoring and mapping. Funding will support the development of high-resolution kelp canopy data important for understanding seasonal variability in kelp forest dynamics that will inform kelp restoration efforts in the sanctuary.

The Ocean Protection Council (OPC) is an important state partner. We recently jointly signed a letter of collaboration along with the California Department of Fish and Wildlife and California Sea Grant to address the rapid and widespread die-off of kelp forests occurring along the north-central California coast. Our agencies recognize a shared goal of a healthy, robust kelp ecosystem and intend to work together to engage with the broader research community, other partner agencies, and stakeholder communities to improve our understanding of the causes of kelp loss and to seek solutions to aid kelp forest ecosystem recovery. Funding for this project is a mutually beneficial activity that helps all of us achieve goals in our strategic plans.

We look forward to working with OPC as an active partner on bull kelp restoration and appreciate this opportunity to comment. Thank you.

Sincerely,

Maria Brown  
Sanctuary Superintendent

June 9, 2022

Mark Gold, California Ocean Protection Council  
California Natural Resources Agency  
715 P Street, 20th Floor  
Sacramento, CA 95814

RE: Support – Staff recommendation: Consideration and Approval of Disbursement of Funds for Enhanced Kelp Canopy Monitoring

Dear Mark Gold,

Climate-driven changes are threatening California's dynamic and biodiverse kelp forests - as well as the thriving ocean economy they support. In order for California to recover kelp ecosystems, we must invest in the tools, technologies, and approaches that will advance the pace of restoration and improve management in a changing ocean. TNC's Kelp Strategy has been working collaboratively across California and around the world to address the threats facing kelp forests by building out solutions to map and monitor kelp, establish balance in the ecosystem, and conduct science-based restoration.

The Nature Conservancy (TNC) would like to express our support for Agenda Item #5 re: Consideration and Approval of Disbursement of Funds for Enhanced Kelp Canopy Monitoring, which would provide funding on the order of \$650,000 to the University of California Los Angeles to continue the development of a novel, remote-sensing based approach for kelp canopy monitoring and mapping. Continued investment in mapping and monitoring kelp forests via remote sensing data streams will support best in class ecosystem management and help direct investments in kelp restoration.

Since 2019, TNC has worked in collaboration with a diverse set of partners, include the California Department of Fish and Wildlife, to develop novel tools and approaches to collect kelp canopy data. To date, advancements in kelp mapping and monitoring has proven to be a critical driver of more cost efficient, reliable, and effective data to inform kelp restoration and management, and has enabled the collective kelp community to conduct research and collect information that addresses priority research, management, and restoration questions.

TNC's online platform, [Kelpwatch.org](https://kelpwatch.org), is currently the world's largest map of kelp forest canopy in both time and space, extending from Baja California, Mexico to the Oregon-Washington state border and providing quarterly data from 1984–2021. A groundbreaking open-source web tool, Kelpwatch.org harnesses the power of machine learning and cutting-edge remote sensing science

to analyze nearly 40 years of Landsat satellite data and interactively display kelp forest canopy. The analysis proposed by this staff recommendation would complement the existing Landsat data set, allowing an even-higher resolution look at changes in kelp dynamics across the state. This would allow for highly targeted and strategic decision-making that could support adaptive management and inform restoration interventions.

There is an urgent need to develop solutions to overcoming the continued threats to the kelp forests that provide the backbone for California's marine environment and coastal communities. The staff proposed disbursement will improve the cadence and resolution of satellite derived kelp canopy data, allowing for closer to real-time and data rich decision making. We offer our support for this recommendation.

Sincerely,

Norah Eddy  
Oceans Program Associate Director  
The Nature Conservancy