

September 28, 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 responses to two requests for information from members of the CCRSG raised at the September meeting regarding larval retention areas and nursery habitats. The responses have been reviewed by the Science Advisory Team.

### **Larval Retention Areas**

The topic of larval retention areas as habitat types was raised during discussion of Provisional Regional Goals and Objectives at the last CCRSG meeting on September 7-8, 2005. While discussing Goal 4, Objective 1, there was some debate over whether larval retention areas should be considered habitat types and thus should be replicated within MPAs. The discussion below summarizes the CCRSG's discussion, provides background information on previous SAT recommendations with regard to larval retention areas, and offers proposed alternative language for Goal 4, Objective 1.

### **CCRSG questions and discussion**

Goal 4, Objective 1, as adopted at the meeting, reads:

Goal 4. To protect marine natural heritage, including protection of representative and unique marine life habitats in central California waters, for their intrinsic value.

1. a. Include within MPAs the following habitat types: estuaries, heads of submarine canyons, pinnacles, upwelling centers, and larval retention areas.
1. b. Include within MPAs the following habitat types: estuaries, heads of submarine canyons, pinnacles, upwelling centers. [1a and 1b split vote move to BRTF]

In particular, CCRSG participants were interested in what would be gained by protecting larval retention areas, given that MPAs are primarily aimed at protecting adult populations from harvest. They also asked whether the locations of larval retention areas are well known for the Central Coast study region.

### **Science Advisory Team guidance and background information**

The Science Advisory Team recommendations on design of MPAs state that larval retention areas are an important oceanographic habitat type, implying that they should be replicated along with other coastal and oceanographic habitat types (see text from Master Plan Framework below). These areas tend to have distinct species composition from other areas and may have higher diversity, though much work remains to be done on characterizing larval retention areas, particularly in the Central Coast region.

One larval retention area is known to exist in the northern part of Monterey Bay, in the lee of Santa Cruz. Others likely exist in the lee of headlands along the coast, but they have not been established scientifically.

From the *Science Advisory Team Guidance on MPA Network Design* from the Master Plan Framework:

Many aspects of ocean climates vary somewhat predictably in space, especially ones that are tied to key features of the coastline – points and headlands, river mouths, etc. Locations that share similar ocean climates are typically more similar in the types of species they harbor. Therefore, defining habitats for the MLPA and MPA networks must include habitats defined by coastal oceanography as well as the composition of the seafloor.

Although a wide range of oceanographic habitats could be defined for the California coastline, the science team suggests that three prominent habitats stand out because of their demonstrated importance to different suites of coastal species:

- Upwelling centers
- Freshwater plumes
- Retention areas

#### *Larval Retention Areas*

Since connectivity and movement of larvae, plankton, and nutrients play such an important role in the impact of MPAs on different species, changes in the speed and direction of coastal currents can create very different ecological settings. A number of circulation features can greatly limit the coastal particles. In particular, features characterized by rotational flows, such as eddies, can greatly enhance the length of time that a particle or larval fish stays in a general region of the coastline. Such retentive features have been shown to significantly affect the species composition of coastal ecosystems (Largier, 2004). Since many retention areas are tied to fixed features of coastal topography (e.g., eddies in the lee of coastal headlands or driven by bottom topography), they define unique regions of coastal habitat that can be predictably defined.

#### **Recommendation to the BRTF**

At the September 19 meeting of the SAT, MLPA Staff proposed the language in option 1b above. After SAT discussion of both the importance of larval retention areas as a habitat and the type of information included in the goals and objectives, they provided the following recommendation:

Given that upwelling centers and larval retention areas are representative habitats and mappable in a gross sense (using headlands as a proxy - upcoast upwelling, downcoast

retention) they are included in Objective 2 and thus do not need additional note in Objective 1.

They directed MLPA Staff to prepare an option 1c that now reads:

1. c. Include within MPAs the following habitat types: estuaries, heads of submarine canyons, and pinnacles.

### **Nursery Habitats**

The discussion of larval retention areas as habitat types during discussion of Provisional Regional Goals and Objectives at the last CCRSG meeting led to another discussion around whether larval settlement areas (nursery habitats) and/or juvenile habitats should also be considered important habitat types for replication. This memo summarizes the CCRSG discussion around this issue, provides background information on previous SAT guidance with regard to nursery areas, and outlines a proposal for moving the issue of nursery areas and juvenile habitat areas to a design consideration.

### **CCRSG questions and discussion**

This question also arose during the discussion of alternate text formulations for Goal 4, Objective 1, presented above. It was suggested that if larval retention areas are important, so might be larval settlement areas and juvenile habitats. It should be noted that, other than estuaries, which have recognized importance as nursery grounds for a wide variety of species, other nursery and juvenile habitats would likely have to be considered on a species-by-species basis.

### **Science Advisory Team guidance to date**

The Science Advisory Team recommendations on design of MPAs highlight the importance of estuaries as nursery habitat for multiple species, but do not discuss other types of nursery or juvenile habitat.

### **Recommendation to the BRTF**

The issue of nursery areas and juvenile habitat is best addressed as a *design consideration* because (a) these habitats are difficult to define, (b) poorly known for some species, and (c) likely to be replicated anyway under other design guidelines.

Unless defined with respect to a single species' development, it is challenging to define what constitutes a nursery area. What criteria should be applied? How many species have to use it? How much greater does the concentration of young individuals within the habitat have to be than areas outside? These questions are difficult to answer quantitatively for a large suite of species, and in fact, may be hard to answer even for individual species. In addition, the young of some species are very small and cryptic, and their early habitat requirements may be poorly known.

Nearly all of the habitats listed in the Master Plan Framework are nursery or juvenile habitat for some species at some time. Estuaries, seagrass beds, shallow and deep rocky reefs, and kelp forests, in particular, are important to many species.

For some MPAs it may indeed be important to include nursery habitat for certain species, but this will have to be decided on a case by case basis, given the specific objectives of the MPA(s). For the above reasons, nursery and juvenile habitats might best be included as a design consideration.