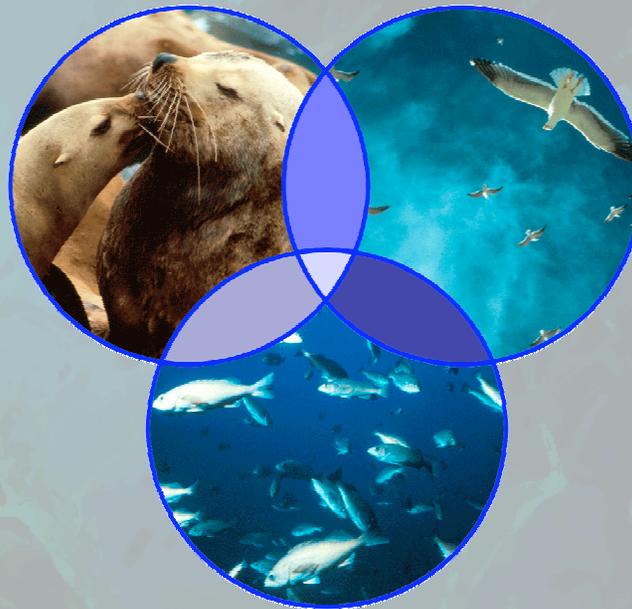# A Biogeographic Assessment of the Channel Islands National Marine Sanctuary & Surrounding Areas:

An Interim Progress Report

A Presentation to the Sanctuary Advisory Council

By:

John D. Christensen
NOAA's NCCOS/CCMA/Biogeography Program
January 23, 2004

Questions that we are Addressing:

➢ **What data currently exists that can be used to identify regions spatially important to species or communities?**

➢ **Does analysis of theses data reveal significant spatial pattern or trend in the distribution of marine associated fauna?**

➢ **Where existing data is insufficient, can we model species distributions to estimate potential patterns?**

➢ **What do the spatial patterns and trends tell us about the biogeography of the region in general?**

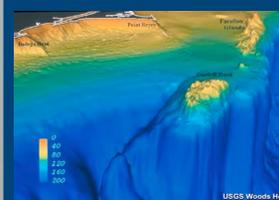➢ **How do these patterns and trends relate to proposed Sanctuary boundary alternatives?**
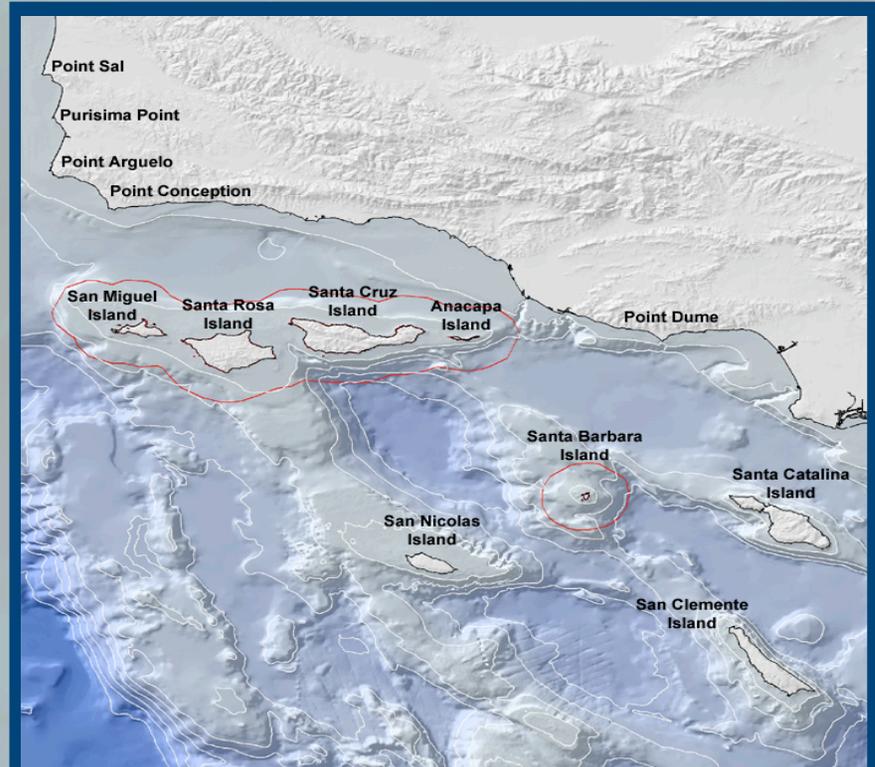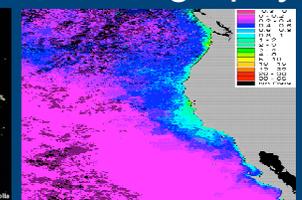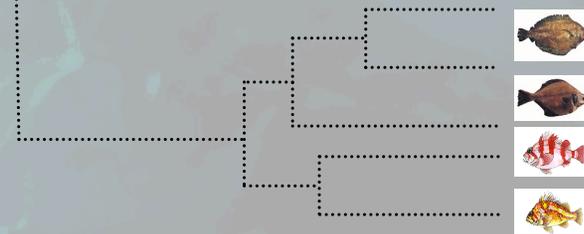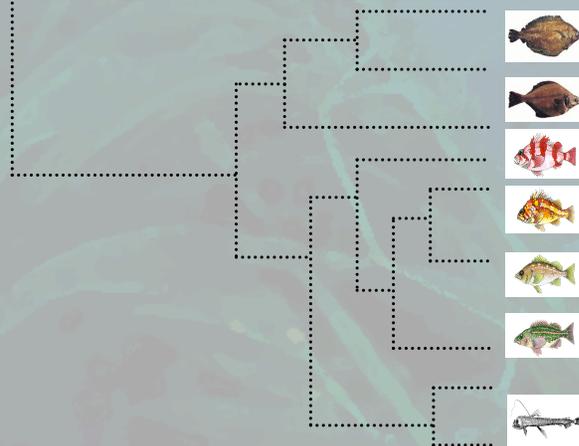

Mammals   Fishes   Birds
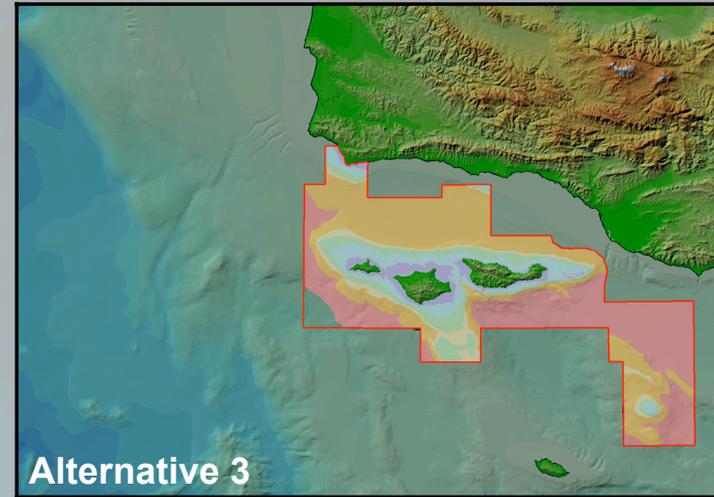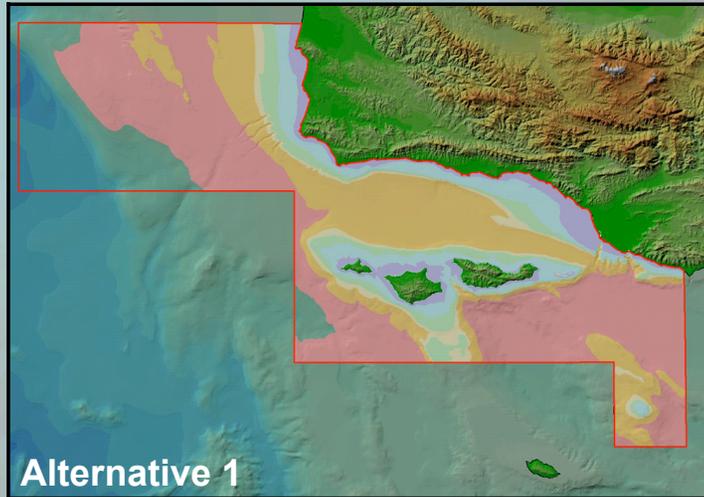
Habitats   Inverts   Oceanography

A Collaboration with the Channel Islands National Marine Sanctuary

Goal: Assimilate and analyze relevant and comprehensive spatial data to evaluate potential implications of boundary alternatives from a biogeographic perspective

Alternative 1

Alternative 3

EXAMPLE:
What fish assemblages occupy each of the alternative boundaries?

A Biogeographic Assessment of the Channel Islands National Marine Sanctuary & Surrounding Areas:

An Interim Progress Report

● **Task I –** Develop Project Work Plan

● **Tasks II & III –** Data Collection and Inventory

● **Task IV –** Data Assessment, Formatting, Selection of Analytical Technique

● **Task V –** Data Analysis

● **Task VI –** Develop Products for Review

Task VII – Incorporate Review Comments Into Final Report

Task VIII – Enhance GIS Capabilities / Data Transfer

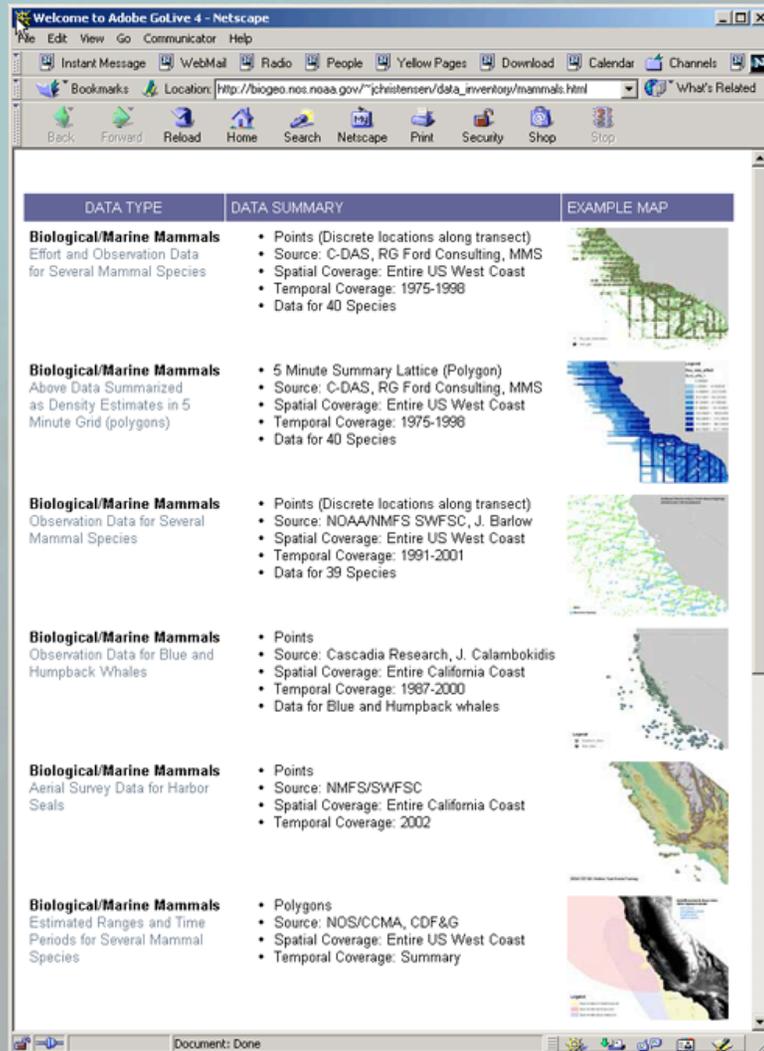# Task I - The Project Work Plan

WORK PLAN
A Biogeographic Assessment of the Channel Islands National Marine Sanctuary and Surrounding Areas:

A Review of Boundary Expansion Alternatives for NOAA's National Marine Sanctuary Program

Prepared
February 2003
By

NOAA/NOS/NCCOS
Center for Coastal Monitoring & Assessment
Biogeography Program

A Cooperative Investigation by NOS' Biogeography Program and the Office of National Marine Sanctuaries
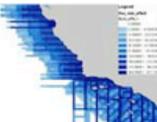
TASK SUMMARY

➢ **Completed in February 2003**
(Scheduled completion April 2003)

➢ **Represents consensus project blueprint between NCCOS, CINMS, and NMSP**

➢ **Includes project objectives, tasks, and associated timelines, project personnel, and contact information**

➢ **On track for an on time delivery**
(Expected May 31, 2004)

➢ **Project work plan is available on the project web site:**
http://biogeo.nos.noaa.gov/projects/ca_nms/cinms/

Tasks II & III – Data Collection & Inventory

TASK SUMMARY

➢ **Completed* in August 2003**
(Scheduled completion June 2003)

➢ **A total of 47 spatially comprehensive datasets**

➢ **INCLUDING:**
10 Marine mammal datasets
3 Marine bird datasets
13 Fish datasets
5 Invertebrate datasets
3 Intertidal community datasets
3 Habitat datasets (kelp, substrate, NWI)
7 Physical oceanographic datasets

➢ **Data inventory is available on the project web site:**
http://biogeo.nos.noaa.gov/projects/ca_nms/cinms/

Task IV – Data Assessment[1], Formatting[2], Choosing Analytical Technique(s)[3]
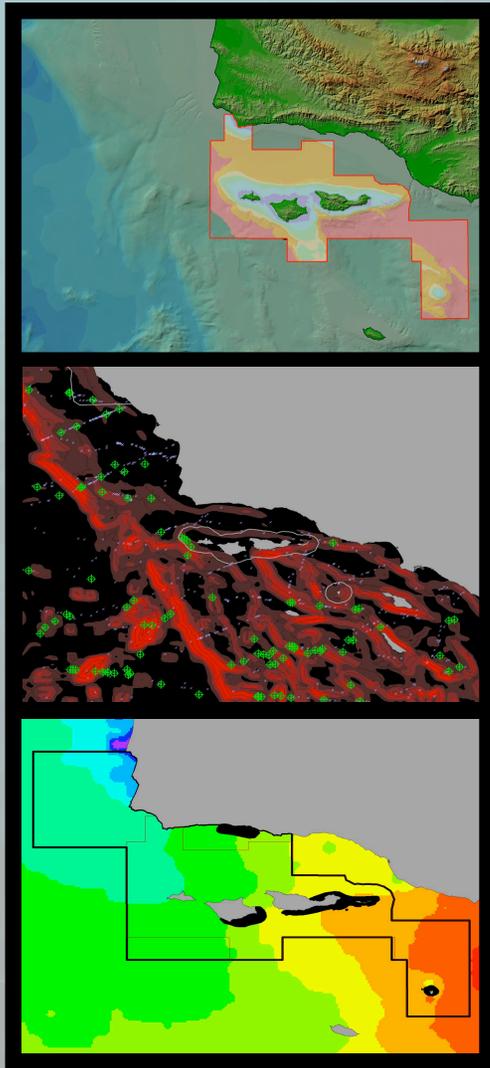
TASK SUMMARY

➢ **Parts 1 & 2 Completed September 2003**
  Part 3 Completed December 2003
  (Scheduled completion July 2003)

➢ **Many Data Sources Found; however, Not All Used**
  Permissions Refused
  Insufficient Spatial/Temporal Robustness
  Incomplete Databases

➢ **Several Meetings Held to Discuss Data Nuances and Analytical Strategies**
  NMFS SWFSC, RG Ford & Associates, Carter Biological Consulting, Inc., Dr. Jim Allen (SCCWRP), Dr. Elizabeth Clark (NMFS), Dr. Jenn Casselle (PISCO), CINMS Staff, among others.....

➢ **Critical Meeting Convened at the Channel Islands NMS in December to Discuss and Decide Upon a Final Analytical Construct and Reporting Standard**
  See Handout: Draft Example Chapter – Bird Diversity
  Report Chapters Consist of 3 Parts
    1. Metadata Report
    2. Large-scale Patterns
    3. Alternatives

Tasks V – Data Analysis & Display

5 species 14 fish Diversity=1.12	5 species 14 fish Diversity=1.57
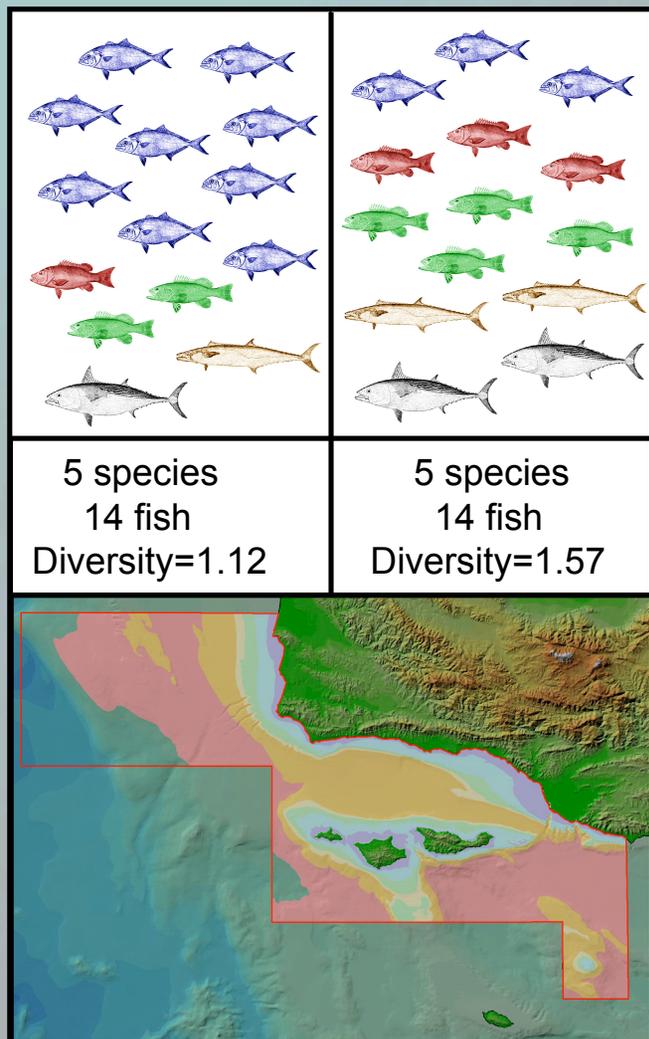
TASK SUMMARY

➢ **Ongoing, Completion Expected March 04**

(Scheduled completion November 2003)

➢ **Analyses Completed To Date:**

   1. **At Sea Marine Bird Diversity (Refer to Handout)**
   2. **Bird Nesting/Colonies**
   3. **Recreational Fisheries Analyses**
       a. **Diversity**
       b. **Assemblage Analysis**
   4. **Kelp Distribution Analysis**
   5. **Oceanographic Fronts Analyses**
       a. **Temperature Anomaly**
       b. **Ocean Color Anomaly**

➢ **Analyses Yet to Complete (To Name a Few...)**

   1. **Marine Mammal Densities**
   2. **Fishery-independent Fish Community Structure**
   3. **Analysis of Substrates**
   4. **Invertebrate Community Structure**
   5. **Eelgrass Distributions**
   6. **Bathymetric Characterization**
   7. **INDIVIDUAL SPECIES ANALYSES**
   8. **Integration**

Tasks V – Data Analysis & Display

SPECIES LIST (80% Determined to Have Adequate Data for Analysis)

- Giant Kelp
- Surfgrass
- Eelgrass
- Euphausids
- Market Squid
- Sea Urchin (red, purple)
- Red Crab
- Rock Crab
- Sheep Crab
- Ridgeback Prawn
- Spot Prawn
- Sea Cucumber (Warty, California)
- Abalone (Red, White, Black)
- Angel Shark
- Thresher Shark
- Leopard Shark
- Soupfin Shark
- Cowcod
- Boccacio
- Pacific Ocean Perch
- Lingcod
- Giant Seabass
- California Sheepshead
- Halibut
- Anchovy
- Sardine

- California Brown Pelican
- Western Snowy Plover
- California Least Tern
- Ashy Storm Petrel
- Pigeon Guillemot
- Xantus's Murrelet
- Cassin's Auklet
- Pelagic Cormorant
- Double-crested Cormorant
- Black Oystercatcher
- Blue Whale
- Gray Whale
- Humpback Whale
- Orca
- Bottlenose Dolphin
- Common Dolphin
- Pacific White-sided Dolphin
- Risso's Dolphin
- Northern Elephant Seal
- California Sealion
- Harbor Seal
- Southern Sea Otter
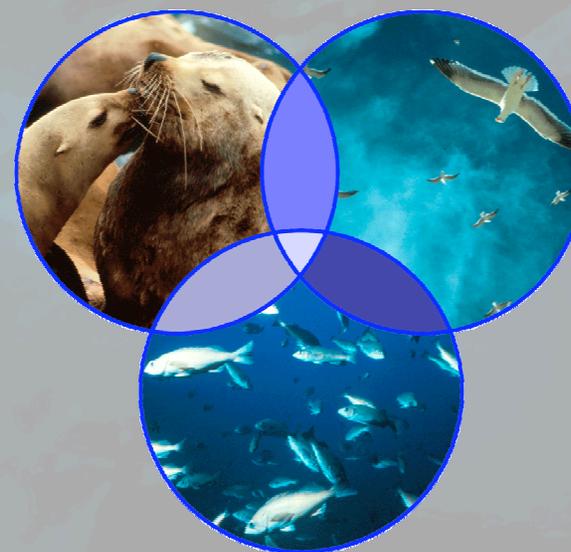
Have Data For:
195 Fish Species
100 Bird Species
28 Marine Mammals

Example Analysis: Marine Bird Diversity
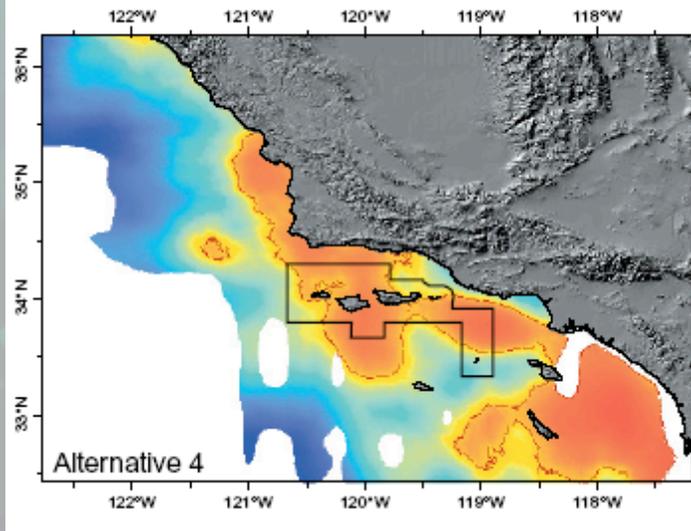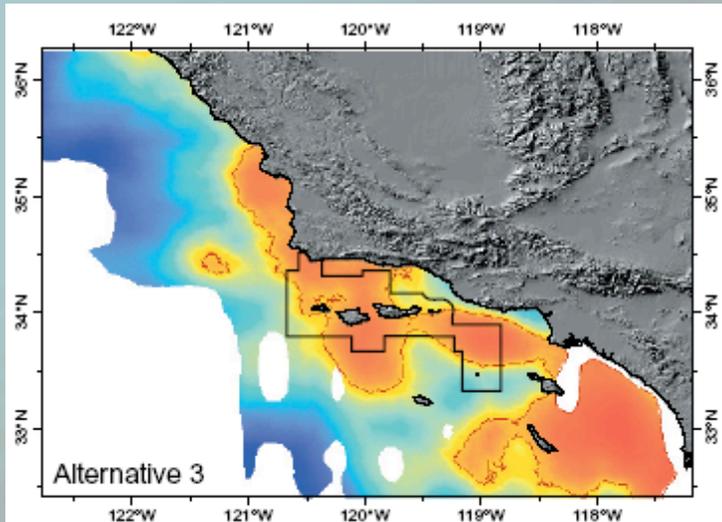
➢ **Data Suggest that the Study Area can be Characterized by High Bird Diversity**

➢ **Elevated Estimated Diversity Values in the Region May be Due To:**

1. **Trophic Linkages to Areas of High Primary and Secondary Productivity (Upwelling)**

2. **Proximity To Ares of Relatively Dense Nesting Colonies**

➢ **Alternatives 3 and 4 Disproportionately Capture Areas of High Bird Diversity**

$$M = \frac{(B_1 - B_0 / B_0)}{(A_1 - A_0 / A_0)}$$
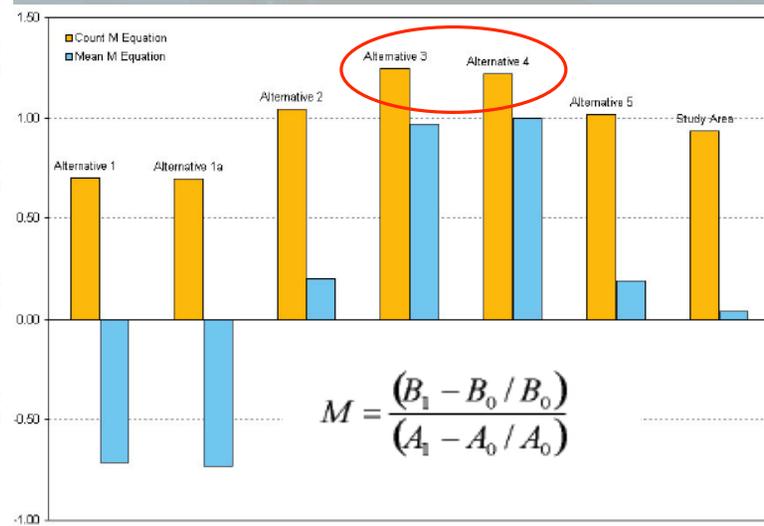
Example Analysis: Recreational Fishing Data (RECFIN)

➢ **Species Groups** Defined by Statistical Classification (Clustering)

➢ **Resulted in Groups of Species that 'Tended' to be Caught in the Same Places**

➢ **Groups Can then be Related to Site Groups Using Correspondence Analysis, Nodal Analysis or Other Forms of Ordination**

SITE GROUPS Resulted in Groups of Sites that 'Tended' to Share Common Species

SOME EXAMPLE SPECIES GROUPS

Vermilion Rockfish Group

Blue rockfish
Bococcio
Canary rockfish
Copper rockfish
Lingcod
Olive rockfish
Rosy rockfish
Starry rockfish
Widow rockfish
Yellowtail rockfish

Gopher Rockfish Group

Black rockfish
Brown rockfish
China rockfish

California Scorpionfish Group

California sheephead
Honeycomb rockfish
Ocean whitefish
Treefish

10 species assemblages and 12 site groups were identified and mapped.

Five of the 12 site groups were found south of Point Conception only.

None of the 12 site groups were found exclusively to the north, suggesting that Point Conception may be a one-way barrier for fishes in this analysis.

All 12 site groups are represented in the current Sanctuary boundaries. Therefore no expansion will add additional assemblages.

Example Analysis: Kelp Distribution
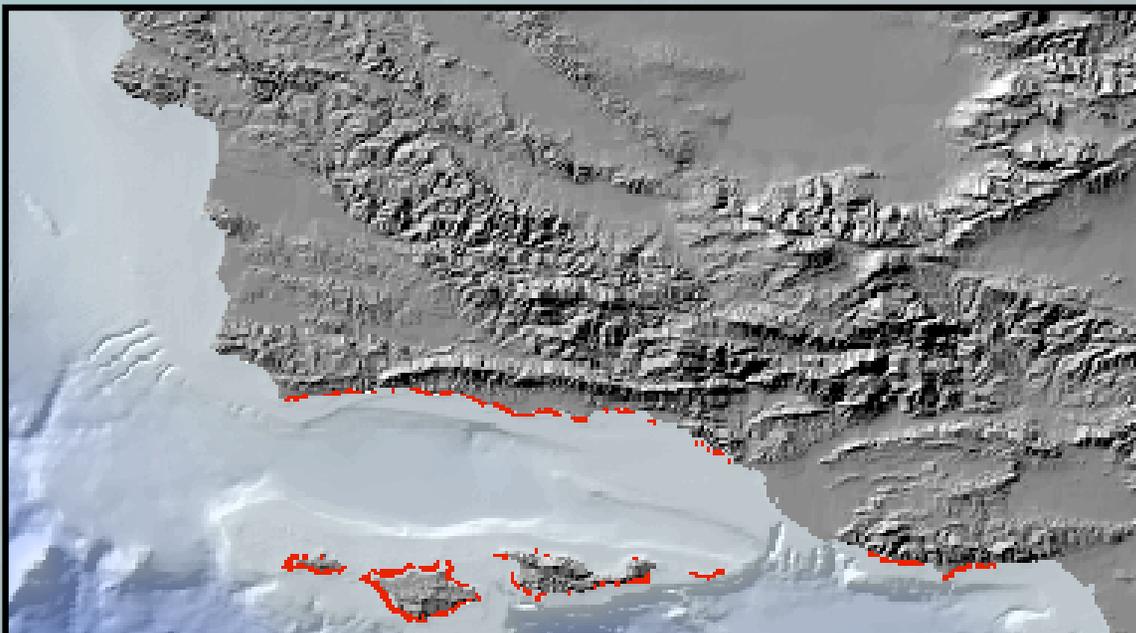
> Preliminary Analyses Suggest that Alternative 2 is the Optimal Design for Kelp

> Caveat: Analysis Done Only in 2 Dimensions

> Estimates of Kelp Distribution can be Integrated with Long-term Monitoring Data to Provide Estimates of Associated Biological Abundance......In this Case California Sheepshead

| Alternative	Kelp Count	Area (ha)	Delta Count	% Area Change	B/A Rate	Estimated CA Sheepshead
Alternative 1	1576	2313949	576	57.6	0.1114	212,760
Alternative 2	1358	1425266	358	35.8	0.1278	183,330
Alternative 3	1070	955932	70	7	0.0452	144,450
Alternative 4	1000	849839	0	0	0.0000	135,000
Alternative 5	996	439997	-4	-0.4	-0.0230	134,460
No Action	1000	374861	NA	NA	NA	135,000
Study Area	NA	NA	NA	NA	NA	NA

Task VI – Product Review

TASK SUMMARY

➢ **Completed* in December 2003**
(Scheduled completion December 2003, *first review document)

➢ **Review Products will be Rolled Out to CINMS Staff and Data Contributors as They Are Produced Rather than In One Mass Effort**
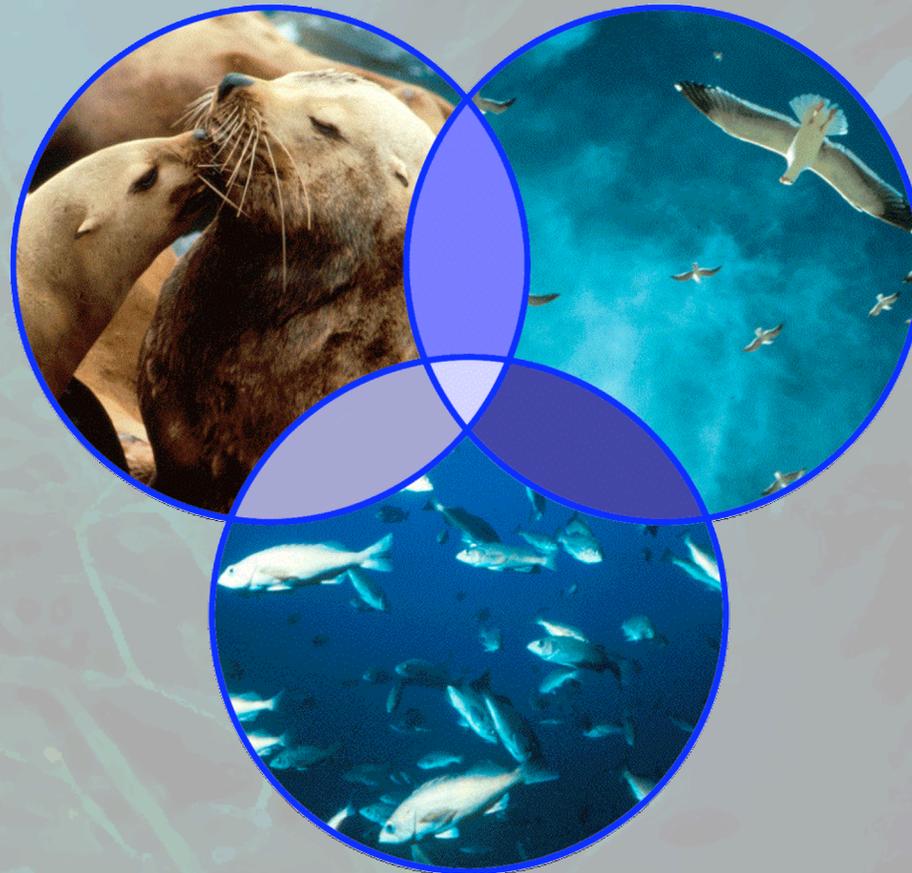
A 'Public' Review Will be Planned For Once Composite Pieces Have Been Completed and Reviewed Internally....

**MID APRIL?
SUGGESTED PARTICIPANTS?**
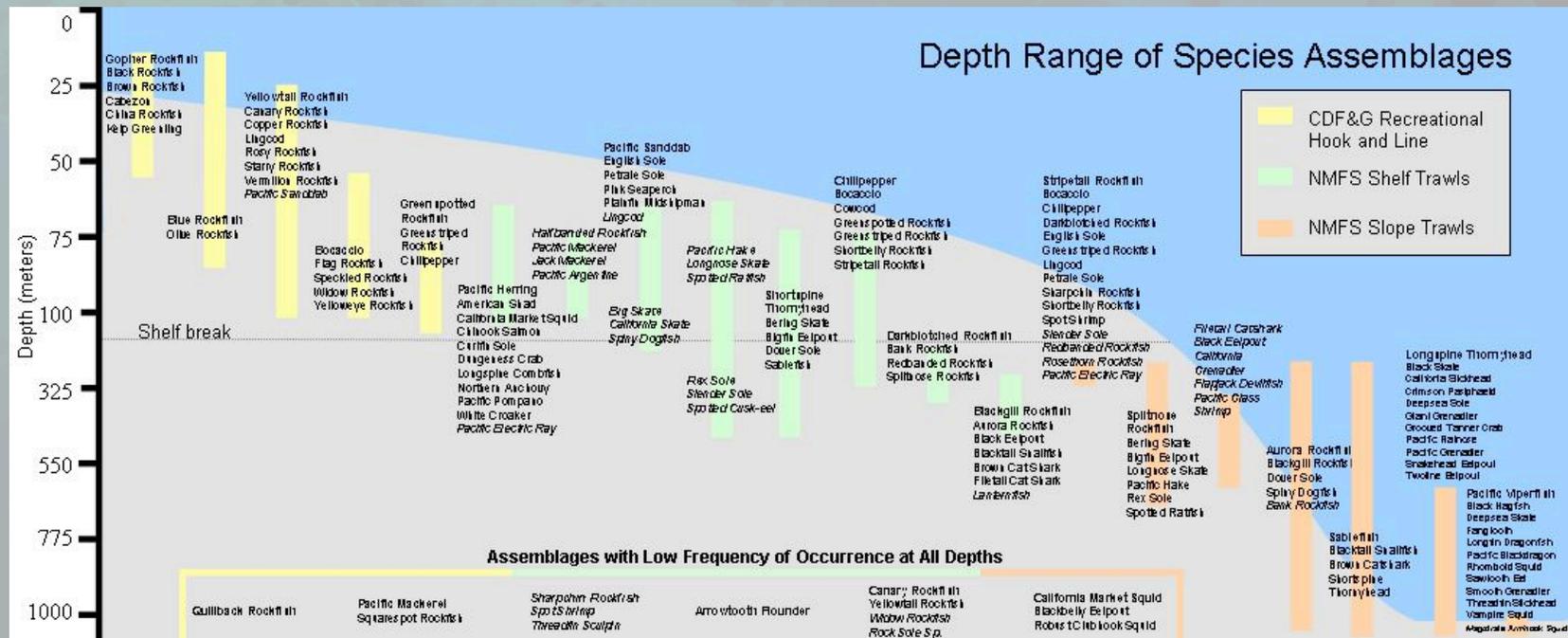
Task VII – Revision and Delivery of Final Product

Expected Completion May 31, 2004

NCCOS Personnel Contact Information

NCCOS's CINMS Project Team

Mark Monaco
Biogeography Program - Chief
Mark.Monaco@noaa.gov
(301) 713-3028, ext-160

John Christensen
Biogeogaphy Program – Project Leader
John.Christensen@noaa.gov
(301) 713-3028, ext-153

Chris Caldow
Biogeography Program – Analytical Lead
Chris.Caldow@noaa.gov
(301) 713-3028, ext-164

Tim Battista – Biological Oceanographer
Ken Buja – GIS Specialist
Randy Clark – Wildlife & Fisheries Scientist
Larry Claflin – Biostatistician
Michael Coyne – Marine Ecologist
Jamie Higgins – Physical Scientist
Chris Jeffrey – Fisheries Biologist
Olaf Jensen – Spatial Statistician
Julie Kellner – Numerical Modeler
Matt Kendall – Fisheries Ecologist
Moe Nelson – Fisheries Biologist
Marcia Orencia – Editor
Jenny Waddell – Marine Affairs Specialist