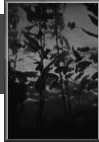# Marine Life Protection Act Initiative

Marine Protected Area Spacing Guidelines and Evaluation

Satie Airame, Science and Planning Advisor • California MLPA Initiative

Presentation to the MLPA Master Plan Science Advisory Team
January 23, 2009 • Conference call

Connectivity in Southern California

- Connectivity is heterogeneous and asymmetric
- Some connections between bioregions
- Strong poleward transport along mainland
- Retention in Santa Barbara Channel and around San Clemente Island

Mitarai, S., D. Siegel, J. Watson, C. Dong, and J. McWilliams

Connectivity in Southern California

- For species with <u>short larval duration</u>, mainland and islands are not strongly connected
- For species with <u>longer larval duration</u>, connection from mainland to islands is stronger, but connection from islands to mainland is not as strong
- Connection between northwestern islands and southeastern islands is not strong, except for species with longer larval duration (e.g., cabezon and rockfish)

Mitarai, S., D. Siegel, J. Watson, C. Dong, and J. McWilliams
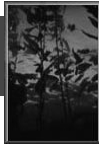
Consideration of MPA Spacing

- Mainland Coast: Master plan guidelines for spacing of marine protected areas (MPAs) apply to the mainland coast of California, including the south coast study region
- Channel Islands: MPAs must be evaluated differently from other regions along the mainland coast of California

SAT Modeling Workgroup, January 14, 2009

MPA Spacing Guideline: Mainland

- For an objective of facilitating dispersal of important bottom-dwelling fish and invertebrate groups among MPAs, based on currently known scales of larval dispersal, MPAs should be placed within 50-100 kilometers (31-62 miles or 27-54 nautical miles) of each other

Master Plan for Marine Protected Areas (2008)
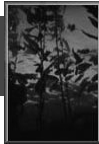
MPA Spacing Evaluation: Mainland

- Tabulate maximum gaps between MPAs or MPA clusters
- Consider spacing of key habitats separately
- Consider only MPAs or MPA clusters of sufficient size to contain adult movement ranges
- Consider only MPAs or MPA clusters that include sufficient amount of key and unique habitats
- Consider only MPAs or MPA clusters at moderate-high, high, or very high levels of protection

SAT Modeling Workgroup, January 14, 2009

MPA Design for the Channel Islands

- Connectivity between Channel Islands (and between islands and mainland) is influenced and limited by their <u>complex geography</u> and <u>ocean circulation</u>, among other factors
- A simple guideline for MPA spacing does <u>not</u> account for these complex variables
- Guidelines <u>other than spacing</u>, which are described in the master plan, will serve as a starting point for design of MPAs at the Channel Islands

SAT Modeling Workgroup, January 14, 2009
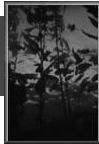
Other MPA Design Guidelines

- Guidelines
  - Bioregions
  - Level of protection
  - Representation of key and unique habitats
  - Replication of habitats within a biogeographical region
  - MPA size
- These guidelines are a <u>starting point</u> for MPA design

Master Plan for Marine Protected Areas (2008)

MPA Spacing Evaluation: Models

- <u>Spatially explicit models</u> will provide additional evaluation of contribution of proposed MPAs to biomass, larval supply and fish yield

- The models confirm assumptions about movement of larvae along the <u>mainland</u> coast

- The SAT has confidence that the models also can evaluate connectivity at the <u>Channel Islands</u> arising from larvae that travel beyond local retention areas

- The models consider potential contributions of proposed MPAs, regardless of size or spacing