North Central Coast State of the Region Assessment (2010-2015) Portfolio Product

Document Title: Remotely Operated Vehicle Research

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About: This product is part of a portfolio of documents developed to inform the *State of the California North Central Coast: A Summary of the Marine Protected Area Monitoring Program 2010-2015.* It was internally reviewed by CDFW. For more information about the State of the Region Assessment, visit oceanspaces.org/nccsotr.

Remotely Operated Vehicle Research

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"The Mission of the Department of Fish and Wildlife is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend for their ecological values and for their use and enjoyment by the public."

ROV Research Overview

The California Department of Fish and Wildlife (CDFW) has performed deep water visual surveys of marine protected areas (MPAs) using remotely operated vehicle (ROV) platforms since 2000.

On the North Central Coast, CDFW conducted surveys in 2009 at 11 index sites. Then in 2011, Marine Applied Research and Exploration (MARE) surveyed an additional seven sites using the same methods and sampling protocols employed by CDFW. These two surveys were the result of a collaborative partnership between MARE, Point Reyes National Seashore (National Park Service), Golden Gate National Recreation Area, Pacific States Marine Fisheries Commission, California State University Monterey Bay (CSUMB) and CDFW.

The 2009 and 2011 survey methods are comparable with deep water visual surveys contracted for the 2011-2012 North Central Coast Baseline Program Project (Baseline Program) led by researchers at CSUMB.

ROV Survey Sites

"Several hundred brown rockfish were observed throughout the region in 2015 contrasted to only five individuals seen in the 2009/2011 surveys"

During the 2009/2011 surveys, fixed index sites were established inside and outside of paired State Marine Reserves (SMRs) and State Marine Conservation Areas (SMCAs) at Southeast Farallon Island, Point Reyes, Bodega Head, and Point Arena (Figure 1).

In 2015, additional surveys on the North Central Coast were completed by CDFW and MARE at sites surveyed by both the Baseline Program and the collaborative surveys in 2009 and 2011. New additional sites were visited at Saunders Reef SMCA, Stewarts Point SMR, Bodega Head SMCA, South East Farallon Island SMCA, Montara SMR, and Pillar Point SMCA. Although not part of the north central coast MPA region, Ano Nuevo SMCA was also surveyed for the first time to take advantage of its close proximity to the southern portion of the North Central Coast region.

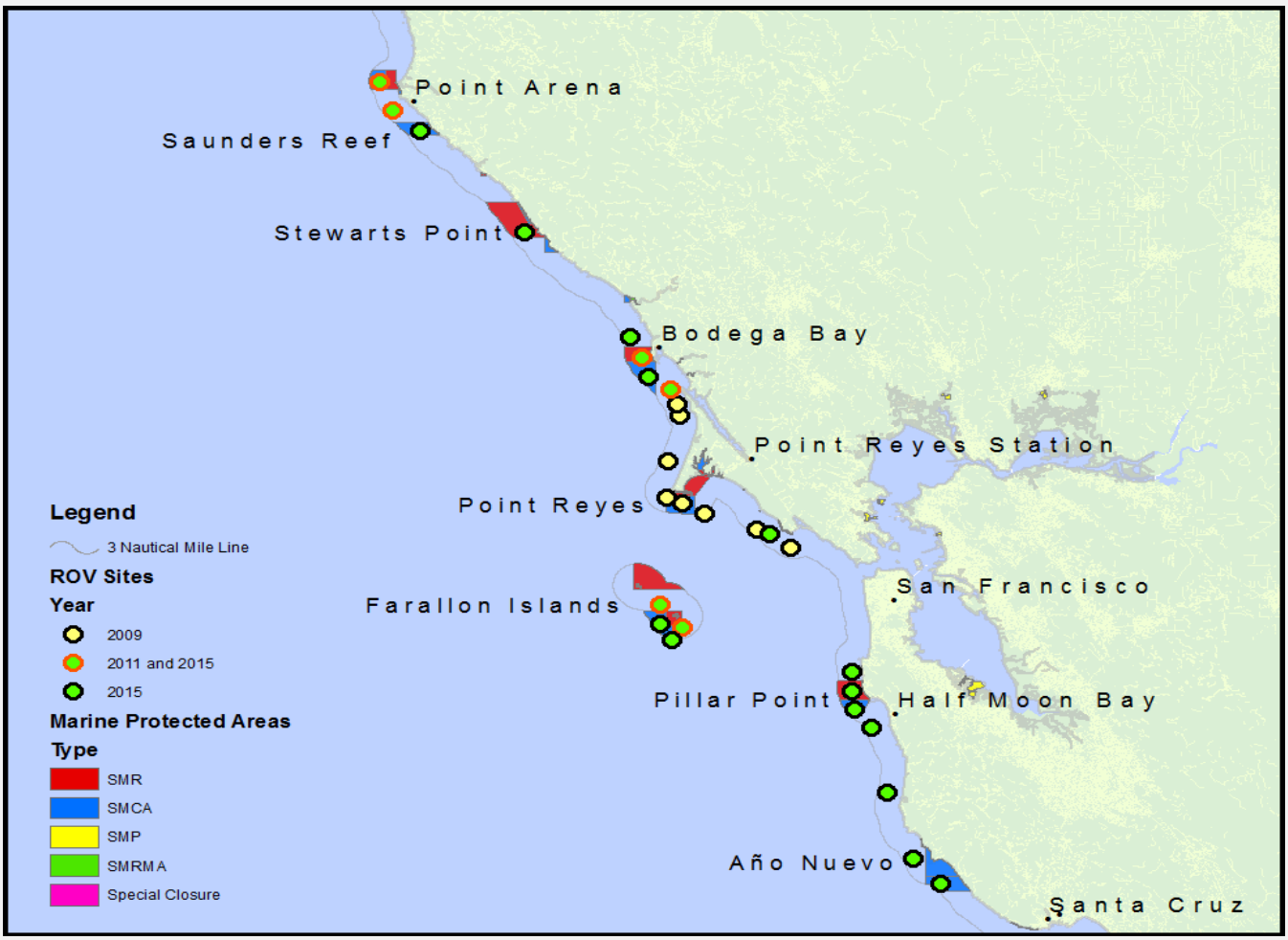

Figure 1. All ROV survey sites throughout the North Central Coast Region in 2009, 2011 and 2015

Results of 2015 ROV Surveys

Initial observations from the 2015 surveys revealed some interesting trends in several species of fish and invertebrates.

- Throughout the North Central Coast region (both within MPAs and unprotected sites) an increase in the abundance of canary, china, and brown rockfishes, as well as lingcod, was observed compared to 2009/2011 surveys. The most striking of these changes in abundance was brown rockfish. Several hundred were observed throughout the region in all sites in contrast to only five individuals seen in 2009/2011. Further study of the data will examine any site or MPA specific differences.
- Wolf eels appeared to be more abundant at sites in and around Montara SMR and Pillar Point SMCA in 2015 in contrast to 2009/2011. Several breeding pairs were also seen and photographed (wolf eels are known to form lifelong mating pairs and guard their eggs together).
- Overall sea star abundance was noticeably low in 2015 surveys. Multiple sea star species were common in 2009/2011 including the highly mobile and predatory sunflower star. Initial observations from 2015 surveys appear to show zero observations of sunflower stars. The reduction of sea stars may be linked to the wasting disease event that has devastated populations all along the Pacific coast beginning in 2013. Following the completion of video processing, we will examine differences by sites and species as well as look for ecological shifts that may be occurring in the absence of these predatory species.

"The reduction of sea stars may be linked to the wasting disease event that has devastated populations along the Pacific coast beginning in 2013."

Concluding Statements

These new ROV surveys on the North Central Coast are part of a larger statewide effort initiated by CDFW in 2014 to visit previously surveyed index sites in MPAs and unprotected areas. This effort has greatly expanded index site distribution amongst MPAs that have yet to be characterized by the regional Baseline Programs throughout the four MPA regions. Survey effort has also been expanded in fished areas outside of MPAs to further characterize rocky habitats providing the ability to examine how California's many nearshore fisheries interact with the network of MPAs at local, regional and broader scales. Analysis of this data will allow evaluation of the performance of the north central coast MPAs after 5 years of protection and provide a broader benchmark for ongoing monitoring.

Full summary reports for the 2009/2011 surveys are available on the CDFW's MPA monitoring web page. Summary reports for the 2015 surveys will be available in mid-2016.

ROV Research Document Contributions

Primary Author	*Michael Prall, CDFW, Marine Region*
Rock Greenling Photo	*CDFW/MARE archive*
ROV Launch Photo	*Mike Prall, CDFW, Marine Region*
Wolf Eel Photo	*CDFW/MARE archive*
Brown Rockfish Photo	*CDFW/MARE archive*
Sunflower Star Photo	*Athena Maguire, CDFW, Marine Region*
Sea Anemone Photo	*CDFW/MARE archive*
Yelloweye Rockfish Photo	*CDFW/MARE archive*
Copper Rockfish Photo	*Mark Winscher, CDFW, Marine Region*

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