

**California MLPA Master Plan Science Advisory Team  
Summary of Information Supporting Bioregions in the  
MLPA North Coast Study Region  
*Revised October 28, 2009***

The Marine Life Protection Act (MLPA) planning process has divided the coast into five study regions. The MLPA North Coast Study Region (NCSR) from Alder Creek near Point Arena to the California/Oregon border is the fourth region to be studied. The MLPA Master Plan Science Advisory Team (SAT) divides the study regions further into multiple bioregions. Bioregions are regions of distinct biological assemblages distinguished by different community compositions, the presence or absence of certain key species, or disruptions to population connectivity among habitats.

Bioregions should not be confused with biogeographic regions. Bioregions are determined by the SAT to help meet the goals of the MLPA by ensuring the full diversity of communities is protected. Biogeographic regions are large-scale regions of similar species assemblages. California contains parts of two biogeographic regions: the San Diegan region extends from Point Conception southward, while the Oregonian region extends from Point Conception northward. Biogeographic regions are delineated using broad changes in the presence or absence of species, while bioregions recognize more subtle differences in species assemblages and community structure.

Bioregions play a key role in the marine protected area (MPA) design process. Replication is encouraged across MPAs in different bioregions to ensure the full diversity of a given habitat is protected. For example, in the MLPA South Coast Study Region, an MPA placed at a kelp forest near Santa Barbara would not protect the same suite of species as an MPA placed at a kelp forest near Catalina Island, even though they are both considered kelp forests during SAT evaluations. Due to their differences in community composition, the Santa Barbara coastline and Catalina Island are part of different bioregions, thus encouraging stakeholders to place MPAs at kelp forests in both bioregions and protecting the full diversity of the habitat type. Additionally, SAT evaluations are conducted for each bioregion, which provides more detail about how alternative MPA proposals differ.

In previous study regions, the SAT has delineated bioregions based primarily on intertidal community data from rocky shores. In the NCSR, these data do not indicate a strong break in bioregions (Blanchette et al. 2008). However, other sources of data suggest there could be a break in population connectivity at Cape Mendocino due to the oceanographic and geomorphologic conditions of the area (e.g. Cope 2004, Dawson et al. 2001, Field and Ralston 2005, Broitman et al. 2008, Francis et al. 2009). The oceanography of the area is fairly well studied, and features such as a large eddy off Cape Mendocino and the strong upwelling in the area lend support for a potential barrier to connectivity in the area (e.g. Magnell et al. 1990, Kosro et al. 1991, Largier et al. 1993, Pullen and Allen 2001).

Additionally, nearshore habitats north of the Cape Mendocino area are heavily influenced by terrestrial sediments through runoff from major rivers such as the Eel and Klamath (Nittrouer 1999, Sommerfield and Nittrouer 1999). Habitats south of the Cape Mendocino area, however, experience much lower sedimentation due to decreased freshwater inflows in that area. This difference in geomorphology and hydrography could lead to differences in community structure.

An important concern in establishing a bioregion break in the Cape Mendocino area is determining where the bioregion boundary should be. There are several prominent features, including False Cape, Cape Mendocino, the mouth of the Mattole River, and Punta Gorda, each of which could serve as a geographic boundary between bioregions. Two considerations for selecting the boundary are the oceanographic regimes at each location and the desire to keep major habitats such as contiguous rocky reefs in single bioregions. Given these considerations, two sites seem to have good potential for serving as the bioregion boundary. False Cape acts as a northern boundary to the Cape Mendocino area, and marks a break in the oceanographic patterns of the region (J. Largier, pers. comm.). The mouth of the Mattole River, however, is more centrally located in the Cape Mendocino area, and neatly divides two major rocky reef systems.

Though the evidence for bioregions in the NCSR is not as striking as that in other regions, there is sufficient evidence to suggest there may be a break in bioregions in the Cape Mendocino area.

## References

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