

## **Spiny Lobster Monitoring Project for the Channel Islands Marine Protected Areas**

1. **Proposers:** Student sponsors: Sofia Hamrin [khamrin@bren.ucsb.edu](mailto:khamrin@bren.ucsb.edu) (805) 636-9669, Christina Cairns [ccairns@bren.ucsb.edu](mailto:ccairns@bren.ucsb.edu) (310) 779-1529, Sarah Abramson [sabramson@bren.ucsb.edu](mailto:sabramson@bren.ucsb.edu) (310) 999-1119

2. **Bren Faculty Sponsors:** Hunter Lenihan, Bruce Kendall

### **3. Proposed Project:**

A. **Problem Statement:** A network of twelve marine protected areas (MPAs) was established within the Channel Island National Marine Sanctuary (CINMS) on April 1, 2003. The MPAs were established with the following broad goals: to conserve biodiversity and integrity of marine ecosystems; to help sustain, conserve and protect marine life populations, including those of economic value; to recover depleted marine resources; and to manage use in a manner that is consistent with protecting biodiversity. The MPAs were also established with the specific objective of improving the sustainable yield of fisheries through spillover of marine life from reserves into surrounding waters including fishing grounds, and perhaps through dispersal of larvae into fished areas. (CIMPA Draft Monitoring Framework, 2003).

One of the major advantages of MPAs is to provide reference sites that enable us to distinguish between natural and anthropogenic changes (Parrish, 2002). However, existing MPA monitoring programs at CINMS only evaluate the ecological impacts of the MPAs via community sampling and are not addressing fishery objectives such as spillover (DFG). This fact has caused considerable contention, particularly within the fishing community. In order to properly assess the effects of the CINMS MPAs on fisheries, quantitative research addressing fishery concerns is needed. Specifically the California spiny lobster industry fears a reduction in fish harvest and possible compaction of the fishery due to the establishment of MPAs (Stadler, 2003).

The California spiny lobster (*Panulirus interruptus*) fishery is one of California's most valuable commercial fisheries, generating over \$4.6 million in commercial landings last year (J. Ugoretz, pers. comm., 2003). The CINMS is a major fishing ground for this species and the lobster industry has shown considerable interest in the success of MPAs at achieving their intended fishery goals (C. Miller, pers. comm., 2003). Field research has not been conducted for this fishery since 1979 (Stadler, 2003). Effective management of the lobster fishery requires a thorough understanding of the resource and the impact that the fishery has on the resource. This project is designed to begin assessment of the effects of MPAs on the lobster fishery by implementing a framework to obtain essential fishery information. This data will be used to examine the sustainability of the current harvest control measures and assemble lobster fishery management recommendations.

#### **B. Project Objectives:**

- To implement a monitoring program collecting data for size frequency, growth rates, lobster abundance, and movement patterns of the California spiny lobster along spatial gradients in replicate reserves and control areas to outside of reserves and control areas
- To use these data to provide a preliminary evaluation of MPAs as a fishery management tool

- To assess existing lobster management regulations and to assemble recommendations to industry and CDFG on potential management improvements
- To facilitate collaboration and cooperation between the lobster industry, governmental agencies (CDFG, NMFS and CINMS) and the scientific community on MPA fishery monitoring
- To develop a model for economic analysis of the implementation of a lobster monitoring program
- To create a public database that provides a system of sharing lobster information
- To help establish a long-term funding base for the continuation of the project

**C. Project Significance:** Very little known about the effects of MPAs on fisheries populations. Numerous scientific studies have documented population recovery within marine reserves in a variety of marine ecosystems, however few have treated the notion of spillover into fished areas and none have documented the effects on commercially valuable species within the Channel Islands. Projects like this are important to determining the effects of MPAs on marine populations and accounting for these results in assembled recommendations. Unfortunately, scientific studies are not easily transferred into policy and public acceptance without education and some direct local experience (Bohnsack, 2003). This project will initiate a cooperative lobster study between the commercial lobster industry, the CINMS, CDFG, and the Bren School. The Marine Life Management Act recognizes the importance and numerous advantages of collaborative research and strongly promotes it where possible (FCG § 7060 (a) and (b)).

This project will primarily serve three groups. It will involve the fishing community by directly engaging lobstermen in the MPA fishery research and subsequent management implications. Their participation is crucial because they contribute great knowledge and they desire cooperation with management regimes (Jentoft, 1989; Jentoft and McCay, 1995). This project will aid the California Department of Fish and Game by providing current information and by assembling management recommendations for the commercial lobster fishery. Lobster assessments in the area have not been completed since 1979. Due to budget constraints, CDFG is not actively researching spiny lobster and future research is not likely (J. Ugoretz, pers. comm., 2003). Bren students will benefit with a broadened knowledge of assessment and management of fisheries. It will also provide students with training and experience in multidisciplinary environmental problem solving such as teamwork, leadership, management, and negotiation skills. Ultimately this project will immerse students in marine resource management; providing us with experience in research, policy, and development of cooperative partnerships with stakeholders and clients.

**D. Background Information:** This project will be conducted in the CINMS, specifically inside and out of no-take MPAs around Anacapa Island and Gull Island. The research framework and literature review of the lobster fishery for this project has been developed by a 2004 Master's group project, "Development of an Ecosystem and Fishery Monitoring Plan for the Channel Islands Marine Protected Areas." Over the past 25 years very little biological or fishery data has been published on the California spiny lobster and management has remained relatively static. Fisheries in Southern California Bight, especially those targeting economically valuable groundfish, have declined significantly over the last decade (Love, *et al.* 1998). Marine reserves, such as those within CINMS, are being implemented to conserve marine resources through regulation of no-take zones.

It is important to assess the effect of these no-take zones on fishing pressure in current take-zones for commercial fisheries in Southern California.

**E. Stakeholders:** Stakeholders include commercial spiny lobster fishermen, recreational spiny lobster fishermen, Channel Islands National Marine Sanctuary, California Department of Fish and Game, NOAA-National Marine Fisheries Service, US National Park Service, environmental NGOs, and research scientists at UCSB and other institutions.

**F. Possible Approach and Available Data:** To evaluate the impacts of the Marine Protected Areas on the California spiny lobster we will implement a monitoring program to measure catch and effort during one fishing season for lobster in the Santa Barbara Channel. We will use the framework established by M. Stadler (Bren School of Environmental Science and Management) through the 2004 group project “Development of an Ecosystem and Fishery Monitoring Plan for the Channel Islands Marine Protected Areas”. This program will be used as a basis to provide fishery data and synthesize with the lobster fishermen management recommendations for the California spiny lobster industry. The project is a cooperative research project that assesses fishery specific objectives of MPAs for lobster including spillover, size-frequency, growth rates, and relative abundance that has been developed by Abeles et al. (2004, in prep.).

A major component of the proposed project will be to coordinate, implement, and analyze this cooperative lobster fishery MPA project. We also will analyze the success of the monitoring program and establish a framework for future implementation of the monitoring strategy. An economic analysis of the implementation of a lobster monitoring program will be conducted. This project will also facilitate cooperation between the lobster industry and the scientific community. In order to be successful, we will work with lobster fishermen to test proposed research methods, including the collection of tags, data, and record of fishing effort (Abeles et al, 2004, in prep.). We also will provide information to lobster fishermen on the potential impacts and projected long-term effects of Marine Protected Areas for future sustainability of the industry. Additionally, we will create a public database that provides a system of monitoring for spiny lobster to be used by the California Department of Fish and Game. Data will be used from Abeles et al. (2004, in prep.). Other sources of information will come from existing biological data as well as guidance from a concurrent lobster study on Catalina Island by Kathy Ann Miller.

**G. Deliverables:** As an outcome from this project, we will introduce a framework for future MPA monitoring programs, synthesize recommendations for regulations of the lobster fishery, gather fishery data into a lobster database, and provide an economic analysis of implementing the program.

4. **Clients:** NOAA Channel Islands National Marine Sanctuary (Sean Hastings [sean.hastings@noaa.gov](mailto:sean.hastings@noaa.gov), (805) 884-1472 and Satie Airame [Satie.Airame@noaa.gov](mailto:Satie.Airame@noaa.gov), (805) 884-1468), California Department of Fish and Game (John Ugoretz [jugoretz@dfg.ca.gov](mailto:jugoretz@dfg.ca.gov), (805) 560-6758)

5. **Anticipated Financial Needs and Sources of Support:** NOAA-CINMS has agreed to provide one full-time summer, supplies, and travel. To complete the field research component of the project CINMS has offered use of their research boat.

## References

- Abeles et al. (2004). Development of an Ecosystem and Fishery Monitoring Plan for the Channel Islands Marine Protected Areas. *Group Project Thesis*, Work in progress.
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- CIMPA Draft Monitoring Framework. May 30, 2003.
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- Jentoft S. and McCay, B. (1995). User participation in fisheries management: lessons drawn from international experiences. *Marine Policy*; 19(3):227-246.
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- Parrish, Richard (2003). Marine Reserves to Supplement Management of West Coast Groundfish Resources: Phase 2 – Draft Concepts for California Waters. *National Marine Fisheries Service, Southwest Fisheries Science Center, Pacific Fisheries Environmental Laboratory*.
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## **Bren School Group Project Proposal, 2004-2005**

Friday, January 16, 2004

1. Title: Collaborative Monitoring of the Marine Protected Areas in the Channel Islands
2. Proposed by: Darren Hardy, Graduate Student ([dhardy@bren.ucsb.edu](mailto:dhardy@bren.ucsb.edu))
3. Faculty Sponsor: James Frew, Assistant Professor ([frew@bren.ucsb.edu](mailto:frew@bren.ucsb.edu))
4. Project:

A. Problem Statement:

- i. Well-designed monitoring programs are essential to ensure the documentation and proper analysis of Marine Protected Areas (MPAs).
- ii. As summarized in the MPA Monitoring Workshop (March 2003), “the primary goal of the workshop was to develop preliminary biological and socioeconomic monitoring plans including:
  1. what to monitor;
  2. how to conduct monitoring;
  3. when to complete various portions;
  4. how to compile data into an easily accessible source;
  5. what funding and personnel needs exist; and
  6. what type of oversight is appropriate.”
- iii. Although many researchers and others parties collect data in or near MPAs, sharing data and analytical results within the scientific community is minimal for a variety of reasons including:
  1. the diversity of the biological monitoring data collected,
  2. the relative privacy and use concerns of the data, and
  3. the willingness and availability of the parties to participate in a coordinated monitoring process.

B. Project Objectives:

- i. Assist California Department of Fish and Game (CDFG), Channel Islands National Marine Sanctuary (CINMS), National Marine Fisheries Service (NMFS, [www.nmfs.noaa.gov](http://www.nmfs.noaa.gov)), and US National Park Service (NPS, [www.nps.gov/chis](http://www.nps.gov/chis)) to identify barriers to acquiring monitoring data.
- ii. Develop a plan for cross-industry collaboration throughout the process of collecting and synthesizing biological monitoring data into a shared resource.
- iii. Develop a method and any associated data requirements for synthesizing diverse biological monitoring data into a shared resource suitable for the CDFG to report on MPA effectiveness to its stakeholders.

C. Project Significance:

- i. Development, implementation, and execution of MPA monitoring programs are now the highest priorities for State and Federal officials, as well as some user groups, such as commercial fishers.
- ii. The benefits of Bren students’ participation are as follows:
  1. Involve students in ocean governance, from regulatory procedures to stakeholder processes.
  2. Deepen students’ understanding of interactions among biological, physical, and chemical processes through exposure to a wide-range of coastal marine research projects, methodologies, and data.

3. Develop and implement environmental policy across fragmented stakeholder groups in an ecologically important region.
4. Provide opportunity to explore collaboration with non-governmental organizations, for-profit parties, and governmental agencies.

D. Background Information:

- i. Study Location: Channel Islands National Marine Sanctuary, California
- ii. A network of 10 marine reserves and 2 marine conservation areas within the CINMS was established in April 2003. Among the goals for the MPAs were (a) conservation of biodiversity, and (b) contribution to sustainable fisheries within the context of existing fishery management.
- iii. CDFG, CINMS, and the NPS are developing programs for monitoring, education, and enforcement of the MPAs in a political climate where some Southern California fishermen oppose the establishment of MPAs.
- iv. The State MPAs provide a large-scale experiment to test whether MPAs can contribute to biodiversity conservation and sustainable fisheries.

E. Stakeholders:

- i. Consumptive and non-consumptive users of marine resources in the Channel Island region, including commercial and sport fishermen, divers, and boaters.
- ii. Government agencies such as CDFG, CINMS, NMFS, and NPS.
- iii. Non-governmental organizations including The Ocean Conservancy ([www.oceanconservancy.org](http://www.oceanconservancy.org)), Environmental Defense ([www.edf.org](http://www.edf.org)), and Natural Resources Defense Council (NRDC; [www.nrdc.org](http://www.nrdc.org))
- iv. Scientific research including coastal marine habitats and ecological change.

F. Possible Approach and Available Data:

- i. Abeles et al. (2003) has a number of sources for biological monitoring data.
- ii. Online collaboration technologies could support information exchange, communication, and shared resources among participating groups.
- iii. Development of a “fair-use” data derivation policy may mitigate concerns of participating scientists, and integration of data sharing requirements into permitting policies of the management agencies may increase participation and monitoring data quality.

- iv. Prior approaches to marine database development, including Abeles et al. (2002, in progress) and the database project at Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO, [www.piscoweb.org](http://www.piscoweb.org)) (Jones, 2004) will be used as a foundation for our project.

G. Deliverables:

- i. A collaboration framework for collecting biological monitoring data into a shared resource over time.
- ii. A method for synthesizing diverse biological monitoring data into a shared resource suitable for the CDFG to report on MPA effectiveness.

H. References

- i. Abeles, A., Afflerbaugh, K., Chiang, L., Pitterle, B., & Stadler, M. (2002). *Ecological Monitoring Framework for the Channel Islands Marine Protected Areas* (Group Project, in progress). Santa Barbara: Bren School of Environmental Science and Management, UCSB. from <http://www.bren.ucsb.edu/research/gp.asp?gp=mpa>
- ii. Abeles, A., Airame, S., Bergen, M., Chiang, L., Fangman, S., Pitterle, B., et al. (2003). *Summary of Research Programs In the Channel Islands National Marine Sanctuary*. Santa Barbara: Bren School of Environmental Science and Management, UCSB; Channel Islands National Marine Sanctuary; California Department of Fish and Game. from [http://www.cinms.nos.noaa.gov/marineres/PDF/sum\\_research.pdf](http://www.cinms.nos.noaa.gov/marineres/PDF/sum_research.pdf)
- iii. CINMS. (2003, March 14-16). *Marine Protected Areas Monitoring Workshop*, Bren School of Environmental Science and Management, University of California, Santa Barbara, from [http://www.cinms.nos.noaa.gov/marineres/mpa\\_workshop.html](http://www.cinms.nos.noaa.gov/marineres/mpa_workshop.html)
- iv. Jones, C. (2004). PISCO Database Project in collaboration with National Center for Ecological Analysis and Synthesis (NCEAS). Personal Communication. from <http://www.piscoweb.org/who/im/cjones.html>

5. Clients:

A. Channel Islands National Marine Sanctuary ([www.cinms.nos.noaa.gov](http://www.cinms.nos.noaa.gov)):

- i. Sean Hastings, Resource Protection Coordinator ([sean.hastings@noaa.gov](mailto:sean.hastings@noaa.gov))

B. California Department of Fish and Game ([www.dfg.ca.gov](http://www.dfg.ca.gov)):

- i. John Ugoretz, Senior Marine Biologist ([jugoretz@dfg.ca.gov](mailto:jugoretz@dfg.ca.gov))

~~C.~~ Partnership for Interdisciplinary Studies of Coastal Oceans ([www.piscoweb.org](http://www.piscoweb.org)):

- i. Satie Airame, Ph.D., Policy Coordinator (PISCO) and Scientific Advisor (CINMS) ([satie.airame@noaa.gov](mailto:satie.airame@noaa.gov))
- ii. Chris Jones, Information Manager (PISCO; [cjones@lifesci.ucsb.edu](mailto:cjones@lifesci.ucsb.edu))

6. Support: CINMS will offer 1 full-time, 2-month internship, office space, supplies, & travel.