

California MLPA Master Plan Science Advisory Team
Draft Work Group Responses to Science Questions Posed by the
NCCRSG at its August 22-23, 2007 Meeting
Revised September 28, 2007

The following are draft responses of the MLPA Master Plan Science Advisory Team (SAT) to questions posed by the MLPA North Central Coast Regional Stakeholder Group (NCCRSG) at its August 22-23, 2007 meeting. These draft responses have been prepared by work groups of the SAT.

1. Are the deep water benthic habitats and water column habitat around the Farallon Islands unique as well as worthy of inclusion?

Draft response: Habitats that are unique are, according to the regional goals and objectives, worthy of inclusion. Please refer to the response to Question 8 from the list of questions from the NCCRSG July 10-11, 2007 meeting for comment on whether the habitats around the Farallones are unique.

2. Specifically – where does the subtidal start? For MLPA purposes does it only span to the extent of state waters or does it extend to XX depth (and if so what depth)?

Draft response: The subtidal includes all habitats deeper than the mean low water level, including state, federal, and international waters.

3. What level of protection would you assign to marine protected areas (MPAs) that allow take of salmon, abalone, urchin, clams, halibut, white seabass, and crab? (Mark Carr, Ray Hilborn)

Draft response: A draft response to this question is still being formulated.

4. What is range and pattern of movement for the various life-stages of yellow-eye rockfish, surfperch, greenling, cabezon, [monkeyfaced prickleback (a.k.a. monkeyfaced eel, *Cebidichthys violaceu*)] and [rock prickleback, (*Xiphister mucosus*)], halibut, and white seabass? (Mark Carr, Jan Friewald)

Draft response: A draft response to this question is still being formulated.

5. In the central coast study region the recommendation to extend MPAs to the three mile state water limit to cover the range of depths and species that utilize the range of depths made sense but the north central coast study region is largely homogenous out to the three mile limit, so does it still require MPA extension to the three mile state water boundary?

Draft response: The SAT recommends that MPAs be designed to extend from the intertidal to the boundary of state waters to encompass the depth-related movements of various species across the range of depths in state waters. The SAT recommends that MPAs in the 30-100 m depth range encompass as much of this depth range as possible, thereby protecting the collective number of species that occur there and accommodate their depth-related migrations.

Please refer to the response to Question 4 from the list of questions from the NCCRSB July 10-11, 2007 meeting.

6. **How do you evaluate proposals relative to Goal 2, Objective 2 for the protection of foraging, nursery and rearing areas?**
a. **Specifically, also considering seabirds, mammals, and sharks.**

Draft response: (Question 6) Fish and invertebrates use habitats already named in the master plan for MPAs goals and objectives (such as estuaries and kelp forest/rocky reefs) for their foraging, nursery, and rearing activities. Therefore, evaluating proposals for protection of these habitats will suffice to evaluate protection of foraging, nursery and rearing areas for most fish and invertebrate species.

Draft response: (Question 6a) A draft response to this question is still being formulated.

7. **Provide an estimate of number of pinnipeds in the area and an estimate of weight of fish taken.**
a. **Also want to know what impacts range expansion of Humboldt squid has and how that should be considered.**

Draft response: (Question 7) A draft response to this question is still being formulated.

Draft response: (Question 7a) Though observational field data shows a recent increase in the number of Humboldt squid (*Dosidicus gigas*) in the California Current ecosystem, it is currently unknown whether these observations represent a permanent range expansion or a temporary intrusion into the north central coast study region at the limit of its range. There is insufficient information on Humboldt squid abundances and feeding habits to accurately predict how increases in their numbers (whether temporary or permanent) can impact local ecosystems. However, as Humboldt squid are predators of commercially-important fish species, as well as being prey of species at higher trophic levels, impacts are conceivable. For the purpose of the MLPA initiative, however, Humboldt squid will probably have negligible direct impacts, as they occur outside of state waters in areas deeper than 200m.

References

- Field, J.C., K. Baltz, A.J. Phillips, and W.A. Walker. 2007. Range expansion and trophic interactions of the jumbo squid, *Dosidicus gigas*, in the California Current. In press.
- Gilly, W.F., U. Markaida, C.H. Baxter, B.A. Block, A. Boustany, L. Zeidberg, K. Reisenbichler, B. Robison, G. Bazzino, and C. Salinas. 2006. Vertical and horizontal migrations by the jumbo squid *Dosidicus gigas* revealed by electronic tagging. Mar. Ecol. Prog. Ser. 324: 1-17.
- Pearcy, W.G. 2002. Marine nekton off Oregon and the 1997-98 El Nino. Prog. Ocean. 54: 399-403.

Waluda, C.M., C. Yamashiro, C.D. Elvidge, V.R. Hobson, and P.G. Rodhouse. 2004. Quantifying light-fishing for *Dosidicus gigas* in the eastern Pacific using satellite remote sensing. *Rem. Sens. Envir.* 91: 129-133.

Zeidberg, L.D. and B.H. Robison. 2007. Invasive range expansion by the Humboldt squid, *Dosidicus gigas*, in the eastern North Pacific. *PNAS* 104: 12948-12950.

8. **Request a finer gradation of the chart Steve Gaines presented on species home range of 10-100 kilometers. [Is it possible to disaggregate the 10-100 km category for home ranges into a finer set? (they want to know how many species are protected using a finer resolution on home range size and preferred MPA sizes)].** (Mark Carr, Jan Friewald, Rick Starr)

Draft response: A draft response to this question is still being formulated.

9. **The master plan for MPAs science guidelines suggest that marine assemblages may differ depending on the substrate type, even within the broad 'hard bottom' category. Specifically they suggest there may be differences in assemblages in and over granitic and sedimentary substrate on the central coast. In this regard:**
- Does the same hold true for granitic, sedimentary, and Franciscan substrate on the north central coast?**
 - If so, does the SAT know of some way to predict where these substrates occur given the Rikk Kvitek data or otherwise?**
 - Can the SAT provide more information on what the composition of the assemblages is likely to be in and over these different substrate types? (so regional stakeholders know what they're trying to protect, if necessary)**

Draft response: (Question 9a) In general granitic rock forms high relief reefs relative to sedimentary rock while the relief of Franciscan formations is variable. In the central coast region, studies have shown that substrate relief influences fish assemblages. There is no data in the NCCSR to determine if such species-habitat relationships occur in the north central region, however, it is likely that reef relief influences fish assemblages in the region, as it does elsewhere.

Draft response: (Question 9b) Interpretation of multibeam imagery of the ocean floor by Dr. Guy Cochrane (U.S. Geological Survey) and Irina Kogan (Gulf of the Farallones National Marine Sanctuary) in combination with other geological resources indicates that hard substrates in the MLPA North Central Coast Study Region include granitic and sedimentary rocks of the Salinian terrance, sedimentary rocks of the Great Valley Complex, and metasedimentary and metavolcanic rocks of the Franciscan Complex.

- From Pigeon Point (southern boundary of the study region) north to Elephant Rock (just south of Tomales Point) coastal substrate is largely sedimentary rock. Exceptions include:
 - Granite in Montara

- Franciscan metasedimentary and metavolcanic rocks between Point San Pedro (Pacifica) and in Daly City where the San Andreas fault cuts across the coastline
- Franciscan rocks (mix of rock types like in the Big Sur coast) between the Golden Gate and eastern Bolinas Lagoon (Wentworth 1997, USGS Open File Report 97-744 Part 5)
- Rock formations from Elephant Rock to Mussel Point and extending offshore to the northwest are granitic.
- From north of Mussel Point to Northwest Cape along the mainland (east of the San Andreas fault) the substrate is metamorphic Franciscan.
- Rock formations from Northwest Cape to Point Arena are sedimentary (Great Valley Complex turbidite sandstone and conglomerate) (Blake et al. 2002, USGS Miscellaneous field studies map MF-2402).

Draft response: (Question 9c) There is no data in the MLPA North Central Coast Study Region to allow the science advisory team to predict how fish assemblages may vary across the three available substrate types. Based on studies conducted in the MLPA Central Coast Study Region, it is likely that sedimentary formations will support relatively more foliose red algae than benthic invert cover due to the friable/erodable nature of the rock which does not provide a firm substrate for invertebrates. It is also likely that the softer sedimentary substrate will support a greater proportion of burrowing species (eg. Pholad clams).