

November 4, 2005

From: Michael DeLapa, Central Coast Project Manager, MLPA Initiative
To: Central Coast Regional Stakeholder Group (CCRSG)
Re: Responses to your requests for information

Members of the MLPA Science Sub-Team have prepared a response to requests for information from members of the CCRSG raised at the October meeting. This response was reviewed by the Science Advisory Team.

In terms of the statute definition, does the term “marine reserve” imply restrictions other than prohibiting extractive uses? In particular, does biology tell us we should limit other uses to minimize impact on the ecosystem and protect the natural state? Are there scientific ways to quantify these limits?

According to the section of the Marine Managed Areas Improvement Act included in this document, actions other than prohibiting extractive uses can be taken to help ensure that a marine reserve meets its stated goals.

From a biological perspective, studies have shown that non-extractive uses of marine areas by humans can have effects on marine ecosystems (for reviews see Crowe et al. 2000 and McCrone 2001). These human impacts include scuba diving (Schaeffer et al 1999), trampling in the intertidal zone (Brown and Taylor 1999, Crowe et al 2000), sound pollution (Popper 2003), tide pooling (Addessi 1994), invasive species (Crowe et al 2000), and alteration of marine mammal and bird behavior (Cassini 2001, Fitzpatrick and Bouchez 1998). For seabirds in particular, a large number of studies have shown that human disturbance disrupts normal nesting behavior (can cause temporary or permanent colony abandonment), causes physiological stress (elevated heart rate and corticosteroid levels), and may result in offspring or adult mortality (reviewed in Carney and Sydeman 1999). In addition, both acute and chronic pollution events have impacts on marine biological communities (reviewed in Crowe et al 2000).

In general, the effects of human disturbance vary with the amount of impact and it is therefore a policy decision to decide how much impact to allow given the goals and objectives of the marine reserve.

Restrictions and Allowable Uses (PRC Section 36710 of the Marine Managed Areas Improvement Act; Chapter 385, Stats. 2000)

- (a) In a **state marine (estuarine) reserve**, it is unlawful to injure, damage, take, or possess any living geological, or cultural marine resource, except under a permit or specific authorization from the managing agency for research, restoration, or monitoring purposes. While, to the extent feasible, the area shall be open to the public for managed enjoyment and study, the area shall be maintained to the extent practicable in an undisturbed and unpolluted state. Access and use for activities such as walking, swimming, boating, and diving may be restricted to protect marine resources. Research, restoration, and monitoring may be permitted by the managing agency. Educational activities and other forms of

nonconsumptive human use may be permitted by the designating entity or managing agency in a manner consistent with the protection of all marine resources.

Cited References

- Addessi, L. 1994. Human disturbances and long-term changes on a rocky intertidal community. *Ecological Applications* 4: 786-797.
- Brown, P.J. and R.B. Taylor. 1999. Effects of trampling by humans on animals inhabiting coralline algal turf in the rocky intertidal. *Journal of Experimental Marine Biology and Ecology* 235(1): 45-53.
- Carney, K.M., and W.J. Sydeman. 1999. A review of human disturbance effects on nesting colonial waterbirds. *Waterbirds* 22(1): 68-79.
- Cassini, M.H. 2001. Behavioural responses of South American fur seals to approach by tourists: A brief report. *Applied Animal Behaviour Science* 71(4): 341-346.
- McCrone, A. (2001). Visitor impacts on marine protected areas in New Zealand. *Science for Conservation* 173. Department of Conservation, Wellington, New Zealand: 68pp.
- Crowe, T.P., R.C. Thompson, S. Bray, and S.J. Hawkins. 2000. Impacts of anthropogenic stress on rocky intertidal communities. *Journal of Aquatic Ecosystem Stress and Recovery* 7(4): 273-297.
- Fitzpatrick, S., and B. Bouchez. 1998. Effects of recreational disturbance on the foraging behaviour of waders on a rocky beach. *Bird Study* 45(2): 157-171.
- Popper, A.N. 2003. Effects of anthropogenic sounds on fishes. *Fisheries* (Bethesda) 28(10): 24-31.
- Schaeffer, T.M., M.S. Foster, M.E. Landrau, and R.K. Walder. 1999. Diver disturbance in kelp forests. *California Fish and Game* 85(4): 170-176.