CALIFORNIA MARINE HABITAT TASK FORCE

STRATEGIC PLANNING MEETING
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FINAL REPORT

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1.0 EXECUTIVE SUMMARY

The California Marine Habitat Task Force Meeting was sponsored by California Department of Fish and Game, National Ocean Services Special Projects Office, and National Marine Fisheries Service and hosted by California State University Monterey Bay on January 20-21, 2000. Sixty-eight participants representing 38 federal and state marine resource agencies and institutions sharing a vested interest in mapping the marine habitats along the California attended the meeting. The overall Task Force mission was to build consensus around a Strategic Action Plan for Mapping the California Continental Shelf and consisted of the following objectives:

- Identify current data holdings or planned collections available for sharing.
- Identify common needs for habitat maps and data coverage
- Define appropriate scales of resolution and coverage based on site-specific needs
- Divide the California continental shelf into priority regions for habitat mapping.
- Define and prioritize sites along the California coast for which habitat data are needed, and define the criteria used to select and prioritize these sites.
- Discuss the need and make recommendations for a universal habitat classification scheme.
- Provide overview of state of knowledge related to marine habitat mapping
- Specify methods for filling data gaps
- Develop protocols and draft memorandum of agreement to facilitate data sharing of marine habitat data.

This report can serve as a blueprint for future coordination, collaboration, data sharing and funding efforts among task force members. The report includes: tables and maps summarizing the recommendations for high priority sites and data gaps to be mapped and filled, a draft habitat classification scheme, recommendations for compilation and processing of existing data, and recommendations to facilitate data sharing among task force members. The top ten sites recommended for mapping included fishing blocks near: Point Arena, Farrallon Islands, Cordell Banks, Monterey Peninsula, Point Sur, Channel Islands, Long Beach, and Point Arguello. Fisheries management, parallel use conflicts, and a need for general baseline data were the criteria most frequently given as the reasons for selection of these priority data needs areas. A complete summary of the proceedings and results can be found on the Task Force Web Site: (http://skyler.monterey.edu/~cahabmap).

2.0 INTRODUCTION & BACKGROUND

Recent state and federal legislation now require our marine resource agencies responsible to adopt an ecosystem approach to fisheries management. At the federal level, the Magnuson Act was amended in 1996 by the Sustainable Fisheries Act, which identified habitat as a crucial component to sustainable fisheries. Under this act, "regional fishery management councils must develop recommendations to National Marine Fisheries Service describing [Essential Fish Habitat] for all species under their management" (Bloeser 1999). At the state level, passage of the 1998 Marine Life Management Act (AB 1241 – authored by Assemblyman Keeley) stipulates that the California Department of Fish and Game (CDF&G) take an ecosystem approach to fisheries and marine resource management. The implementation of these policies requires that agencies shift from population management focused solely on species to an ecosystem approach that considers the interactions between the species, their habitats and human activities. For this reason, there is a pressing need to map and identify the marine habitats along California's continental margin.

Due to such a radical shift in management policies, most agencies are not equipped to meet the requirements of the new legislation. Mapping and classifying the ocean habitats requires expensive equipment, technical expertise and long hours to obtain and process the data. An adequate sea floor mapping system can cost upwards of $1 million, and the mapping itself can cost up to $10,000 per square mile or more when provided through outside contractors. For agencies such as the Department of Fish and Game that are responsible for all of the state waters (out to 3 miles from shore), this task could involve mapping several thousand square miles. As a result agencies are trying to determine what can be done to meet the new policy requirements, without having the budget, expertise, or personnel to do the work themselves. Because it is virtually impossible for a single agency to manage the task alone, agencies must set priorities and focus first on those sites of greatest importance. Agencies with similar needs are seeking to join forces in order to combine resources and get the mapping done more efficiently. Interagency partnering can also facilitate the identification and application of existing data sets that can provide habitat information without the need for expensive field surveys.

The California Department of Fish and Game recognized the need for collaboration between resource agencies and conceived of a workshop that would bring together groups from throughout California to prioritize mapping sites, identify common needs, and share existing data sets. CDF&G Oil Spill Prevention and Response (OSPR) used some of the funding from an oil spill litigation settlement in 1998 to put on the California Marine Habitat Task Force Strategic Planning Meeting, and contracted with California State University Monterey Bay to coordinate and run the meeting.

In the process of coordinating the meeting, Fish and Game and CSUMB learned that the NOAA National Ocean Service's Special Projects Division had a particular interest in the development of marine GIS, particularly for the National Marine Sanctuaries. Because Dan Basta of the Special Projects Division saw this conference as a unique opportunity to create a meeting format that could be applied to similar regional conferences to be held nationwide, NOS tasked three experienced workshop facilitators from the Special Projects Division to help with the workshop. These facilitators assisted with the design of pre-workshop surveys materials, as well as the materials, methods and format of the workshop itself.

The workshop, entitled the California Marine Habitat Task Force Strategic Planning Meeting, was held on January 20-21, 2000 at California State University Monterey Bay, in Seaside, California.

2.1 GOALS & OBJECTIVES

The goal of the Strategic Planning Meeting was to develop recommendations and priorities leading to a multi-agency coordinated action plan for producing a comprehensive habitat GIS of the California continental shelf. Sixty-four attendees from various resource agencies participated (Appendix B). In addition to the workshop, an Industry Night was also scheduled to allow manufacturers and service providers of ocean mapping systems to showcase their product lines and capabilities.

The workshop was designed to meet the following objectives:

- Identify current data holdings or planned collections available for sharing.
- Identify common needs for habitat maps and data coverage
- Define appropriate scales of resolution and coverage based on site-specific needs
- Divide the California continental shelf into priority regions for habitat mapping.
- Define and prioritize sites along the California coast for which habitat data are needed, and define the criteria used to select and prioritize these sites.
- Discuss the need and make recommendations for a universal habitat classification scheme.
- Provide overview of state of knowledge related to marine habitat mapping
- Specify methods for filling data gaps
- Develop protocols and draft memorandum of agreement to facilitate data sharing of marine habitat data.

3.0 METHODS

3.1 GENERAL APPROACH

In order to meet the objectives, conference organizers gathered lists of agencies' data needs and data holdings prior to the workshop to help foster a discussion of common needs and holdings at the conference. The organizers designed data needs survey and data holdings survey around the Fish and Game fishing blocks that have been used in stock management for years (Appendix H). In this way, data could be easily quantified to show gaps in data holdings as well as overlaps in areas of common interests. The invited resource agencies were provided with maps of the fishing blocks and the data needs and holdings surveys and were asked to identify where they needed habitat information, and where they already had existing data. This data was then summarized and provided in both tabular and map format for discussion at the meeting.

The meeting was coordinated to meet all of the objectives in the two-day timeframe (see meeting agenda Appendix A). A large group discussion was held on the need for habitat maps and the importance of seafloor mapping to obtain the habitat information. Using the information collected prior to the workshop, breakout groups identified important fishing blocks and added to the list of mapping needs and holdings in each region (Northern, Central, and Southern), plus determined the top priorities for mapping in each region. One breakout group discussed the need to develop and implement a universal habitat classification scheme, while another outlined the protocol for data sharing between agencies, and a interim data sharing Memorandum of Agreement was agreed upon.

3.2 PRE-WORKSHOP ASSESSMENT

3.2.1 IDENTIFYING POTENTIAL INVITEES

The meeting was publicized as 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. The meeting design included those agencies and organizations with a vested interest in mapping regional marine habitats. Within those agencies, meeting organizers sought to identify the most qualified experts to represent the needs of their institutions (Appendix B). An introductory letter (Appendix C) and brochure outlining the meeting scope were sent out to a limited number of agencies throughout California. The response was overwhelmingly positive. Agencies and representatives that accepted the invitation were sent follow-up materials in preparation for the workshop.

3.2.2 INVITATION & SURVEY MATERIALS

In a second introductory letter (Appendix D), Task Force participants were asked to provide a preliminary assessment of their agencies' mapping needs and selection criteria, and data holdings. Survey sheets and reference maps were provided to each participant, as well as a list of suggested guidelines for selecting and prioritizing mapping areas (i.e. parameters to map, data resolution, etc). The information was compiled into maps and tables in advance of the Task Force meeting to show the distribution of existing or planned data sets as well as the areas where data is most desired. The summaries were used to perform a data gap analysis that was presented at the beginning of the meeting and used to focus the discussions on setting mapping priorities and data sharing.

In this document, marine habitat mapping is defined as 'spatial quantification of those physical parameters of greatest value in defining seafloor habitat (e.g. depth, substrate type, slope, and aspect)'. Information on the theory, methods and considerations of resolution and scale for marine habitat and a Case Study example (Big Creek Marine Reserve) were available for participants to review prior to the meeting at the California Marine Habitat Task Force web site (http://skyler.monterey.edu/~cahabmap).

3.2.3 DEFINING MAPPING SITES

To organize mapping priorities efficiently, the state of California was divided into three different regions using arbitrary land boundaries. The Northern region ranged from the Oregon border to Tomales Bay, the Central region from Tomales to Point Conception, and the Southern region from Point Conception to the Mexican border. The California Continental shelf was then subdivided using these landmark boundaries, and the existing 10' CDF&G commercial fishing block designations were used to define priority areas for marine habitat mapping within the larger regions.

3.2.4 REGIONAL DATA NEEDS & HOLDINGS

To identify the current marine habitat data holdings and mapping needs of contributing agencies survey materials including worksheets, regional maps, and instructions were sent to each attendee prior to the meeting (Appendix E-H). Each organization's representative was asked to return four different sets of information relating to their data needs and data holdings:

- The criteria that each institution set and used for selecting and ranking sites for habitat mapping.
- List of top 10 sites in rank order for each institution's habitat maps needs.
- One completed Data Needs Worksheet for each desired area, along with one set of regional maps that illustrates the total needs.

- One completed Data Holdings Worksheet for each area of existing or planned habitat data, along with one regional set of maps that illustrates the total holdings of each organization.

3.2.5 DATA NEEDS INSTRUCTION & SURVEY WORKSHEET

3.2.5.1 Ranking Criteria List

The attendees were asked to list all of the reasons that their agency would want a site or sites mapped (Appendix F). Examples of these reasons included: areas of use conflict, areas of multiple use (potential conflict), designated areas (special use, harvest areas, reserves, preserves, sanctuaries, etc.), areas of high political interest, high use areas, and agency-specific management priorities.

3.2.5.2 Applying Ranking Criteria to Fishing Block Maps

With a predefined list of criteria, representatives from each institution applied the criteria to maps of the fishing blocks. Each institution identified the geographic distribution of their mapping needs by selecting the fishing blocks in which they had particular interest. Once these blocks were identified, priorities were assigned to the blocks by giving one point to each block for each of the criteria that applied. Totals for each block were then tallied and complied into a list of the top ten high priority sites for habitat mapping.

3.2.5.3 Completing Data Needs Worksheet

Each institution completed one data needs worksheet for each specific area in which they had habitat mapping needs. On this worksheet, representatives described where they needed to map (in some cases, mapping needs were less than one fishing block, and in other cases the needs spanned many blocks), why they needed to map (including their mapping criteria), what type of data they need (bathymetry, sidescan sonar, substrate type, etc), what resolution they needed the data at, and how and when the mapping should be done.

3.2.6 DATA HOLDINGS INSTRUCTION & SURVEY WORKSHEET

Data holdings were acquired from each institution in order to identify areas of potential overlap for data sharing and new data acquisition. The representatives used the same (Data Needs) maps and a data holdings worksheet (Appendix G) to convey that information.

3.2.6.1 Completing Data Holdings Worksheet

Representatives completed one data holding worksheet for each specific area for which their institution had existing habitat, substrate, or multibeam bathymetry data, or plans for obtaining those data. Similar to the data needs worksheet, the representative described where, why, what, how, and when the mapping was or would be done. These blocks were marked on a single fishing block map for each region.

3.3 WORKSHOP SESSIONS

3.3.1 OVERVIEW

During the two-day workshop several roundtable working groups were organized to discuss regional data needs and holdings, data sharing and future collaboration between agencies, and the implementation of a universal marine habitat classification scheme. Participants of the data needs and holdings session were given the opportunity to add to the mapping priority database developed from the pre-workshop surveys. A workshop folder containing a meeting agenda, attendee list, summary sheets of data holdings and needs, blank maps with designated fishing

blocks, Worksheet A, Worksheet B, and a reprint of *A Classification Scheme for Deep Seafloor Habitats*, Greene *et al.* 1999 was provided to attendees. Examples of existing joint initiatives for marine habitat mapping (USGS/NMFS) and development of marine habitat classification protocols (NOAA/ESA) were also reviewed.

3.3.2 IDENTIFICATION OF PRIORITY HABITAT MAPPING LOCATIONS: NORTHERN, CENTRAL, AND SOUTHERN REGIONAL GROUPS

OBJECTIVE - Review and discuss marine habitat information needs and holdings for each region.
PROCEDURE - A facilitated breakout group was organized for each of the three regions. Participants chose two regions of interest for the breakout groups. The three working sessions began with each facilitator reviewing wall-size tables and maps summarizing the pre-workshop surveys and proposing guidelines & criteria for additional site selection based on the second workshop notice information (Appendix E). Facilitators then encouraged participants to breakout into subset groups, by agency, to review Worksheet A (Appendix N) and maps and identify the highest priority cells (blocks) that were not already determined in the pre-workshop survey. Participants were instructed to provide information on mapping needs and, if available, any information on existing or planned data holdings related to those identified blocks. After the larger breakout reconvened, the group determined if there were any known holdings for the blocks that were just characterized. All participant input was collated onto single wall-sized plots. This process of priority block identification was repeated in a second breakout session (second region of choice) where new blocks were added to the master list from the previous session.

Based on priority block identification for each separate region (Worksheet A), participants were instructed to determine block priorities based on specific economic and environmental habitat parameters/ criteria (e.g. fishery management, parallel use conflicts, zoogeographical importance, etc) for all regions and blocks (Worksheet B, Appendix O). Additional categories were added to the predefined list of priority criteria as a result of attendee-provided information in Worksheet A. Each participant was given 10 priority "dots" to assign to regional blocks and criteria where they felt habitat-related data were lacking. Wall-sized data tables (Worksheet B) were used to capture “dot” assignments. Participants could “vote” in any number of ways: a) they could place 10 votes (dots) in 10 different blocks, b) they could place all 10 votes in one block, or c) some other combination. Partial (1/2) votes were allowed. Dots were tallied after final voting to rank individual blocks.

3.3.3 DATA SHARING PROTOCOL

OBJECTIVE - Considerations for establishing and maintaining data sharing among various resource agencies.
PROCEDURE - Working group facilitated by Mary Tsui, Land Systems Group and Tim Goodspeed, NOAA, Special Projects Division. Following a morning presentation on the issues surrounding data documentation and data sharing, a breakout session was held to answer specific questions and concerns and to determine whether or not an agreement could be crafted and presented to the full conference. Interestingly, most of the concerns expressed are ones the conference was designed to address. The roundtable discussion on data sharing among resource agencies presented the following concerns: where were existing data stored, what would be the format for disseminating and repository for newly collected data, multiple platforms and data formats to accommodate a variety of users, overhead cost associated with formatting those data, classification of terms used in existing numerous (i.e. field titles and data terms vary from user to user). As with multiple platforms, there is considerable overhead with making data usable to other

researchers. Finally, some attendees were very concerned with the possible premature release of data and QAQC.

3.3.4 DEVELOPMENT OF HABITAT CLASSIFICATION SCHEME

OBJECTIVE - Discussion on the adoption of a universal marine habitat classification scheme.
PROCEDURE - Working group facilitated by Gary Greene, Moss Landing Marine Labs and Tom Culliton, , NOAA, Special Projects Division. A standard, universally useful habitat classification scheme needs to be agreed to if descriptions of habitats are to be accurately and efficiently applied among scientific disciplines. In recent years, many marine benthic habitats have been described using geophysical and biological data. These descriptions can vary from one investigator to another, which make it difficult to compare habitats and associated biological assemblages among geographic regions. Using marine geophysical data collected with a variety of remote sensor systems and in situ biological observations for habitat assessment of deepwater rockfishes, Greene et al. (1999) constructed a classification scheme that can be used in describing marine benthic habitats. It was suggested that the scheme first be adapted to CDF&G and OSPR needs, and then be used to reinterpret the marine geology maps of the entire California continental shelf, compiled and published (1986) by Dr. Gary Greene of the USGS and Mike Kennedy of the California Department of Conservation Mines and Geology division (CDM&G), and digitized by the CSUMB group. Each of these substrate maps has a companion metadata map of equal size and scale defining and cataloguing the type, resolution, quality and source for all of the original data used in the compilation, to produce a new set of attributed GIS vector themes for essential marine habitats. Following is a summary of the structure of a habitat classification scheme for benthic habitats.

Habitat Scales & Classification Categories
Megahabitats: Large physiographic features, from kilometers to tens of kilometers, and larger. *(e.g.* submarine canyons, seamounts, lava fields, plateaus, and large banks, reefs, terraces, and expanses of sediment-covered seafloor).
Mesohabitats: Features from tens of meters to a kilometer, including small seamounts, canyons, banks, reefs, glacial moraines, lava fields, landslide fields, gravel, pebble and cobble fields, caves, overhangs and bedrock outcrops.
Macrohabitats: Features from one to ten meters, and include seafloor materials and features such as boulders, blocks, reefs, carbonate buildups, sediment waves, bars crevices, cracks, caves, scarps, sink holes and bedrock outcrops, biogenic structures such as kelp beds, corals (solitary and reef-building) or algal mats.
Microhabitats: Seafloor materials and features that are centimeters in size and smaller, such as sand, silt, gravel, pebbles, small cracks, crevices, and fractures.

System (based on salinity and proximity to bottom, e.g., Marine Benthic-Estuarine Benthic):
Subsystem (mega-and mesohabitats based on physiography and depth):
e.g., - Continental Shelf
Intertidal (salt spray to extreme low water)
Shallow Subtidal (0-30 m)
Outer (30-200 m [location of shelf break])
Class (meso-or macrohabitats based on seafloor morphology):
e.g., -Bars
-Sediment waves
-Caves, crevices (ragged features)
-Debris field, slump, block glide, rockfalls
-Grooves, channels (smooth features)

-Ledges
-Vertical wall
-Pinnacles
SubClass (macro-or microhabitats based on substratum textures)
e.g., -Organic debris (shell hash; drift algae)
-Mud (clay to silt; <0.06 mm)
-Sand (0.06-2 mm)
-Gravel (2-4 mm)
-Pebble (2-64 mm)
-Cobble (64-256 mm)
-Boulder (0.25-3.0 m)
-Bedrock
Subclass (macro- and microhabitats based on slope)
e.g., -Flat (0-5°)
-Sloping (5-30°)
-Steeply sloping (30-45°)
-Vertical (45-90°)
-Overhang (> 90°)

Modifiers
- -for bottom morphology
  - -regular (continuous homogeneous bottom with little relief)
  - -irregular (continuous non-uniform bottom & local relief 1-10 m)
  - -structure (fractured, faulted, folded)
  - -outcrop (amount of exposure)
- -for bottom deposition
  - -consolidation (unconsolidated, semi-consolidated, well consolidated)
  - -erodability (uniform, differential)
  - -sediment cover
- -for bottom texture
  - -voids (percentage volume occupied by clasts or rock)
  - -sorting (i.e., well sorted; poorly sorted)
  - -density (particle concentration)
- -for physical processes
  - -currents
  - -wave activity
  - -upwelling
- -for biological processes
  - -bioturbation (tracks, trails, burrows, excavation, mounds)
  - -cover of encrusting organisms
  - -communities (examples of conspicuous species)
- -for anthropogenic processes (e.g. artificial reefs, dredge spoils, trawl tracks)

4.0 RESULTS

4.1 WORKSHOP ATTENDANCE

The Task Force workshop was attended by sixty-eight participants representing thirty-eight federal and state marine resource agencies (see Appendix 2). Since not all participants attending the workshop responded to pre-workshop survey requests, results are presented here in pre- and post-workshop format. These sections may or may not overlap in data content.

4.2 PRE-WORKSHOP DATA HOLDINGS & NEEDS

Information on current data holdings and needs (Table 1 and 2) were collected from eleven agencies prior to the Task Force workshop. Existing data holdings (Table 1) were summarized by fishing block ID number (location), collection date, spatial resolution, description of physical parameters (i.e. bathymetry, substrate type, etc) and available data format. Holdings data fell into a wide variety of categories, including oil industry information, anthropogenic impacts, marine species and habitat data. The information on data holdings would potential be used to eliminate any overlap in assigning priority mapping locations from the data needs survey results. Unedited (Appendix M) pre-workshop needs data were condensed and are presented in Table 2 and Figure 1. Suggested requirements for high priority mapping were based on the following major categories: fisheries management and fish population assessment, multi-user conflicts, marine disposal, and areas of significant natural value and/or political interest. Color-coded location maps were produced from these tabular summaries (Appendices H-L) and used during the workshop to illustrate block locations with existing and desired data.

Table 1. Summary data from pre-workshop data holdings surveys.

				Why Data Needed			Parameters				
ID Number	Institutions	Block #(s)	Water Depth (range in ft)	Species or Resources of Concern	Management Issues of Concern	How would Mapped Data be Used?	Bathymetry	Substrate Type	Resolution & Scale	How data formatted	When data acquired
1-1	MBARI	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	1640ft to 9000ft	marine geo, chem, and bio	/	/	yes	/	/	dig., web?, CD, SSS-mos, muliti.mos., arc/info, geotiff	1998/ available end of yr 2000
1-2	NMFS	b508,517,523,547,637,643	30m to 350m	rockfishes, habitat w/in no-take areas	overfishing, ident. Refugia, EFH, baseline info	establish baseline w/ no take area, char. EFH	yes	yes	/	dig., SSS-single line, SSS-mos, SRP	93, 96, 99
1-3	DOC-oil&gas	643,644,651-659,664-668,671, 672,680, 683-686,689-691,701, 712,713,718-721, 738	/	oil wells and platforms	/		no	no	/	*GIS of oil wells and platform LOCATIONS ONLY	/
1-4	USGS	106,108-112,114-117,119-125,127-129,131,133-135,138, 203-206, 211-214, 226, 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, 679,680,681,683,690-694,701-714,717-723,725,726,728-735,738-740,743-746,749-755,757-760,762-766,802, 803,805,806,809-820,822,824,826,828-831,835-840,842-848,851,853-856,858, 860-866,869,871-876,878-882,886-894, 896,897			See "Pre-Workshop Data Needs and Data Holdings Survey Results and Details" for description and maps						

1-5	SCCWRP	651-657,664-667,678-691,701-703,707-713,718-721,728-730,737-740,749-751,744-745,756-758,760-763,801-802,806-808,821-822,842-843,860-861,854,877-879,916	16ft to 705ft	assess extent of sediment contamination and distribution of sediment grain size,demersal fishes, inverts and infauna	Extent of pollution impacts in southern California map. (southern Ca Bight Project & Southern Ca bight regional survey).	To assess extent of contamination and impacts to fish and invertebrate assemblages	yes	yes	/	digital, Web Accessible, Comma Delineated ASCII	1998, 1999
1-6	F&G North	431	0-20f	invertebrate	current reserve, near port	/	/	/	1	/	/
1-7	F&G North	441	20-50f	finfish	multi use conflict, far port	/	/	/	1	/	/
1-8	F&G North	228	3-30f		current reserve, far port	/	/	/	1	/	/
1-9	USGS	681,643,684,707-708,710-711	3-300ft	rockfish, squid, abalone, sea urchins	benthic fisheries habitat	being processed, interpreted, and ground truthed for benthic habitat	no	yes	/	digital, SSS-mos, SRP	1/98-12/00

TABLE 2. Results of pre-workshop data needs surveys.

ID Number	Institutions	Block #(s)	Prioirity (H/M/L)	Water Depth (range in ft)	Why Data Needed				Parameters		Resolution & Scale
					Ranking Criteria	Species or Resources of Concern	Management Issues of Concern	How would Mapped Data be Used?	Bathymetry	Substrate Type	
1-1	NMFS	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	H	30m to 300m	used by commercial and recrational fishers, hab of particular concern	rockfishes, lingcod	overfishing, gear impacts	improve stock asses., identify no-take areas	yes	yes	1, 10, 100, 1000
1-2	MBNMS	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	L	1m to 3000m	SNV, multiple & high use	several	/	to better monitor & manage the MBMS	yes	yes	varys
1-3	MBNMS	538-539,547-548	H	1ft to 100ft	SNV	intertidal & subtidal communities	Cal Trans road work and slide into the sea	monitoring and mgmt of slide areas, comp. of natural and human caused changes	yes	yes	10
1-4	MBNMS	526	H	1ft to 100ft	SNV, multiple & high use	several	Natural versus human caused changes to resources	better monitor and manage	yes	yes	10
1-5	MBNMS	518,527-530,536,537,546	M	1000ft to 4000ft	SNV, little known re: deep sea habitats	several	/	better monitor and manage	yes	yes	100
1-6	MBNMS	516	H	1ft to 20 ft	SNV, multiple & high use	several	Natural vs human caused changes to resources	better monitor and manage	yes	yes	10
1-7	F&G-central	457-458,549	H	6ft to 600 ft	PFA, nusery ground for numerous species.	many species incl. Rockfish	fishing nursery area and refugia, little to no near-shore mapping	Fishery independent data can be combined w/ mapping to look at hab & pop assesments	yes	yes	/
1-8	F&G-central	526	H	0ft to 100ft	Highly utilized, 30m+ already mapped. Poss. no take area.	nearshore rockfish	Multi-user conflict	Assist fish. mgmt.	yes	yes	1

1-9	F&G-central	539	H	132ft to 252ft	sport and comm. fishery. Some has been mapped.	Rockfish and lingcod	Sust. of commerical and recreational fisheries in the area	submersible and species compo from rec. fish. Combined = biomass est. for rockfish and lingcod, enhancing mgmt	yes	yes	/
1-10	F&G-central	547	H	0ft to 150ft	mapping exists except nearshore N and S of BCER. Fished and unfished areas could be studied.	nearshore rockfish	Multi-user conflict	Fish counts will be stratified based on habitat type to assist in managing fisheries.	yes	yes	10
1-11	F&G-central	615	H	30ft to 150ft	commerical nearhsore and recreational hook-and-line fishery.	"Live fish fishery"sport fishery species	Sustainable catches	Mapping + diving surveys =fish pop density estimates	yes	yes	
1-12	F&G-central	448-449	M	0ft to 90ft	reserve, de facto complete no-take area. Comparison to other exploited areas w/ similar habitat, SNV	Invertebrates, marine mammals, marine birds	Illegal take, fishing effects on perimeter. Candiatate for reserve expansion.	unique conditions= highly productive habitat. Compare to exploited similar habs.	yes	yes	/
1-13	F&G-central	472478	M	6ft to 240ft	Little known, important fishing area	.Kelp, rockfish, marine mammals, birds, etc	Significant fishing grounds and very little if any near-shore mapping has been done here.	Est. of hab types used for pop assesments. Est of hab available for restocking (abalone).	yes	yes	/

					Why Data Needed				Parameters		
ID Number	Institutions	Block #(s)	Prioirity (H/M/L)	Water Depth (range in ft)	Ranking Criteria	Species or Resources of Concern	Management Issues of Concern	How would Mapped Data be Used?	Bathymetry	Substrate Type	Resolution & Scale
2-1	F&G-central	473	M	180ft to 280ft	frequently fished by the Princeton CPFF. Among most productive in depth range in central CA. High catch rate for rockfishes, esp. yellowtail.	Rockfishes and lingcod	Sustainability of commerical and recreational fisheries in the area	biomass estimates for nearshore rockfishes for improving the Nearshore Species Fishery Mgmt Plan.	yes	yes	/
2-2	F&G-central	518	M	300ft to 600ft	comm and rec. fishery, hab for bocaccio and canary rockfish. Need hab association data to expedite the rebuilding of stocks.	Rockfishes, particulary bocaccio, cowcod, and canary, and lingcod	Sustainability of commerical and recreational fisheries. Potential site for Marine Reserve	Habitat data from mapping will be used in conjunction with location based CPFF catch data to help determine species-habitat associations.	yes	yes	/
2-3	F&G-central	517	M	200ft to 300ft	High relief bottom/high biodiversity.	Lingcod and rockfishes.	Address the mandate of the Magnuson-Stevens Fishery Conservation and Management Act, specifically Essential Fish Habitat.	Surveyed by DELTA sub in 92-93. Incorportating hab. mapping with current and historical fishery data allows for eval. of an area intensively fished for approx. 100 years.	yes	yes	/
2-4	F&G-central	637	M	30ft to 150ft	This is an important area for both commercial nearshore and the recreational hook -and-line fisheries.	"Live fish fishery"sport fishery species.	Sustainable catches	Mapping +diving surveys, would identify habitat data that could be related to fish pop density. Est. total abundance.	yes	yes	
2-5	SCCWRP	683-691,706-713,728-730,749-750,744-745	H	30ft to 600ft	PI, designated areas, SNV, SSI, DFG current mngmt., areas of multiple use. Availability of existing habitat data	many verts and inverts.	A national marine sanctuary without a map of bottom habitat for fishery species within the sanctuary	To provide information on essential marine habitat for fisheries species within the sanctuary	yes	yes	10, 100

2-6	SCCWRP	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	M	15ft to 600ft	Areas of multiple use, includes designated areas, significant natural areas, areas used by species of special interest or concern.	rockfish, flatfish, abolone, red sea urchin, Ca. Market squid, etc, etc	Fisheries, essential fish habitat, contamination	To provide information on essential marine habitat for fisheries species within the sanctuary	yes	yes	100, 1000
2-7	Cal Trans	526-560	H	/	Resolve management conflicts - manage resources to complement and coordinate/ not conflict		mudslide repair, highways, disposal of soil, conflicts of soil is bad soil is good in marine environment	help direct appropriate methods for allowing sediment to enter marine environment where it is consistent w/ natural processes	/	/	/
2-8	USACE	301,455,488-489	M	0ft to 400ft	Multiple dredged material disposal sites, HPI, SSI, EFH, ESA critical habitat areas.	Federally listed, SSI, critical ESA hab.	Management of disposal sites	Planning purposes and evaluation, monitoring, and designation of dredged material disposal sites	yes	yes	10
2-9	USACE	469-470	M	8200ft to 9800ft	Dredged Material disposal site, EFH, ESA critical hab, designated area, SNV	Federally listed, SSI, critical ESA hab.	Management of dredged material disposal sites	As baseline data in monitoring, evaluation of dredged material disposal site, and designation of disposal sites	yes	yes	1

ID Number	Institutions	Block #(s)	Prioirity (H/M/L)	Water Depth (range in ft)	Why Data Needed				Parameters		Resolution & Scale
					Ranking Criteria	Species or Resources of Concern	Management Issues of Concern	How would Mapped Data be Used?	Bathymetry	Substrate Type	
3-1	USACE	108	M	80-100ft	Dredged Material disposal site, EFH, ESA critical hab, designated area, SNV	Federally listed, SSI, critical ESA hab.	Disposal site mgmt monitoring & designation	Monitoring, site evaluation, and site designation	yes	/	1
3-2	USACE	210	M	150-180ft	Dredged Material disposal site, EFH, ESA critical hab, designated area, SNV	Federally listed, SSI, critical ESA hab.	Disposal site mgmt monitoring & designation	Monitoring, site evaluation, and site designation	yes	YES	1
3-3	USACE	516	M	30-80ft	Dredged Material disposal site, EFH, ESA critical hab, designated area, SNV	Federally listed, SSI, critical ESA hab.	Management of dredged material disposal sites	As baseline data in monitoring, evaluation of dredged material disposal site, and designation of disposal sites	yes	yes	1
3-4	NRDC	446-450,455-459	H	/	SNV, SSI, area of conflict, close to coastal parkland	rockfish, nearshore fin-fish	overfishing, unique hab at risk	to help designate marine protected area via marine life protection act	/	/	100
3-5	NRDC	685-690	H	/	SNV,SSI, vulnerable to human impact	abalone, rockfish, sheephead, cabezon	overfishing	to help designate marine protected area via marine life protection act	/	/	/
3-6	NRDC	262-263,268-269,516,525-526,685-690,761-762,813-814	H	/	SNV, high species diversity/abundance, high use, potent. conflict, overfishing	/	/	/	/	/	100
3-7	F&G -South	745,765,829,850, 867,871-872,889-891	/	0-100m	/	white abalone	identification & protection of EFH	location of optimal hab. for white abalone, poss collection for captive breeding program.	yes	yes	/
3-8	F&G North	108	H	0-90f	/	finfish, invertebrate	multi use conflict; near port	/	/	/	1

3-9	F&G North	133	H	0-10f	/	finfish, invertebrate	multi use conflict; near port; potential reserve	/	/	/	1
3-10	F&G North	262	H	0-50f	/	finfish, invertebrate	multi use conflict, near port, current reserve	/	/	/	1
3-11	F&G North	268	H	0-20f	/	finfish	multi use conflict, near port	/	/	/	1
3-12	F&G North	402	H	0-20f	/	finfish, invertebrate	multi use conflict; far port; potential reserve	/	/	/	1
3-13	F&G North	414	H/M	0-20f	/	finfish, invertebrate	current reserve, far port	/	/	/	1
3-14	F&G North	414	M	0-20f	/	finfish, invertebrate	current reserve, far port	/	/	/	1
3-15	F&G North	132	M		/	invertebrate	multiuse conflict, potential reserve, far port	/	/	/	1
3-16	F&G North	255	M	0-35 f	/	finfish	multiuse conflict, far port	/	/	/	1
3-17	F&G North	274	M	0-20f	/	finfish	far port	/	/	/	1

					Why Data Needed				Parameters		
ID Number	Institutions	Block #(s)	Prioirity (H/M/L)	Water Depth (range in ft)	Ranking Criteria	Species or Resources of Concern	Management Issues of Concern	How would Mapped Data be Used?	Bathymetry	Substrate Type	Resolution & Scale
4-1	F&G North	402	M	0-30f	/	finfish, invertebrate	potential reserve, multi use conflict, near port	/	/	/	1
4-2	F&G North	431	M	0-20f	/	finfish, invertebrate	potential reserve, near port	/	/	/	1
4-3	F&G North	402/401	M	0-20f	/	invertebrate	potential reserve, far port	/	/	/	1
4-4	F&G North	114	L	0-40f	/	invertebrate	multiuse conflict, far port	/	/	/	1
4-5	F&G North	222,233	L		/		far port	/	/	/	1
4-6	F&G North	243	L		/	finfish, invertebrate	multiuse, near port	/	/	/	1
4-7	F&G North	268,274,408	L	0-20f	/	invertebrate	far port	/	/	/	1
4-8	UCSC	526,532,509	H	0-100m	mult use/conflict, designated areas, high use area, DFG current priority, SSI, availability of existing hab. Data (patchy, would extend existing mapping efforts)	many fish, mammals, birds	EFH: structure and dynamics	To calculate landscape habitat parameters.To guide the collection of geo-referenced bio data.	Yes	yes	10
4-9	UCSC	501,538-539,547,553	M	0-300ft	mult use/conflict, designated areas, high use area, DFG current priority, SSI, availability of existing hab. Data (patchy, would extend existing mapping efforts)	many fish, mammals, birds	EFH: structure and dynamics	To calculate landscape habitat parameters.To guide the collection of geo-referenced bio data.	yes	yes	10
4-10	USACE	114,120,126,201-202,216,227,234, 242,248-249,407,414-415,422-423,430,438,447, 553	M	0FT TO 1000FT	Dredged Material disposal site, EFH, ESA critical hab, designated area, SNV	Federally listed, SSI, critical ESA hab.	Disposal site mgmt monitoring & designation	Planning purposes, monitoring of dredged material disposal sites, and designation of disposal sites	yes	yes	1000

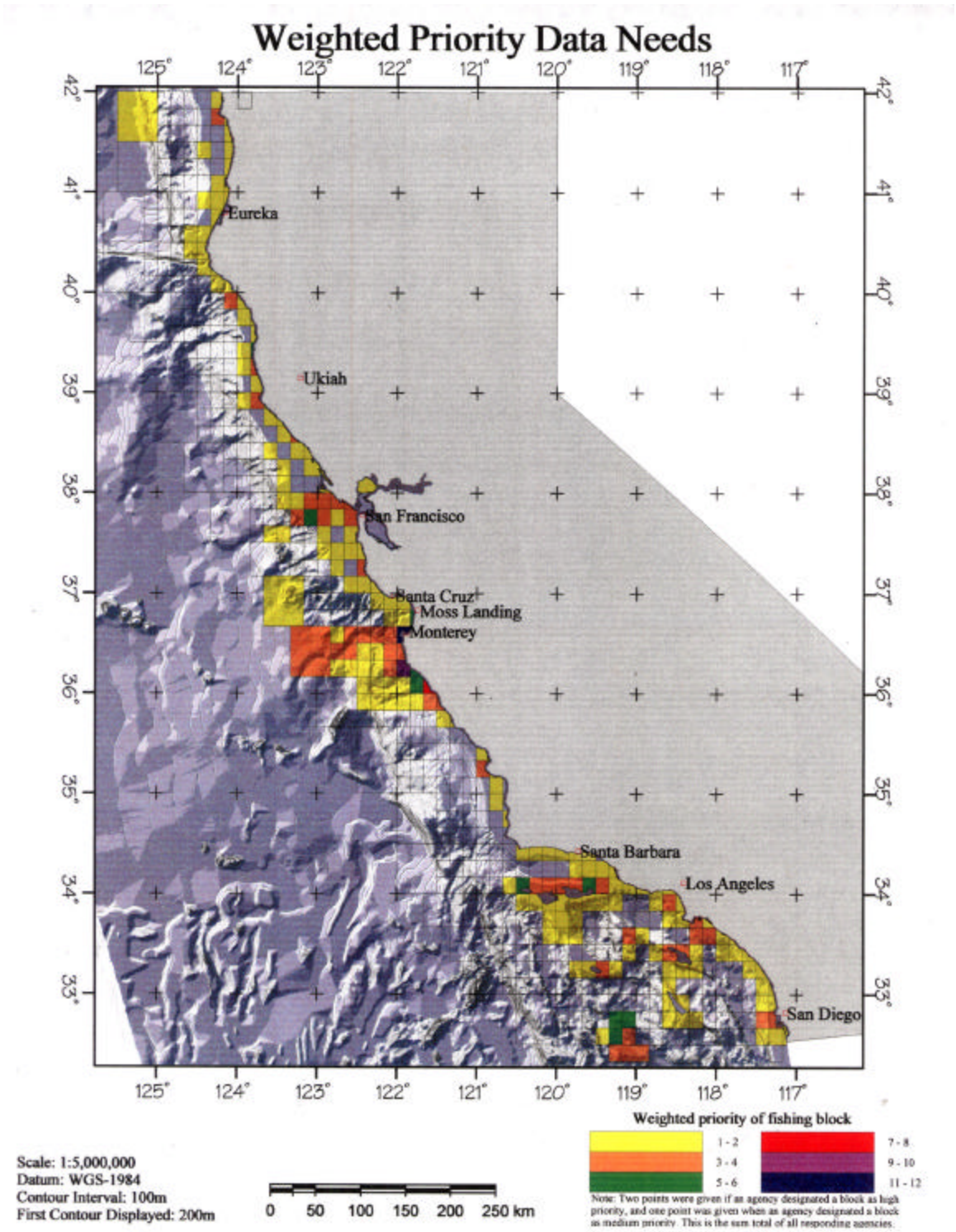

Figure 1. High (12) to low (1 vote) mapping priority per 10' fishing block as determined by the pre-workshop surveys. The highest habitat mapping priorities were assigned to blocks in the central region with medium and low priority mapping located throughout the California continental shelf.

4.3 POST-WORKSHOP PRIORITY HABITAT MAPPING LOCATIONS

4.3.1 REGIONAL DATA NEEDS & HOLDINGS

Not surprisingly, the review of existing habitat data and maps (holdings) indicate a significant lack in even fundamental mapping data. The assembled results of pre- and post-workshop surveys reveal that existing data holdings are variable, but limited. The gap analysis performed from the data needs information showed very agency-specific mapping requirements within the individual fishing blocks. However, the most pragmatic recommendation would be to focus on mapping areas (or needs) of greatest economic relevance and largest spatial overlap.

Pre- and post-workshop data needs information were combined to provide the extensive list of desired mapping criteria below. Habitat maps and habitat use of highest interest included but was not limited to; identifying canyon heads as natural refugia for rockfish; monitoring canyons for sediment movement; coastal upwelling; live fish and shellfish fisheries; coastal roadwork; subtidal cable installation; identification of essential fish habitat; improving fisheries management; defining juvenile fish nurseries; assessing fishing impacts; predicting landslide susceptibility areas; marine disposal; trace sediment movement; understanding processes at the land/sea interface; marine navigation; collection of bathymetry to update nautical charts; documenting unique geological features; assessing sites for potential oil drilling; vessel trafficking; assessing oil spill management and response; mapping general environmental change; to illustrate user conflicts; classify threatened, rare, or endangered species; track waste discharge and source pollution; mitigation reporting; and detecting data gaps for long-term studies.

Data resolution, spatial scale, and acquisition costs were also briefly discussed as an important parameter when considering priority mapping locations. Selection of which mapping tools and methods to use need to be are based on the geographic extent of the project (scale) and the resolution required (data density), which in turn, are based on the purpose and goals of the project. Identifying the correct scale and resolution for a project in advance is important because survey costs scale directly with each of these parameters, and there is generally a direct trade-off between scale and resolution (NEDP report, 1999).

4.3.2 MAPPING ASSESSMENT BY CRITERIA

Priority mapping results (Worksheet B) using economic and environmental criteria are illustrated, by region, in Figure 2 piecharts (Appendix P). Although the overall key criteria were similar for each region (e.g. fisheries management, parallel use conflicts, need for general baseline data) there was a surprisingly strong regional emphasis in the choice of top criteria. Nearly 50% (53 of 103 votes) of block identification in the northern region (Figure 2a) prioritized fisheries management as the main criteria for ranking sites. Collection of baseline data was held as the most important criteria for the central region (Figure 2b), while the choice of main criteria was more evenly spread in the southern region votes (Figure 2c).

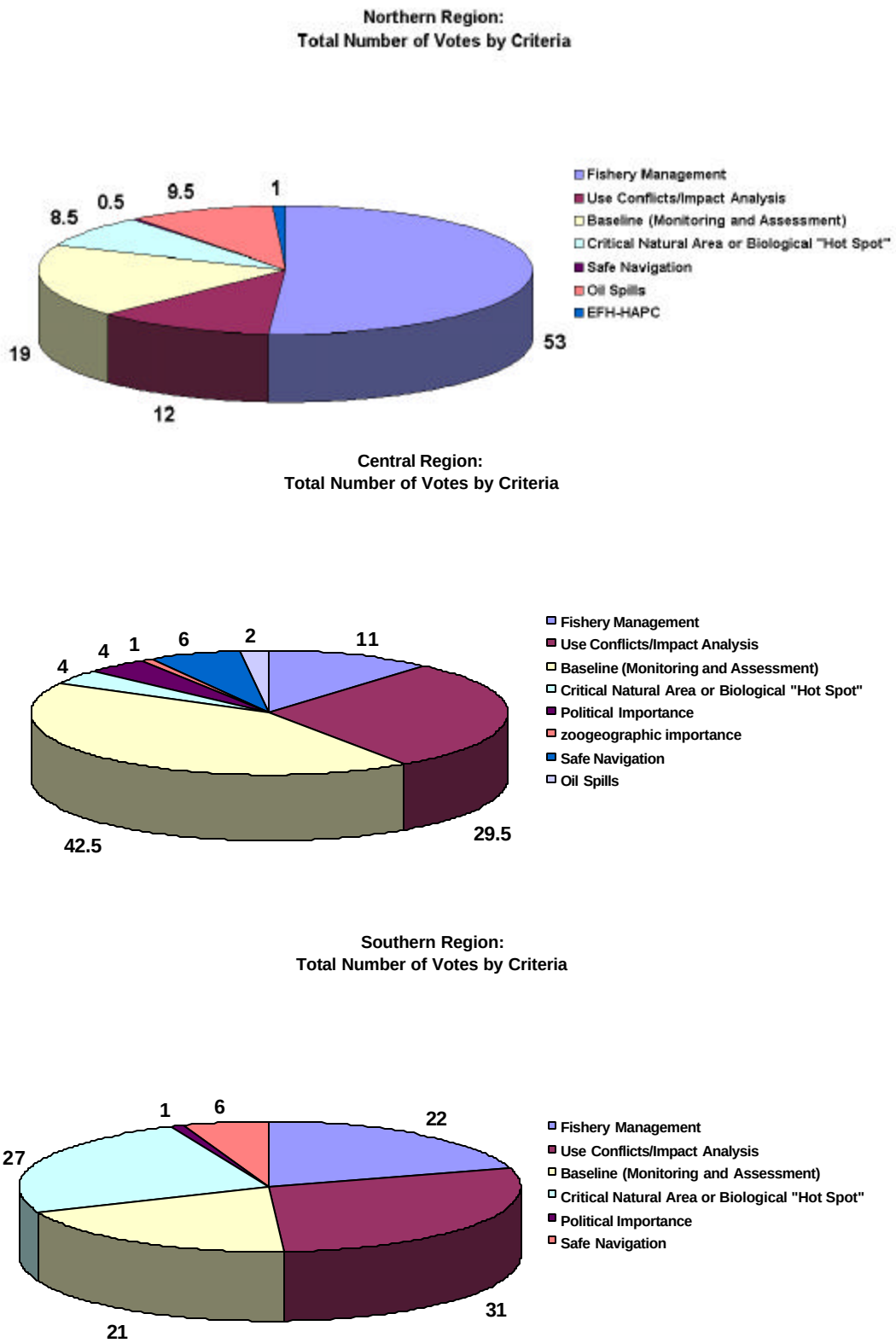

Figure 2. Pie diagrams showing regional preferences in priority mapping criteria. Sections equal the total number of votes for those criteria.

Table 3 shows the top ten priority blocks based on the extended criteria list and divided by northern, central, and southern regions. The number of votes ("dots") for each factor or criteria were tallied per block to give a total vote and priority ranking for that location. This regional information was pooled to identify the top ten priority blocks and ranking criteria for the entire California continental shelf (Table 4). Priority blocks were given location names based on its vicinity to a known landmark. Four priority blocks fall within the northern region, three in the central region, and four in the southern region. Based on workshop participant input, Table 4 results indicate fisheries management to be the key mapping criteria overall (37 votes or 46% of total votes).

Figure 3 represents the total overall assessment of fishing block locations for priority mapping by workshop attendees. As was shown in pre-workshop results, the highest habitat mapping priorities, this time determined by workshop participants, were mainly assigned to blocks in the central and northern regions, with medium and low priority mapping located throughout the California continental shelf.

Table 3. Summary of Worksheet B information showing top ten priority sites for habitat mapping by region.

Northern Region			Criteria										
Block	Total Vote	Priority Rank	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	Zoogeo-graphic Importance	Safe Navigation	Oil Spills	EFH-HAPC
402	11	1	7	1	0	1	0	0	0	0	0	1	1
458	11	1	6	0	3	1	0	0	0	0	0	1	0
441	9	2	5	0	1	3	0	0	0	0	0	0	0
451	9	2	6	0	1	2	0	0	0	0	0	0	0
403	6	3	6	0	0	0	0	0	0	0	0	0	0
222	5	4	5	0	0	0	0	0	0	0	0	0	0
209	3.5	5	0	2.5	0	0	0	0	0	0	0	1	0
108	3	6	0	0	2	0	0	0	0	0	0	1	0
210	3	6	0	1.5	0	0	0	0	0	0	0.5	1	0
223	3	6	3	0	0	0	0	0	0	0	0	0	0
233	3	6	2	1	0	0	0	0	0	0	0	0	0
430	3	6	0	1.5	0	0.5	0	0	0	0	0	1	0
467	3	6	1	1	1	0	0	0	0	0	0	0	0

Central Region			Criteria										
Block	Total Vote	Priority Rank	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	Zoogeo-graphic Importance	Safe Navigation	Oil Spills	EFH-HAPC
526	8	1	0	3.5	4.5	0	0	0	0	0	0	0	0
539	7	2	0	2	0	0	0	0	0	0	0	1	0
643	6	3	1	0	3	1	0	0	0	1	0	0	0
644	6	3	2	1	0	1	0	2	0	0	0	0	0
615	5	4	3	0	2	0	0	0	0	0	0	0	0
501	4	5	1	1	2	0	0	0	0	0	0	0	0
532	4	5	0	2.5	1.5	0	0	0	0	0	0	0	0
539	4	5	2	0.5	1.5	0	0	0	0	0	0	0	0
548	4	5	0	3	1	0	0	0	0	0	0	0	0
547	3	6	0	1	2	0	0	0	0	0	0	0	0
509	3	6	0	1.5	1.5	0	0	0	0	0	0	0	0
516	3	6	1	1.5	0.5	0	0	0	0	0	0	0	0
538	3	6	0	2	0	0	0	0	0	0	0	1	0

Southern Region			Criteria										
Block	Total Vote	Priority Rank	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	Zoogeo-graphic Importance	Safe Navigation	Oil Spills	EFH-HAPC
707	6	1	2	0	0	4	0	0	0	0	0	0	0
719	6	1	2	1	0	0	0	0	0	0	3	0	0
684	4	2	1	0	0	2	0	1	0	0	0	0	0
711	4	2	0	0	2	2	0	0	0	0	0	0	0
890	4	2	3	0	0	1	0	0	0	0	0	0	0
842	4	2	1	1	1	1	0	0	0	0	0	0	0
669	3	3	0	3	0	0	0	0	0	0	0	0	0
685	3	3	1	1	0	1	0	0	0	0	0	0	0
686	3	3	0	1	1	1	0	0	0	0	0	0	0
701	3	3	0	0	0	0	0	0	0	0	3	0	0
708	3	3	1	0	0	2	0	0	0	0	0	0	0
709	3	3	1	0	0	2	0	0	0	0	0	0	0
710	3	3	1	0	0	2	0	0	0	0	0	0	0
756	3	3	0	1	2	0	0	0	0	0	0	0	0
757	3	3	0	1	2	0	0	0	0	0	0	0	0

Table 4. Summary of Worksheet B data showing top ten priority sites for mapping in California as designated by total voting "dots "

				Criteria										
Block	Locations	Total Vote	Priority Rank	Fishery Manage-ment	Use Conflicts/ Impact Analysis	Baseline (Monitoring and Assessment)	Critical Natural Area or Biological "Hot Spot"	Special Species Located in Area	Political Import-ance	Reserve Potential	Zoogeo-graphic Importance	Safe Navi-gation	Oil Spills	EFH-HAPC
402	Point Arena	11	1	7	1	0	1	0	0	0	0	0	1	1
458	Farrallon	11	1	6	0	3	1	0	0	0	0	0	1	0
441	Cordell Banks	9	2	5	0	1	3	0	0	0	0	0	0	0
451	Cordell Banks	9	2	6	0	1	2	0	0	0	0	0	0	0
526	Monterey	8	3	0	3.5	4.5	0	0	0	0	0	0	0	0
539	Point Sur	7	4	0	2	0	0	0	0	0	0	0	1	0
707	Channel Islands	6	5	2	0	0	4	0	0	0	0	0	0	0
719	Long Beach	6	5	2	1	0	0	0	0	0	0	3	0	0
644	OS Point Arguello	6	5	2	1	0	1	0	2	0	0	0	0	0
643	Point Arguello	6	5	1	0	3	1	0	0	0	1	0	0	0
403	OS Point Arena	6	5	6	0	0	0	0	0	0	0	0	0	0

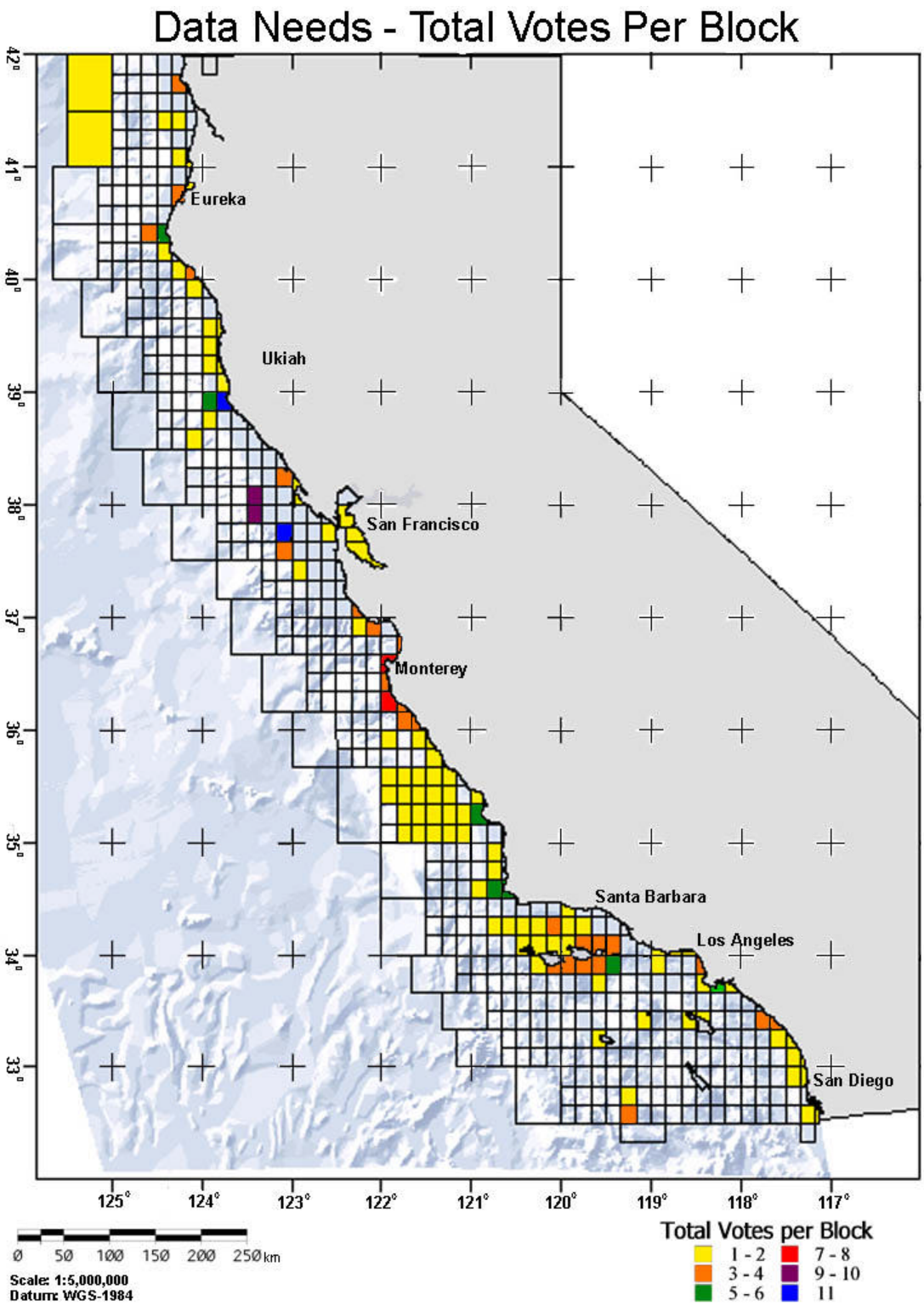

Figure 3 illustrates the high (11 total votes) to low (1 vote) mapping priority per 10' fishing block.

4.4 DATA SHARING AND DATA DOCUMENTATION

4.4.1 MEMORANDUM OF AGREEMENT (MOA) AND METADATA

The session began with a brief introduction about the concerns regarding data sharing such as data searches, the format for dissemination, premature release of data, conflicting mandates on how and what data should be shared, and the formation of a memorandum of agreement (MAO). All participants agreed on the importance of sharing data and establishing a clearinghouse. However it was unclear on who would be responsible for establishing and maintaining this collection. Concerns as to metadata and memorandum development were also discussed. Participants in the roundtable discussion agreed that a standard metadata scheme is important but could not decide on a universal format. Some participants did not understand the difference between data and metadata and needed some information to clarify the issue. Standards used by NOAA, FGDC, and MGDC were suggested. The need to establish an official MOA was questioned as federal agencies are already required to share data through FOIA. It was agreed however that an official agreement would perhaps help foster better collaboration and data exchange between the agencies. No firm conclusions were reached as a group. Several agencies determined that they could use existing data sharing agreements (Appendix R) and the existing metadata standard for their purposes; however, most agencies were clearly going to need more education on both data sharing and documentation. MOA issues such as wavier statement, liability, metadata, and terms of agreement were reviewed (Appendix R). In general, all the participants in this discussion agreed and supported the need of establishing a data sharing protocol, but figuring out how to and who should do this was not resolved.

SUGGESTED ACTIONS

- An ongoing body should be established, a user group for the future to address the next steps, and to provide recognition for a MOA.
- Common area of Project (data) sharing, - website is suggested
- Establish 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
- Use of NOAA standard for data collection
- Use of the FGDC website as an archiving and dissemination source
- Virtual community to support exchange as well as special interest groups and publications

4.5 HABITAT CLASSIFICATION SCHEME

The discussions that took place during the morning session of the Habitat Classification Group focused on a need for coordination between Fish and Game and Gary Greene. Arguments centered around whether the classification scheme was too heavily focused on geology rather than biology. All were in agreement that a glossary of terms is needed so that users understand the verbiage being used. It was also mentioned by a number of participants that the scheme be GIS friendly for ease in data handling and sharing. The need for both sides to understand and communicate became clear. Therefore, in the afternoon, Gary and Fish and Game representatives had a private discussion while the others discussed modifications to the habitat classification scheme proposed by Greene *et al.*

During the afternoon session many suggestions were made for modifying Gary's classification scheme (see Methods, Appendix S). It was recognized early on in the discussions that there was a definite need to review current habitat classification schemes that have been used around the world. One group suggested adopting a recognized classification scheme out of Canada. The

importance of scale and depth zones was discussed in detail. It was suggested that three depth zones be integrated into the scheme (upper, middle, and lower shelf). The need for a hierarchical scheme was introduced, but in the end people resolved that the scheme could not be hierarchical. Instead, a more multi-dimensional approach was suggested that involved defining categories and checking those that apply. The group conceded this suggestion.

5.0 CONCLUSIONS & RECOMMENDATIONS

The California Marine Habitat Task Force Workshop was a crucial first step towards coordinating marine habitat mapping efforts throughout California. Prior to this, no coordinated meeting on habitat mapping been held in California to initiate cooperation among this many marine resource agencies. The two-day meeting allowed resource agencies to work together to prioritize mapping sites along the California Continental shelf, as well as discuss the best methods for collecting, interpreting, and sharing the data.

Marine habitat data holdings were identified both in pre-workshop surveys and in regional breakout groups during the workshop. The majority of existing data holdings were developed for site-specific projects and revealed a lack of information in basic marine habitat descriptions. Resource limitations necessitated the ranking of regionally desired sites in order to prioritize future mapping efforts. The Task Force website (http://skyler.monterey.edu/~cahabmap) holds the summarized data holdings and needs for use by the Task Force members. Workshop attendees expressed an interest in developing a server to facilitate the sharing of existing data, and this website is the initial step in that coordination.

Task Force members successfully prioritized sites along the California coast for which habitat data are needed. The top ten sites identified included fishing blocks near: Point Arena, Farrallon Islands, Cordell Banks, Monterey Peninsula, Point Sur, Channel Islands, Long Beach, and Point Arguello. These locations extend across all three California regions, and reflect the needs of multiple agencies. Many criteria were applied to prioritizing sites to map, reflecting the varied needs of the thirty-eight state and federal agencies that attended the meeting. However, fisheries management, parallel use conflicts, and a need for general baseline data were the criteria most frequently applied to the priority areas. (It is worth noting, however, that the prioritization results reflect the needs and biases of the people present, and should only be used as a guide to those areas of general interest. Had different agency representatives been present, the rankings may well have been different. The results, however, do represent the most comprehensive work to date on coordinating and prioritizing mapping needs for this region.)

No formal plans were created at the meeting for coordinating habitat mapping in these top priority regions. It is recommended that the agencies interested in these priority areas work to develop a coordinated plan of action for combining the resources needed to obtain the essential habitat information. An ongoing workgroup is encouraged for the development of data sharing protocols, as well as working towards the adoption of a federally recognized metadata format. Through this workgroup, surveys could be distributed periodically to the agencies to identify new data holdings and accompanying shifts in regional data needs.

Habitat mapping is increasingly relied upon by resource management agencies as a tool for predicting the real or potential distribution of species or communities that must be surveyed remotely (NEDP report, 1999). Agency representatives agreed that this could be partially accomplished by the development of a universal habitat classification system, which would be used to interpret habitat mapping data, insure that results from different studies could be efficiently and effectively combined, and to facilitate effective data sharing between

organizations seeking to leverage their available resources. In order to successfully coordinate mapping efforts, data should be obtained and interpreted in a way satisfactory to all involved agencies. According to the NEDP report (1999), a successful, regional habitat mapping program needs to include the following elements: 1) well defined goals and objectives, 2) scales for map extents and data resolution appropriate to the stated purpose, 3) a universally accepted and broadly applicable hierarchical habitat classification system based on spatially nested physical and biophysical characteristics that control where species live, 4) a means for acquiring data at appropriate resolutions and spatial scales for each of the relevant habitat characteristics, and 5) a means for combining, analyzing and displaying these various geospatial data sets collected in diverse formats, and at different scales and resolutions such that the habitat classification system may be applied. Many differing opinions were expressed during the workshop on the basis for such a scheme (geology, biology, etc). No formal agreement on a single scheme was made; however, a review of existing classification schemes worldwide was suggested.

The Task Force workshop confirmed the importance of continued coordination in addressing the mapping needs of state and federal agencies in California. The attendees successfully identified major gaps in existing marine data, a common interest in acquiring general habitat information, as well as laid the groundwork for developing an informal communication network between agencies statewide. Our hope is that the participants and related groups will be able to make use of these results in their efforts to secure the resources and funding needed to map the habitats of California's continental margin. Indeed, the workshop results played a key role in the drafting of a proposal recently funded through the new National Sea Grant Essential Fish Habitat Program. This new project entitled *Fisheries Habitat Characterization Of The California Continental Margin: Identification, Quantification And Synthesis Of Existing Information*, is a direct outgrowth of the workshop and represents a collaborative effort between workshop participants from Moss Landing Marine Labs, NOAA, NMFS, CDFG, USGS, SeaGrant and CSUMB.

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7.0 REFERENCES

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8.0 APPENDICES