



Joint Management Plan Review Cross-Cutting Boundary Team

Draft Findings Report

This document is in draft form and was prepared to communicate information and decisions made by the Crosscutting Boundary Team to the Sanctuary Advisory Councils of the Gulf of the Farallones, Cordell Bank, and Monterey Bay National Marine Sanctuaries. This document will be revised and updated and the conclusions and recommendations presented will be evaluated based on the comments received. A Final Evaluation Report and Data Compendium will be produced and made available upon request.

July 11, 2003

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Introduction

As a component of the Joint Management Plan Review (JMPR), the National Marine Sanctuary Program (NMSP) assembled a crosscutting internal team (Team) to address two boundary issues relating to the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries (GF and MB, respectively). Each issue is briefly characterized at the end of this introduction. The focus of this Team was to address concerns voiced during the public scoping process of the JMPR and to provide guidance and recommendations to the Director of the NMSP on how to resolve the two boundary issues.

The Team developed an evaluation process and an analytical framework specifically for this work. The evaluation process is composed of two general phases; Phase I - evaluation of existing data and information and the development of proposed recommendations; and Phase II - consultation with the Sanctuary Advisory Councils for each site. The analytical framework combines programmatic and site-specific priorities and mandated responsibilities with an evaluation of over 180 sets of data and information using several different analytical methodologies.

This report (*Findings Report*) represents the conclusion of Phase I and documents the work done by the Team during this phase as well as the recommendations for each issue. All Team members support the data selections, methodologies, analytical interpretations, and recommendations. Further, this report represents a single voice of consensus from the Team. The Team prepared this report to provide the SAC members with information on the evaluation process, the analytical framework, and the results of the analysis. During Phase II, the Team will present this work and its contents to each SAC and facilitate a review of this report by the SACs. All comments received from the SACs will be reviewed by the Team and incorporated into the Final Boundary Evaluation Report that will be presented to the Director of the NMSP.

Issue 1: GFNMS and MBNMS Co-terminus Boundary

Since designation in 1992, the northern portion of the Monterey Bay National Marine Sanctuary has been under co-management with the Gulf of the Farallones National Marine Sanctuary. Despite continued efforts to implement a shared management structure, this arrangement has resulted in confusion with some communities as to which site is ultimately responsible for managing and protecting the resources in this area. The NMSP received many comments throughout the public scoping period and the SAC prioritization workshops requesting that the NMSP resolve the ongoing northern MB/southern GF boundary issue during the JMPR.

Issue 2: The San Francisco/Pacifica Exemption Area

In conjunction with the GF/MB boundary issue, the Team reviewed the existing San Francisco/Pacifica exemption area in the northern region of the MBNMS. NOAA excluded this area as part of the original MBNMS Sanctuary designation in 1992 due to concerns regarding levels of discharge from the San Francisco

Municipal combined sewer overflow plume. The Team will provide an evaluation of the issue and determine whether the area should be included for NMSP protection.

Goals and Objectives

Goal

To bring together key NMSP staff and work through a process designed by the group that will generate a supportable and logical resolution to two boundary issues using clear and concise analytical thinking and teamwork.

Objectives

- 1) To develop and implement an analytical process designed to determine a recommendation for a boundary configuration relative to the GF/MB shared boundary using the best available information and resources.
- 2) To prepare an appropriate set of information and a recommendation for a boundary configuration to be presented to the Sanctuary Advisory Councils of the MB, GF, and CB NMSs for their review and comment.
- 3) To develop a Final Boundary Evaluation Report for the Director of the NMSP.
- 4) To develop and implement an analytical process designed to evaluate the inclusion of the existing San Francisco/Pacifica exemption area in NMSP jurisdiction using the best available information and resources.

Evaluation Framework

Process

The NMSP assembled the Team to evaluate ecological, physical, biogeographic, socioeconomic, geopolitical and administrative factors in order to determine whether there is a need to modify the existing boundary configuration of GF and MB. A Sanctuary Advisory Council (SAC) representative from each site (GFNMS and MBNMS) attended all meetings as observers. See *Team Members* for further information.

Phase I – Evaluation and Recommendation Development

This phase of the process included three steps laid out in a manor that promoted a thorough evaluation of all data, information, and criteria relative to this issue, and insured the generation of a recommendation sound in reason and function. The evaluation provided a basis for determining optimal boundary, administrative, and/or regulatory scenarios to promote maximum efficiency in engaging local communities and protecting sanctuary resources. At the conclusion of any step, the Team could have concluded that no changes to the boundaries were warranted and moved to generate the Findings Report, there in concluding Phase I. Since that conclusion was not made, the Team continued to step through the remaining steps by assessing administrative and/or regulatory changes that could be made, and developed a proposed recommendation (see the *Phase One* process diagram for more information). The three steps of phase one were as follows.

Step One - Evaluation of existing data and information

The Team evaluated over 180 GIS compatible data layers (see *Data List* for more detailed information). These data covered a wide range of general areas including, but not limited to, base physical, biological, and terrestrial data sets; marine birds, mammals, fish, integrated biogeographic data sets; and commercial activities, jurisdictional and political boundaries, and information on other significant resources. Due to the varying nature, spatial extent, and resolution of the data being analyzed, several analytical approaches were used during this step of the evaluation. See *Assumptions and Methodologies* for more information.

Step Two – Administrative and regulatory considerations

Should the data evaluated during Step One present a significant case for altering the current boundary configuration, considerations of administrative and regulatory changes that could be made to address the need for moving a boundary would be assessed. Such changes would be made in lieu of making actual changes to the current boundary configuration should the team agree that such changes would increase the NMSP's ability more effectively manage these marine areas in a manor than if handled by changing the boundary configuration.

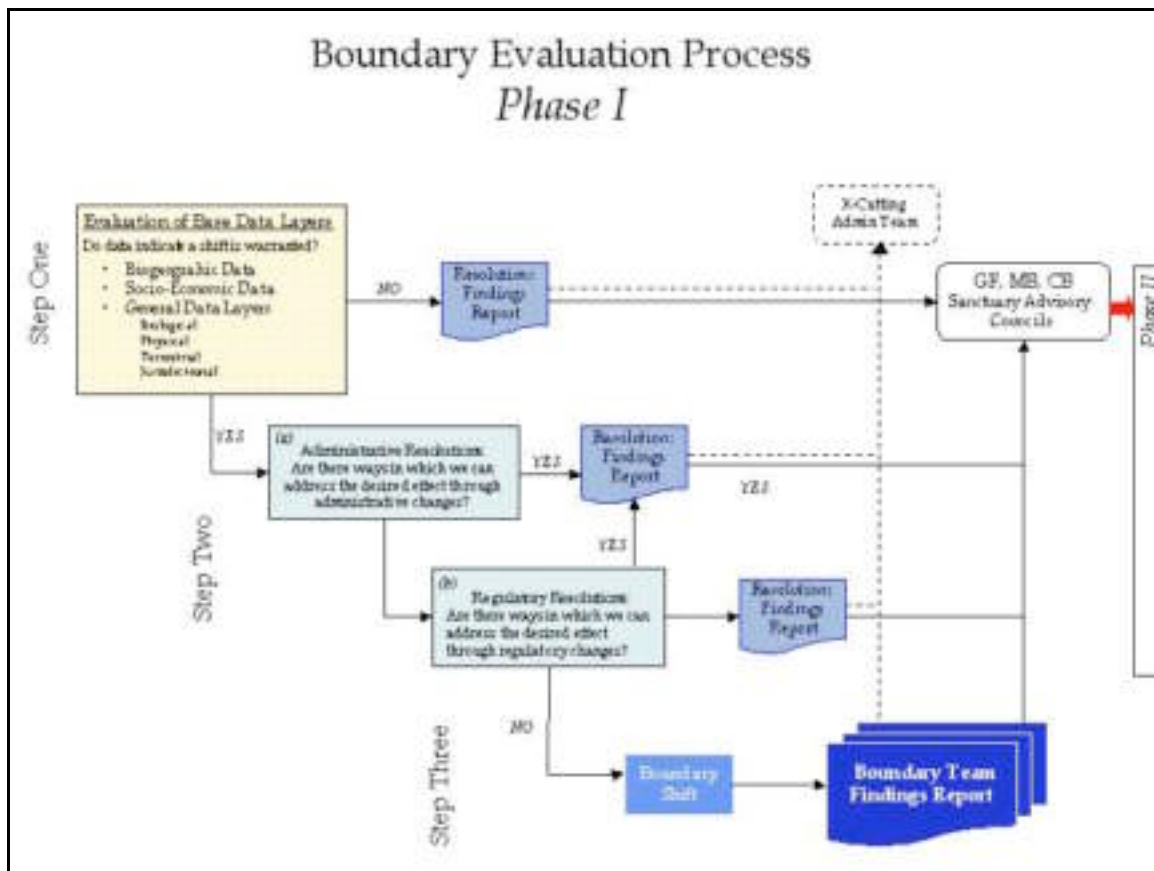
Step Three – Development recommendation for new boundary configuration

Should the results of Step Two indicate that the optimal way to address the considerations raised in Steps One and Two is a change to the existing boundary configuration, the Team would establish a single recommendation for changing the current boundary configuration. The team would strive to reach consensus on this recommendation before presentation to the SAC’s and the Director of the NMSP using a consensus driven decision-making process.

Conclusion of Phase I

The Team prepared this *Findings Report* that documents, as succinctly as possible, the inner workings of the Team, the evaluation process, and presents the recommendation of the Team to Sanctuary Advisory Council for review and comment.

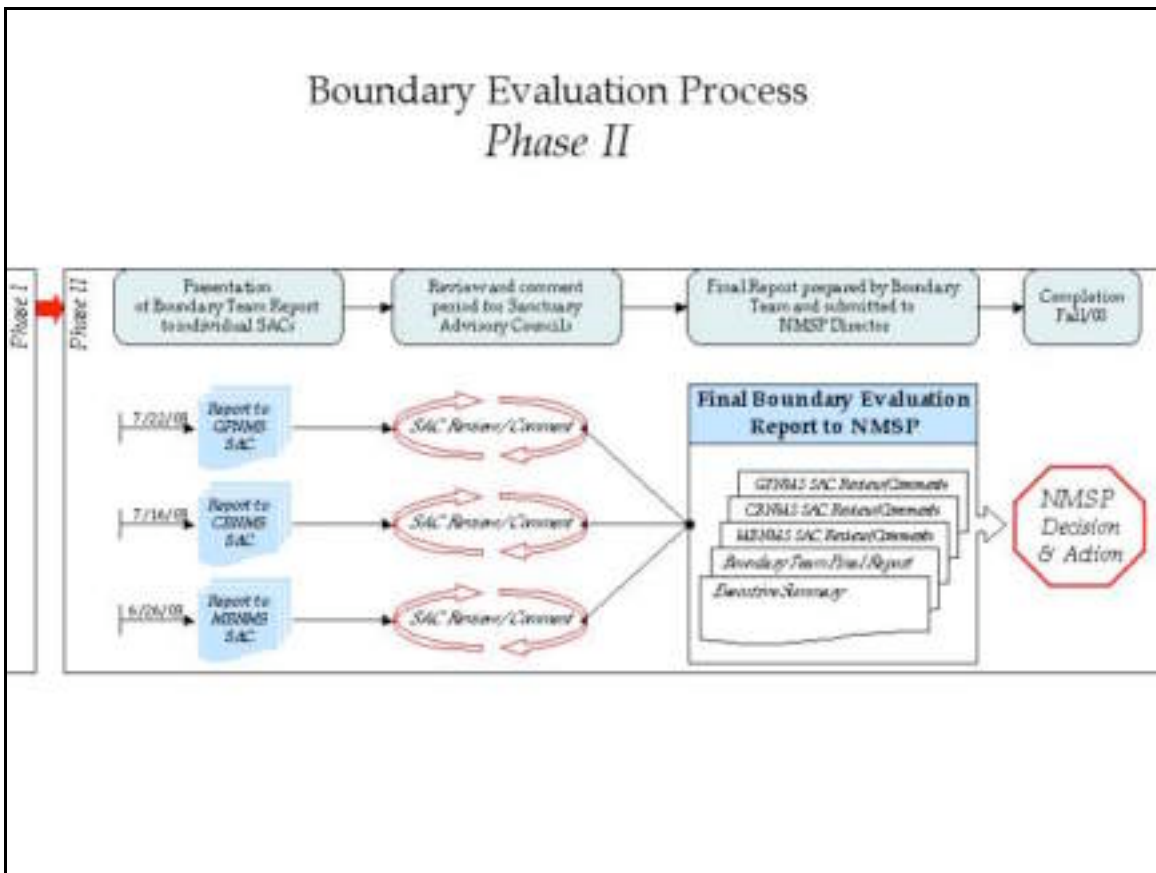
Figure 1: Boundary Evaluation Process – Phase I



Phase II – SAC review and Final Evaluation Report

Upon the completion of the Team's evaluation, the Team will present the *Findings Report* to each SAC (Cordell Bank SAC members may not request a full presentation). Each SAC member will be given the opportunity to review and comment upon this *Findings Report*. These comments will be submitted through the local Management Plan Coordinators during the SAC action plan review. At respective SAC meetings, each SAC should strive for a consensus recommendation regarding the findings in this report; these will be forwarded to the Team Lead. The Team will then review the SAC comments and respond to the recommendation. The Team will then prepare a *Final Boundary Evaluation Report* that will include the complete *Findings Report*, SAC recommendations, the final Team recommendation for the Director, and any necessary supportive information. (Note: The final Team recommendation may or may not differ from the initial Team recommendation presented in the *Findings Report*. Changes made to the recommendation presented in the *Findings Report* will be based on the Teams response to the SAC comments received.) This Final Evaluation Report will be presented to the NMSP Director for review, and action. Any and all formal decisions made and actions taken relative to these issues will be made by the Director of the NMSP. If the Director determines a boundary change is appropriate, the NMSP, through the JMPR, will proceed with a NEPA compliant, formal rulemaking process.

Figure 2: Boundary Evaluation Process – Phase II



Evaluation Criteria/Objectives

The Team developed seven evaluation objectives. These objectives were used to support the evaluation process and to insure the utility and efficacy of moving a component of the GF and MB boundaries or altering the administrative and/or regulatory structures of the sites based on the mandated responsibilities of the NMSP as defined within the National Marine Sanctuaries Act. Each data layer thought to indicate a trend in the Evaluation Area (the region between San Francisco Bay and Point Ano Nuevo) would be evaluated relative to each one of these objectives in Step I. Further, these objectives would be used to assess the appropriateness of any possible change to the administrative and/or regulatory structures of each site in Step II (a) and (b). The act of reconfiguring the boundaries and or the administrative and/or regulatory structures of the GF and MB NMSs would need to meet at least one of these objectives to be considered viable.

The objectives developed by the Team are presented below in the form of questions that would be asked of each significant data layer, or administrative or regulatory change being evaluated.

Boundary Evaluation Objectives

Step I: Do the data indicate a shift in the location of the boundary to:

Step II(a): Are there ways the NMSP can address the desired effect of a boundary shift through administrative changes that would:

Step II(b): Are there ways the NMSP can address the desired effect of a boundary shift through regulatory changes that would:

- 1) provide additional comprehensive and coordinated conservation and management of this marine area (e.g., Federal agencies, State and local governments, Native American tribes and organizations, international organizations, and other public and private interests, etc.).
- 2) ensure it maintains the natural biological communities in the National Marine Sanctuaries.
- 3) increase protection, and where appropriate, restoration of natural habitats, populations, and ecological processes.
- 4) enhance public awareness, understanding, appreciation, participation, stewardship, and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of this marine area.

- 5) enhance coordination of scientific research and the long-term monitoring of the resources of this marine area.
- 6) facilitate to the extent compatible with the primary objective of resource protection, public and private uses of the resources of this marine area.
- 7) provide for more efficient and cost-effective uses of program resources (e.g., funding, staffing, partnerships, facilities, etc.).

Data

The Team began this process with a collection of nearly 300 data layers. This collection was paired down to 180 data layers based on relevance, quality of data, and spatial extent of data. Further the Team assembled these data layers such that data representing all major areas of NMSP management and resource protection were addressed to the greatest extent possible. This final collection of data is grouped into the following major categories. For more detailed information on the data see Appendix 1.

1. Biogeographic
 - Marine Birds (e.g. species distribution, abundance, density)
 - Marine Mammals (e.g. species distribution, abundance, density)
 - Fish (e.g. distribution, abundance, density, assemblages)
 - Habitat Suitability Models
 - Integrated products (e.g. hot spot and critical habitat assessments)
2. Biological/Terrestrial (e.g. watersheds, shoreline type, marine plants)
3. Jurisdictions (e.g. ownership, management boundaries)
4. Demographic (e.g. population, pop density, change)
5. Commercial (e.g. land-use, farmland, fishing)
6. Geopolitical (state and federal legislative districts)
- Other (e.g. shipwrecks, outfalls, desalination, dredging)

Assumptions and Methods

Assumptions

Based on the characteristics of the issues at hand and the confines of resources and options available, the Team agreed to a set of initial assumptions for this evaluation. They are as follows:

1. The Team must consider all aspects of NMSP responsibilities and mandates when evaluating the data (e.g. resource protection, management of biological, physical, and cultural resources, administrative and regulatory function)
2. The shared boundary can move no farther south then Point Ano Nuevo

3. The shared boundary can move no farther north than the current configuration of GF and MB boundaries.
4. The grid system to be used will be set up based on latitude/longitude coordinates and designed to match the highest resolution data available.
5. The lat/long grid system will not preclude the development of boundary alternatives that do not follow latitudinal patterns. This grid system will be used to locate the shoreline extent of any alternative developed.
6. The underlying premise to be evaluated is that a major biogeographic break exists around Point Ano Nuevo and that a different boundary configuration would promote more effective management and protection of the resources in this region. Based on this premise data will be evaluated under the assumption that a boundary would be moved in order to maximize the presence of a particular resource in one sanctuary while minimizing the presence of that same resource in the other.

Methods Overview

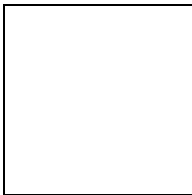
Due to the wide array of data evaluated during this process four unique analytical approaches were utilized during this process. Results from each methodology enabled the Team to determine if a particular data layer portrayed distribution patterns that would be better matched with NMSP responsibilities and mandates if the boundary configuration was structured differently. In addition, this approach enabled the Team to identify possible alternate boundary configurations better matched to the resource distributions and patterns.

Method 1: GIS spatial analysis using a grid system approach

The grid system used was defined with a spatial extent of the study area identical to that of the JMPR, Point Arena to Point Sal. This system included two separate grid masks. The first was a grid mask where each cell within the study area was identified by one of four possible ownership classes: GF, CB, MB, SA (study area). The second grid mask encompassed the "evaluation area" for this evaluation (the northern shoreline limit of Marin County to 10 miles south of Point Ano Nuevo). This grid mask was sectioned into 11 longitudinal sections that were designed to match the grid dimensions of the highest grid resolution of the data to be processed during the analysis. All appropriate data were then "pushed" (evaluated) through this system of two masks. The resulting information enabled the Team to track the change in distribution of resources from the northern to the southern extent of the evaluation area relative to the distribution of that resource outside of the evaluation area. See Figure 3 for an illustration of this grid system, and data processing approach. Based on Assumption 6 described above, the team used two levels of separation to identify data layers possibly indicating a significant shift. The two levels were a 70% / 30% (i.e., 70% of the resources remained in one sanctuary) or greater split of resources and an 80% / 20% or greater split. Where appropriate, data layers were processed and these splits

were tracked. Where these splits were reached under the current boundary configuration, the resource was said to promote the status quo configuration. Where the split was reached by theoretically moving the boundary south, the point at which the splits were reached was tracked and tagged as a resource that could promote a different boundary configuration. Where neither split was reached under the status quo or maximum alternate configuration, the data layer was tagged as not promoting a change to the current boundary configuration.

Figure 3: Grid system and GIS spatial data processing approach



Method 2: Multivariate & discriminate analyses

Three data sets were used for this analysis: NMFS benthic shelf trawls, NMFS benthic slope trawls, and CDFG recreational hook and line. These data were first clustered (using 1-Pearson Correlation Coefficients and Average Linkage) to establish assemblages of species. These assemblages were then analyzed in a series of discriminant analyses designed to visually determine if differences for a given assemblage could be found between three geographical areas while minimizing for variances due to bathymetry. To differentiate the three geographical areas, all data collected in GFNMS was placed into one group, and data collected in MBNMS was divided into two groups; Evaluation Area (north of latitude 37.1) and MB South (south of latitude 37.1). Discriminant analysis is a statistically robust method to resolve a linear gradient of variation between groups such that variation between groups is maximized and variation within groups is minimized. This approach enabled differences between GFNMS and MB South to be assessed, and subsequently compared to data from the Evaluation Area to determine if those data were more similar to the data from the GFNMS component or the MB South component. Differences were based on a visual interpretation of graphs.

Method 3: Visual interpretation and evaluations of distributions

Many of the data sets integral to this process and to the responsibilities and action of the NMSP could not be analyzed with the two methods above. These data layers (e.g. shipwreck locations, desalinization sites, geopolitical, jurisdictional boundaries) all had a spatial component that allowed the Team to assess their distributions relative to the existing boundary configuration with the use of GIS software. The group visually assessed these data by asking two questions of each data layer.

1. Would moving the boundary increase the ability of the NMSP to protect and manage this resource?
2. If yes, at what point along the coast and within the Study area could a boundary be placed to reach the desired effect relative to this resource.

Answers to these questions were recorded and evaluated against other data sets analyzed in this fashion as well as against data analyzed using the previous methods.

Method 4: Balancing act

Once the Team had processed all data layers using one of the above methodologies and possible indications of alternate boundary delineations generated. The Team conducted a thorough crosswalk of all data layers portraying a distributional pattern possibly better suited by a different boundary configuration. To do this, four questions were initially asked of each data layer.

By moving the boundary south:

1. what would be the minimal move that would accommodate the patterns seen?
2. what effect will the move have on other resource patterns in the GF and the MB where no evidence was found suggesting a new boundary configuration?
3. would such a move have adverse effects relative to the management and protection of other resources with in the GF?
4. would such a move have adverse effects relative to the management and protection of other resources with in the MB?

The process of cross-walking all data layers promoting a possible alternate boundary configuration with those supporting the status quo configuration provided further insurance that all data considered relative to the option of moving a boundary was properly weighted relative to other data layers. This approach insured the promotion of effective and efficient management and protection of resources as opposed to complicating it.

Findings

Issue 1: GFNMS and MBNMS Co-terminus Boundary

Using the methodologies described earlier in this report, the Team evaluated all data available and tracked significant distributions and patterns that might suggest the need for a new boundary configuration. A majority of the data suggested that the existing boundary configuration is appropriate and that the delineation mark of at least a 70/30 (e.g. selected marine mammal distributions) split of a given resource existed within the current boundary configuration. Further, a few data layers reached the 80/20 delineation (e.g. kelp distributions). The current boundary configuration, based either on existing distributions of significant resources relative to GF boundaries or based on significant resources relative to MB boundaries, was found to be appropriate and well suited for effective management and protection of the resources within the region.

After processing over 180 data layers, tracking the changes in distributions and patterns of the data layers, and cross-walking each “significant” resource data layer with “status quo” resource data layers, the impact of moving a boundary on the “status quo” resource configuration was assessed. The Team came to four distinct conclusions. They are as follows:

1. The quantity and quality of the data and information used in this evaluation as well as the analytical framework was well suited in detail and approach to generate a logical and supportable resolution to this issue. Further, while there was some concern that there may be some information that was not addressed in this evaluation, obtaining this information would have been time and/or cost prohibitive, and any evidence of a major biogeographic break would have surfaced within this process if such a break existed.
2. There is no evidence suggesting that there is a major biogeographic break off the coast of California at Point Ano Nuevo. This was a unanimous conclusion by the Team. The results of all of the analyses suggest that there are notable differences between the Gulf of the Farallones and Monterey Bay; however, differences between these areas and that of the Evaluation Area were not notable. In short, the Team concluded that with respect to a majority of the data evaluated, the Evaluation Area is not notably similar to either the Gulf of the Farallones or Monterey Bay even though the Gulf of the Farallones and Monterey were found to be notably different.
3. From a programmatic and management perspective, very few of the visually assessed data layers indicated that a change to the current boundary configuration would result in improved management and protection.

While the evaluation of data promoted a status quo recommendation, the Team did feel that consideration of several significant aspects of management in this region for which data did not exist needed to be addressed. Specifically, the Team decided that the area of MB north of San Francisco (the “panhandle”) may not be the optimal configuration for four reasons:

1. Enforcement. Based on experiences of the Team, a recognition was made that enforcement issues in this area are complicated in part due to the boundary configuration around the Exemption Area. The Team felt that the current boundary should be restructured to address this.
2. Public understanding of the locations of the boundaries of both sanctuaries due to the complex configuration of the existing boundaries in this area.
3. Administrative considerations. This area is logistically more difficult for the MB staff to reach and would be better served by staff in the Gulf of the Farallones offices.
4. To enhance partner coordination between the Golden Gate National Recreation Area and the Point Reyes National Seashore.

Before agreeing to recommend a new boundary configuration, the Team cross-walked this possible change with the Evaluation Criteria/Objectives described earlier in this report. The Team agreed that this move would meet five of the seven criteria developed; numbers 1, 4, 5, 6, and 7.

Based on these considerations, the Team concluded the northern limit of the Monterey Bay National Sanctuary should be moved south to the existing southern boundary of the Exemption area at Point San Pedro. The proposed change would be completed by connecting the existing southwestern corner of the Exemption Area (37.61367N, 122.61673W) to the existing shared boundary coordinate directly to the west (37.61622N, 122.76937W). This new delineation would shift territory north of that line to the Gulf of the Farallones National Marine Sanctuary, and the Exemption Area would remain unchanged.

Recommendation for Issue I:

Move the northern limit of the MBNMS south by connecting the existing southwestern corner of the Exemption Area at 37.61367N, 122.61673W to the existing shared boundary coordinate located due west at 37.61622N, 122.76937W.

Issue 2: The San Francisco/Pacifica Exemption Area

A preliminary assessment of this issue revealed that the conditions under which the San Francisco/Pacifica Exemption Area was originally developed in 1992 still exist. These issues were:

1. Potential contamination from the San Francisco Municipal combined sewer overflow discharge plume
2. Dredging activities
3. Vessel Traffic

During this 5-year management period, if conditions change significantly, an in depth assessment could be conducted. This assessment could look at whether these conditions warrant the continued exclusion from NMSP protection based on current NMSP goals for resource protection and management, and constituent outreach and education.

Recommendation for Issue 2:

No action. The Exclusion Zone should remain in place. Further investigations could be warranted in the future should existing conditions regarding sewer overflows, dredging and vessel traffic change significantly.

Review Guidance/Information

The following guidelines and information should be used in generating review comments for the Team. These guidelines will help insure that the Team gets the information needed in a manner that is most useful to everyone, and the SAC recommendations can be readily incorporated into the Final Boundary Evaluation Report. Please feel free to add supplemental language to the review should the following questions not cover the topics you would like to address.

In the review submitted to the Team, be sure to indicate your name and SAC seat represented, and include comments on the following topics.

1. Comments regarding the general approach taken by this Team
2. Comments regarding the data and information used in this evaluation
3. Comments regarding the recommendation presented in the findings report
4. General comments for the Team

All comments must be submitted via the local Management Plan Coordinator or raised at the SAC meetings when this issue will be discussed. Contact information is provided in Appendix 4.

Next Steps

1. By July 22, the Team will have presented this findings report to each SAC and the review and comment step of Phase II will begin (See Figure 2: Boundary Evaluation Process – Phase II for more information)
2. Each SAC member is encouraged to complete a review of this Report and the findings of the Team. Each SAC should strive for a consensus recommendation regarding the findings in this report.

Comments will be consolidated and discussed by the Team by September 2003. During these discussions, the Team will reassess the original recommendation relative to comments received from the SAC review and prepare a final recommendation for the Director. This final recommendation may or may not be the same as the recommendation in this report as changes may be made based on SAC review comments

3. The Final Boundary Evaluation Report will be generated for submission to the Director of the NMSP by the end of September 2003. This report will include an Executive Summary, the original Findings Report, a summary of the SAC comments, copies of all SAC comments received (in their original state) during the SAC review, a final recommendation summary from the Team, and any supplemental information requested by the Director. This report will be made available to each SAC.
4. The Director of the NMSP will review the Final Boundary Evaluation Report and determine the best action to take relative to the issues addressed.

See Appendix 2 for more information on next steps and schedules

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Appendices

Appendix 1 - Overview Data List

Data Layer Name	
Biogeographic - Base Layers	
1	Kelp Distribution 1999
2	Substrate Type - P:C:G
3	Substrate Type - ROCK
4	Substrate Type - MUD
5	Substrate Type - ROCK/MUD
6	Substrate Type - SAND
7	Seasonal Sea Surface Temperatures (averages)
8	Seasonal SST Anomalies (deviations)
9	Seasonal Chla concentrations (averages)
10	Seasonal Current Patterns (magnitude, direction)
11	Bathymetry (70M)
12	Bathymetry - Complexity
Biogeographic - Derived Fish Layers	
13	Species diversity of demersals
14	Species richness of demersals
15	Gopher assemblage - Recreational
16	Blue rock assemblage - Recreational
17	Yellow tail rockfish assemblage - Recreational
18	Boccacio assemblage - Recreational
19	Green spotted Rockfish assemblage - Recreational
20	Half-banded rockfish assemblage - Shelf Trawl
21	Sanddab assemblage - Shelf Trawl
22	Big skate assemblage - Shelf Trawl
23	Pacific hake assemblage - Shelf Trawl
24	Short spine assemblage - Shelf Trawl
25	Chillipepper assemblage - Shelf Trawl
26	Dark blotch assemblage - Shelf Trawl
27	Split nose assemblage - Slope trawl
28	Cat shark assemblage - Slope trawl
29	Aurora assemblage - Slope trawl
30	Sable fish assemblage - Slope trawl
31	Long spine assemblage - Slope trawl
32	Pacific viper assemblage - Slope trawl
Biogeographic - Habitat Suitability Models	
33	Flatfish - all species, adult
34	Flatfish - all species, sub-adult
35	Mean distribution model - all species
36	Rockfish Distribution, all species, adult
37	Rockfish Distribution, sub-adult, all species
38	Shallow / shelf assemblage distribution, adult
39	Shallow / shelf assemblage distribution, sub-adult
40	Deep / slope assemblage distribution, adult
41	Deep / slope assemblage distribution, sub-adult
42	Distribution Overlap Map
Biogeographic - Birds	
43	Marine Bird Density - all seasons
44	Marine Bird Biomass - all seasons
45	Marine Bird Species Diversity - all seasons
46	Major Marine Bird Breeding Colonies
47	Brown Pelican - 3 Season Persistence

48	Black-legged kittiwake - Davidson Density
49	Western and Clark's Grebe density - Davidson
50	Northern Fulmar density - Davidson
51	Sooty Shearwater density - upwelling/ density
52	Ashy Storm Petrel density - oceanic
53	Leach's Storm Petrel density - upwelling/ density
54	Leach's Storm Petrel density - Davidson
55	Black, surf, white-winged scoter density-Davidson
56	Brown Pelican density - oceanic
57	Common Murre density - upwelling
58	Rhinoceros Auklet density - Davidson
59	Black Footed Albatross -upwelling
60	Caspian Tern - upwelling/ density
61	Tufted Puffin - upwelling/ density
62	Tufted Puffin - oceanic
63	Cassin Auklet - upwelling/ density
64	Common Murre density - 3 Season
Biogeographic - Marine Mammals	
65	California Sea Lion - 3 Season Persistence
66	California Sea Lion Count
67	California Sea Lion haul outs
68	Northern Fur Seals Density - 3 Season Persistence
69	Northern Fur Seals - rookery
70	Dall's Porpoise Density - 3 Season Persistence
71	Pacific white-sided dolphin density -3 Season Pers.
72	Pacific white-sided dolphin - High use
73	Risso's Dolphin Density - 3 Season Persistence
74	Humpback Whale - 2 Season Persistence
75	Gray Whale Density - 3 Season Persistence
76	Gray Whale - Davidson
77	Blue Whale -Counts
78	Stellar Sea Lion
79	Harbor Seals
80	Elephant seals
81	Sea Otters
Biogeographic - Integrated Products	
82	Cumulative High Diversity - fish
83	Cumulative High Suitability - fish
84	Overlap of Diversity and Suitability - fish
85	Cumulative High Diversity - marine birds
86	Cumulative High Density - marine birds
87	Overlap of Diversity and Density - birds
88	Integrated Species Diversity- marine birds, fish
89	Integrated Species Density/ Suitability- birds, fish
90	Integrated Div, den, suit - fish and birds
Demographic	
91	Population Density
92	Population Change
93	Projected population % change - Tabular
94	Income/ Industry/ county - Tabular
95	Employment/ Industry/ county - Tabular
96	Income: Commercial Fishing/ county - Tabular

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97	Travel \$/accommodations/county - Tabular
98	Travel \$/business/county - Tabular
	Commercial Fishing - Categories listed by habitat
99	Red urchin - Near shore Rocky Reef/Kelp
100	Kelp greenling - Near shore Rocky Reef/Kelp
101	Cabezon - Near shore Rocky Reef/Kelp
102	Blue rockfish - Near shore Rocky Reef/Kelp
103	Lingcod - Near shore Rocky Reef/Kelp
104	Black rockfish - Near shore Rocky Reef/Kelp
105	China rockfish - Near shore Rocky Reef/Kelp
106	Grass rockfish - Near shore Rocky Reef/Kelp
107	Market squid - Near shore Soft Bottom
108	Bocaccio rockfish - Rocky Deep Shelf/Slope
109	Chillipepper rockfish - Rocky Deep Shelf/Slope
110	Yellowtail rockfish - Rocky Deep Shelf/Slope
111	Lingcod - Rocky Deep Shelf/Slope
112	Dungeness crab - Soft Bottom Deep Shelf/Slope
113	Sablefish - Soft Bottom Deep Shelf/Slope
113	English sole - Soft Bottom Deep Shelf/Slope
114	Petracle sole - Soft Bottom Deep Shelf/Slope
114	Dover sole - Soft Bottom Deep Shelf/Slope
115	California halibut - Soft Bottom Deep Shelf/Slope
115	Sanddab - Soft Bottom Deep Shelf/Slope
116	Lingcod - Soft Bottom Deep Shelf/Slope
117	Albacore tuna - Open Water Habitat
118	Pacific mackerel - Open Water Habitat
119	Jack mackerel - Open Water Habitat
120	Chinook salmon - Open Water Habitat
121	Swordfish - Open Water Habitat
122	Pacific sardine - Open Water Habitat
123	Northern anchovy - Open Water Habitat
	General - Shoreline Type
124	Coarse-Grained Sand to Granule Beaches (ESI)
125	Exposed Rocky Cliffs (ESI)
126	Exposed Seawall (ESI)
127	Exposed Tidal Flats (ESI)
128	Exposed wave-cut platforms in bedrock (ESI)
129	Fine- to medium-grained sand (ESI)
130	Gravel Beaches (ESI)
131	Mixed sand & gravel Beaches (ESI)
132	Riprap (ESI)
133	Salt- & brackish-water marshes (ESI)
134	Sheltered Man-Made Structures (ESI)
135	Sheltered rocky shores (ESI)
136	Sheltered tidal flats (ESI)
137	Undefined (ESI)
138	Wave Cut Rocky Platforms (ESI)
	General - Terrestrial
139	Major Ownership
140	Land Cover
141	Major Streams
142	Coastal Watersheds
143	MW WQPP Watersheds
144	CA important farmland
	General - Boundaries
145	Counties w/ off shore rocks
146	Congressional Districts
147	Census cities

148	State Assembly districts
149	Regional WQ Control board boundaries
150	CA F&G boundaries
151	EPA region 9
152	Coast Guard Regions
153	NMSP Boundaries
154	ACOE Regions
155	MPWC zones
156	State Park Regions
157	State Parks
158	National Parks
159	National Forests
160	National Wildlife Refuges
161	National Recreation Areas
162	Other Federal Lands
163	CA MPAs (some shoreline mm)
164	3 mile CA limit (some shoreline mm)
165	EEZ
166	Coastal Zone management Areas
167	Contiguous Zone
168	OCSLA 8g Line
169	NERR Boundaries
170	State Senate Districts
171	Vessel Approach Zones
172	NMSP Over Flight Zones
173	ASBS
174	Armored Seawalls
	General - Miscellaneous
175	Vessel Traffic Lanes
176	Coastal access points
177	Impaired water bodies (303D)
178	Potential desalinization sites
179	Dredge disposal sites
180	Outfalls
181	Mariculture
182	Academic/Research Institutions
183	Shipwrecks (AWOIS, Navy, NMSP, PCMAS)
184	SFB Pollution
185	Polluting Wrecks

Appendix 2 – Overview of Phase I and Phase II schedules

Phase 1

- April 3: Conference call
- April 7: Conference call
- April 7 - 15: Working period to develop and process target data and to draft proposed questions and criteria.
- April 17/18: Meeting in California to finalize the Team Charter, finalize evaluation process, review / revise criteria framework, develop criteria for data assessment, and review available data (*open to SAC observers*).
- April 21 – May 5: Working period to conduct preliminary analyses.
- April 21 – May 5: Interim internal conference call to discuss progress.
- May 7: Meeting in California to review preliminary analysis results and develop / conduct subsequent targeted analyses (*open to SAC observer*).
- May 8 – May 30: Working period to conduct analyses and develop boundary configurations.
- June 19: Meeting in California to review analysis results, draft boundary alternatives and justifications for each (*open to SAC observer*).
- June 23: Conference call
- June 26: Conference call
- June 26 – July 9: Draft Findings Report prepared

Phase 2

- **June 27** – Present summary of Findings Report to MB SAC (note: only a general overview was presented. Detailed information on the evaluation and the Team recommendation was not presented)
- **July 17** – Present Findings Report to CB SAC
- **July 21, 22** - Present Findings Report to GF SAC
- **August 1** – MB SAC recommendation to Crosscutting Boundary Team
- **August 1**– GF and CB recommendation to Crosscutting Boundary Team
- **September** - Preparation and presentation of Final Boundary Evaluation Report to NMSP Director

Appendix 3 – Team Members

Team Participants:

1. Bill Douros, MBNMS
2. Dan Howard, CBNMS
3. Maria Brown, GFNMS
4. Julie Barrow, NMSP
5. Anne Walton, GF/CBNMS
6. Sean Morton, MBNMS
7. Brady Phillips, NMSP
8. Columbine Culberg, NMSP

External Experts:

9. Mark Monaco, NCCOS
10. Rod Ehler, NMSP
11. Dr. Larry Claflin, NCCOS
12. Wendy Morrison, NCCOS

Team Lead:

13. Mitchell Tartt, NMSP
14. Dave Lott, NMSP

Sanctuary Advisory Council Observers:

15. Dan Haifley, MB SAC representative
16. Stephanie Harlan, MB SAC representative
17. Richard Charter, GF SAC representative
18. Jim Kelly GF SAC representative

SAC Observer Guidelines:

1. The purpose of the SAC Observer was to allow each SAC to follow NMSP work done by the Cross Cutting Boundary Internal Team during the JMPR and to promote improved SAC involvement in Phase II as described in the JMPR Work Plan (www.sanctuaries.nos.noaa.gov/jointplan).
2. SAC Observers did not participate in discussions during Team meetings other than to ensure their understanding of the discussions/actions of the Team.
3. Scheduling of Team meetings were not delayed due to schedules of SAC observers.
4. Each SAC Observer was advised to have an alternate to attend meetings should the designated SAC member have had a conflict.
5. Only one SAC Observer from each SAC attended a given meeting
6. Documents discussed during meetings are not to be distributed outside of the Team

Appendix 4 – Contact Information

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