

California Marine Life Protection Act Initiative
Draft SAT Response to Science Question Received at the August 3, 2009
Meeting of the MLPA South Coast Regional Stakeholder Group
Draft revised September 3, 2009

The science question in this document was received at the August 3, 2009 meeting of the MLPA South Coast Regional Stakeholder Group (SCRSR). The MLPA Master Plan Science Advisory Team (SAT) Habitat Work Group (consisting of Larry Allen, Mark Carr, Paul Dayton, Steve Gaines, Ray Hilborn, Steve Murray and Pete Raimondi) reviewed the question and has developed this draft response for consideration by the full SAT at its next meeting.

Question: Can maximum kelp be used to represent kelp habitat in marine protected areas (MPAs) and, if so, how much maximum kelp (linear miles) is needed to encompass 90% of the associated biodiversity? Note this question was asked within the context of SAT evaluations for Round 3 MPA proposals. (The amount needed to encompass 90% of biodiversity counts as 1 replicate.)

Answer¹: A goal of the MLPA is to protect key marine habitats, including biogenic kelp habitats. In the MLPA South Coast Study Region (SCSR), the SAT noted that kelp forests include several types of habitat and that special consideration in design planning should be given to uniquely productive habitats such as kelp forests.

Kelp forests are productive and diverse coastal habitats that support a variety of marine species. In the SCSR, kelp forests are dominated by giant kelp (*Macrocystis pyrifera*), whose fronds occupy the entire water column from the bottom to the surface. Although many species that inhabit kelp forests may also inhabit rocky reef habitats devoid of kelp, distinct ecological communities can develop in association with the unique habitat structure provided by giant kelp, especially on otherwise low-relief habitat (e.g., cobble, low-relief reef). In areas where kelp cover is sporadic, such as these low-relief bottom habitats, these communities are also likely to be supported only sporadically. Therefore, if a goal of an MPA is to protect the kelp forest community, it is preferable to locate the MPA in an area of more persistent kelp. Locating such an MPA in an area of high rocky relief and persistent kelp, it increases the likelihood that kelp forest communities are consistently protected from take despite year-to-year fluctuations in kelp abundance.

In the SCSR, kelp abundance, and in particular *Macrocystis pyrifera*, has traditionally been measured in terms of canopy cover, and this is the metric that is used by the SAT to identify areas with persistent kelp. Persistent kelp is defined by the SAT as areas where kelp canopy cover was present during at least three out of seven years of measurements; these measurements reveal that persistent kelp beds are patchily distributed through the SCSR, especially in the southern mainland bioregion. One notable stretch of coast, between Palos Verdes and the San Elijo area, has unique geomorphologic features that failed to support any persistent kelp beds of sufficient size to meet the SAT replication guidelines of 1.14 miles (Figure 1). The minimum size of habitats is based on protection of an area or linear extent of habitat sufficient to include 90% of available species. The roughly 75-mile gap between

¹ Supporting citations are available in the *Draft Methods Used to Evaluate Marine Protected Areas in the MLPA South Coast Study Region (May 4, 2009 draft)*.

available persistent kelp beds exceeds the SAT spacing guidelines and constrains the location of MPAs designed to capture persistent kelp habitat.

Along the 75-mile stretch of coast where persistent kelp beds are unavailable (specifically, from the mouth of Alamitos Bay to the mouth of Batiquitos Lagoon), the SAT Habitat Work Group recommends that MPAs be designed that contain *potential* kelp habitat, as represented by the maximum kelp measure. Maximum kelp is defined by the SAT as areas where kelp canopy cover was present during at least one of seven years of measurements; this measurement was provided to improve knowledge of the availability of hard surfaces in nearshore habitats and was not intended by the SAT to be a substitute for persistent kelp for MPAs designed to protect this key habitat type. The available kelp forest community surveys preclude direct assessment of whether the maximum kelp approach will lead to protection of sufficient habitat for 90% of associated “kelp forest diversity” (the standard). However, it is possible to estimate the spatial extent of maximum kelp habitat needed to produce (on average) the same amount of kelp as that produced in 1.14 miles of persistent kelp habitat; this value is 2.04 linear miles of maximum kelp.

In conducting spacing evaluations for Round 3 MPA proposals, the SAT Habitat Work Group will conduct three separate spacing evaluations for kelp habitat. One evaluation will analyze spacing between replicates of persistent kelp only. A second evaluation will consider MPAs located between the mouths of Alamitos Bay and Batiquitos Lagoon that capture at least 2.04 miles of maximum kelp to contribute to the network spacing for kelp; this isolated use of maximum kelp will provide some but not optimal protection for this key biogenic habitat type. Through these two evaluations, the SAT will be able to assess the spacing between MPAs that protect more persistent kelp beds as well as efforts to “fill the gap” between Palos Verdes and San Elijo with an alternate kelp measure.

Finally, consistent with the evaluations conducted in Round 2, the SAT will conduct a spacing evaluation using the maximum kelp measure to assess spacing between MPAs that contain potential kelp habitat. For the purpose of this evaluation, 1.14 miles will be used as the replication guideline for maximum kelp. MLPA Initiative staff have requested that this evaluation be conducted in order to provide additional information about the distribution of rocky reef and kelp habitat and maintain consistency with the evaluation methods used in Round 2. However, the SAT Habitat Work Group emphasizes that protection of persistent kelp is the most robust way to ensure protection of kelp forest communities.

In regard to spacing guidelines generally, all spacing evaluations are conducted with an artificial southern endpoint at the California-Mexico border (the southern edge of the SCSR). Oceanographic models and studies indicate that ocean currents generally travel from south to north along the mainland coast of the Southern California Bight; thus, populations in mainland areas are more likely to be replenished by larvae from MPAs to the south, than from those to the north. Because the artificial endpoint at the border does not provide any habitat protection, the SAT Habitat Work Group encourages particular consideration given to the locations of southern MPAs that contain replicates of key habitat types in designing MPA proposals for the SCSR.

Figure 1: Availability and distribution of nearshore rocky habitat replicates along the mainland coast.

Geographic Availability of "Persistent" Kelp, Maximum Kelp, and 0-30m Rock Replicates

