

## **MPA and Network Design**

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### **Why are We Discussing MPA Network Design?**

- A central goal of the Marine Life Protection Act is *to ensure that the state's MPAs are designed and managed, to the extent possible, as a network* [MLPA, Section 2853(b)(6)].

### **Why Marine Reserves?**

- On average, when marine reserves are designated, biomass increases by 413%, density of marine life increases by 200%, the size of marine animals increases by 82%, and the number of species increases by 71% (Halpern, 2003).
- Marine reserves have positive impacts on biodiversity 90% of the time.
- The positive impacts on biodiversity inside a reserve are also seen outside reserve boundaries.

### **Why Marine Reserve Networks?**

- By themselves, individual reserves do not tend to support enough fish and invertebrates to sustain marine populations.
- To ensure that young are available to replenish and sustain populations within reserves, the area protected must be large relative to the movement of adults. Single large reserves, however, are often not an economically viable way to protect marine ecosystems. Therefore, reserves are not a viable strategy for highly mobile species.
- Establishing networks of several smaller reserves can reduce economic impacts without compromising the conservation of biodiversity and fisheries benefits.

### **Marine Reserve Networks Can Benefit Biodiversity**

- Goal: Ensure that species of concern are colonizing and persist inside the network of MPAs.
- To protect particular species, connectivity of marine reserves through dispersal of young matters. Persistence of a threatened species critically depends on connectivity.
- Understanding adult movement and larval dispersal patterns will help determine the size and spacing of effective MPAs.

### **Marine Reserve Networks Can Benefit Fisheries**

- Goal: Ensure that benefits of protection within reserves is shared with areas outside of the reserve by spill-over of adults or export of young.
- The larger, more abundant fish that develop inside a marine reserve can move outside of the reserve.
- A network of marine reserves can enhance fished populations outside of MPA boundaries through the export of larvae.

### **Network Design Guidelines**

- MPAs in networks must be spaced appropriately to ensure larval transport between them.
- To protect adult populations that vary in their movement rates, MPAs should extend 5-10 km alongshore (preferably 10-20 km).
- Much larger MPAs are required to fully protect birds, mammals, and migratory fish.
- To connect MPAs through dispersal of young of important bottom-dwelling fish and invertebrate groups, MPAs should be no more than 50-100 km apart for each habitat.

### **MPA Network and the MLPA**

- The MLPA requires that the network as a whole meet the various goals and guidelines set forth by the law and contemplates the adaptive management of that network [Fish and Game Code Section 2857(c)(5)].
- The MLPA requires that MPAs be managed as a network. A statewide network could be one that has connections through design, funding, process, and management.

### **Glossary**

**Biomass** - The total mass of living matter within a given area.

**Marine Reserve** - A marine or estuarine area where 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.

**Network** - A network is a group of reserves that is designed to meet objectives that single reserves cannot achieve on their own (Roberts and Hawkins, 2000).

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