

California Marine Life Protection Act Initiative

1416 Ninth Street, Suite 1311 Sacramento, CA 95814 916.653.5656

To: MLPA South Coast Regional Stakeholder Group
From: MLPA Initiative Staff
Subject: Use of Kelp Data in the MLPA Initiative Process
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The Marine Life Protection Act (MLPA) Initiative is committed to incorporating the best, readily available scientific information into the marine protected area planning process. Some members of the MLPA South Coast Regional Stakeholder Group (SCRSG) and members of the public have raised important questions regarding the use of kelp data within the process. This memorandum sets the context for use of kelp data within the MLPA South Coast Project, and summarizes kelp data available for planning and evaluation purposes.

Giant kelp (*Macrocystis pyrifera*) forests are one of several habitats specifically identified within the MLPA, as well as the *California Marine Life Protection Act Master Plan for Marine Protected Areas*, for consideration in marine protected area (MPA) planning. The MLPA Master Plan Science Advisory Team (SAT) considers giant kelp in a number of evaluations of MPA proposals, including evaluations of habitat representation, habitat replication, and MPA spacing. A description of data used by the SAT in conducting these analyses is provided below, so that members of the SCRSG may better utilize available kelp information and SAT evaluation results in crafting MPA proposals.

Kelp Data Available for MPA Planning

Data delineating where giant kelp is present have been gathered by the California Department of Fish and Game (DFG) with aerial surveys using a digital multispectral video (DMSV) sensor. The statewide aerial imagery has been collected on an annual basis since 2002, primarily between late summer and fall when kelp is generally most abundant. Locations surveyed from year to year are subject to weather and flight restrictions. Additional statewide kelp abundance data were gathered by DFG in 1989 and 1999. For the MLPA South Coast Study Region, seven total years of statewide data are available from DFG: 1989, 1999, 2002, 2003, 2004, 2005, and 2006.

In some cases, the DFG kelp dataset incorporates data from an outside organization to create a statewide dataset. For instance, kelp data for San Diego and Orange counties gathered by MBC Applied Environmental Science for the Region Nine Kelp Survey Consortium are incorporated into the 2005 and 2006 DFG data. This dataset was generated by processing of data gathered with image collection methods using film photography during low tides.

It is important to recognize that a great number of surveys of giant kelp have been conducted in the MLPA South Coast Study Region. Many available studies of kelp forests focus on a relatively small geographic area or do not comprehensively map the spatial extent of kelp growth. The kelp data gathered by DFG differ from other available data in that the DFG data cover the MLPA South Coast Study Region using a consistent methodology for delineating the spatial extent of giant kelp forests. Additional data may be considered within the MLPA Initiative

process through an external data submission protocol created by the SAT; submitted data will be subject to review using outlined data criteria. Information regarding submission of data and data criteria are further described in a separate memorandum available online at http://www.dfg.ca.gov/mlpa/pdfs/agenda_042809a8.pdf.

Use of Kelp Data in MLPA Master Plan Science Advisory Team Evaluations

The abundance of giant kelp fluctuates from year to year due to a variety of factors, including oceanographic conditions, storm activity, fluctuations in species assemblages, and anthropogenic influences (further ecological information regarding giant kelp can be found in section 3.1.5 of the *Regional Profile of the MLPA South Coast Study Region*). These fluctuations are somewhat represented in the seven years of data described above, which span a range of environmental conditions and associated kelp coverage. These fluctuations present a unique challenge for consideration of kelp in SAT analyses. For this reason, the SAT has developed several methods of grouping the data described above, each of which provides different information regarding kelp abundance. Methods for grouping the data above include maximum kelp extent, kelp persistence, and average kelp extent.

Maximum Kelp Extent

The SAT has used the term "maximum kelp" extent to describe any location where kelp has been present within the available seven years of DFG data. Spatial information for this maximum extent of kelp is displayed in the *Draft Regional Profile of the MLPA South Coast Study Region (Point Conception to the California/Mexico border)*. This information is also displayed in the online MPA mapping tool, MarineMap, within the "nearshore habitats" layer as a feature showing the maximum area covered by kelp forests. In Round 1 of the SAT analyses, the maximum kelp extent was used as one data source for developing a proxy for the presence of hard bottom habitats (see the April 23, 2009 memorandum *Use of Substrate Data in the MLPA Initiative Process* for further details, available online at http://www.dfg.ca.gov/mlpa/pdfs/agenda_042809a8.pdf). On the other hand, maximum kelp extent was not used by the SAT in Round 1 evaluations of habitat representation, habitat replication and MPA spacing to represent the abundance of kelp.

Kelp Persistence

Kelp persistence refers to locations where kelp has been present in at least three of any of the seven years of available data. The SAT used the kelp persistence calculation to differentiate between the ecological assemblages associated with kelp forests that tend to be present from year to year and those kelp forests that are only occasionally present. In Round 1 of the SAT evaluations, kelp persistence was the primary measure of kelp abundance used by the SAT for evaluating habitat representation, habitat replication and MPA spacing.

Average Kelp Extent

Average kelp is an additional measure reported in the Round 1 habitat calculations. This measurement is generated by calculating the area of kelp present in a proposed MPA for each

of the seven years of DFG data, then finding the mean for those seven calculations. Unlike "maximum kelp" and "kelp persistence", "average kelp" is an arithmetic calculation based on seven separate spatial data layers; it is not a separate data layer that can be displayed. While in round 1 this calculation has been provided by MLPA staff to the SCRSG with summary habitat calculations, it has not been included in round 1 SAT evaluations.

Nearshore Hard Bottom Habitats

Abundance of nearshore hard bottom habitats (located between 0 and 30 meters) is an additional calculation that may be referenced in considering potential abundance of kelp. As kelp primarily grows on hard bottom substrates, locations where shallow rocky reefs exist may be considered potential kelp habitat, provided other environmental conditions are amenable to kelp growth (more information on how nearshore substrate is evaluated can be found in the April 23, 2009 memorandum *Use of Substrate Data in the MLPA Initiative Process*).

Linear Versus Area Measurement

The four methods for considering kelp abundance described above are implemented using either an area or linear measurement. In previous MLPA study regions, as well as in the MLPA South Coast Study Region, the SAT has resolved to use a linear measurement for assessing nearshore habitats based on the determination that the alongshore span of a rocky reef or kelp bed provides the most relevant measure of the extent to which the biodiversity associated with that habitat is represented within an MPA. For this reason, evaluations for maximum kelp, kelp persistence, and nearshore hard bottom habitats are conducted using linear features that show the locations where these habitats occur. Average kelp, on the other hand, is calculated as an area measurement to provide additional information regarding the extent of kelp habitats.

Round 2 SAT Evaluations Using Kelp Data

On May 5, 2009, the SAT discussed habitat evaluations for Round 2 of the MLPA South Coast Project. The SAT approved the evaluation methods used in Round 1, including the evaluation of "kelp persistence" and nearshore hard and soft bottom habitats in the 0 to 30 meter range using a linear measurement. In addition, the SAT resolved to add an additional analysis for Round 2 considering "maximum kelp" using a linear measurement, in order to better inform the MLPA Blue Ribbon Task Force and SCRSG with regard to dynamic kelp habitats. Note that the SAT did not add the analysis of "average kelp" to evaluations for Round 2 as the other measurements were deemed to provide the most appropriate and useful information. As a result, average kelp calculations will not be included in Round 2 summaries or analyses provided by staff.

Spatial data for "kelp persistence," "maximum kelp," and nearshore hard and soft habitats in the 0 to 30 meter range may be viewed using MarineMap (online at <http://www.marinemap.org/marinemap>) so that the SCRSG and members of the public may more clearly understand and reference these data.