

# Agenda

## *California Marine Habitat Mapping Task Force to Coordinate Multi-Agency Mapping of the California Continental Shelf*

Goal: Develop a multi-agency coordinated strategic plan for mapping and producing a comprehensive GIS database for California continental shelf habitats.

**January 20, 2000**

**8:00-9:00 Registration and Continental Breakfast**

**9:00-10:45 Welcome and Overview (Plenary)**

Workshop goals and objectives – Rikk Kvitek, CSUMB

Overview of approaches to marine habitat mapping – Rikk Kvitek, CSUMB

Need for a universal habitat classification scheme – Gary Greene, MLML

Role of NOAA Hydrographic Survey Division in habitat mapping –  
Sam De Bow, NOAA

Presentation of pre-workshop survey results – Amanda Green, CSUMB

Review workshop process – Tim Goodspeed, NOAA Special Projects

Break into Groups

**10:45-11:00 Coffee Break**

**11:00-12:00 Part 1. Determine Habitat Mapping Locations and Needs  
(Northern, Central, and Southern Regional Groups)**

Review and discussion of marine habitat information needs and holdings in region

**LUNCH**

Overview of joint USGS/NMFS initiative and goals for marine habitat mapping – Peter Barnes, USGS

Overview of joint NOAA/ESA development of marine habitat classification scheme - Mary Yoklavich, NMFS

**1:00-2:30 Part 1. (Continued)**

**2:30-2:45 Coffee Break**

**2:45-4:00 Part 2. Review Habitat Mapping Locations and Needs Identified  
in Part 1 (participants choose regional group)**

Review results from Part 1

Identify any additional marine habitat information needs and holdings in region

**4:00-5:00      Part 3. Identify Priority Habitat Mapping Locations**

Participants review results from all regions (individually)

Determine priority locations for marine habitat mapping

**5:00-6:00      Buffet Dinner**

**6:00-9:00      Evening Reception – Industry Night**

**January 21, 2000**

**8:00-9:00      Breakfast**

**9:00-9:30      Review Day One Results (Plenary)**

Review group results

Discuss day two plans

**9:30-10:45      Part 4. Data Sharing, Developing a Habitat Classification Scheme, and Proposed Action Plan Outline (Plenary)**

Considerations for establishing and maintaining data sharing protocols – Mary Tsui, Land Systems Group

A proposed marine habitat classification scheme – Gary Greene, MLML

**10:45-11:00      Coffee Break**

**11:00-12:00      Part 5. Define and Adopt a Marine Habitat Classification Scheme and Develop an Agreement for Data Sharing between Task Force Members (Groups)**

Define and adopt a marine habitat classification scheme (group 1)

Develop an agreement for data sharing between Task Force members (group 2)

**LUNCH**

**1:00-3:00      Continue Breakout Groups**

**3:00-3:30      Next Steps**

California Marine Habitat Task Force Meeting  
January 20-21, 2000  
Attendee List

### Task Force Personnel

Name	Affiliation	Email
Rikk Kvitek	CSUMB	Rikk_kvitek@monterey.edu
Gary Greene	MLML	greene@mlml.calstate.edu
Amanda Green	CSUMB	Amanda_green@monterey.edu
Tim Goodspeed	NOAA Special Projects	Tim.goodspeed@noaa.gov
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Todd Jacobs	NOAA Special Projects	Todd.jacobs@noaa.gov

### Attendees

Name	Affiliation	Email
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Bob Barminski	CAP Rock	
Peter Barnes	USGS	pbarnes@octopus.wr.usgs.gov
Greg Benoit	CA Coastal Commission	Gbenoit@coastal.ca.gov
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Ivan Butler	NMFS	
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Mike Carron	NAVO	carronm@navo.navy.mil
Guy Cochrane	USGS	gcochrane@usgs.gov
Sam De Bow	HSD/NOS	Sam.Debow@noaa.gov
Andrew DeVogelaere	MBNMS	andrew.devogelaere@noaa.gov
Cathy Dickenson	Dickenson Foundation	Not available
Bob Embly	NOAA/PMEL	Robert.W.Embley@noaa.gov
Larry Espinosa	OSPR/DFG	lespinos@ospr.dfg.ca.gov
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Rick Fletcher	OCNMS	
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Jim Gardener	USGS	jim@octopus.wr.usgs.gov
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Bill Gilmour	RACAL	
Gary Greene	MLML	greene@mlml.calstate.edu
Churchill Grimes	NMFS	churchill.grimes@noaa.gov
Jochen Halfar	EDF	
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Ray Highsmith	NURP	highsmith@ims.alaska.edu
Randy Imai	DFG-OSPR	rimai@ospr.dfg.ca.gov
K. Halimeda Kilbourne	USGS	kkilbourne@usgs.gov
Paul Kruger	CAP Rock	
Peter La Civita	USACE	

Doug Lockhart	RACAL	
Aileen Loe	Cal Trans	aileen_loe@dot.ca.gov

Milton Love	UCSB	love@lifesci.ucsb.edu
Larry Mayer	Hydrographic Center (JHC)	Not available
Ron McDowell	Dickenson Foundation	Not available
Dallas Meggitt	Natural Resources Consultants	dmeeggitt@earthlink.net
Jim Oakden	MLML	
Lee Otter	CCC	
Monica Parisi	CDFG CWHR	Mparisi@dfg.ca.gov
Richard A. Pickrill	Geological Survey of Canada	pickrill@agc.bio.ns.ca
George Robertson	Orange County Sanitation	Grobertson@oscd.com
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Deidre Sullivan	MATE	deidres@marinetech.org
Mario Tamburri	Sanctuary/MBARI	
Lu L. Tan	MMS	lu.tan@mms.gov
James Thomas	NOAA	
Mary Tsui	Land Systems Group	mtsui@landsystemsgroup.com
Dan Urbin	Alaska DFG	
David VenTresca	CDF&G	dventres@dfg.ca.gov
Waldo Wakefield	NOAA/NMFS	Waldo.Wakefield@noaa.gov
Nancy Wright	DFG marine region	nmwright@dfg.ca.gov
Mary Yoklavich	NOAA/NMFS-SWFSC	mary@tib.nmfs.gov

If information is missing or incorrect, please contact the webmaster at:





## **CALIFORNIA MARINE HABITAT TASK FORCE**

ESSP/SIVA • CSU-MONTEREY BAY • 100 CAMPUS CENTER • SEASIDE, CA 93955

Dear Superman,

You are cordially invited to the California Marine Habitat Task Force Meeting, sponsored by California Department of Fish and Game, National Ocean Services Special Projects Office, and National Marine Fisheries Service. This meeting is a landmark event designed to be the first stage in creating a multi-agency cooperative aimed at producing a comprehensive habitat map of the California continental shelf. In designing this meeting, we have attempted to include those agencies and organizations with a vested interest in mapping these marine habitats. Within those organizations, we have sought to identify the most qualified experts to attend the meeting. You have received this invitation because your participation is crucial to provide valuable input and to represent the needs of your organization. Travel expenses and per diem will be provided by the sponsors if case your institution does not have a budget to cover them. We will be finalizing the list of attendees on November 10th and space is limited, so please respond quickly to ensure your participation. After the attendee list is finalized, I will be sending you a second announcement with a detailed agenda and instructions for compiling the types of information you will need to bring to the workshop. We look forward to your participation. Feel free to call me if you have any questions.

Sincerely,

Amanda Green

Conference Coordinator

Email: [amanda\\_green@monterey.edu](mailto:amanda_green@monterey.edu)

Phone: (831)582-4687



## CALIFORNIA MARINE HABITAT TASK FORCE

ESSP/SIVA • CSU-MONTEREY BAY • 100 CAMPUS CENTER • SEASIDE, CA 93955

November 23, 1999

Dear Task Force Participant,

I would like to thank you again for your willingness to represent your institution's interests at the first California Marine Habitat Task Force Strategic Planning Meeting on January 20-21, 2000. Attached please find the draft meeting agenda along with the survey sheets and reference maps designed to assess your institution's mapping needs and data holdings. More information and updates about the meeting can be found at the Task Force web site: <http://skyler.monterey.edu/~cahabmap>.

To insure the success of, and your participation in, the Task Force Strategic Planning Meeting, we must receive the information on your institution's data needs, selection criteria and holdings no later than **December 15, 1999**. Our plan is to compile this information into maps and tables in advance of the January meeting that will show the distribution of existing or planned data sets as well as the areas where data is most needed. These summaries will be used to perform a data gap analysis that will be presented at the beginning of the meeting and used to focus our discussions on setting mapping priorities and data sharing. This advance work on the part of each of the participants is essential if we are to achieve the goals of the meeting in just two days. Participants outside of California can use the enclosed information as the framework for the task force meeting.

By marine habitat mapping we mean spatial quantification of those physical parameters of greatest value in defining seafloor habitat (e.g. depth, substrate type, slope, and aspect). These data can then be classified according to the marine habitat classification scheme we will be discussing at the January meeting. Examples of various marine habitat GIS products for the Big Creek Marine Reserve can be viewed on the California Marine Habitat Task Force web site. Additional information on the theory, methods and considerations of resolution and scale for marine habitat is also available on the web site.

Following are the instructions for using and completing the enclosed survey material templates. These materials are also being emailed to you as attachments should you wish to use them in electronic form. We are using the long established 10' x 10' fishing blocks (see enclosed maps) as a way to define areas of interest and data holdings. Use the enclosed forms and maps as templates that can be copied and filled out as needed.

We need **four** different sets of information from each Task Force member representative relating to Data Needs and Data Holdings. (Remember, as a Task Force participant you are representing your agency or institutional interests.)

- ◆ The criteria that you set and used for selecting and ranking sites for habitat mapping.
- ◆ List of top 10 sites in rank order for your institution's habitat maps needs.
- ◆ **ONE** completed Data Needs Worksheet for **EACH** area for your institution's habitat maps needs, along with **ONE** set of regional maps that illustrates the total needs.
- ◆ **ONE** completed Data Holdings Worksheet for **EACH** area for which your institution has or will be collecting habitat mapping data, along with **ONE** regional set of maps that illustrates the total holdings of your organization.

Thank you again, and please feel free to contact me if you have any questions. I look forward to seeing you in January.

Regards,  
Amanda Green  
California Marine Habitat Task Force Coordinator

## **DATA NEEDS**

### **Ranking Criteria List**

Start by listing all the reasons why you might want to have a site mapped. The following examples are not presented in any particular order, and we encourage you to modify and add other criteria to this list. Please include this list in the material you send to us.

Areas of use conflict

Areas of multiple use (potential conflict)

Designated Areas (special use, harvest areas, reserves, preserves, sanctuaries, etc.)

Significant natural areas (areas known to be of unique or important natural value, but not having any official or political designation)

High use areas (rank according to user distribution and concentration)

DFG current management priorities

Areas of high profile political interest

Area used by species of special interest or concern

Availability of existing habitat data

### **Applying Ranking Criteria to Fishing Block Maps**

Once you have agreed upon the ranking criteria with your colleagues, you are ready to apply these criteria to the enclosed maps showing the grid of numbered fishing blocks. We have provided you with one set of hard copy maps of the three California regions (northern, central and southern). Make several copies of these maps (as appropriate to your region/s of interest) to use as scratch sheets as you go through the scoring process.

We recognize that your areas of interest may be larger or smaller than a fishing block, and this fact can be addressed on the Data Needs Worksheet. Here, we just want to identify what the geographic distribution of mapping needs are. To weight the blocks according to your criteria, place one check in each block for each of the criteria that apply. (A block may theoretically contain up to as many checks as there are ranking criteria.)

### **Completing Data Needs Worksheet**

Start by making several copies of the blank worksheet and map templates included with this package. Then, for each specific area that your institution needs to have habitat maps for, complete one Data Needs Worksheet, describing WHERE, WHY, WHAT and HOW, and WHEN this mapping should be done. Mark and label each of these areas on copies of the enclosed maps. Note: Only one "data needs map" needs to be turned in for each region (Northern, Central, and Southern) that your organization is interested in. You do not need a new map for each new worksheet.

### **Selecting & Ranking Top 10 High Priority Sites for Habitat Mapping**

Once you have identified, described and marked each of your areas of mapping interest, list in **RANK ORDER** your **TOP TEN** high priority sites for mapping.

**DATA HOLDINGS**

The results from the Data Holdings Worksheets will be compared with those from the Data Needs Worksheets to identify areas of overlap for data sharing and new data acquisition.

**Completing Data Holdings Worksheet**

Start by making several copies of the blank Data Holdings Worksheet and map templates included with this package (the map templates are the same as for the data needs). Then, for each specific area for which your institution has existing habitat, substrate or multibeam bathymetry data, or plans for obtaining those data, complete one Data Holdings Worksheet, describing WHERE, WHY, WHAT, HOW and WHEN this mapping was/will be done. As with the Data Needs Worksheets, mark and label each of these areas on copies the enclosed maps. Note: Only one “data holdings map” needs to be turned in for each region (Northern, Central, and Southern) that your organization is interested in. You do not need a new map for each new worksheet.

**Return the completed maps and forms by December 15th to:**

Amanda Green - Habitat Task Force Coordinator  
CSUMB ESSP/SIVA  
100 Campus Center  
Seaside, CA 93955  
Phone: 831-582-4687  
Fax: 831-582-3073  
Email: [amanda\\_green@monterey.edu](mailto:amanda_green@monterey.edu)

Marine Habitat Data **Needs** Worksheet

Worksheet \_\_\_\_ of \_\_\_\_

Your Name: \_\_\_\_\_  
 Institution Name: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Data Contact: \_\_\_\_\_  
 Phone Number: \_\_\_\_\_  
 Email: \_\_\_\_\_

Fill out one worksheet for each area of interest (see instructions).

**Where** should mapping be done? (shade cells or draw the area on copies of the attached maps)

Site name: \_\_\_\_\_

General location: \_\_\_\_\_

Priority: ☐ **High** (high need to complete within 1-2 years)

☐ **Medium** (complete within next 2-5 years)

☐ **Low** (complete within 5-10 years)

Approximate size of area mapped (Sq. miles) \_\_\_\_\_

Water depth range (ft): minimum depth \_\_\_\_\_ ft maximum depth \_\_\_\_\_ ft

Block number(s) that cover the proposed area (from attached maps) \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**Why** should mapping be done? (use back of page as needed)

Ranking criteria that apply: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

Species or resources of concern: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

Management issues of concern: \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

How would the mapped data be used? \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

**What** habitat parameters should be mapped?

bathymetry                      substrate type

**How** finely should this site be mapped? (resolution & scale)

What is the smallest habitat "patch" size you need to identify on your map? (e.g. every rock larger than 1x1 ft, or rocky reefs greater than 500 x 500 ft)

\_\_\_ 1 x 1 ft      \_\_\_ 10 x 10 ft      \_\_\_ 100 x 100 ft      \_\_\_ 1000 x 1000 ft      \_\_\_ other \_\_\_\_\_

Please explain your choice (use back of page as needed):

Marine Habitat Data **Holdings** Worksheet

Worksheet \_\_\_\_ of \_\_\_\_

Your Name: \_\_\_\_\_

Institution Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Data Contact: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Email: \_\_\_\_\_

Fill out one worksheet for each coverage (see instructions).

**Where** has/will mapping be(en) done? (shade cells or draw the area on copies of the attached maps)

Site name: \_\_\_\_\_

General location: \_\_\_\_\_

Approximate size of area mapped (Sq. miles) \_\_\_\_\_

Water depth range (ft): minimum depth \_\_\_\_ ft maximum depth \_\_\_\_ ft

Block number(s) that cover the data set (from attached maps) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_**Why** was/will mapping (be) done? (use more space as needed)

Species or resources of concern: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Management issues of concern: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

How has/will the mapped data be(en) used? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**What** habitat parameters were/will be mapped?

bathymetry

substrate type

**How** are/will data (be) formatted, are/will they (be) accessible to others, and how were/will they (be) acquired?

\_\_\_ Digital

\_\_\_ Web Accessible

\_\_\_ Sidescan-Single Line

(Describe) File

\_\_\_ CD

\_\_\_ Sidescan - Mosaic

Size, GIS Format

\_\_\_ Disk

\_\_\_ Multibeam – Single Line

\_\_\_\_\_

\_\_\_ Not available

\_\_\_ Multibeam - Mosaic

\_\_\_\_\_

\_\_\_ Cost \$ \_\_\_\_\_

\_\_\_ Seismic Reflection Profiles

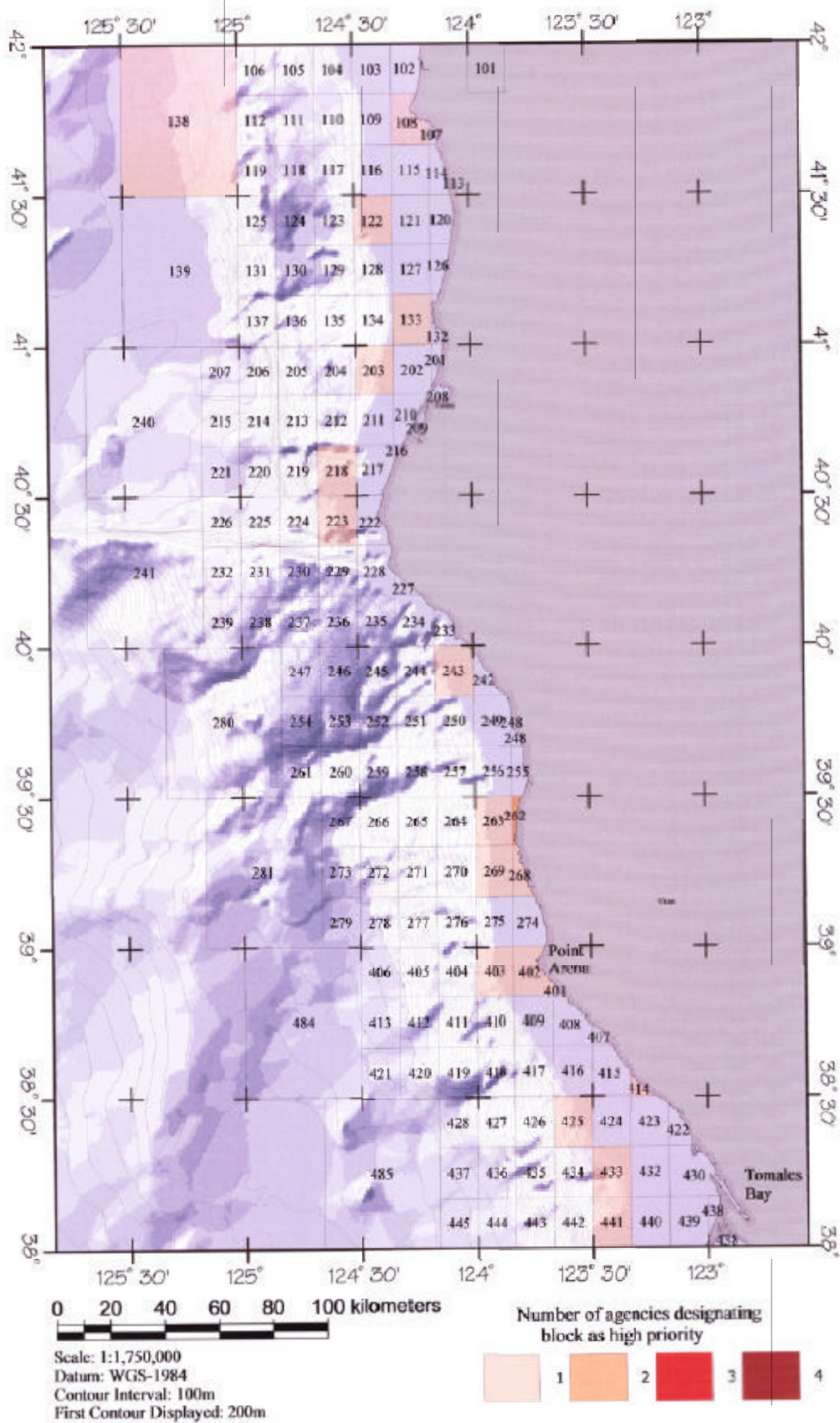
\_\_\_ Hardcopy only

**When** were/will data (be) acquired? \_\_\_\_\_ (mmyy) through \_\_\_\_\_ (mmyy)

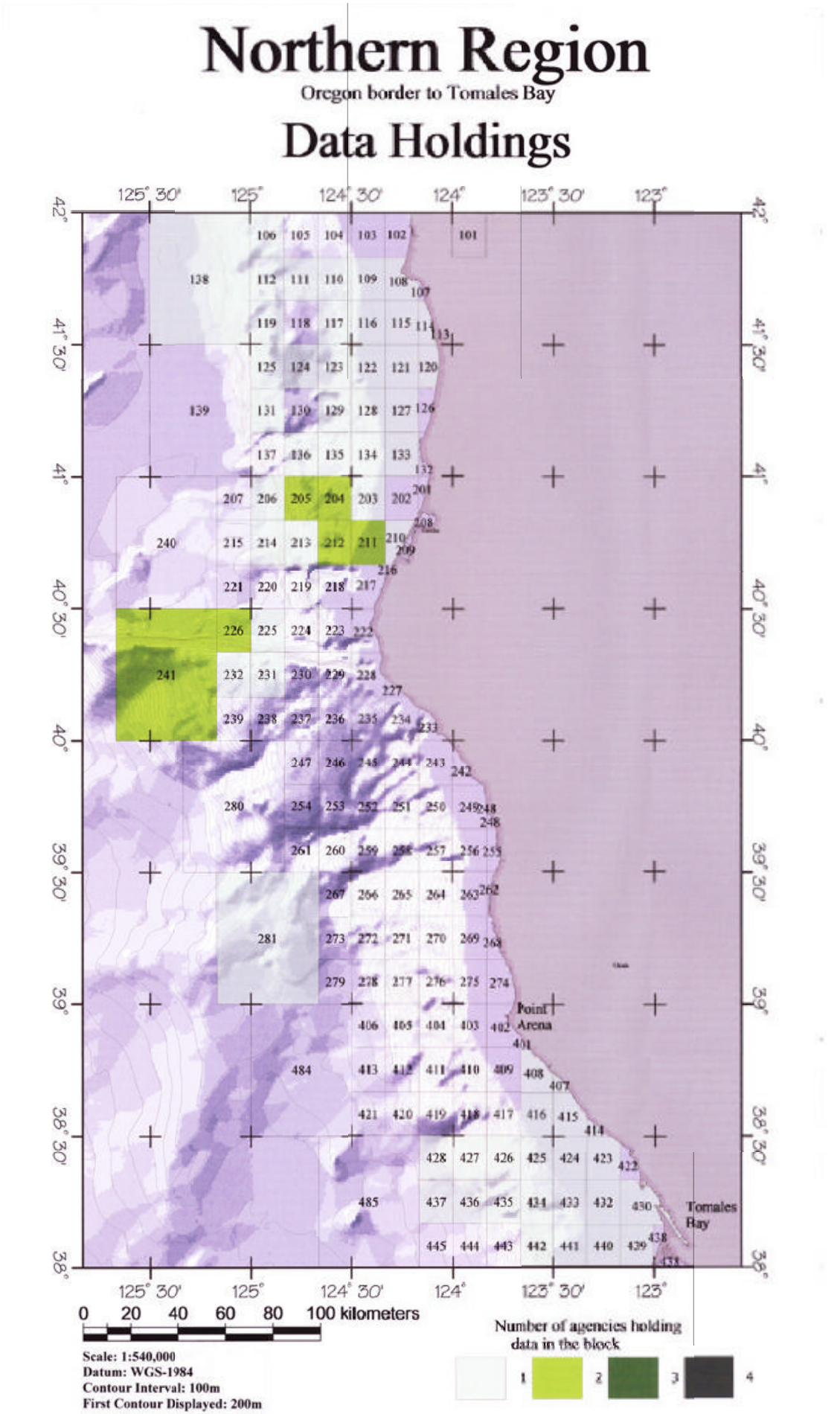
Northern Region

Oregon border to Tomales Bay

High Priority Data Needs





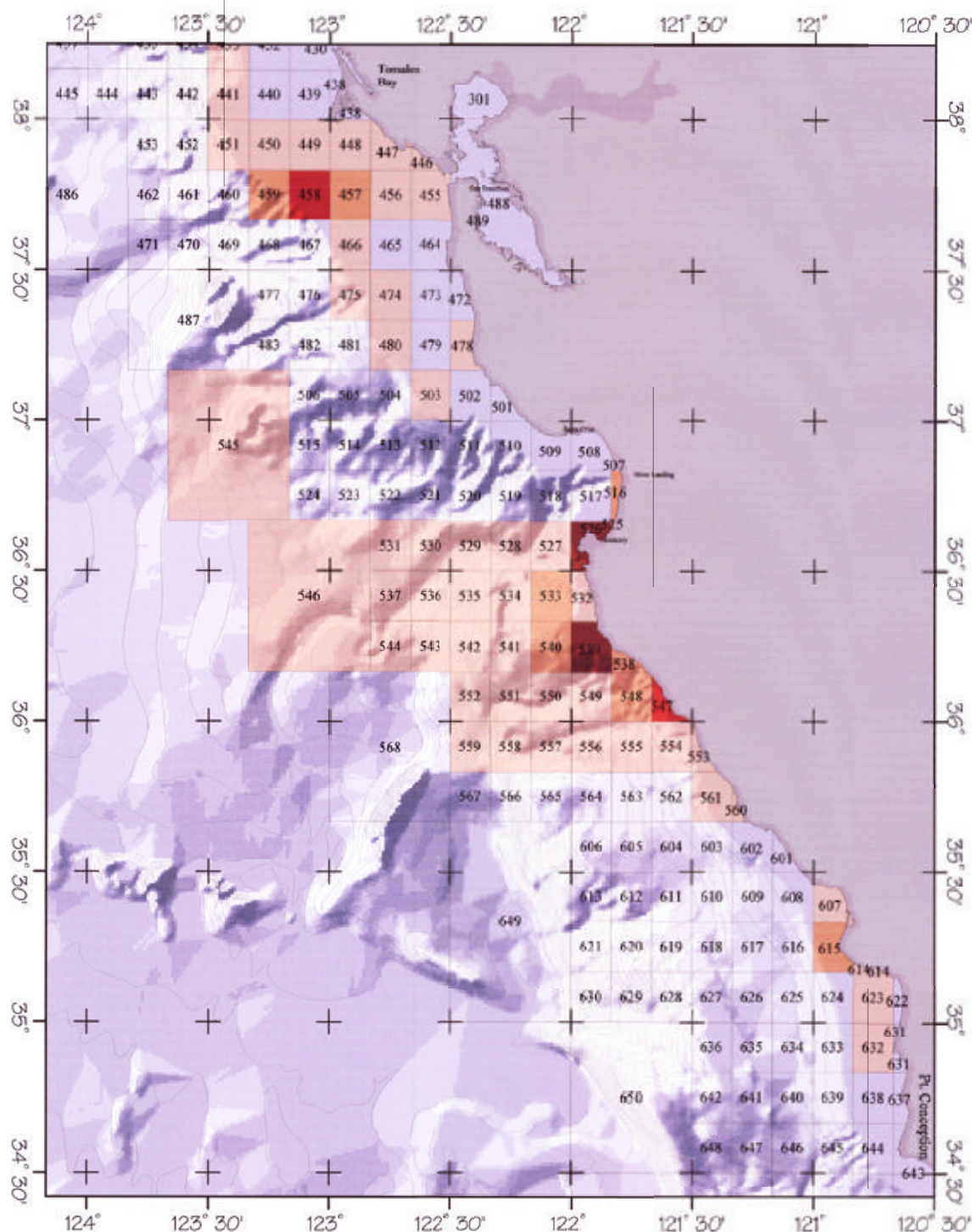




# Central Region

## Tomales Bay to Point Conception

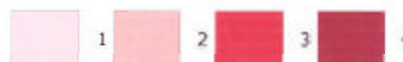
### High Priority Data Needs



0 20 40 60 80 100 kilometers

Scale: 1:1,750,000  
Datum: WGS-1984  
Contour Interval: 100m  
First Contour Displayed: 200m

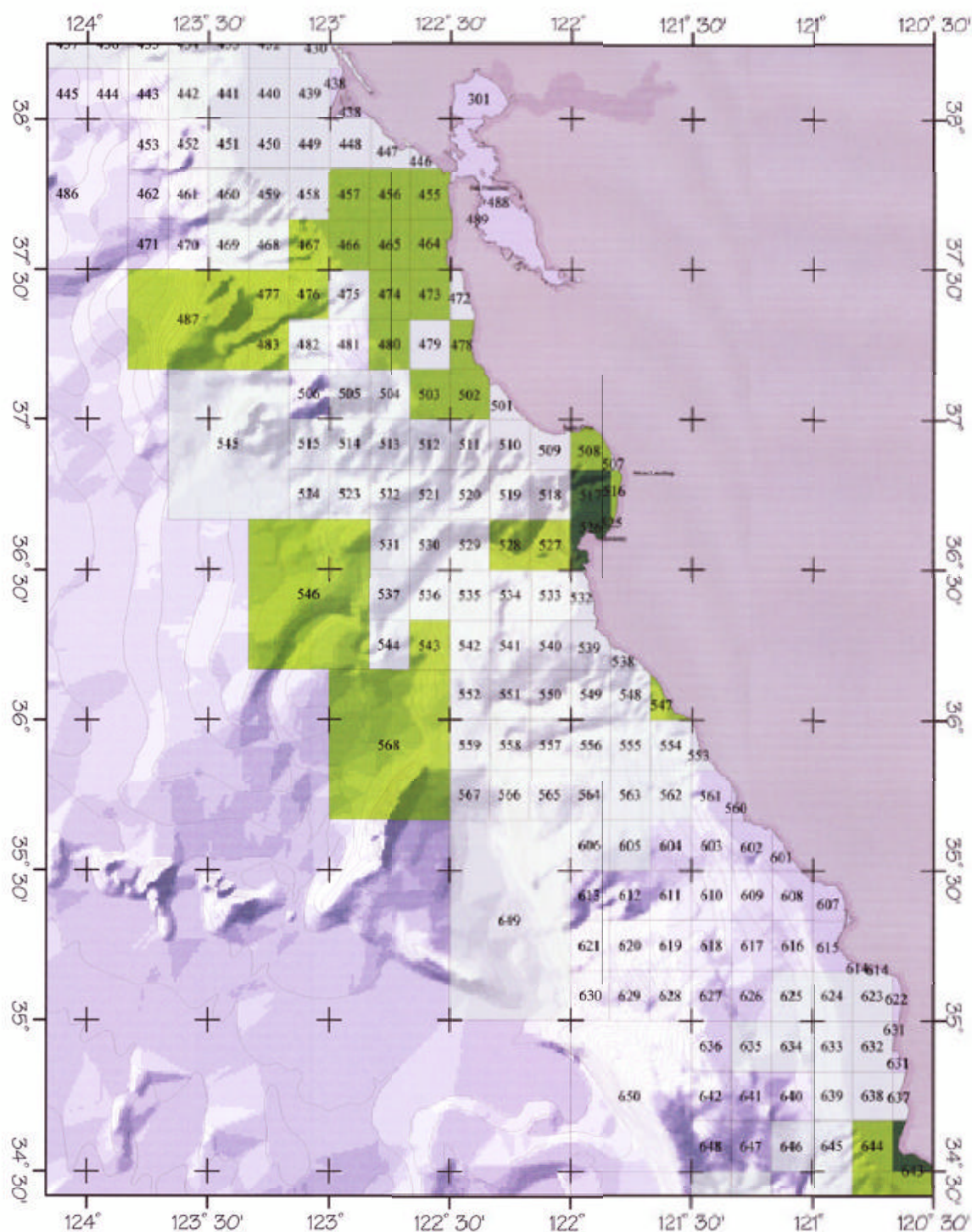
Number of agencies designating block as High Priority



# Central Region

Tomales Bay to Point Conception

## Data Holdings



0 20 40 60 80 100 kilometers

Scale: 1:540,000

Datum: WGS-1984

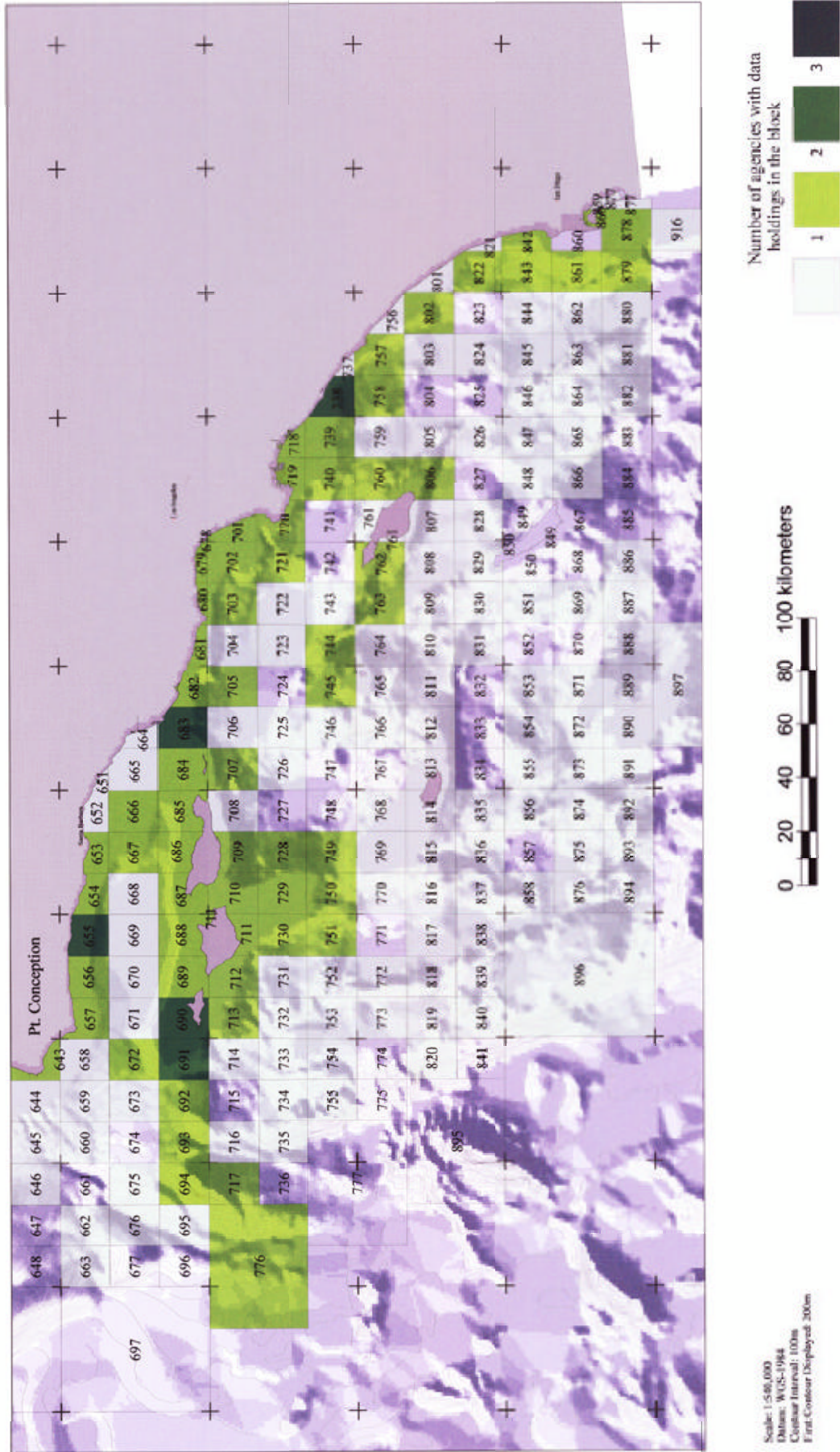
Contour Interval: 100m

First Contour Displayed: 200m



# Southern Region - Data Holdings

Point Conception to Mexican border



## Pre-workshop Results: Raw NEEDS Data

<b>Block Number(s):</b>	122,203,218,223,243,403,425,433,441,451,458,466,474-475, 478,480,503,526,533,539,540,561,607,615,623,632,684,685,690,702,719,739,740,861,871,872,890,897
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	20m to 300m
<b>Ranking Criteria (needs):</b>	area is used by species of concern, area is used by commercial and recreational fishery, some areas could be considered as habitat areas of particular concern.
<b>Species/Resource of Concern:</b>	rockfishes, lingcod
<b>Management Issues of Concern:</b>	overfishing of groundfish stocks, impacts of fishing gear on habitats, use conflicts
<b>How Would Mapped Data Be Used:</b>	to improve stock assessments, to identify areas of particular concern, to identify areas that are appropriate for no-take reserves
<b>Bathymetry:</b>	Yes
<b>Substrate Type:</b>	Yes
<b>Resolution and Scale:</b>	1, 10, 100, 1000ft
<b>Institution:</b>	NMFS

<b>Block Number(s):</b>	446,456,464-466,472, 475,478-480,501-504,507-513,516-522,526-530,532-536,538-542,547-551,553-557,560-562,602-604
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Low- because of size, not importance
<b>Water Depth:</b>	1m to 3000m
<b>Ranking Criteria (needs):</b>	Designated area of significant natural value, multiple & high use
<b>Species/Resource of Concern:</b>	several
<b>Management Issues of Concern:</b>	/
<b>How Would Mapped Data Be Used:</b>	to better monitor & manage the MBNMS
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	vary
<b>Institution:</b>	MBNMS

<b>Block Number(s):</b>	538-539,547-548
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	1ft to 100ft
<b>Ranking Criteria (needs):</b>	Designated area of significant natural value
<b>Species/Resource of Concern:</b>	intertidal & subtidal communities
<b>Management Issues of Concern:</b>	Cal Trans road work and slides into the sea
<b>How Would Mapped Data Be Used:</b>	better monitoring and management of slide areas, comparison of natural and human caused changes
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	10
<b>Institution:</b>	MBNMS

<b>Block Number(s):</b>	526
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	1ft to 100ft
<b>Ranking Criteria (needs):</b>	Designated area of significant natural value, multiple & high use
<b>Species/Resource of Concern:</b>	several
<b>Management Issues of Concern:</b>	Natural versus human caused changes to resources
<b>How Would Mapped Data Be Used:</b>	better monitor and manage
<b>Bathymetry:</b>	yes

<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	10
<b>Institution:</b>	MBNMS

<b>Block Number(s):</b>	518,527-530,536,537,546
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	1000ft to 4000ft
<b>Ranking Criteria (needs):</b>	Designated area of significant natural value, very little is known about the deep sea habitats
<b>Species/Resource of Concern:</b>	several
<b>Management Issues of Concern:</b>	/
<b>How Would Mapped Data Be Used:</b>	better monitor and manage
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	100
<b>Institution:</b>	MBNMS

<b>Block Number(s):</b>	516
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	1ft to 20 ft
<b>Ranking Criteria (needs):</b>	Designated area of significant natural value, multiple & high use
<b>Species/Resource of Concern:</b>	several
<b>Management Issues of Concern:</b>	Natural versus human causes of change
<b>How Would Mapped Data Be Used:</b>	better monitor and manage
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	10
<b>Institution:</b>	MBNMS

<b>Block Number(s):</b>	457-459
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	6ft to 600 ft
<b>Ranking Criteria (needs):</b>	Very little mapping has been done in the near-shore environment of the Farallon Islands, yet this area is a principal fishing area and serves as a nursery ground for numerous fisheries, avian species, and marine mammals. A better understanding and detailed mapping of this environment is an essential element to its management and on-going research activities in this location.
<b>Species/Resource of Concern:</b>	rockfish, marine mammals, marine avian species, highly migratory fisheries, etc.
<b>Management Issues of Concern:</b>	Significant fishing grounds, nursery area, and refugia, very little to no near-shore mapping has been done here.
<b>How Would Mapped Data Be Used:</b>	Fishery independent data can be combined w/ mapping to look at hab & pop assessments.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes- +seabed morph., slope, aspect, rugosity, grain size, surface sed. depth
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	526
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0ft to 100ft

<b>Ranking Criteria (needs):</b>	Highly utilized by divers, researchers, fishermen, tourists, students, MB Aquarum, Hopkins. Deeper than 30m already mapped. Poss. no take area. Poss. partnerships/leverage Dept. funds.
<b>Species/Resource of Concern:</b>	nearshore rockfish
<b>Management Issues of Concern:</b>	Multi-user conflict
<b>How Would Mapped Data Be Used:</b>	To enhance research and provide products to assist in managing fisheries. Fish counts can be stratified based on habitat type.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes +seabed morphology, slope , aspect, rugosity, sediment grain size, surface sediment depth
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	539
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	132ft to 252ft
<b>Ranking Criteria (needs):</b>	Large offshore rocky hab. supports sport and commercial fisheries. Submersible data available for groundtruthing. Some has been mapped. Mary Y. should be contacted prior to additional mapping.
<b>Species/Resource of Concern:</b>	Rockfish (bocaccio) and lingcod - both PFMC threatened
<b>Management Issues of Concern:</b>	Rockfish densities/habitat associations are available from submersible surveys and species composition information is available from site specific recreational fishery sampling. By incorporating habitat mapping with available data this will allow biomass estimates for rockfish and lingcod to be obtained enhancing our mgmt of central CA fisheries.
<b>How Would Mapped Data Be Used:</b>	Sustainability of commercial and recreational fisheries in the area
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology, slope ,rugosity, sediment grain size, surface sediment depth
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	547
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0ft to 150ft
<b>Ranking Criteria (needs):</b>	The offshore areas to BCER have recently been extensively mapped. The missing components are the nearshore areas to the north and south of BCER. With this additional mapping, fished and unfished areas could be studied for this region. The desired substrate/habitat classifications would be: rock(relief, boulder/flat), cobble, sand. The mapping scale/resolution should be at least 10m and preferably 1m.
<b>Species/Resource of Concern:</b>	nearshore rockfish
<b>Management Issues of Concern:</b>	Multi-user conflict
<b>How Would Mapped Data Be Used:</b>	Fish counts will be stratified based on habitat type
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology, slope, aspect, rugosity.
<b>Resolution and Scale:</b>	10
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	615
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	30ft to 150ft
<b>Ranking Criteria (needs):</b>	This is an important area for both the commercial nearshore and the recreational hook-and-line fishery.

<b>Species/Resource of Concern:</b>	Nearshore fish included in "Live fish fishery" and nearshore sport fishery
<b>Management Issues of Concern:</b>	Sustainable catches
<b>How Would Mapped Data Be Used:</b>	Mapping associated with diving surveys, would identify habitat quality that could be related to fish population density. Catch estimates could then be related to estimates of total abundance.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes+seabed morphology, rugosity
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	448-449
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0ft to 90ft
<b>Ranking Criteria (needs):</b>	The area is currently a reserve, and although technically only recreational fishing is prohibited, it functions as a de facto complete no-take area. As such it is a valuable study for comparison to other exploited areas with similar habitat. The area is also an Area of special Biological Significance and a National Park Research Natural Area.
<b>Species/Resource of Concern:</b>	Invertebrates, marine mammals, marine birds
<b>Management Issues of Concern:</b>	Illegal take within reserve area and fishing effects on reserve perimeter. Would be a good candidate for reserve expansion as nearshore fishing pressure increases in future.
<b>How Would Mapped Data Be Used:</b>	The granitic headland is greatly influenced by both climatic and oceanographic conditions. Jutting into the ocean at the northern edge of the Gulf of the Farallons, an unique blend of conditions creates a highly productive habitat. However, kelp beds, which are common to the North and South, are lacking here. The area has served as a baseline no-take area for almost three decades. Comparisons to similar exploited habitat types may yield allowable catch estimates for Fishery Mgmt Plans based on available habitat/biomass estimates for fish and invert stocks.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology slope, aspect, rugosity, algal cover.
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G Central

<b>Block Number(s):</b>	472,478
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	6ft to 240ft
<b>Ranking Criteria (needs):</b>	Little is known about the habitat in the near-shore areas of San Mateo County, yet this area is an important fishing area for both vertebrate and invertebrate species. It also provides habitat for numerous marine mammals and seabirds.
<b>Species/Resource of Concern:</b>	Abalone, rockfish, marine mammals, marine avian species including migratory and residential species, surfperch and kelp.
<b>Management Issues of Concern:</b>	Significant fishing grounds and very little if any near-shore mapping has been done here.
<b>How Would Mapped Data Be Used:</b>	The mapping efforts could be used to estimate the extent of various habitat types (eg., kelp beds, sandy bottom, reefs) at various depth ranges. These estimates + fishery independent data can be used to estimate the potential habitat available for stocks that are being rebuilt, as well as population estimates.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology, slope, aspect, rugosity, sediment grain size
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	473
<b>Needs/Holdings:</b>	Needs

<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	180ft to 280ft
<b>Ranking Criteria (needs):</b>	Within Deep Reef, this is the area most frequently fished by the Princeton CPFF fleet that Deb's project has monitored during the last eleven years. It also appears to be among the most productive areas in this depth range in central California. It has sustained a relatively high catch rate for rockfishes, particularly yellowtail, during that time. The mean length of sampled yellowtail rockfish in the general Deep Reef area has shown a remarkable consistency over time.
<b>Species/Resource of Concern:</b>	Rockfishes and lingcod
<b>Management Issues of Concern:</b>	Sustainability of commercial and recreational fisheries in the area
<b>How Would Mapped Data Be Used:</b>	If we could obtain submersible observations of species/habitat associations and densities of benthic oriented rockfishes, we could obtain biomass estimates for some species of nearshore rockfishes for use in improving the Nearshore Species Fishery Management Plan.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology, slope, rugosity
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	518
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	300ft to 600ft
<b>Ranking Criteria (needs):</b>	This is an important commercial and recreational fishing area and likely habitat for bocaccio and canary rockfishes, species which are or soon will be considered as over fished by NMFS. Rebuilding plans will be required for these species. Habitat association data for these species will be essential for expediting the rebuilding of these stocks, and mapping data would contribute to our knowledge of available habitat and species-specific habitat requirements. This area is adjacent to areas already mapped by Mary Yoklavich's research project which, among other things, is documenting habitat associations for important rockfish species.
<b>Species/Resource of Concern:</b>	Rockfishes, particularly bocaccio, cowcod, and canary, and lingcod
<b>Management Issues of Concern:</b>	Sustainability of commercial and recreational fisheries in the area. Potential site for Marine Reserve, particularly in relation to protecting above species as part of NMFS-mandated rebuilding plan.
<b>How Would Mapped Data Be Used:</b>	Habitat data from mapping will be used in conjunction with location based CPFF catch data to help determine species-habitat associations.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes+seabed morphology, slope, aspect, rugosity, sediment grain size, surface sediment depth.
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	517
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	200ft to 300ft



<b>Ranking Criteria (needs):</b>	Portuguese Ledge is of historical importance in relation to commercial and recreational fisheries. This area has been fished since the late 1800's, hence name of the reef system. From the 1950's on it became an important location for CPFVs fishing out of Monterey and Santa Cruz. Historically, it was a productive area for lingcod, bocaccio, yellowtail rockfish, and a number of other species of benthic rockfishes. This area has been surveyed by the research submersible DELTA in 92 and 93. The bottom topography of this area is known to be of high relief; DELTA observations confirmed the area to be highly complex. The high biodiversity found on this deep-reef system is undoubtedly related to the biocomplexity. Data are available from DELTA surveys (14 quantitative transects plus qualitative observations), CPFV data, and historical documentation.
<b>Species/Resource of Concern:</b>	Lingcod and rockfishes. Twnty-eight species of fishes, which included 20 rockfish species, were identified from DELTA observations in 1992 and 1993. Lingcod, bocaccio, and yellowtail rockfish were dominant species.
<b>Management Issues of Concern:</b>	Address the mandate of the Magnuson-Stevens Fishery Conservation and Management Act, specifically Essential Fish Habitat.
<b>How Would Mapped Data Be Used:</b>	Incorporating habitat mapping with current and historical fishery data for this area will allow evaluation of an area that has been intensively fished for approximately 100 years.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	637
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	30ft to 150ft
<b>Ranking Criteria (needs):</b>	This is an important area for both commercial nearshore and the recreational hook -and-line fisheries.
<b>Species/Resource of Concern:</b>	Nearshore fish included in "Live fish fishery" and nearshore sport fishery.
<b>Management Issues of Concern:</b>	Sustainable catches
<b>How Would Mapped Data Be Used:</b>	Mapping associated with diving surveys, would identify habitat quality that could be related to fish population density. Catch estimates could then be related to estimates of total abundance.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes-seabed morphology, rugosity
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	F&G-central

<b>Block Number(s):</b>	683-691,706-713,728-730,749-750,744-745
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	30ft to 600ft
<b>Ranking Criteria (needs):</b>	Areas of high profile political interest, designated areas, significant natural areas, area used by species of special interest, DFG current mgmt., areas of multiple use, availability of existing habitat data.
<b>Species/Resource of Concern:</b>	CA. Mkt squid, abalone species, red sea urchin, ridgeback rock shrimp, spot prawn, CA sea cucumber, CA spiny lobster, white seabass, Dungeness crab, CA Halibut, rockfish
<b>Management Issues of Concern:</b>	A national marine sanctuary without a map of bottom habitats or information on EFH.
<b>How Would Mapped Data Be Used:</b>	To provide information on essential marine habitat for fisheries species within the sanctuary
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	10, 100
<b>Institution:</b>	Southern CA Coastal Water Research Project - Larry Cooper

<b>Block Number(s):</b>	651-657,664-667,678-691,701-703,707-713,718-721,728-730,737-740,749-751,744-745,756-758,760-763,801-802,806-808,821-822,842-843,860-861,859,877-879,916,812-815,829,849-850,871-872,889-890,866-868,897
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	15ft to 600ft
<b>Ranking Criteria (needs):</b>	Areas of multiple use, includes designated areas, significant natural areas, areas used by species of special interest or concern.
<b>Species/Resource of Concern:</b>	rockfish, flatfish, abalone, red sea urchin, Ca. Market squid, etc, etc
<b>Management Issues of Concern:</b>	Fisheries, essential fish habitat, contamination
<b>How Would Mapped Data Be Used:</b>	To provide maps of EFH for fishery species.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	100, 1000
<b>Institution:</b>	Southern Ca Coastal Water Research Project - Larry Cooper

<b>Block Number(s):</b>	526-560
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	Resolve management conflicts - manage resources to complement and coordinate/ not conflict
<b>Species/Resource of Concern:</b>	/
<b>Management Issues of Concern:</b>	mudslide repair/ highways/disposal of soil, conflicts of "soil is bad" "soil is good" in marine environment
<b>How Would Mapped Data Be Used:</b>	help direct appropriate methods for allowing sediment to enter marine environment where it is consistent w/ natural processes
<b>Bathymetry:</b>	?
<b>Substrate Type:</b>	?
<b>Resolution and Scale:</b>	?
<b>Institution:</b>	Cal Trans - Aileen Loe

<b>Block Number(s):</b>	301,455,488-489
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0ft to 400ft
<b>Ranking Criteria (needs):</b>	Multiple dredged material disposal sites, area of high political interest, Areas used by species of special interest or concern, essential fish habitat, ESA critical habitat, Significant natural area.
<b>Species/Resource of Concern:</b>	Federally listed, proposed for listing, and species of concern, as well as any critical habitat areas designated or proposed under the endangered species act.
<b>Management Issues of Concern:</b>	Management of disposal sites
<b>How Would Mapped Data Be Used:</b>	Planning purposes and evaluation and monitoring of dredged material disposal sites, and designation of disposal sites.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	10
<b>Institution:</b>	US Army Corps of Engineers - Peter LaCivita

<b>Block Number(s):</b>	469-470
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	8200ft to 9800ft

<b>Ranking Criteria (needs):</b>	Dredged Material disposal site, essential fish habitat, ESA critical habitat, designated area, significant natural area
<b>Species/Resource of Concern:</b>	Federally listed, proposed for listing, and species of concern, as well as any critical habitat areas designated or proposed under the endangered species act.
<b>Management Issues of Concern:</b>	Management of dredged material disposal sites
<b>How Would Mapped Data Be Used:</b>	As baseline data in monitoring, evaluation of dredged material disposal site, and designation of disposal sites
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	US Army Corps of Engineers - Peter LaCivita

<b>Block Number(s):</b>	210
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	150FT TO 180FT
<b>Ranking Criteria (needs):</b>	Dredged Material disposal site, essential fish habitat, ESA critical habitat, designated area
<b>Species/Resource of Concern:</b>	Federally listed, proposed for listing, and species of concern, as well as any critical habitat areas designated or proposed under the endangered species act.
<b>Management Issues of Concern:</b>	Management of disposal site
<b>How Would Mapped Data Be Used:</b>	Monitoring, site evaluation, and site designation
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	Yes
<b>Resolution and Scale:</b>	1
<b>Institution:</b>	US Army Corps of Engineers - Peter LaCivita

<b>Block Number(s):</b>	516
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	30ft to 80ft
<b>Ranking Criteria (needs):</b>	Dredged Material disposal site, essential fish habitat, ESA critical habitat, designated area, significant natural area
<b>Species/Resource of Concern:</b>	Federally listed, proposed for listing, and species of concern, as well as any critical habitat areas designated or proposed under the endangered species act.
<b>Management Issues of Concern:</b>	Management of dredged material disposal sites
<b>How Would Mapped Data Be Used:</b>	As baseline data in monitoring, evaluation of dredged material disposal site, and designation of disposal sites
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	US Army Corps of Engineers - Peter LaCivita

<b>Block Number(s):</b>	114,120,126,201-202,216-217,227,234,242,248-249,407,414-415,422-423,430,438,447,553
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0ft to 1000ft
<b>Ranking Criteria (needs):</b>	EFH, ESA critical habitat, designated area, significant natural areas, areas of high profile political interest, areas used by species of special concern, dredged material disposal sites
<b>Species/Resource of Concern:</b>	Federally listed, proposed for listing, and species of concern, as well as any critical habitat areas designated or proposed under the endangered species act.
<b>Management Issues of Concern:</b>	mgmt of disposal sites and site designation

<b>How Would Mapped Data Be Used:</b>	Planning purposes, monitoring and designation of dredged material disposal sites
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	1000ft
<b>Institution:</b>	US Army Corps of Engineers - Peter LaCivita

<b>Block Number(s):</b>	446-450,455-459
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	significant natural areas (underwater pinnacles), areas used by species of concern, areas of conflict, proximity to coastal parkland
<b>Species/Resource of Concern:</b>	rockfish, other nearshore fin fish
<b>Management Issues of Concern:</b>	Excess fishing pressures, unique and vulnerable habitat at risk, opportunity to create significant marine protected area.
<b>How Would Mapped Data Be Used:</b>	To help designate marine life reserve or protected area via marine life protection act process
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	100ft
<b>Institution:</b>	Natural Resources Defense Council - Karen Garrison

<b>Block Number(s):</b>	685-690
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	significant natural areas (underwater pinnacles), areas used by species of concern, vulnerable to human impact
<b>Species/Resource of Concern:</b>	abalone (esp. white), rockfish, sheephead, cabezon)
<b>Management Issues of Concern:</b>	overfishing
<b>How Would Mapped Data Be Used:</b>	marine life protection act
<b>Bathymetry:</b>	?
<b>Substrate Type:</b>	?
<b>Resolution and Scale:</b>	?
<b>Institution:</b>	Natural Resources Defense Council - Karen Garrison

<b>Block Number(s):</b>	262-263,268-269,516,525-526,685-690,761-762,813-814
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	Significant natural area with high habitat value in terms of species diversity and abundance, high use, potential conflict, vulnerability to pollution, storms, overfishing
<b>Species/Resource of Concern:</b>	/
<b>Management Issues of Concern:</b>	/
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	100ft
<b>Institution:</b>	Natural Resources Defense Council - Karen Garrison

<b>Block Number(s):</b>	745,765,829,850,867,871-872,889-891
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	/
<b>Water Depth:</b>	0 to 100m
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	white abalone

<b>Management Issues of Concern:</b>	identification and protection of EFH
<b>How Would Mapped Data Be Used:</b>	Location of optimal hab. for white abalone and possible collection for captive breeding program. Future plans include locating areas for out planting individuals to restore populations. When surveys completed, data can be used to determine area of white abalone habitat. This data would also be useful to other species, e.g. rockfishes.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes +seabed morphology, rugosity, algal cover
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	Fish and Game south

<b>Block Number(s):</b>	108
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0-90 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	multi use conflict; near port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	133
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0-10 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrate
<b>Management Issues of Concern:</b>	multi use conflict; near port; potential reserve
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	262
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0-50 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	multi use conflict, near port, current reserve
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	268
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish

<b>Management Issues of Concern:</b>	multi use conflict, near port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	402
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	multi use conflict; far port; potential reserve
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	414
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High/Medium
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	current reserve, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	441
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	20-50 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish
<b>Management Issues of Concern:</b>	multi use conflict, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	414
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	current reserve, far port
<b>How Would Mapped Data Be Used:</b>	/

<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	132
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	invertebrates
<b>Management Issues of Concern:</b>	multiuse conflict, potential reserve, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	255
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-35 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish
<b>Management Issues of Concern:</b>	multiuse conflict, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	274
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish
<b>Management Issues of Concern:</b>	far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	402
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-30 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	potential reserve, multi use conflict, near port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/

<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	431
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	potential reserve, near port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	402/401
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	invertebrates
<b>Management Issues of Concern:</b>	potential reserve, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	114
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Low
<b>Water Depth:</b>	0-40 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	invertebrates
<b>Management Issues of Concern:</b>	multiuse conflict, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	222,233
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Low
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	/
<b>Management Issues of Concern:</b>	far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North



<b>Block Number(s):</b>	243
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Low
<b>Water Depth:</b>	/
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	finfish, invertebrates
<b>Management Issues of Concern:</b>	multiuse, near port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	268, 274,408
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Low
<b>Water Depth:</b>	0-20 fathoms
<b>Ranking Criteria (needs):</b>	/
<b>Species/Resource of Concern:</b>	invertebrate
<b>Management Issues of Concern:</b>	far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North

<b>Block Number(s):</b>	526,532,509
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	High
<b>Water Depth:</b>	0-100m
<b>Ranking Criteria (needs):</b>	1)areas of mult use/conflict (tourism, kelp harvesting, live fish fishery, recreational fishery, urbanization, research) 2) designated areas (harvest area, sanctuary, marine protected area 3)importance of habitat to coastal ecosystem (nursery grounds, high productivity, larval source) 4) high use area (high recreational concentration) 5)DFG current mgmt. priorities (marine protected habitat, EFH) 6)Area used by species of special interest or concern (economically important macroalgae, invertibrates and groundfish; species currently at low stock size; e.g., giant kelp, sea urchins, abalone, several rockfish species, lingcod, and coastal salmonid runs) 7) availability of existing hab. Data (patchy, would extend existing mapping efforts)
<b>Species/Resource of Concern:</b>	kelp forest ecosystem, rockfish, fish community (general), sea urchins, abalone, macro-invert community (general), sea otters & other marine mammals (marine Mammal Act)
<b>Management Issues of Concern:</b>	1)EFH: structure and dynamics 2)marine reserve design: location, size, landscape comp., fisheries enhancement potential (larval dispersal and spillover) 3)distinguishing anthropogenic from natural causes of variability (-relating habitat characteristics and nearshore oceanographic features to reef process and pattern, relating human impacts to reef process and pattern) 4)kelp harvesting, live fish fishery, recreational fishery.
<b>How Would Mapped Data Be Used:</b>	1)To calculate landscape habitat parameters at a range of biologically relevant scales (micro-mesohabitat scales) 2) to guide the collection of geo-referenced biological data (biogenic habitat, invertibrates, fish) 3) to quantify spatially-explicit linkages btwn reef structure and ecosystem structure at multiple scales. 4)To guide collection of hydrographic data for modelling effects of water movement on settlement of macroalgae, inverts and fish at macro-mesohabitat scales. 5)To incorporate our biotic and hydrographic info into the GIS of the habitat maps in order to facilitate applied use by resource managers.
<b>Bathymetry:</b>	Yes
<b>Substrate Type:</b>	YES

<b>Resolution and Scale:</b>	10by10
<b>Institution:</b>	UC Santa Cruz- Dept of Biology
<b>Block Number(s):</b>	501,538-539,547,553
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	0-300ft
<b>Ranking Criteria (needs):</b>	1)areas of mult use/conflict (tourism, kelp harvesting, live fish fishery, recreational fishery, urbanization, research) 2) designated areas (harvest area, sanctuary, marine protected area 3)importance of habitat to coastal ecosystem (nursery grounds, high productivity, larval source) 4) high use area (high recreational concentration) 5)DFG current mgmt. priorities (marine protected habitat, EFH) 6)Area used by species of special interest or concern (economically important macroalgae, invertebrates and groundfish; species currently at low stock size; e.g., giant kelp, sea urchins, abalone, several rockfish species, lingcod, and coastal salmonid runs) 7) availability of existing hab. Data (none to our knowledge)
<b>Species/Resource of Concern:</b>	kelp forest ecosystem, rockfish, fish community (general), sea urchins, abalone, macro-invert community (general), sea otters & other marine mammals (marine Mammal Act)
<b>Management Issues of Concern:</b>	1)EFH: structure and dynamics 2)marine reserve design: location, size, landscape comp., fisheries enhancement potential (larval dispersal and spillover) 3)distinguishing anthropogenic from natural causes of variability (-relating habitat characteristics and nearshore oceanographic features to reef process and pattern, relating human impacts to reef process and pattern) 4)kelp harvesting, live fish fishery, recreational fishery.
<b>How Would Mapped Data Be Used:</b>	1)To calculate landscape habitat parameters at a range of biologically relevant scales (micro-mesohabitat scales) 2) to guide the collection of geo-referenced biological data (biogenic habitat, invertebrates, fish) 3) to quantify spatially-explicit linkages btwn reef structure and ecosystem structure at multiple scales. 4)To guide collection of hydrographic data for modelling effects of water movement on settlement of macroalgae, inverts and fish at macro-mesohabitat scales. 5)To incorporate our biotic and hydrographic info into the GIS of the habitat maps in order to facilitate applied use by resource managers.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	10X10
<b>Institution:</b>	UC Santa Cruz- Dept of Biology

<b>Block Number(s):</b>	108
<b>Needs/Holdings:</b>	Needs
<b>Priority (needs):</b>	Medium
<b>Water Depth:</b>	80FT TO 100FT
<b>Ranking Criteria (needs):</b>	Dredged Material disposal site, essential fish habitat, ESA critical habitat, designated area, significant natural area
<b>Species/Resource of Concern:</b>	Federally listed, proposed for listing, and species of concern, as well as any critical habitat areas designated or proposed under the endangered species act.
<b>Management Issues of Concern:</b>	Disposal site mgmt monitoring and designation
<b>How Would Mapped Data Be Used:</b>	Monitoring, site evaluation, and site designation
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	no
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	US Army Corps of Engineers - Peter LaCivita

## Pre-workshop Results: Raw HOLDINGS Data

<b>Block Number(s):</b>	136,204,205,210-212,225, 226,232,241,455-457,464-467,473,474,476-480,483, 487,502-505,507-550,552-559,562-568,605,606,638, 639,643-646,649,653-660, 662,663,666-673,675,676, 682-695,716,717,776
<b>Needs/Holdings:</b>	Holding
<b>Water Depth:</b>	1640ft to 9000ft
<b>Species/Resource of Concern:</b>	marine geology, biology and chemistry
<b>Management Issues of Concern:</b>	-
<b>How Would Mapped Data Be Used:</b>	-
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	-
<b>Resolution and Scale:</b>	-
<b>Institution:</b>	MBARI
<b>How data formatted (holdings):</b>	digital, web accessible-?, CD, sidescan-mosaic, multibeam mosaic, arc/info grids, geotiff
<b>When data aquired (holdings):</b>	1998/ available end of yr 2000

<b>Block Number(s):</b>	508, 517, 526, 547, 637, 643
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	30m to 350m
<b>Species/Resource of Concern:</b>	rockfishes, habitat w/in no-take areas
<b>Management Issues of Concern:</b>	1)overfishing, 2)identification of natural refugia, 3)characterization of EFH, 4)baseline information on marine reserves
<b>How Would Mapped Data Be Used:</b>	1)establish baselines on species & habitats associated w/ no-take areas, 2)characterize EFH for rockfish assemblages, in particular.
<b>Bathymetry:</b>	Yes
<b>Substrate Type:</b>	Yes
<b>Resolution and Scale:</b>	-
<b>Institution:</b>	NMFS
<b>How data formatted (holdings):</b>	digital, sidescan-single line, sidescan-mosaic, seismic reflection profiles, hardcopy only
<b>When data aquired (holdings):</b>	93, 96, 99

<b>Block Number(s):</b>	643,644,651-659,664-668,671,672,680,683-686,689-691,701,712,713,718-721,738
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	/
<b>Species/Resource of Concern:</b>	GIS of oil wells and platform locations
<b>Management Issues of Concern:</b>	/
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	no - only GIS of oil and well platform locations
<b>Substrate Type:</b>	no - only GIS of oil and well platform locations
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	DOC-oil&gas
<b>How data formatted (holdings):</b>	GIS
<b>When data aquired (holdings):</b>	/

<b>Block Number(s):</b>	106,108-112,114-117,119-125,127-129,131,133-135,138,203-206,211-214,226,241,281,407-408,414-416,423-428,430,432-437,439-442,446-451,455-460,464-469,472-478,480,482,483,487,501-503,516,517,525-528,543,546,568,623-625,632,633,634,635,655,679,680,681,683,690
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	See USGS section of folder

<b>Species/Resource of Concern:</b>	for details and related maps
<b>Management Issues of Concern:</b>	
<b>How Would Mapped Data Be Used:</b>	
<b>Bathymetry:</b>	
<b>Substrate Type:</b>	
<b>Resolution and Scale:</b>	
<b>Institution:</b>	USGS
<b>How data formatted (holdings):</b>	
<b>When data aquired (holdings):</b>	

<b>Block Number(s):</b>	651-657,664-667,678-691,701-703,707-713,718-721,728-730,737-740,749-751,744-745,756-758,760-763,801-802,806-808,821-822,842-843,860-861,858,877-879,916
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	16ft to 705ft
<b>Species/Resource of Concern:</b>	To assess extent of sediment contamination and distribution of sediment grain size, assessment of demersal fishes, invertebrates and infauna.
<b>Management Issues of Concern:</b>	Extent of pollution impacts in Southern California map. (Southern CA Bight Pilot Project -1994 (SCBPP) & Southern Ca Bight Regional Survey 1998 (Bight '98)).
<b>How Would Mapped Data Be Used:</b>	To assess extent of contamination and impacts to fish and invertebrate assemblages.
<b>Bathymetry:</b>	yes
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	Southern Ca Coastal Water Research Project - Larry Cooper
<b>How data formatted (holdings):</b>	digital, Web Accessible, Comma Delineated ASCII
<b>When data aquired (holdings):</b>	1998, 1999

<b>Block Number(s):</b>	431
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	0-20 fathoms
<b>Species/Resource of Concern:</b>	invertebrate
<b>Management Issues of Concern:</b>	current reserve, near port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North
<b>How data formatted (holdings):</b>	n/a
<b>When data aquired (holdings):</b>	n/a

<b>Block Number(s):</b>	228
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	3-30 fathoms
<b>Species/Resource of Concern:</b>	/
<b>Management Issues of Concern:</b>	current reserve, far port
<b>How Would Mapped Data Be Used:</b>	/
<b>Bathymetry:</b>	/
<b>Substrate Type:</b>	/
<b>Resolution and Scale:</b>	1ft
<b>Institution:</b>	Fish and Game - North
<b>How data formatted (holdings):</b>	n/a
<b>When data aquired (holdings):</b>	n/a

<b>Block Number(s):</b>	681,643,684,707-708,710-711
<b>Needs/Holdings:</b>	Holdings
<b>Water Depth:</b>	3-300ft
<b>Species/Resource of Concern:</b>	rockfish, squid, abalone, sea urchins
<b>Management Issues of Concern:</b>	benthic fisheries habitat
<b>How Would Mapped Data Be Used:</b>	is being processed, interpreted, and groundtruthed for benthic habitat
<b>Bathymetry:</b>	no
<b>Substrate Type:</b>	yes
<b>Resolution and Scale:</b>	/
<b>Institution:</b>	USGS
<b>How data formatted (holdings):</b>	digital, sidescan mosaic, seismic reflection profiles
<b>When data aquired (holdings):</b>	1/98-12/00

[illegible]



## Worksheet B: Identify Priority Blocks Post-Workshop Results

Block	Fishery Management	Use Conflicts/ Impact Analysis	Baseline (Monitoring and Assessment)	Critical Natural Area or Biological "Hot Spot"	Special Species Located in Area	Political Importance	reserve potential	zoogeographic importance	Safe Navigation	Oil Spills	EFH-HAPC	Total Vote	Priority Rank	Who voted
402	7	1	0	1	0	0			0	1	1	11	1	CDFG, UCSG, UCSC, UCSB, NMFS, (2)NWFSC/NMFS, NRC, NRDC, PMCC, OSPR
458	6	0	3	1	0	0	0	0	0	1		11	1	(2)NWFSC/NMFS, UCSB, MLML, (2)NMFS, UCSG, CDFG, CWHR, NRDC,
441	5	0	1	3	0	0	0	0	0	0		9	2	FS, MLML, (3)NMFS, UCSB, USGS, NRDC
451	6	0	1	2	0	0	0	0	0	0		9	2	MLML, (2)NWFSC/NMFS, (2)NMFS, UCSG, PMLL, USGS, UCSB
526	0	3.5	4.5	0	0	0	0	0	0	0		8	3	(3)NMFS, MLML, UCSC, F&G, USACE, CWHR
539	2	2.5	1.5	0	0	0	0	0	0	1		7	4	MBNMS, CALTRANS, NMFS, UCSG, UCSC, USGS, OSPR
403	6	0	0	0	0	0			0	0	0	6	5	(2)NMFS, (2)NMFSC/NMFS, UCSC, MLML
643	1.0	0.0	3.0	1.0	0.0	0.0	0	1	0.0			6	5	F&G, (3)OSPR, CWHR, USGS
644	2	1	0	1	0	2	0	0	0	0		6	5	MMMS, UCSB, UCSC, MLML, USGS, NRDC
707	2.0	0.0	0.0	4.0	0.0	0.0	0	0	0.0			6	5	USGS, MLML, EDF, CINMS, UCSB, NMFS
719	2	1	0	0	0	0	0	0	3			6	5	(3)NOS, (2)OSPR, CWHR



## CALIFORNIA MARINE HABITAT TASK FORCE WORKSHOP

## APPENDIX P

all coastal	0	0	6	0	0	0			0	0	0	6	5	(6)USGS
222	5	0	0	0	0	0			0	0	0	5		OSPR, PMCC, NMFS, (2)NWFSC/NMFS
615	3	0	2	0	0	0	0	0	0	0		5		UCSG, NMFS, PMCC, MLML, F&G
455	0	0	1	0	0	0	0	0	2.5	0.5		4		CCC, USACE, (2)NOS/OCS
501	1	1	2	0	0	0	0	0	0	0		4		UCSG, MBNMS, CCC, CAL-TRANS
532	0	2.5	1.5	0	0	0	0	0	0	0		4		MBNMS, CAL- TRANS, UCSC, USGS
548	0	3	1	0	0	0	0	0	0	0		4		(2)MBNMS, CAL-TRANS, USGS
684	1.0	0.0	0.0	2.0	0.0	1.0	0	0	0.0			4		USGS, EDF, NRDC, UCSB
711	0.0	0.0	2.0	2.0	0.0	0.0	0	0	0.0			4		F&G, CWHR, EDF, CINMS SCCWRF,
842	1	1	1	1	0	0	0	0	0			4		OCS, OSPR, MLML
890	3	0	0	1	0	0	0	0	0			4		(2)NMFS, UCSB, MLML USACE, CCC,
209	0	2.5	0	0	0	0			0	1	0	3.5		(.5)OSPR, PMCC
108	0	0	2	0	0	0			0	1	0	3		CWHR, F&G, OSPR
210	0	1.5	0	0	0	0			0.5	1	0	3		USACE, CCC, OSPR
223	3	0	0	0	0	0			0	0	0	3		(2)NWFSC/NMFS, NMFS
233	2	1	0	0	0	0			0	0	0	3		UCSG, PMCC, USACE
430	0	1.5	0	0.5	0	0			0	1	0	3		CCC, USACE, OSPR
467	1	1	1	0	0	0	0	0	0	0		3		NMFS, (2)USACE
509	0	1.5	1.5	0	0	0	0	0	0	0		3		NRC, UCSC, MBNMS
516	1	1.5	0.5	0	0	0	0	0	0	0		3		CCC, PMCC, USACE
538	0	2	0	0	0	0	0	0	0	1		3		MBNMS, CAL- TRANS, OSPR
547	0	1	2	0	0	0	0	0	0	0		3		F&G, CWHR, CAL-TRANS
669	0	3	0	0	0	0	0	0	0			3		(1.5)NRC, (1.5)MMS

## CALIFORNIA MARINE HABITAT TASK FORCE WORKSHOP

## APPENDIX P

681	1.0	1.5	0.5	0.0	0.0	0.0	0	0	0.0			3		CCC, USGS, SCCWRP
685	1.0	1.0	0.0	1.0	0.0	0.0	0	0	0.0			3		USGS, UCSC, EDF
686	0.0	1.0	1.0	1.0	0.0	0.0	0	0	0.0			3		UCSC, F&G, EDF
701	0	0	0	0	0	0	0	0	3			3		(3)NOS
708	1.0	0.0	0.0	2.0	0.0	0.0	0	0	0.0			3		USGS, EDF, CINMS
709	1.0	0.0	0.0	2.0	0.0	0.0	0	0	0.0			3		USGS, EDF, CINMS
710	1.0	0.0	0.0	2.0	0.0	0.0	0	0	0.0			3		USGS, EDF, CINMS
756	0	1	2	0	0	0	0	0	0			3		SCCWRP, (2)OCSD
757	0	1	2	0	0	0	0	0	0			3		SCCWRP, (2)OCSD
121	2	0	0	0	0	0			0	0	0	2		(2)NWFSCC/N MFS
122	2	0	0	0	0	0			0	0	0	2		(2)NWFSC/NM FS
132	0	0	1	0	0	0			0	1	0	2		CWHR, OSPR
133	0	0	1	0	0	0			0	1	0	2		CWHR, OSPR
234	0	1	1	0	0	0			0	0	0	2		USACE, USGS
243	1	0	1	0	0	0			0	0	0	2		PMCC, USGS
438	0	0	1	1	0	0	0	0	0	0	0	2		NRDC, OSPR
475	2	0	0	0	0	0	0	0	0	0	0	2		(2)NMFS
488	0	0	0	0	0	0	0	0	2	0		2		(2)NOS/OCS
489	0	0	0	0	0	0	0	0	2	0		2		(2)NOS/OCS
561	0	0	1	1	0	0	0	0	0	0		2		CAL-TRANS, UCSG
603	0	1	1	0	0	0	0	0	0	0		2		MBARI, NRC
609	0	1	1	0	0	0	0	0	0	0		2		MBARI, NRC
610	0	1	1	0	0	0	0	0	0	0		2		MBARI, NRC
614	0	0	0	0	0	0	0	0	2	0		2		(2)NOS/OCS
617	0	1	1	0	0	0	0	0	0	0		2		NRC, MBARI
618	0	1	1	0	0	0	0	0	0	0		2		NRC, MBARI
632	1	0	0	0	0	1	0	0	0	0		2		UCSG, UCSB
638	0	1	0	0	0	1	0	0	0	0		2		MMS, UCSB
670	0	2	0	0	0	0	0	0	0			2		NRC, MMS
671	0	2	0	0	0	0	0	0	0			2		NRC, MMS
672	0	2	0	0	0	0	0	0	0			2		NRC, MMS
673	0	2	0	0	0	0	0	0	0			2		NRC, MMS
687	0	1	0	1	0	0	0	0	0			2		UCSC, EDF
690	1.0	0.0	0.0	1.0	0.0	0.0	0	0	0.0			2		USGS, CINMS
712	0.0	0.0	0.0	2.0	0.0	0.0	0	0	0.0			2		EDF, CINMS
718	1	1	0	0	0	0	0	0	0			2		OSPR, CWHR
801	0	1	1	0	0	0	0	0	0			2		SCCWRP, OCSD
802	0	1	1	0	0	0	0	0	0			2		SCCWRP, OCSD
821	0	1	1	0	0	0	0	0	0			2		SCCWRP, OCSD
822	0	1	1	0	0	0	0	0	0			2		SCCWRP, OCSD

843	0	1	1	0	0	0	0	0	0			2		SCCWRP, OCSD
872	1	0	0	1	0	0	0	0	0			2		PMCC, NRDC
878	2	0	0	0	0	0	0	0	0			2		(2)OSPR
208	0	0.5	0	0	0	0			0	1	0	1.5		CCC, (.5)OSPR
138	0	0	1	0	0	0			0	0	0	1		MNFSC/NMFS
139	1	0	0	0	0	0			0	0	0	1		MNFSC/NMFS
228	0	0	1	0	0	0			0	0	0	1		F&G
255	1	0	0	0	0	0			0	0	0	1		CDFG
256	0	0	1	0	0	0			0	0	0	1		USGS
262	1	0	0	0	0	0			0	0	0	1		CDFG
263	0	0	1	0	0	0			0	0	0	1		USGS
268	1	0	0	0	0	0			0	0	0	1		CDFG
269	0	0	1	0	0	0			0	0	0	1		USGS
274	1	0	0	0	0	0			0	0	0	1		CDFG
410	0	1	0	0	0	0			0	0	0	1		NRC
419	0	1	0	0	0	0			0	0	0	1		NRC
510	0	0	1	0	0	0	0	0	0	0		1		NRDC
553	0	1	0	0	0	0	0	0	0	0		1		CAL-TRANS
554	0	1	0	0	0	0	0	0	0	0		1		CAL-TRANS
556	0	0	0	1	0	0	0	0	0	0		1		NRDC
560	0	1	0	0	0	0	0	0	0	0		1		CAL-TRANS
602	0	0	1	0	0	0	0	0	0	0		1		MBARI
604	0	0	1	0	0	0	0	0	0	0		1		MBARI
605	0	0	1	0	0	0	0	0	0	0		1		MBARI
606	0	0	1	0	0	0	0	0	0	0		1		MBARI
607	0	0	1	0	0	0	0	0	0	0		1		UCSG
611	0	0	1	0	0	0	0	0	0	0		1		MBARI
612	0	0	1	0	0	0	0	0	0	0		1		MBARI
613	0	0	1	0	0	0	0	0	0	0		1		MBARI
616	0	0	1	0	0	0	0	0	0	0		1		MBARI
619	0	0	1	0	0	0	0	0	0	0		1		MBARI
620	0	0	1	0	0	0	0	0	0	0		1		MBARI
625	0	0	1	0	0	0	0	0	0	0		1		MBARI
626	0	0	1	0	0	0	0	0	0	0		1		MBARI
627	0	0	1	0	0	0	0	0	0	0		1		MBARI
628	0	0	1	0	0	0	0	0	0	0		1		MBARI
629	0	0	1	0	0	0	0	0	0	0		1		MBARI
645	0	1	0	0	0	0	0	0	0	0		1		MMS
654	1	0	0	0	0	0	0	0	0			1		OSPR
667	0	1	0	0	0	0	0	0	0			1		MMS
668	0	1	0	0	0	0	0	0	0			1		(.5)NRC, (.5)MMS
679	0	1	0	0	0	0	0	0	0			1		CCC
680	0	1	0	0	0	0	0	0	0			1		CCC
688	0	0	0	1	0	0	0	0	0			1		CINMS
689	0	0	0	1	0	0	0	0	0			1		CINMS
704	0.0	0.5	0.5	0.0	0.0	0.0	0	0	0.0			1		SCCWRP
720	1	0	0	0	0	0	0	0	0			1		OSPR
727	0	1	0	0	0	0	0	0	0			1		PMCC
761	0	0	1	0	0	0	0	0	0			1		F&G
762	0	0	0	1	0	0	0	0	0			1		NRDC
765	0	0	0	1	0	0	0	0	0			1		CINMS

814	0	0	1	0	0	0	0	0	0			1		F&G
877	1	0	0	0	0	0	0	0	0			1		OSPR

## **Notes for California Marine Habitat Task Force Breakout Groups**

### **Central Region Working Session**

Tim Gooding opened the meeting by discussing the “pre-workshop data needs” packet and explained how to interpret the handouts and Data Needs/Holdings worksheets.

Q: How is ranking criteria for the data needs defined?

A: Each invited person/group has 10 votes which they can place on the areas where they feel habitat-related data are lacking (1-10 votes per area).

-don't restrict data needs to <30m

-can use ½ votes

Larry Espinosa: Focus on areas (for needs) of greatest economic interest and greatest overlap. Look at the long-term, not just a one-year project.

Karen Garrison: Her needs are not specific to “blocks” (high relief habitat). How can she translate that into the pre-delineated format?

-need to ID grids that have habitat chars you are interested in and vote for those

(Everyone was given 10 minutes to describe his or her ideas, areas of interest)

Greg Cailliet: Q: Are all the data holdings included (CDF&G missing?)?

A: No, but list priorities regardless.

Suggestions:

1) Canyon heads (452, 459, 468, 467, 476, 475, 504, 556, 549...at least)

Why? -natural refugia for rockfish, now being fished

-deep (150-1500 m)

-adult habitat/refugia

-prob. Increased fishing pressure in future

**(All this is being written on the board)**

2) Coastline north of Santa Cruz (501, 502, 509, 510)

Why? -upwelling

-important for larval transport/recruitment

3) Coastline (526, 532, 539, 538, 548, 547, 554, 553, 561, 560, 602, 601, 608, 607) from 5-200 m

Why? -important for live fish fishery

-increased fishing

**(notes below are supplemental to those taken on the Data Needs worksheet)**

Larry Espinosa: interested in group 3 (as ID'd by Greg Cailliet...b/c oil seeps are present in this region)

Andrew DeVogelere: Sanctuary is interested in the same section due to roadwork and cable laying

Eileen Loe: same concerns for CalTrans

Karen Garrison: concerned about Big Sur coast

Dallas Meggit: interested in the first two areas designated by Greg Cailliet

Churchill Grimes: NMFS is interested in area 1 (canyon heads) for essential fish habitat/management (also areas 534, 533, 441, 442, 451, 458, 467, 466, 476.....on board) Why? Important fishery areas. Areas 634, 635 (lingcod, *Sebastes* spp. habitat) Why? ID and describe fish habitat to improve fisheries management Area 434. Why? Same reasons as above and lack of information from this area.

Eileen Loe: Wants a ¼ mile buffer around Hwy. 1 where it intersects the coast (concerned with the very nearshore-to 60m). Why? To predict areas susceptible to landslides and attempt to prevent, mitigate damage. The application of the research would effective management of the area if erosional factors can be determined and accommodated. Bathymetry and substrate (esp. historically) are both important to monitor "normal" activity (slides) in the region (identify historic slide locations). The highest priority areas are those with the highest monetary interest (developed areas). She's also interested in how the nearshore "looks" (what is it composed of....sand, rock?) and how it will change with landslide activity.

Lee Otter: 532-560 (areas touching shoreline). Why? Marine disposal (works w/CalTrans) to 1-mile seaward. 516, 517. Why? Contaminated sediments from rivers and dredging ends up here (they think, there are no good current studies). Want both bathymetry and substrate info at a scale large enough to trace sediments (100's of yd<sup>3</sup> at a time). SF14, 508, 516. Why? Substrate needs to be known so disposal effects/changes can be determined. 526. Why? Rockfish habitat. 463. Why? Slide area. 464. Why? Devil's Slide (to understand processes b/w land and sea interface). 553-607 (coastal). Why? Biota concerns due to erosion.

Sam DeBeau: Is interested in the entire coastline to 20 fathoms. Why? navigation, especially large cruise ships (highest need w/in SF Bay). Need bathymetry to update nautical charts. NOAA plans to do some of this themselves. Needs 10' x 10' resolution.

Dallas Meggit: Interested in shoreline-2,000 m between Bodega Head and Grover Bank. Wants bathymetry and bottom types. Both the coastal commission and cable industry want to steer clear of hard-bottom areas.

Gerry Hatcher: MBARI interested in 100-4,000 m in areas 601, 604, 607-613, 614-621, 626-630. Wants bathymetry and substrate. Why? There is a data gap in this region and interesting geology.

Hali Kilbourne: Interested in Big Sur region from Caramel south. Why? To look at habitat preferences on a large scale (< 3km). Wants substrate type and bathymetry.

USGS: Interested in shore to 100m (mapping 643, 644 for bathymetry, substrate). .1 m resolution (after mosaicing ¼ pixels will give 1 m resolution).

Andrew DeVogelere: Wadell Bluff (south of Ano Nuevo). Interested in the geology of canyons off the Big Sur coast. Interested in nearshore and intertidal. Substrate only. Why? Fish habitat, oil spills.

Karen Garrison: Canyon heads are of interest to her (same as Greg Cailliet's designations). She wants to incorporate kelp into the mapping (CalCOFI has done flyover maps but they need to be incorporated into a GIS). The Sanctuary completed an overflight of the Sanctuary boundary (Mike Donnellan is using it to map environmental change for an MLML thesis). Why? Juvenile fish habitat, shellfish habitat, use conflicts. She believes reserves need to be established in different habitat types (including kelp). You can infer substrate type and depth simply from presence of kelp.. Cordell Banks and Farallon area are also important. Why? Essential fish habitat, reserves and sanctuary areas. She wants bathymetry and substrate in these areas and resolution of 10' – 100'. 446-448, 438 (Point Reyes Coast). Why? Juvenile rockfish habitat, potential refuge area, adjacent to park (easier for management, pollution, mitigation). Her interest area is up to one mile offshore. Existing no take areas (526, 547, 643, 438) are also important to her.

Larry Espinosa: Oil seeps (538, 539) and sites for potential oil drilling are important to him. Also: Point Arguello, Point San Luis. Why? Fisheries management, spill response, user conflicts, threatened/rare/endangered species, Effects of fishing, navigation, waste discharge (habitat perturbations).

Mark Carr: 501, 510, 526, 532, 539, 538-560.....one more I missed. Why? Data gaps, EFH, contains most of Sanctuary. Wants bathymetry, substrate. 526. Why? Hopkins Marine Station has done long-term studies there. 532. Why? Data gap. 539. Why? Data gap, long-term studies. 538-560. Why? Some of these blocks have data gaps. 615. Diablo Canyon. Why? Long-term studies. Interested in 3-100m for all areas.

## **GROUP II**

SCCWRP: 632, 631, 637, 638. Why? Cochrane (USGS) is doing work there and there's a reserve as well. Interested from shoreline to one mile. 601, 602, 608. Why? Probably good rockfish habitat. Important for fisheries management. Interested in substrate type. Resolution b/w 10' x 10' and 100' x 100'.

Milton Love: 632, 638, 644. Why? Oil platforms. Wants to look at contribution of oil platforms to natural reefs and fishes (esp. rockfish). Interested in shoreline to 250m. Wants 100m for first cut on resolution, 5m on second cut. 458-457, 433-434. Why? Fish habitat, especially rockfish. Wants substrate/bathymetry and resolution of 100m for first cut, 5 m for second.

Greg Benoit: 455. Why? Vessel trafficking, oil spills. 615. Why? Impact (cumulative) analyses, 0-30m. 607. Why? Impact (cumulative) analyses, 0-30m. Resolution: 50-100m for oil spills, 1m for cumulative impact.

MBARI: See Gerry Hatcher's earlier comments. Want to fill in the entire deep-water gap (200m to abyss). 501-643. Why? Explain/define geologic features (especially bathymetry and substrate). Resolution required: 2% of water depth in shallow water, 3% in deep water. Resolution is limited by depth (100m = 2m resolution). Interested in canyon heads and processes. MBARI wants to monitor the canyons for sediment movement.

CDF&G: 615. Why? Fishery conflicts (b/w Moro Bay and Point Sur). Headlands are of biological significance. Interested in 100 m resolution, 1 m in rocky areas (from intertidal to 30 m).

Sea Grant: High catch blocks (areas that contain approx. 25% of commercial catches). Why? To understand why they are so productive, assess fishing impacts. 10m scale resolution, depth is unimportant (whatever is in the predescribed areas). Also, the coastal shoreline is important to them. Why? The live fish fishery operates in nearshore waters.

USGS: Not choosing areas. He (did not note name of rep.) believes in mapping where it's most needed and considers the USGS a facilitating agency. He uses laser depth sounding to map nearshore areas. They can't remove backscatter yet but are working on it. EPA, Army Corps of Engineers (488, 455, 446) will look at habitat in these areas because dredging needs to be done for the airport. Lidar: good from 50-80m, depending on system.

NMFS/NWFSC (Waldo Wakefield): Wants coast-wide map of the shelf. Why? stock assessment, future reserves, and habitat areas of particular concern, fishing gear impact studies. Wants 200-1300m area from Point Conception to Cape Flattery, WA. Wants bathymetry and substrate type. Holdings: 400-1600m photos (Waldo Wakefield has). Cailliet, Nybakken, and Waldo did 2000-3000m camera tows w/1000's of photographs (area not ascertained-check tape).



Mary Yoklavich: From trawl landings and logbooks, she ID'd blocks where 50% of the rockfish came from. 441, 451, 466, 475, 480, 503, 533, 540 (trawl), 441, 458, 474, 478, 526, 539, 561, 607, 615, 623, 632 (recreational fishery). Wants both bathymetry and substrate type b/w 30-300m. Between 10' x 10' and 100' x 100' is the ideal resolution.

## Northern Region Working Session

<u>Block/Agency Rep.</u>	<u>Why data is needed/ for?</u>
<b>Rick Starr (Seagrant)</b>	Q: Need to discuss resolution and how it needs to be determined?
<b>Mark Carr (UCSC)</b> 234, 233, 243, 242	A: Start At gross scale and go to minimum range
<b>Mark</b> 402, 403 422-425 430-433	Ecological sig. and fisheries  potential marine reserve (422)-- remaining for fisheries interest (PMR)= potential marine reserve (430)- remaining for fisheries
<b>Jim Gardner (USGS)</b>	EEZ is main focus, priority determined by financial partners- NOAA, etc .- benthic, bio. Habitat .- urban usage of habitat not in position to say priorities, only a PROVIDED USGS is producing backscatter and multibeam, bathymetry is 10-100m in mapped areas, low resolution
<b>Greg Benott</b> (Cal Coastal Comm) Humbolt Bay 201,202,208,209,210, 211,216,217	Main function: regulate onshore development .- impact analysis, oil spill studies, multi-agency watershed data Resolution: 30m needed for blocks 208,209/ others in 10-30m res. Overlap: mentioned on large summary sheets .- offshore helps onshore data, therefore, would like any info they can get Water depth: in bay= 10-30m
<b>Allison Bailey (NMFS)</b>	General priorities: respnsible for managing fish species, can't give priority Location Depth: 50-1,000m= primary 1,000-2,000m= secondary Res: 100m (for larger coverages initially)- survey deepwater species on slope Why needed: essential fish habitat (EFH), habitat area of particular concern (HAPC), stock assessment, fishing gear impacts
<b><i>Discussion Begins</i></b>	
<b>Jim Gardner (USGS)</b>	Substrate? What is it to biologists?
<b>Allison Bailey (NMFS)</b>	What's on the surface.
<b>Jon Heifetz (NMFS)</b>	Infauna important (cm range)
<b>Jim Oakden (MLML)</b>	can go deeper, substrate includes typical habitat for infauna
<b>Jim Gardner (USGS)</b>	need to define substrate needs (depth into sed) b/c different technology is used depending on needed penetration
<b>Ed Bowlby (NOAA)</b>	Ex. Changing habitats.... Do we need specifics?
<b>Larry Mayer (Univ of New Hampshire- Center for Coastal and Ocean Mapping)</b>	costs in data acquisition, need to think about defining survey w/ forethought of needed data w/ little extra cost
<b>Jim Gardner (USGS)</b>	need to be cautious about costs- speed of ship determined by tech. Needs and this relates to ship time/cost
<b>Rick Starr (SeaGrant)</b>	not so simple...where=1 issue and what, how is separate issue
<b>Jennifer Bloeser (PMCC)</b> 234,233,243,242	(EFH) and criteria mentioned here

402,403 why needed: same as before mentioned  
 422-425 " " "  
 430-433 " " " , and EFH?eelgrass (,10m depth and 10m res)  
 208,209

132,133 why needed: EFH, kelp beds  
 depth: 10-30m  
 res: 1-10m  
 217-219 why: fishing areas, gear impacts  
 depth: 100-200m  
 res: 10-100m  
 223,222,228,229 why: fishing areas, EFH  
 depth: 100-200m  
 res: 10-100m

**End Session 1**

Larry Mayer  
 (Univ of Vermont...) new holdings: EM-300 (ONR) Roger Flood 201,202,210

Ray Highsmith (West Coast & Polar Regions Undersea Research Ctr)  
 217,218 Eel river and canyon- Sep and April  
 .-there's MBARI EM-300 data there as well

Mary Yoklavich (NMFS)  
 122,203,218, 223,243,403,425, 433,441  
 looked @ economic analysis identifying 50% of rockfish landings  
 .-overfished, need to replenish stock  
 .-high economic value  
 .-high concentration rockfish landings  
 blocks along deep water mostly  
 depth: 30-300m  
 .-represents offshore component to earlier mentioned inshore blocks 402, 422-424,217,202, etc...  
 res: 100m or greater initially-- 10m for specific projects  
 overlap: MBARI and USGS

Dave Ventresca  
 (F & G) 430 F & G has holdings inside Tomales Bay

Jim Gardner (USGS)  
 More than 1 Eel River dataset (217,218)  
 \*have west coast surface sed. Grainsize in Arcview... will go public soon (within a year)  
 Mark Zimmerman worked with USGS...100,000 samples  
 .- will be on USGS website (link on seafloor mapping website)  
 .- Alaska next... Gulf of Mex and East Coast in future  
 .- SPOT data, polygons, whatever you want  
 GLORIA= long-range sidescan... 200m to deeper water  
 1980's...series of Atlas' and CD-Roms  
 low res= 1 pixel=size of football field...\* not calibrated  
 U.S., Hawaii, and Alaska  
 .- need metadata to add to GIS

David Ventresca (F & G)  
 107,108 have data for biologists@ MBARI already habitats  
 geology- need additional areas (central CA, Mendocino fracture zone and canyons to the south)  
 .-no immediate need for this group  
 .-Humbolt oil spill  
 deth: intertidal- 30m

	res: 1m purpose: impact analysis, bio. Importance of headlands, multi-user conflicts
<b>Point Arena 402</b>	importance: headlands, user conflicts, invert/vert. Fishing area, near fishing port depth: intertidal- 30m (MLMA funding) res: 1-100m
<b>Punta Gorda 222,228,227</b>	why" headland (same as above), existing reserve (compare fished/unfished areas), revisit shallow areas, adjacent to areas already mapped res: 1-100m depth: 3-30m
<b>234,233</b>	Fort Bragg depth: 3-30m res: 1-100m why: same as above, existing reserve
<b>David Caress (NGDC)</b>	Q: background data looked at? Seabeam (NOAA) and other data holdings included? GDC, NGDC
<b>Rikk Kvitek (CSUMB)</b>	F & G has tried to identify as much as possible, but not in holding chart .- maps not complete rep. Of existing holdings
	<b>Discussion begins..</b>
<b>Rick Starr (SeaGrant)</b>	Priority blocks combination of 2 adjacent blocks? Can we vote for more than 1 block with a dot?
<b>Rikk Kvitek (CSUMB)</b>	voting on individual blocks (1 block=1 dot)
<b>David Ventresca (F &amp; G)</b>	Adv. Is that bio. Data is according to F & G .-need general priority
<b>Dick Pickrill</b>	res: controlled by equipment to some extent better to focus on
	<b>Group nominated adding EFH and HAPC to criteria on Workshop B</b>
	BREAK
	<b>Session #2</b>
<b>Nancy Wright (DFG)</b>	Q: high risk discussed?
<b>Todd Jacobs</b>	A:oil spills discussed, but not as risk
<b>George Robertson (Orange County Sanitation District Todd</b>	Q: why have EFH and HAPC separate?  Explanation
<b>David Cox</b>	Comments made for WSB only relating to specific sections?
<b>Todd</b>	Reiterate if you feel the need, but notes will all be combined
	<b>Short break to review</b>
<b>David Fox (OR Dept of F &amp; G)</b>	wants to do collaborative projects north and south
<b>Peter Barnes (USGS) 438,439</b>	NMFS endorsement for everything and CDFG coastal needs 5-10m depth NPS holdings? Where are they along the coast?
<b>Randy Imai (DFG-OSPR) 132,133</b>	Trinidad why: oil spill ended up in these blocks, state park, reserve, EFH and HAPC depth: 3-30m res: 10-100m

<b>Namcy Wright (CDFG)</b>	*new 1999 aerial photography of kelp beds for entire CA coast .-GIS formatted
<b>Monica Parisi (DFG)</b>	same as NMFS (needed everywhere) depth: 0-50m res: 10-100m
<b>Randy Imai</b>	endorse...oil spill in area
<b>David Fox (OR Dept of Fish and Wildlife)</b>	endorse...NMFS data depth: 0-50m why: Oregon fleet extends into N. CA
<b>102,112</b>	depth: 0-1000m res: 5-100m
<b>George Robertson</b>	existing data discussion (add to overlap) Western EMAP (started last summer- next couple yrs) EPA sponsored- collecting habitat and biology info to >200m in future Contracting out
<b>Jim Allen (So. Cal. Coastal Res. Council)</b>	Q: DPR have coastal data?
<b>Randy Imai</b>	A: archeological yes, but more terrestrial
<b>Peter Barnes</b>	Bodega Bay, Humbolt State?
<b>Randy Imai</b>	A: Humbolt State Univ project this year in Humbolt Bay...sponsored by F & G and County of Humbolt (208,209) .-political boundaries etc... GIS data
<b>Todd Jacobs</b>	Review of dot process

***End Session #2***

## Southern Region Working Session

Name/Institution	Water Depth	Why Data Needed	Bathymetry	Substrate	Resolution	Overlap
<b>Blocks of Interest</b>						
<b>Love (UCSB)</b>						
		Fish populations around oil platforms/ Platform	y	y	1-10 m	MBARI
	644	versus natural reef habitats	y	y	1-10 m	MBARI
	707	Possible marine preserve candidate	y	y	1-10 m	MBARI
	724	Rockfish habitats/overfishing	y	y	1-10 m	MBARI
684/685		Oil platforms versus natural reefs	y	y	1-10 m	MBARI
<b>Robertson (UCSD)</b>						
			y	y		CDF&G,CSU
	737 10-500 m	Baseline impact	y	y	1-10 m	MB,PNTW
	739 10-500 m	Bathymetry and substrate type	y	y	1-10 m	CDF&G,CSU
	740 10-500 m	Bathymetry and substrate type	y	y	1-10 m	MB,PNTW
	757 10-500 m	Existing outfalls	y	y	1-10 m	CDF&G,CSU
						MB,PNTW
<b>Airame (CINMS)</b>						
		Baseline Information and Stateholder Based Reserve	y	y		
684-690		Physical, Biological, Socio-Economic, and Recreation Habitat	y	y	10-100 m	MMS,MPS,&U
707-712			y	y	10-100 m	SGS
811-814			y	y	10-100 m	MMS,MPS,&U
						SGS
<b>Wakefield (NMFS)</b>						
			y	y		BLM,Lonsdale
122/203/218/223	20-200m	Stock Assessment, Habitat Accuracy, and gear impact	y	y	10 m shelf and 100m Slope	&Speiss (Scripps)

243/403/425/433	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
441/451/458/466	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
474/475/478/480	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
503/526/533/539	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
540/561/607/615	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
623/632/684/685	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
690/702/719/739	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
740/861	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
890/897	20-200m		y	y	10 m shelf and 100m Slope	BLM,Lonsdale &Speiss (Scripps)
871/872		Tanner and Cortez Banks	y	y	5-10 m	
889/890		Tanner and Cortez Banks	y	y	5-10 m	
	897	Tanner and Cortez Banks	y	y	5-10 m	
<b>LaCivita(ACoE)</b>						
	651	Dredge Material, Disposal Monitoring & Management	y	y	5-10 m	UCSD, City of San Diego
	652	Habitat and Endangered Species, Essential Fish Habitat	y	y	5-10 m	UCSD, City of San Diego

664	Navigation Channels (Cultural Resource)	y	y	5-10 m	UCSD, City of San Diego
738	NOAA Charts, Coastal Habitat Restoration Projects	y	y	5-10 m	UCSD, City of San Diego
878		y	y	5-10 m	UCSD, City of San Diego
740		y	y	5-10 m	UCSD, City of San Diego
<b>Fox(ODFW)</b>					
USGS Coverage	Fisheries Stock Assessment	y	y	100 m broad surveys	
Santa Monica to San Diego	Use Broad Target Surveys for High Resolution Targets	y	y	5-10 m rock Specialized surveys @ 2m	
<b>Wright (F&amp;G)</b>					
Extreme Nearshore, Kelp & Rockfish, 80m to shoreline habitat					
<b>Imai (F&amp;G)</b>					
	Biology and Substrate Modeling	y	y	90 m Resolution & 15 m for Rock Outcrop	UCSB
651-654	80 m contour	y	y		UCSB
664-665	80 m contour	y	y		UCSB
718-720	80 m contour	y	y		UCSB
	860 contour	y	y		UCSB
	877 contour	y	y		UCSB
	866 contour	y	y		UCSB
<b>Tan (MMS)</b>					



667-672	50-500 m	Oil Rig & Platform Leases	y	y	90 m resolution	MBARI & Oil Proprietary
704-706	50-500 m		y	y	10 m resolution minum	MBARI & Oil Proprietary
721-723	50-500 m		y	y		MBARI & Oil Proprietary
739-740	50-500 m		y	y		MBARI & Oil Proprietary
758-759	50-500 m		y	y		MBARI & Oil Proprietary
<b>Allen (SCCWRP)</b>						
Santa Monica to Dana Point	10-200 m	Trawl Surveys, Sediment Type, Contamination Monitoring, Infaunal Habitats	y	y	100x100m resolution	
SL Bight		Hard Bottom versus Soft Bottom Habitats	y	y	100x100m resolution	
871, 878-879		Cold versus warm essential fish habitat in C.I.M.S.	y	y	100x100m resolution	
860,861		Contamination monitoring critical for juvenile habitat	y	y		
738-740			y	y		
<b>Barnes (USGS)</b>						
		Coastal Hazards, Erosion, Bioresources, Habitat, Geologic Framework Geologic Hazards	y	y	<10 m horizontal < 7 m vertical	OSU OSU
<b>Carr (UCSC)</b>						
644		Decomission of oil platform Deep platform decomission and ecological research	y	y	3 m resolution	MMS
654-651		& monitoring	y	y		
684-687		Potential nearshore marine reserve	y	y		

<b>Espinoza (CDF&amp;G)</b>					
652-658		Oil Field Seeps	y	y	
666-672		Oil Field & Platforms	y	y	
718-719		Ports	y	y	
859,860,877		Ports	y	y	
<b>Grimes (NMFS)</b>					
<b>(SWFCC)</b>		Sport Fishing Habitats	y	y	3x3 m resolution
690/684/685	20-200m		y	y	
701/702/			y	y	
719/720/727			y	y	
739/740/756			y	y	
860-861			y	y	
<b>Caillet (MLML)</b>					
Canyon Heads		Overfishing			
644/645,661,676			y	y	10x20 m lower resolution
682,701,705,720			y	y	5x5 m higher resolution
721,842,843			y	y	
Basins					
668/669/670			y	y	
721/722/723			y	y	
741			y	y	
845-862,880			y	y	
<b>Kilbourne (USGS)</b>					
		Coastal and Marine Sediments			
<b>Cochrane (USGS)</b>					
0-100 m	Future Work		n	y	3 m resolution
685/690/709					
<b>NOAA</b>					

	701 0-60m	Multibeam	y	n	3x3 m resolution
	719 0-60m	Upcoming Projects (2000-2001)	y	n	
<hr/>					
<b>Meggitt (NCR)</b> 664-668	0-2000m	Cable Routing	y	y	30x30 m resolution

## Habitat Classification Working Session

### Sign-in Sheet

NAME	AFFILIATION	CONTACT INFO.
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Ron & Kathy McDowell	ORCAS IS. WA	360-376-3194
Dan Urban	Alaska Dept. F&G	<a href="mailto:dan_urban@fishgame.state.ak.us">dan_urban@fishgame.state.ak.us</a>
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### Classification Scheme Group (Day 2)

SPEAKER	DISCUSSION
Tom	<p>Introduction:</p> <ul style="list-style-type: none"> <li>- What is missing?</li> <li>- How can we modify it?</li> <li>- What can we combine?</li> <li>- What can we delete?</li> </ul>
Mary Q:	Who's using this scheme and how are we going to use it?
Gary A:	Exposure. Will people use it if it's modified? Ex. Add fjords
PeterQ:	How do we get from describing habitat to managing it? How is the scheme used to do this?
Gary A:	It's been done in Monterey and Alaska w/rockfish. It's a generic scheme to describe environments w/different species and correlate residency
? Q:	Problem coming from terrestrial-based descriptions. Do you have equivalent land-scheme?
Gary A:	Mostly be the same...Initiated to characterize environment for rockfish. Originally used NOAA nautical charts. After looking @ morphology, influenced fisheries management
Rick	Don't have knowledge of terrestrial. Another use of the scheme is to compare diff. Geographic areas of rockfish – used by resource management
? Q:	Does it blend w/traditional schemes?
Gary A:	Designed for shallow water habitat and was extended to deep water habitat
Greg Cailliet	Good to have a common ground between disciplines. Heavily geology oriented b/c biologists have yet to do biological surveys. It's a basic tool.
Ray Highsmith	<p>Applauds effort - deep water studies use remote sensing (geology-based)</p> <p>Need to understand geology and vice versa <b>*Need GLOSSARY of terms</b></p>
?	likes physical descriptions, weak depth breaks for biology (i.e. temp)
Greg C. Response:	fish tell you what zone you're in, <b>suggests using modifiers of species distribution</b>

?	need to get more specific, not everything can be defined by geology <b>*universal biologiv depth zones need to be integrated</b>
?Response	criticism implies appreciation and now need to discuss
USGS Canada	parallet w/terretrial environment, be careful w/pigeon hole, climate/ physical oceanography processes
Gary	we realize we need to address this
?	pigeon hole important to avoid, need to use %'s, but not pigeon hole <b>need to delete hard categories</b> (i.e. just say slope, not steep etc...)
Gary	reason is to have common understanding
Monica F & G	Scheme for marine habitats at Fish and Game defines habitat by species means, looking @ marine, estuaries, bays, etc..., cuts need to be made by depth, energy (open/protected coast), and habitat type, and substrate is a function of habitat type Goal: where this scheme matches benthic classification, now GIS mode, Advantage = doing mapping concurrently w/habitat classification Don't want classification driven by what can be mapped
?	need variables as well as constants
Monica	It's important to ground-truth variables
Rick Starr	Deep water is difficult b/c many species are unknown, <b>*consider how to adapt habitats that are NOT well-known</b>
Monica	Detail greater in deep water scheme – change shallow to have more detail may be good
Mary	it's lacking multiple data, so focused on what data could be collected, deep water climate data NOT yet available, but scheme needs to be able to accommodate
Rikk	Use geophysical data as baseline
Monica	What's driving presence of species?
Gary	Intent to associate species NOT using geophysical data as controlling factor
?	Fixety is an issue when laws are made, <b>need flexible definitions</b>

- Gary State of knowledge dictates legislatures
- Canada Get back to how can we best describe physical biological env., GIS helps bring perspective, **\*GLOSSARY important**
- Peter really describing substrate, not habitat
- Mary other research has been comparable w/this scheme, definitely deep water, not necessarily shallow
- Tom Q: what is cut-off for deep water?
- Greg C. SCUBA depths, supports geophysical baseline (side discussion w/Monica)
- Tom coordination between F & G and Gary et al. Is needed
- Jim Allen background fish contamination in S. Cal., Atlas of fishes of NE Pacific Basin – distrib. w/depth. Shelf is out to 200m (changes)  
Results of Atlas:  
Feeding guilds established, division between shallow and deep species, sometimes 3 categories of depth, see definite correlation between species shift and depth breaks, 3 depth zones on shelf = >10-200m based on temp., light, and energy (10-30, 30-100, 100-200) = inner, middle, outer  
>200 = mesobathyal etc...  
he showed a graph of environment versus size to show depth breaks are apparent  
**\*suggests using shelf zones (3) described above**
- ? **needs to be codable for GIS**, maybe specify depth # and individual defines shallow, deep, etc..., need to mesh qualitative and quantitative descriptors
- ? international scope? Want to maintain depth gradient?
- Jim Allen Yes
- ? what about corals, worms?
- Jim A. always have overlapping zones, just looking @ fish
- Gary #'s can change

BREAK FOR LUNCH

## Afternoon Goals:

- intent to define problems
- pictorial Atlas (future goal)
- want to make useful to community

Rikk Kvitek    GIS-based product vs. hardcopy Atlas, challenge for data Classification

Gary            maps of habitat used as baseline in GIS

Rikk            How does it take into account shifting physical parameters?

Gary            Applied to infauna

## LUNCH

## Recommendations to scheme:

Jim Allen      shallow to inner shelf, outer to middle...

?                universality?  
West coast minimum, need OR and WA  
Place system in larger geographic context w/scaled down to megahabitat

Ed Bowlby    Ref. "classification schemes in British Columbia" '98 by Zadaris

Jim A.         need review of world habitat classification literature

USGS           hook into ICES, marine habitat mapping task force  
Canada

Jim A.         LONGHURST classification scheme?

Peter?         Dredge spoil sites – dredge mat'l disposal sites add "hazardous, toxic,  
LaCivita       Radiological waste dump sites", add shipwrecks

Jim A.         add "outfall pipes"

Canada        Glossary

Peter          anthropogenic and artificial structures combined

Oregon        **feature descriptions should be mutually exclusive (no repetition),**  
David Fox    **simplify classes as much as possible, \*2 hierarchies = 1 based on scale**

Satie Airama   forced into hierarchy – not needed (assumed), \*not hierarchical scheme,  
More multi-dimensional



Peter depth seems to be overall theme, modified from there

David Fox **\*SCALE needs to be a major part**

Canada pull “biological processes modifier”

Satie make it independent attribute, not within system

Jim A. don’t call it biological “processes”

Tom need to address marine climate, currents, temp., light, etc...

Satie doesn’t work as hierarchy, instead define categories and check those that  
Apply (combine terms as one sees fit)  
**EVERYONE IN AGREEMENT!**

Jim A. review of multi-dimensional model (similar to European Union)  
- check parameters as they apply and avoid repetition  
**End Discussion**

## Data Sharing Working Session

Mediator: Mary Tsui

Scribe: ???, CSUMB and Kate Stanbury, MLML

### CONCERNS

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1. What are data?
2. Link/Search
3. Premature release of data
4. Conflicting mandates
5. Educational level of user (technical competence) – what do they do with the data once they have it?

Though the above concerns were raised all attendees supported data sharing.

### MEMORANDUM OF AGREEMENT (MOA)

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Jim Gardner, USGS: Why have an MOA? Federal agencies are required to share data through FOIA.

OC: Should make effort as seamless as possible to avoid duplication

Nancy Wright, CDFG: concerned with locating available data

Mary Tsui: metadata development is important so you know what you have

Jim Gardner, USGS: Two levels to sharing data, 1) philosophical and 2) day-to-day practicality

Dallas Meggitt, (NRC): NGDC accepts and disseminates data in any format. Deepwater mapping community has used NGDC to identify data – states the shallow water community should be aware of FGDC data standards.

Dave Caress, MBARI: In summary, 1) agree to share data, 2) NGDC is a good source for archiving and dissemination, 3) require metadata (include in contracts), 4) data will become increasingly available due to internet.

### METADATA

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All agree a standard metadata scheme is important but which should be used?

Jim Gardner, USGS: suggests use of MGDC(???), 20-30 fields to consider

Dave Caress, MBARI: emulates standard for end user, customer kept in mind

Jim Oakden, ABA: metadata is much more complicated for biology due to changing taxonomy, difficult to develop a method to archive in order to compare past with future.

Nancy Wright, CDFG: only certain fields are necessary but nevertheless is required, FGDC standard not always completed.

### SUGGESTED ACTIONS

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- ♦ An ongoing body should be established, user group for the future to address where to go from here, provide recognition for an MOA.
- ♦ Common area of Project (data) sharing, - website is suggested
- ♦ Partnerships
- ♦ Begin with an area –wide (Monterey Bay) effort
- ♦ Proposal should be submitted to run a server – Gary Greene's Center for Habitat Studies may be an option though there are concerns about longevity of funding, who provides the data, and who would fund such an effort

- ◆ Suggest use of NOAA standard for data collection
- ◆ Suggest use of using the FGDC website as archiving and dissemination source

The attendees suggest endorsing Rikk Kvitek and/or Gary Greene to develop a Coastal Mapping Data Sharing Scheme and to create an ongoing body to facilitate data exchange and information.

#### DISCUSSION OF HANDOUTS

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To address an ongoing body see page 4, # 3 in “Components of an MOU/MOA”

Content standards in metadata are difficult to require - handout suggests an organization must give a 6-month notification of intention to withdraw from the MOA.

#### FINAL COMMENTS

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Is the Habitat Task Force a continuing body?

Rikk Kvitek, CSUMB: declares CSUMB is unwilling to orchestrate the task force in the future

Perhaps a virtual community will support exchange as well as special interest groups and publications.

CCJDC may be the appropriate venue for an overseer role but the responsible organization must take a coordinator role in order to be viable.

## **MEMORANDUM OF AGREEMENT FOR DATA SHARING**

THIS AGREEMENT is entered into between the Central Coast Joint Data Committee and public and private organizations ("Partners") which are either users or developers of Geographic Information System (GIS) coverages and spatial data, for the California Central Coast Region which can be used for planning and management, for the purpose of sharing and cooperative use of GIS coverages other spatial data ("Coverages and Spatial Data").

### **RECITALS**

WHEREAS, each of the Partners is concerned with planning or management; and

WHEREAS, each of the Partners use GIS or other information technology to accomplish those goals; and

WHEREAS, there is significant overlap in the data needed for the planning and analysis tasks to be accomplished; and

WHEREAS, the data that must be developed or acquired for these purposes is expensive and sharing of data will allow Partners to accomplish these goals at lower cost; and

WHEREAS, there are administrative, organizational and technical barriers which have prevented data sharing in the past; and

WHEREAS, the Central Coast Joint Data Committee ("CCJDC") was created in 1996 to address the issues surrounding spatial data sharing;

NOW THEREFORE, the parties agree to the cooperative process for the sharing of spatial data about the California Central Coast as itemized below:

### **I. Common Base Map(s)**

The parties to this agreement agree that data will, to the extent possible, be held in common registration to facilitate the transfer of information between Partners. The common registration will be specified by the CCJDC.

### **II. Sharing and Registration of Existing and Future Coverages and Spatial data**

- A. **Sharing, Distribution and Update of Coverages and Spatial Data.** Each party to this agreement will make available to the other parties any coverages and spatial data developed by the Partner insofar as the distribution of the coverages and spatial data is not limited by licenses, proprietary ownership cost sharing agreements or the Public Records Act.

Each party shall also make available any updates of existing coverages and spatial data as they are developed. All coverages and spatial data and documentation shall be made available to the CCJDC for distribution to the other parties to this agreement within two (2) months following the completion and acceptance of the coverage by the Partner. The CCJDC will facilitate the provision of all coverages and spatial data and documentation to the participants in this agreement within two (2) months of receipt from the cooperating agencies. The CCJDC will maintain a current catalog of all coverages and spatial data available to participants in this agreement.

- B. **Transaction Costs and Fees.** The parties to this agreement shall not pay any fees for the acquisition or use of the coverages and spatial data, other than normal transaction costs, including labor and media costs for the copying of data.

C. **Restrictions on Use.**

The parties to this agreement shall use the coverages and spatial data provided by other parties solely for their own purposes. To the extent of agency policy, no provision of this agreement shall limit the application of the Public Records Act (or, in the case of Federal Partners, the Freedom of Information Act) to the parties to this agreement.

- D. **Hold Harmless.** The CCJDC and each party to this agreement shall accept coverages and spatial data from all other parties "as is." In addition, each party to this agreement shall hold harmless every other party. Partners shall require any third party users of these coverages to agree in writing to hold harmless all parties to this agreement.

The parties to this agreement represent that the coverages and spatial data are complex and time sensitive and that they may contain some nonconformities, defects, or errors. The coverages and spatial data represent the best available information. The parties to this agreement do not warrant that the coverages and spatial data will meet users' needs or expectations, or that all nonconformities, defects or errors can or will be corrected.

- E. **Attribution.** Any authorized use of information derived or generated from coverages and spatial data provided pursuant to this Agreement in any product shall acknowledge the appropriate party to this agreement as the source, and include any qualifications deemed appropriate given the specific data quality and application of the derived information.

- F. **Data Transfer Format.** The coverages and spatial data will be prepared in a format widely used by CCJDC members. The CCJDC may establish further standards for data transfer format as required to accommodate parties to this agreement.

### III. Documentation: Metadata and Data Dictionaries

Each party to this agreement will make available to all other parties the metadata and data dictionaries necessary for responsible use of the shared coverages and spatial data.

The materials to be supplied will be made available in a standard format agreed upon by the CCJDC, and will be published and updated no less than every 6 months based on new information provided by the Partners.

#### **IV. Central Coast Joint Data Committee**

- A. Each party to this agreement will designate one staff member and one alternate to serve on the Central Coast Joint Data Committee (CCJDC). The CCJDC shall meet at least quarterly to:
  - 1. Apply and adjust as necessary existing standards for documentation, data formats, geographic accuracy, updating and database design, under development by the Federal Geographic Data Committee,
  - 2. Facilitate the transfer of coverages and spatial data among the parties to this agreement,
  - 3. Inform the parties to this agreement of new data development activities on the part of any party to this agreement,
  - 4. Coordinate training opportunities, and
  - 5. Set priorities for and design future cooperative data collection and development activities, using a cooperative process determined by the CCJDC as described in Item VI of this agreement.
- B. The CCJDC shall function according its own bylaws and operating procedures.
- C. AMBAG and its non-profit foundation agrees to enter into contracts on behalf of the CCJDC.

#### **V. Standards**

All parties to this agreement will work through the CCJDC to apply and adjust as necessary existing standards for documentation, data formats, updating and database design, under development by the Federal Geographic Data Committee. Further, to the extent possible, all parties agree to abide by these standards in the development of coverages and spatial data.

#### **VI. Coverage or Spatial Data Development**

The CCJDC may jointly develop new coverages and spatial data. The priorities for the development of new coverages shall be determined by a cooperative process (such as a workshop, conference, forum or other approach) which invites the input of interested partners.

No party to this agreement shall be required to participate in the development of any coverages and spatial data.

#### **VII. Terms of Agreement**

- A. Any of the parties to this agreement shall have the right to withdraw from this agreement by action of the policy board of the party and by giving the other parties six (6) months notice in writing.
- B. New parties not identified under (A) may be admitted to this agreement in the following manner: The party seeking admission shall make a written request for admission to the CCJDC, which will then vote on the

request.

C. This agreement may be amended on recommendation of the CCJDC.

Accepted

\_\_\_\_\_  
Chair, CCJDC

\_\_\_\_\_  
Date

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Date

### *Components of an MOA/MOU*

1. Introductory paragraph stating what you intend to do.
2. Recitals - the "whereas" statements that elaborate upon the introductory paragraph. These are optional but often useful in setting the tone of the agreement. The "whereas" statements are followed by a "Now Therefore" statement that essentially says, "since we have all these reasons, here's what we're going to do."
3. The details of what you intend to do, including any caveats. Typical of inclusion are the following:
  - 3.1. Statement of sharing
  - 3.2. Restrictions on use - essentially the waiver statement
  - 3.3. Hold harmless statement - not responsible for another's use of the data
  - 3.4. Attribution statement - citation of originator
  - 3.5. Data transfer format
  - 3.6. Documentation - metadata, data dictionaries
  - 3.7. Creation of maintenance body
  - 3.8. Standards - probably could be lumped in with documentation
  - 3.9. Terms of agreement - how much notification is required to leave the agreement



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## *Map Waivers Commonly Used*

1. **SANDAG:** While the data have been tested for accuracy and are properly functioning, SANDAG disclaims any responsibility for the accuracy or correctness of the data. **THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE AND/OR ANY OTHER TYPE WHETHER EXPRESSED OR IMPLIED.** In no event shall SANDAG become liable to users of these data, or any other party, for any loss or damages, consequential or otherwise, including but not limited to time, money, or goodwill, arising from the use, operation or modification of the data. In using these data, users further agree to indemnify, defend, and hold harmless SANDAG for any and all liability of any nature arising out of or resulting from the lack of accuracy or correctness of the data, or the use of the data.

To assist SANDAG in the maintenance of the data, users should provide SANDAG, at the address shown below, information concerning errors or discrepancies found in using the data.

SANDAG  
Attn: GIS Project Manager  
401 "B" Street, Suite 800  
San Diego, CA 92101

[gismaster@sandag.cog.ca.us](mailto:gismaster@sandag.cog.ca.us)

In using the data, users should be aware that these data are generalized and not parcel based, and were created for use in regional planning projects.

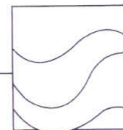
**Please acknowledge SANDAG as a source when SANDAG data are used in the preparation of reports, papers, publications, maps, and other products.**

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2. **California Coastal Commission:**

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# A classification scheme for deep seafloor habitats

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**Abstract** – A standard, universally useful classification scheme for deepwater habitats needs to be established so that descriptions of these habitats can be accurately and efficiently applied among scientific disciplines. In recent years many marine benthic habitats in deep water have been described using geophysical and biological data. These descriptions can vary from one investigator to another, which makes it difficult to compare habitats and associated biological assemblages among geographic regions. Using geophysical data collected with a variety of remote sensor systems and in situ biological and geologic observations, we have constructed a classification scheme that can be used in describing marine benthic habitats in deep water. © 1999 Ifremer / CNRS / IRD / Éditions scientifiques et médicales Elsevier SAS

**habitat / universal classification / benthic / fisheries management**

**Résumé** – Une classification des habitats benthiques profonds. Un système de classification des habitats benthiques profonds, pour avoir valeur de référence générale, doit pouvoir être mis en pratique avec précision et efficacité dans les disciplines scientifiques. Ces dernières années, les habitats marins benthiques profonds ont été décrits à partir de données géophysiques et biologiques ; les descriptions varient d'un chercheur à l'autre, rendant la comparaison difficile entre les habitats et les populations de différentes régions géographiques. Des données géophysiques obtenues par plusieurs systèmes de détection à distance, et des observations biologiques et géologiques in situ, ont permis d'établir une classification qui est proposée pour décrire les habitats marins benthiques en eau profonde. © 1999 Ifremer / CNRS / IRD / Éditions scientifiques et médicales Elsevier SAS

**habitat / classification universelle / benthique / gestion des pêcheries**

## 1. INTRODUCTION

Remote sensing and large-scale mapping of the seafloor are gaining popularity for assessing habitats and potential

impact of human disturbances (such as bottom trawling) on benthic organisms. Because many benthic habitats are defined by their geology (along with depth, chemistry, sedimentology, associated biotic communities and other

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attributes), geophysical techniques are critical in determining habitat structure and lithology (rock type). However, with the increased use of multidisciplinary techniques (i.e. in situ observations as well as geophysical sensors) and nomenclature (geological, geophysical and biological) to define benthic habitats, it has become apparent that a standard classification scheme is needed to more accurately and efficiently interpret and compare habitats and associated assemblages across geographic regions.

Until recently, assessment of benthic marine habitats and associated biological assemblages has been mostly limited to intertidal and subtidal (i.e. 0–30 m water depth) regions of the continental shelf. Extensive characterization, mapping and classification schemes have been developed for European shallow coastal biotopes, primarily using Scuba, video surveys, acoustic imaging and geologic sampling in the northeast Atlantic [5–7, 13–15, 24]. In North America, marine geophysical methodologies, such as side-scan sonar, swath bathymetry and seismic reflection profiling, are now being used to investigate benthic habitats in deep water (i.e. > 30 m; [1, 2, 4, 11, 12, 26–28, 31–33]). These techniques use sound sources of different frequencies to produce images of surface and subsurface features of the seafloor. Reflected sound waves are recorded as seafloor images in plane, areal and cross-section views. Additionally, increased availability and use of underwater video camera systems on remotely operated vehicles (ROVs), occupied submersibles, and benthic sleds have made fine-scale surveys of habitats and associated biological assemblages in deep water more commonplace [10, 30].

Although habitat characterization in areas of abrupt bathymetry and deep water is in its infancy, several pioneering studies pertaining to fisheries habitats have been conducted along the continental margin of North America. For example, fisheries habitats have been studied in the Gulf of Maine over the Georges and Stellwagen Banks [16, 17, 27, 28], middle Atlantic Bight [3], and other areas along the east coast of the US [1, 2, 26]. Along the west coast of North America recent investigations of essential benthic habitats of rockfishes have been reported off central California [11, 12, 31, 32, 33], British Columbia [18] and southeast Alaska [20, 21, 29]. Because many of these studies have not yet been widely reported, a workshop on “Applications of Side-scan Sonar and Laser-line Systems in Fisheries Research” was held in an effort to standardize these newly developed methods [19].

Information on benthic habitats is critical to the understanding and prediction of spatial distribution and abundance of many species of fishes. Using geology, geophysics, and biological observations, we describe here a classification scheme that is being applied primarily to benthic habitats of rockfish assemblages in deep water (i.e. 30–300 m) along the west coast of North America. We also suggest that this scheme can be developed further as a model for characterizing seafloor habitats elsewhere, and extended to subsurface assemblages that would include the endofauna.

## 2. CLASSIFICATION OF HABITATS

We have adopted a classification scheme developed by Greene et al. [12], which was modified after Cowardin et al. [8] and Dethier [9], and based on remote sensing geophysical and geological techniques that are used to define and map the seafloor in deep water. The interpretations of these geophysical and geological data are groundtruthed or verified using in situ biological and seafloor observations, which is a critical element for habitat classification.

**Megahabitats** refer to large features that have dimensions from kilometers to tens of kilometers, and larger. *Megahabitats* lie within major physiographic provinces, e.g. continental shelf, slope and abyssal plain [23]. Although a physiographic province can be a *megahabitat*, more often these provinces comprise several different *megahabitats*. Other examples of *megahabitats* include submarine canyons, seamounts, lava fields, plateaus, large banks, reefs, terraces, and expanses of sediment-covered seafloor.

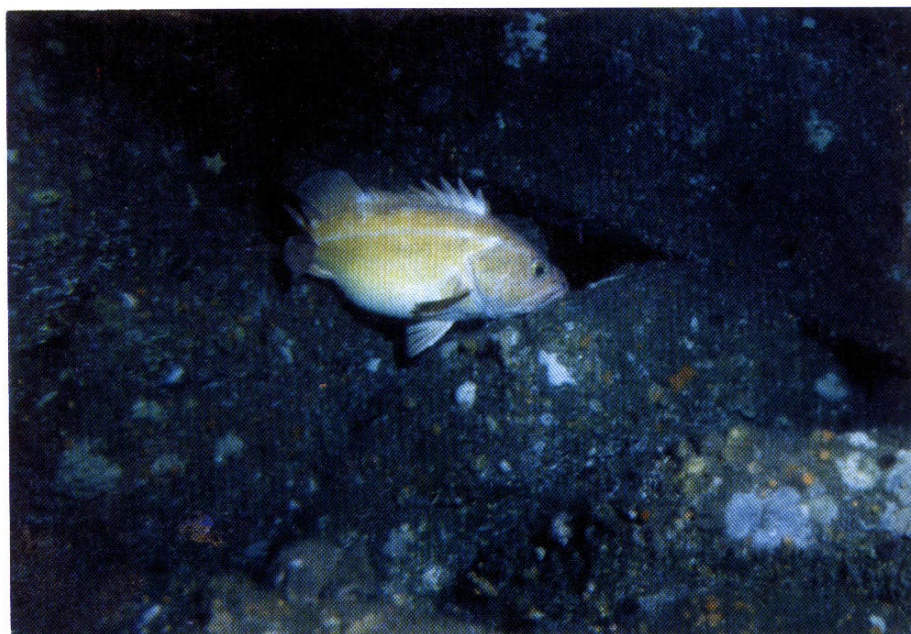
**Mesohabitats** are those features having a size from tens of meters to a kilometer. *Mesohabitats* include small seamounts, canyons, banks, reefs, glacial moraines, lava fields, mass wasting (landslide) fields, gravel, pebble and cobble fields, caves, overhangs and bedrock outcrops. More than one *mesohabitat*, and similar *mesohabitats* (in terms of complexity, roughness, and relief), may occur within a *megahabitat*. Distribution, abundance and diversity of benthic fishes vary among *mesohabitats* [1, 20, 25]. Similar *megahabitats* that include different *mesohabitats* likely will comprise different assemblages of fishes and, following from this, similar *mesohabitats* from different geographic regions likely comprise similar fish assemblages (see figure 1, for example).

**Macrohabitats** range in size from one to ten meters and include seafloor materials and features such as boulders,





A



B

**Figure 1.** Yelloweye rockfish (*Sebastes ruberrimus*) associated with boulder mesohabitat at (a) base of volcanic cone in the offshore Edgecumbe lava field off southeast Alaska, and (b) in 90 m water off Pt. Sur, central California.

blocks, reefs, carbonate buildups, sediment waves, bars, crevices, cracks, caves, scarps, sink holes and bedrock outcrops [4, 20]. *Mesohabitats* can comprise several

macrohabitats. Biogenic structures such as kelp beds, corals (solitary and reef-building) and algal mats also represent *macrohabitats*.

**Microhabitats** include seafloor materials and features that are centimeters in size and smaller, such as sand, silt, gravel, pebbles, small cracks, crevices and fractures [3]. **Macrohabitats** can be divided into *microhabitats*. Individual biogenic structures such as solitary gorgonian corals (e.g. *Primnoa* spp), basket sponges (e.g. *Spongia* spp) and sea anemones (e.g., *Metridium* spp) form *macro-* and *microhabitats*.

We propose the following standard classification structure:

## 2.1. System

(based on salinity and proximity to the seafloor)

We have developed this habitat classification scheme for the Marine Benthic System, as compared with Estuarine or Freshwater and Pelagic, Epipelagic, etc. systems.

– Marine Benthic

**Subsystem** (mega- and mesohabitats based on physiography and depth) Depth intervals are relevant to fisheries assessment and management.

(see figure 2 for an illustration of several megahabitats)

– *Continental Shelf*

Intertidal (salt spray to extreme low water)

Shallow Subtidal (water depth = 0–30 m)

Outer (water depth = 30–200 m [~ location of shelf break])

– *Continental Slope*

Upper (water depth = 200–500 m)

Intermediate (water depth = 500–1 000 m)

Lower (water depth = 1 000 + m)

– *Continental Rise* (water depth = 3 000–5 000 m)

– *Abyssal Plain* (~ water depth = 5 000 +m)

– *Trenches* (~ water depth = 3 000–11 000 m)

– *Submarine Canyons*

Head (water depth = < 100 m)

Upper (water depth = 100–300 m)

Middle (water depth = 300–500 m)

Lower (water depth = 500–1 000 + m)

– *Seamounts*

Top

Flank

Base

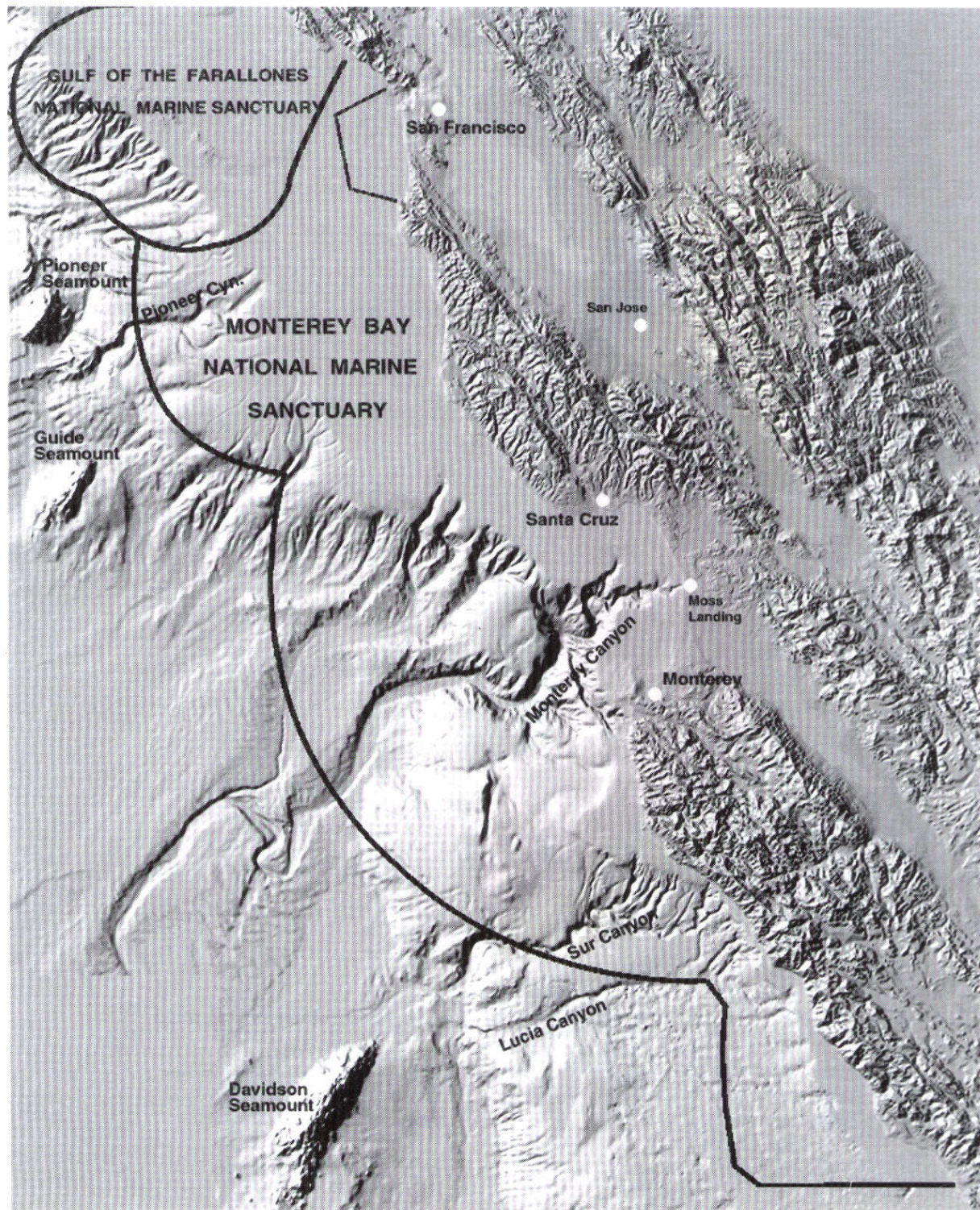
**Class** (meso- or macrohabitats based on seafloor morphology) (see figure 3 for an example of mesohabitats) e.g.:

- Bar
- Sediment Wave
- Bank
- Moraine
- Cave, Crevice (ragged features)
- Sink
- Debris Field, Slump, Block Glide, Rockfall
- Groove, Channel (smooth features)
- Ledge
- Vertical Wall
- Pinnacle
- Mound, Buildup, Crust (> 3 m in size)
- Slabs
- Reef (carbonate feature)
  - Biogenic
  - Nonbiogenic
- Scarp, Scar
- Terrace
- Vent
- Artificial Structure (wreck, breakwater, pier)
- Lava Field
  - Compression Ridge
  - Lava Tube
  - Crater
  - Lava flow

**Subclass** (macro- or microhabitats based on substratum textures) (see figure 4 for an example of macro- and microhabitats) e.g.:

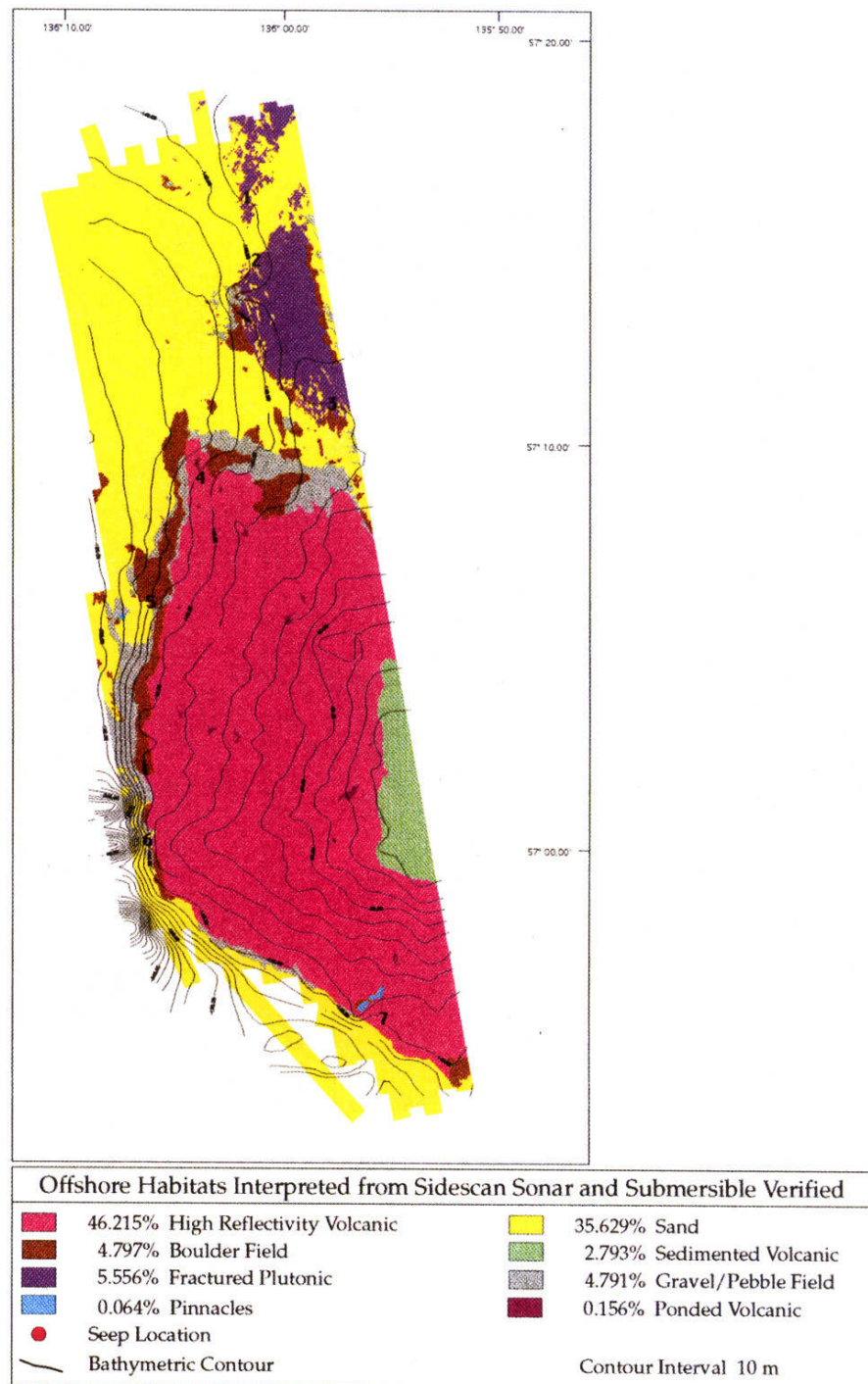
- Organic Debris (coquina; shell hash; drift algae)
- Mud (clay to silt; grain size < 0.06 mm)
- Sand (grain size = 0.06–2 mm)
- Gravel (grain size = 2–4 mm)
- Pebble (grain size = 2–64 mm)
- Cobble (grain size = 64–256 mm)
- Boulder (grain size = 0.25–3.0 m)
- Mixed Sediment (combinations of all of the above)
- Bedrock





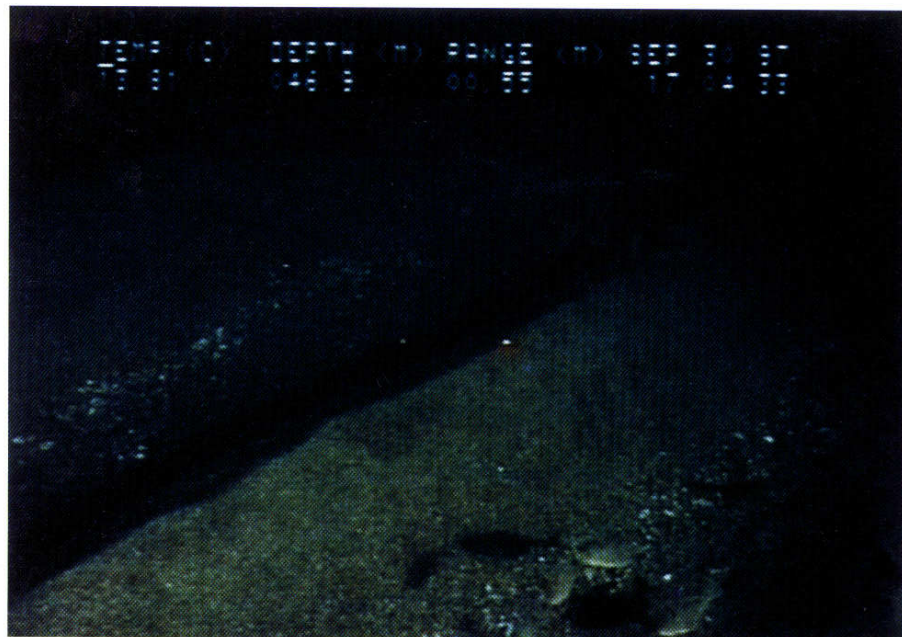
**Figure 2.** Physiographic map (based on NOAA SeaBeam swath bathymetric data) of central California megahabitats, including submarine canyon, continental slope and shelf, and seamounts.



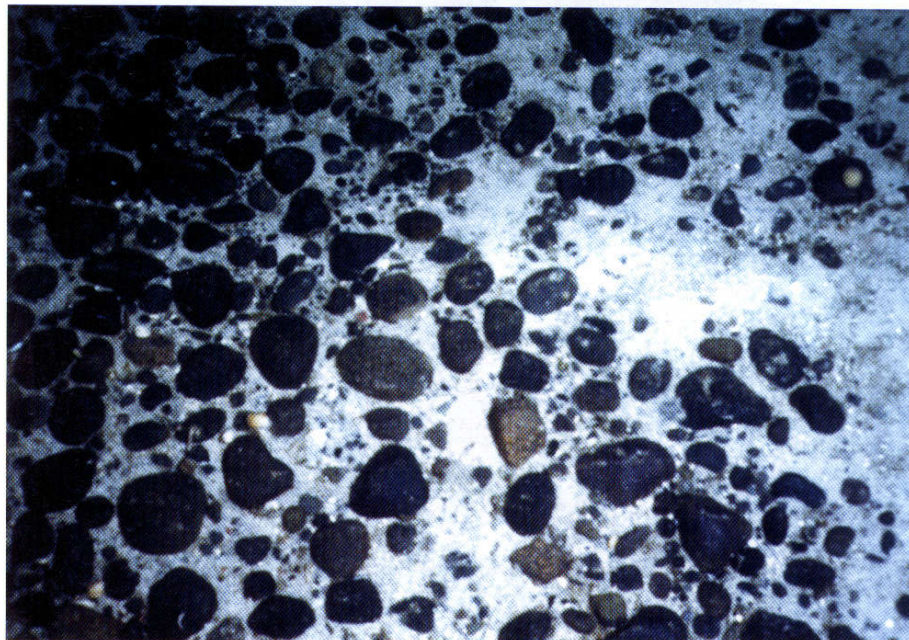


**Figure 3.** Geological map of the offshore Edgecumbe lava field, including lava flows, moraines, volcanic cones and other mesohabitats. Map based on AMS 150 kHz side scan sonar and interferometry bathymetric data.





A



B

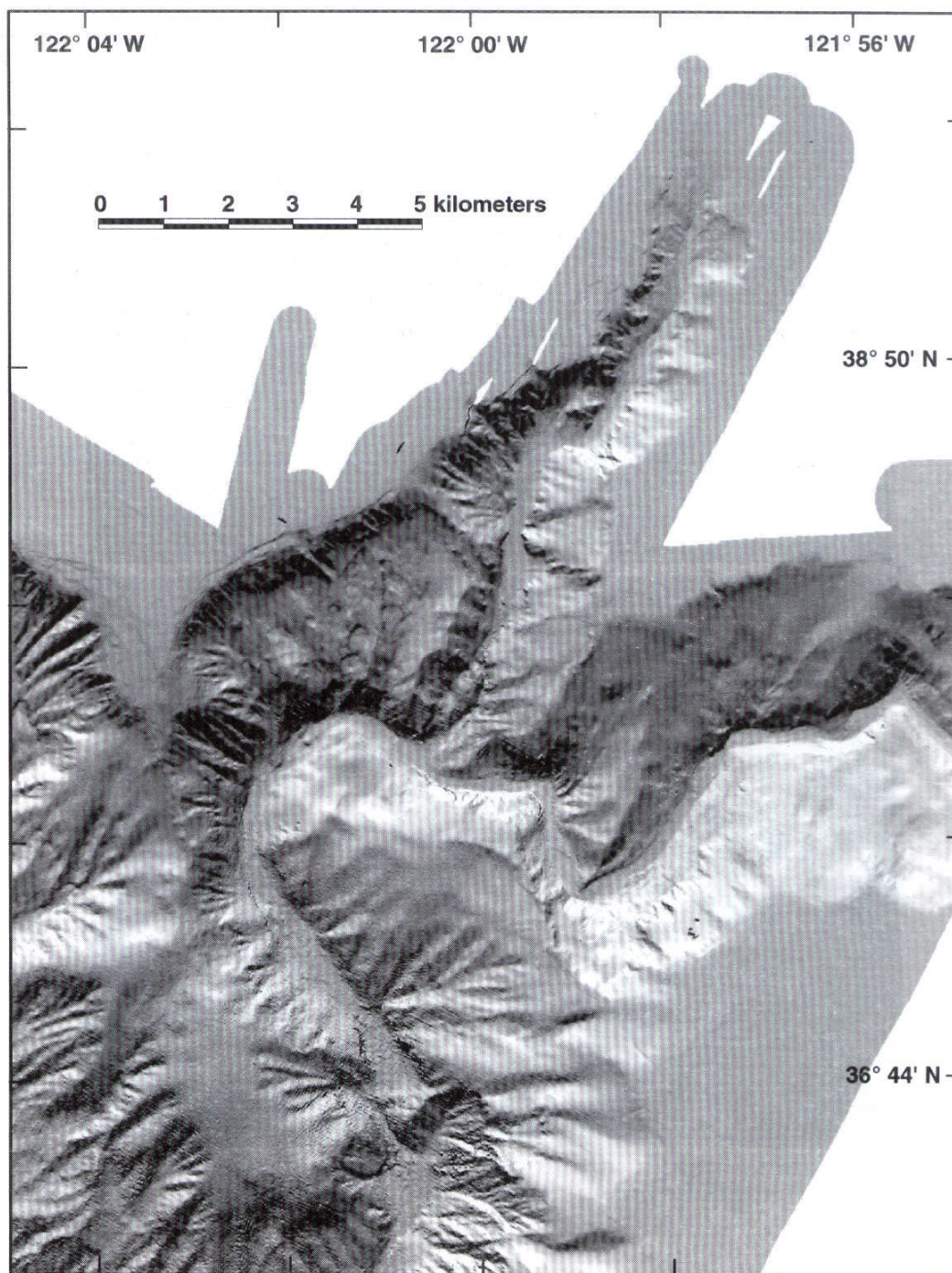
**Figure 4.** (a) Sand wave macrohabitat with speckled sanddabs (*Citharichthys stigmaeus*) in Big Creek Ecological Reserve, central California (note: 20-cm dual laser spots in center of photograph as scale), and (b) pebble microhabitat in offshore Edgecumbe lava field, southeast Alaska.

- Igneous (granitic; volcanic)
- Metamorphic
- Sedimentary

**Subclass** (macro- and microhabitats based on slope) e.g.:

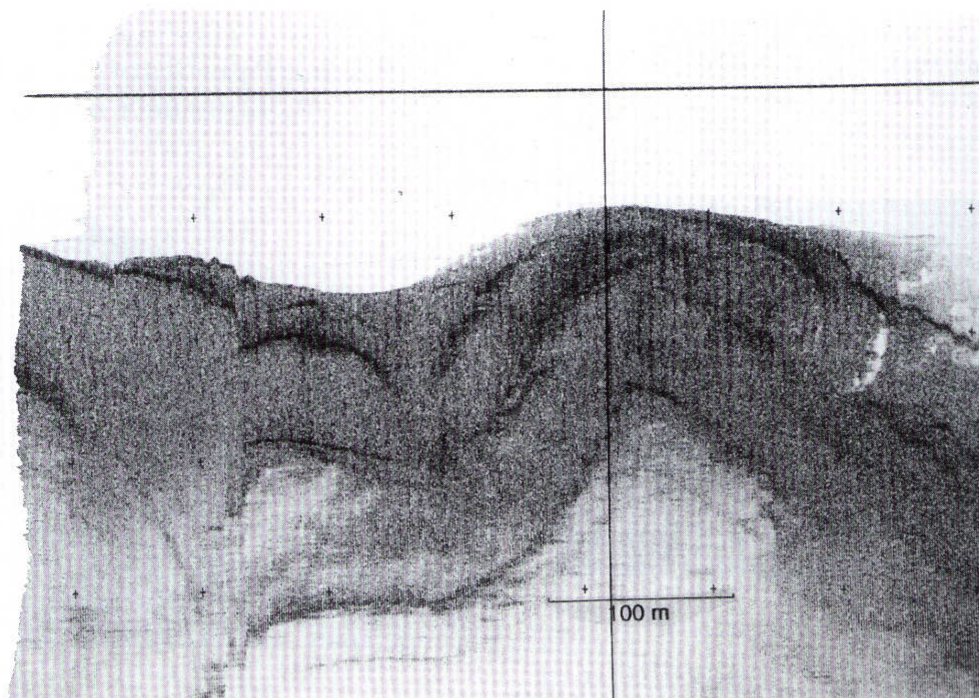
- Flat (0–5°)
- Sloping (5–30°)





**Figure 5.** Bathymetric image of mega- and mesohabitats in Soquel Canyon. These data were recently collected by the Monterey Bay Aquarium Research Institute using a Simrad EM 300 kHz swath mapping system.



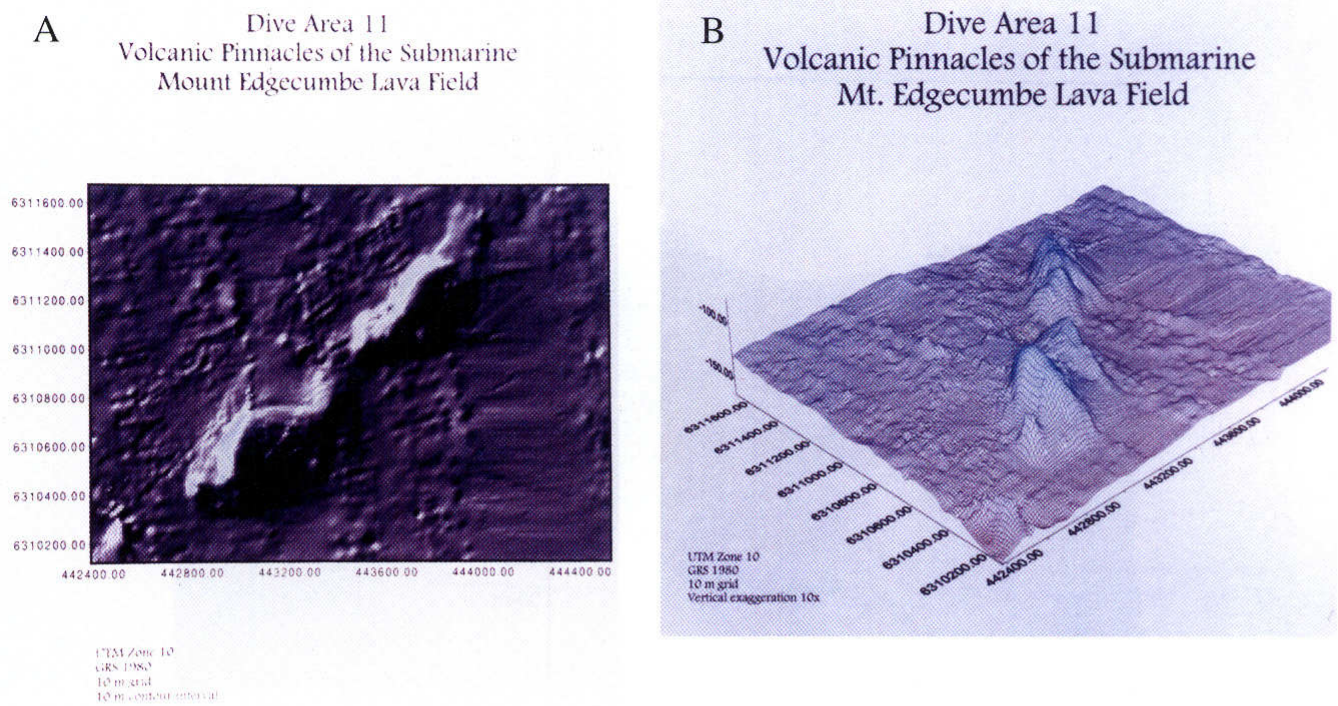


**Figure 6.** Side scan sonar (100 kHz system) image of differentially eroded sedimentary rock outcrop along a wall of Soquel Canyon, Monterey Bay, California.



**Figure 7.** Crevice in the Pliocene Purisima formation that has been differentially eroded along the walls of Soquel Canyon, Monterey Bay, California. Photograph taken from the submersible *Delta* in 180 m water. This is typical habitat of adult greenspotted rockfishes (*Sebastes chlorostictus*).





**Figure 8.** Bathymetric (a) shaded-relief and (b) net mesh diagrams of pinnacle (volcanic cones) mesohabitats located on the southern end of the offshore Edgecumbe lava field off Sitka, Alaska. Images produced from AMS 150 kHz side scan sonar.



**Figure 9.** Biological microhabitats of algae and sea anemones with lingcod (*Ophiodon elongatus*) and young of the year rockfish (*Sebastes* spp.) on top of rock pinnacle mesohabitat (see figure 8 for location). Photograph taken from submersible *Delta*. Note lingcod (40 cm total length) for scale.

- Steeply Sloping (30–45°)
- Vertical (45–90°)
- Overhang (> 90°)

## 2.2. MODIFIERS

### – for bottom morphology

- regular (continuous homogeneous bottom with little relief)



- irregular (continuous non-uniform bottom with relief 1–10 m in height)
- hummocky (uniform bottom with mounds or depressions 0–3 m in height or depth)
- structure (fractured, faulted, folded)
- outcrop (amount of exposure)
  - bedding
  - massive
  - friable

**– for bottom deposition**

- consolidation (unconsolidated, semi-consolidated, well-consolidated)
- erodability (uniform, differential)
- sediment cover
  - dusting (thickness of layer < 1 cm)
  - thin (thickness of layer = 1–5 cm)
  - thick (thickness of layer > 5 cm)

**– for bottom texture**

- voids (percentage volume occupied by clast or rock)
- sorting (i.e. well sorted; poorly sorted)
- packing (i.e. well packed; poorly packed)
- density (particle concentration)
  - occasional  
(random occurrence of feature, e.g. boulder)
  - scattered (feature covers 10–50 % of area)
  - contiguous (features are close to touching)
  - pavement (features are touching everywhere)
- lithification
- jointing
- clast (rock) roundness
- clast shape
  - blocky
  - lensoidal
  - boitroidal (e.g. pillow lava)
  - needle-like
  - angular

**– for physical processes**

- currents
  - winnowing

- scouring or lag deposits
- sediment trail
- wave activity
- upwelling
- seismic (earthquakes, shaking and fault rupture)
- for chemical processes**
  - vent chemistry (sulfur, methane, freshwater, CO<sub>2</sub>)
  - cementation
    - weathering or oxidation (fresh to highly weathered)

**– for biological processes**

- bioturbation (tracks, trails, burrows, excavation)
- cover of encrusting organisms
  - continuous (> 70 %)
  - patchy (20–70 % cover)
  - little to no cover (< 20 %)
- communities (examples of conspicuous species)
  - sea anemones
  - crinoids
  - vase sponges
  - coralline algae
  - kelp understory
  - sea grasses
  - kelp forest

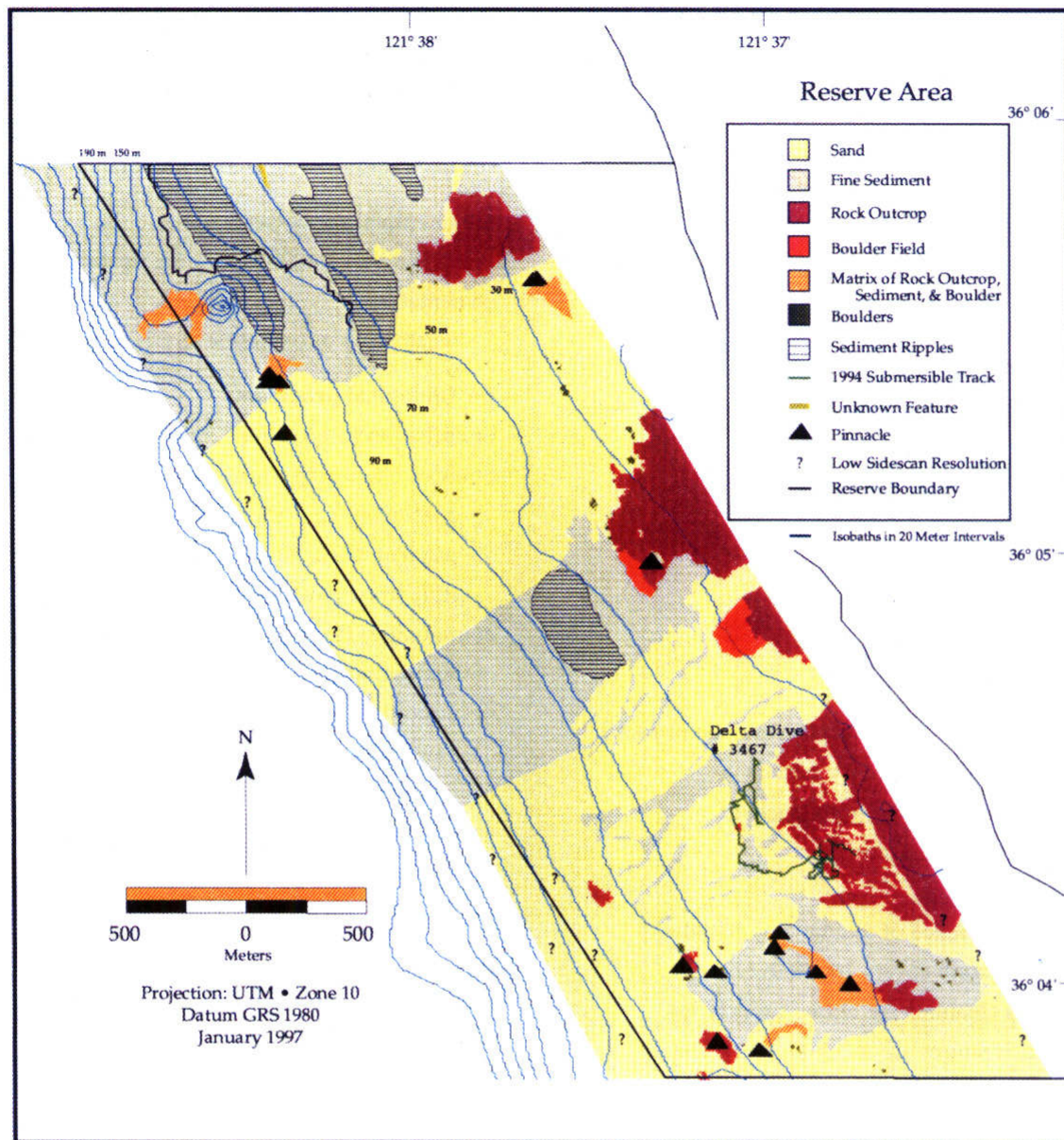
**– for anthropogenic processes** (examples of human disturbance)

- artificial reefs
- dredge spoil piles
- trawl and dredge tracks
- discarded and lost fishing gear

### 3. EXAMPLES OF MARINE BENTHIC HABITATS

Soquel submarine canyon in Monterey Bay, California has been described using our habitat classification scheme:

A megahabitat comprising upper submarine canyon (100–300 m), steeply sloping (30–45°) walls, and locally including mesohabitats of vertical walls (80–90°) with landslide morphology (slump scarps and debris field; *figure 5*). Macro- and mesohabitats include well-bedded,



**Figure 10.** Map of mega- and mesohabitats in the Big Creek Ecological Reserve off central California, as interpreted from 100/500 kHz EG&G side scan sonar images.

friable outcrops of sandstone, mudstone and coquina. Differentially eroded beds (figure 6) along the canyon walls form overhangs ( $> 90^\circ$ ) and crevices (figure 7); landslide debris produces irregular seafloor conditions consisting of scattered blocky boulders of sandstone interspersed with a fairly bioturbated mud seafloor. Landslide debris contains 40 % boulders, 20 % cobble field and 40 % mud.

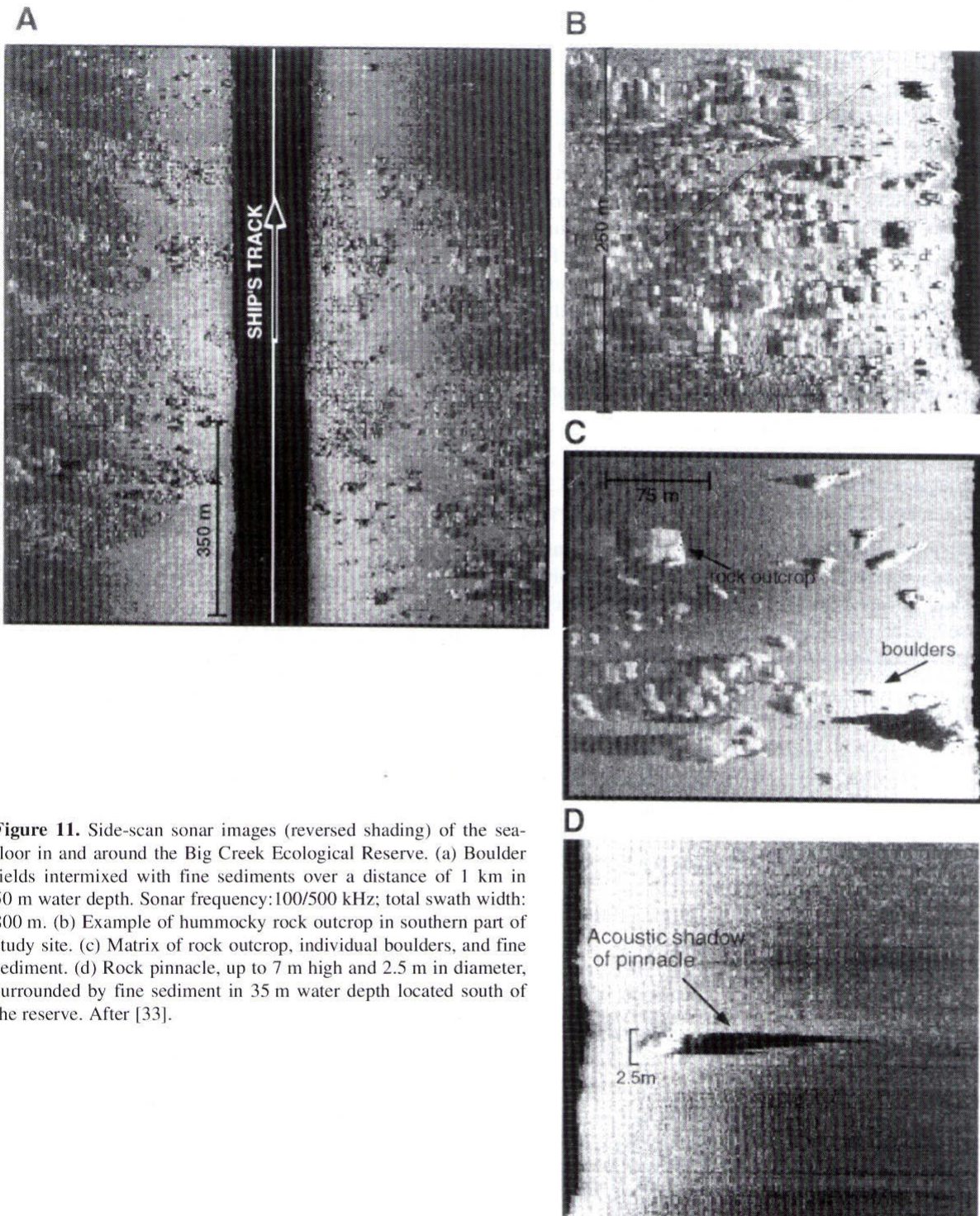
These descriptions of habitats in relatively deep water, together with the quantitative analyses of associated fish

assemblages, are valuable in predicting community structure and evaluating changes to that structure, as well as in applying small scale species-habitat relationships to broader scale fishery resource surveys.

An example from a volcanic lava field that is essential habitat for yelloweye rockfishes (*Sebastes ruberrimus*) off southeast Alaska has been described using our classification scheme:

Lava field megahabitat on continental shelf in intermediate water depths (30–200 m). Meso- and macrohabitats





**Figure 11.** Side-scan sonar images (reversed shading) of the seafloor in and around the Big Creek Ecological Reserve. (a) Boulder fields intermixed with fine sediments over a distance of 1 km in 50 m water depth. Sonar frequency: 100/500 kHz; total swath width: 800 m. (b) Example of hummocky rock outcrop in southern part of study site. (c) Matrix of rock outcrop, individual boulders, and fine sediment. (d) Rock pinnacle, up to 7 m high and 2.5 m in diameter, surrounded by fine sediment in 35 m water depth located south of the reserve. After [33].

include pinnacles (volcanic cones), ledges, vertical walls, collapsed lava tubes, compression ridges, caves and crevices, moraines and extensive sand fields (figure 3). The

lava field is irregular (1–3 m relief) with both a'a' and pahoehoe lava flows. Pinnacle mesohabitat (figure 8) has a large boulder apron macrohabitat at the base, with



vertical walls of columnar basalt forming the flanks, and an irregular top that supports a microhabitat of anemones, hydrocorals, bryozoans, and redtree coral (*figure 9*).

Evidence from in situ observations of fish abundance and distribution, combined with extensive benthic habitat mapping, led to our recognition that the pinnacle area is a rare and highly productive feature, providing habitat for breeding, spawning, growth, and maturation of a variety of species. In 1997, the area was classified by the National Marine Fisheries Service, the Alaska Department of Fish and Game, and the International Pacific Halibut Commission as a permanent no-take marine reserve for groundfish (those species associated with the seafloor; [22]). This is the first marine reserve in the state of Alaska that is closed to all harvesting of groundfish. Anchoring also is prohibited in an effort to protect habitat.

A final example of a marine benthic megahabitat is described for an area of the Big Sur coastline off central California, within the Big Creek Ecological Research Reserve:

Flat megahabitat on continental shelf in shallow to intermediate water depths (0–100 m; *figure 10*). Mesohabitats include sand waves, sand stringers and cobble patches interspersed with rock outcrops; isolated boulders and pinnacles are examples of macrohabitats (*figure 11*).

Characterizations of benthic habitats are critical steps in evaluating the effectiveness of the Big Creek Ecological Reserve at protecting and enhancing coastal fishery resources. These characterizations and maps of bottom types have directed the efforts to assess the fishes and their habitat associations within the reserve, and provide the basis for long-term monitoring and management of marine resources in this area.

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## 4. CONCLUSIONS

Geophysical techniques that help identify and define large-scale marine benthic features are valuable in appraising essential habitats of marine benthic fish assemblages. Interpretation and verification of those features identified from side scan sonar, swath bathymetry backscatter imagery, and seismic reflection profiles are critical in characterizing these habitats. We have developed a classification scheme that should be useful in standardizing descriptions of such habitats in deep water. This classification scheme is applicable to data collected with several types of sensor systems that are now being used to characterize deep-water habitats of invertebrate and vertebrate fauna.

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