



## Science Needs Assessment Kelp Forest Dynamics

### Conservation Issue

Monitoring kelp forests is necessary for further understanding of how changes in kelp canopy cover will impact Monterey Bay National Marine Sanctuary (MBNMS) resources.

### Description

Sanctuary staff are concerned about the recent loss of kelp forest cover in California and a co-occurring increase in abundance of purple sea urchins, which contribute to overgrazing kelp forests. The recent combination of multiple marine heatwaves and increased herbivory contributed to the decline of kelp forests throughout California.



A typical giant kelp forest along the central coast of California. Photo: Chad King/NOAA

### Data and Analysis Needs

1. Annual and seasonal kelp canopy cover estimates
2. Annual SCUBA surveys of remnant kelp forests to assess stability and the potential for resistance and resilience to further declines
3. Surveys of urchins to determine densities, size structure, reproductive capacity, and likelihood of survival

### Potential Products

- Map of kelp canopy cover and estimates of maximum cover on an annual basis
- Status and trend plots of urchin densities at multiple locations

### Suggested Scientific Approach and Actions

- Collaborations between agency and academic ecologists to characterize the relationship between climate change, kelp cover, and herbivory
- Establish and maintain monitoring programs to detect changes in biological resources within remnant and former kelp forest sites
- Analyze monitoring data to create status and trends for key indicators of kelp forest health

### Supplementary Information

[MBNMS Research Advisory Panel's response to request from MBNMS Advisory Council on iconic kelp](#)

## Key Partners

California Department of Fish and Wildlife, Ocean Protection Council, University of California Santa Cruz, Stanford University, California State University Monterey Bay, Partnership for Interdisciplinary Studies of Coastal Oceans



Purple and red urchins have exploded in numbers in recent years. This is an area in which kelp has been significantly reduced from its historical density. Photo: Steve Lonhart/NOAA

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