

This draft *Regional Profile of the North Central Coast Study Region (Alder Creek near Point Arena to Pigeon Point, California)* provides information to support implementation of the Marine Life Protection Act in this study region. A first draft of this regional profile is being provided to the MLPA North Central Coast Regional Stakeholder Group at its first meeting in 2007 to assist in developing an understanding of the biological and socioeconomic context of the region. In addition to members of the public, it is anticipated that the regional stakeholders and members of the MLPA Master Plan Science Advisory Team (SAT) will review and comment on draft versions of this document and will provide additional information to be included based on their local knowledge. This draft regional profile is a work in progress.

The MLPA Initiative and California Department of Fish and Game staff are compiling and developing spatial data layers and conducting geographic information system (GIS) analyses to support the planning process. This draft regional profile includes maps of only selected spatial data layers. Most of the spatial data layers available for the region will be posted on the publicly-accessible MLPA Internet mapping service site (<http://www.marinemap.org/mlpa>).

Sincere thanks are offered to the many individuals and organizations who have already contributed data and information to this draft document.

Questions or comments may be directed to [MLPAComments@resources.ca.gov](mailto:MLPAComments@resources.ca.gov).

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**California Marine Life Protection Act Initiative**  
**Regional Profile of the**  
**North Central Coast Study Region**  
**(Alder Creek/Point Arena to**  
**Pigeon Point, California)**

May 7, 2007 Draft

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## Contents

Acronyms and Abbreviations .....	ix
Executive Summary .....	xi
1.0 Introduction .....	1
2.0 General Description of the North Central Coast Study Region .....	
3.0 Ecological Setting .....	6
3.1 Ecosystems and Habitats.....	7
3.1.1 Depth Categories .....	11
3.1.2 Intertidal Zones .....	12
3.1.3 Estuaries and Lagoons .....	15
3.1.4 Seagrass Beds.....	19
3.1.5 Kelp Forests .....	19
3.1.6 Sandy/Soft Bottoms .....	20
3.1.7 Hard Bottom / Rocky Reefs.....	21
3.1.8 Underwater Pinnacles .....	21
3.1.9 Submarine Canyons.....	22
3.1.10 Oceanographic Habitats.....	22
3.1.11 Rocks and Islands.....	25
3.2 Important Regional Species .....	26
3.2.1 Species likely to benefit from MPAs.....	26
3.2.2 Depleted and Overfished Species.....	27
3.2.3 Special Status Species .....	30
3.3 Areas of Biodiversity Significance .....	36
4.0 Land-Sea Interactions.....	38
4.1 Ecological linkages.....	39
4.2 Coastal Watersheds and Land Use in Study Region .....	40
4.3 Coastal Water Quality .....	41
4.3.1 Impaired Water Bodies in the North Central Coast Study Region .....	43
4.3.2 Beach Closures.....	46
4.4 Effects of Land Use on Coastal Waters .....	48
4.4.1 Impacts of Local Geology on Water Quality.....	48
4.4.2 Nonpoint Sources.....	49
4.4.3 Point Sources.....	51
4.5 Some Water Quality Projects in the North Central Coast Study Region.....	52
4.5.1 Water Quality Monitoring Programs in the Monterey Bay National Marine Sanctuary and the Gulf of the Farallones National Marine Sanctuary .....	52
4.5.2. U.S. Environmental Protection Agency Projects .....	53
4.5.3 Other Water Quality and Monitoring Programs .....	53
5.0 Socioeconomic Setting .....	55
5.1 Coastal Counties.....	55
5.1.1 Mendocino County .....	55
5.1.2 Sonoma County .....	56
5.1.3 Marin County.....	57
5.1.4 San Francisco County.....	58
5.1.5 San Mateo County .....	59
5.2 Coastal Communities.....	60

5.3 Population Projections .....	62
5.4 Commercial Fisheries .....	64
5.4.1 Port Complexes.....	64
5.4.2 Commercial Fisheries .....	71
5.4.3 Commercial Landings .....	75
5.5 Kelp and Aquaculture Leases .....	79
5.5.1 Synopsis of Kelp Bed Lease Status, Kelp Harvest Regulations, and Algae Harvest.....	79
5.5.2 Aquaculture Leases .....	80
5.6 Recreational Fisheries .....	82
5.6.1 Modes of Fishing.....	83
5.6.2 Recreational Fishing Effort.....	85
5.6.3 Distribution of Recreational Fishing Effort.....	87
5.6.4 Recreational fishery profiles .....	88
5.6.5 Commercial and Recreational Fisheries .....	89
5.7 Scientific Collecting.....	91
5.8 Coastal Tourism.....	94
5.9 Non-consumptive Uses.....	96
5.9.1 Recreational Beach Use .....	97
5.9.2 Boating .....	99
5.9.3 Recreational SCUBA Diving.....	103
5.9.4 Other Recreational Activities.....	104
5.9.5 Tidepool Visitors and Wildlife Watching From Shore .....	104
5.10 Navigation .....	105
5.10.1 Lighthouses.....	105
5.10.2 Vessel Traffic .....	106
6.0 Academic Institutions, Research, Public Outreach and Education .....	107
6.1 Major Marine Institutions in the North Central Coast Study Region.....	107
6.2 Scientific Research and Collecting.....	107
6.3 Public Education and Outreach.....	111
7.0 Jurisdiction and Management	
7.1 Federal, State, Local and Native American Jurisdiction and Programs .....	116
7.1.1 Federal Agencies and Programs.....	117
7.1.2 State Agencies and Programs .....	120
7.1.3 Local Government Programs .....	122
7.1.4 Native American jurisdiction/treaty rights .....	123
7.2 Non-governmental Organizations and Programs.....	124
8.0 Existing MPAs and Coastal Protected Areas.....	125
8.1 Existing State Marine Protected Areas in the Study Region .....	125
8.2 Marine Managed Areas and Other Fishery Closures.....	127
8.2.1 National Marine Sanctuaries .....	127
8.2.2 Fishery Closures Within or Adjacent to the North Central Coast Study Region.....	128
8.3 Military and Powerplant Closures.....	129
8.4 Terrestrial Protected Areas in Coastal Watersheds .....	130
9.0 Evaluation of Existing MPAs .....	131
9.1 Protection Levels of Existing MPAs .....	133
9.2 Habitat Protection of Existing MPAs (Goals 1 and 4).....	135
9.3 Size and Spacing of Existing MPAs (Goals 2 and 6) .....	137
9.4 Replication of Habitats in Existing MPAs .....	139
9.5 Recreational, Educational, and Study Opportunities (Goal 3).....	140
9.6 Summary Evaluation of Existing MPAs.....	140

10.0 Summary by Subregion .....	141
10.1 Alder Creek/Point Arena to Horseshoe Point (Subregion 1) .....	142
10.1.1 Ecological Setting.....	142
10.1.2 Land-Sea Interactions .....	143
10.1.3 Socioeconomic Setting.....	143
10.1.4 Research and Monitoring .....	143
10.1.5 Existing MPAs, Marine Managed Areas, and Coastal Protected Areas.....	143
10.1.6 Other Issues.....	144
10.2 Horseshoe Point to Bodega Head (Subregion 2).....	144
10.2.1 Ecological Setting.....	144
10.2.2 Land-Sea Interactions .....	144
10.2.3 Socioeconomic Setting.....	145
10.2.4 Research and Monitoring .....	145
10.2.5 Existing MPAs, Marine Managed Areas, and Coastal Protected Areas.....	145
10.2.6 Other Issues.....	146
10.3 Bodega Head to Double Point (Subregion 3).....	146
10.3.1 Ecological Setting.....	146
10.3.2 Land-Sea Interactions .....	146
10.3.3 Socioeconomic Setting.....	147
10.3.4 Research and Monitoring .....	147
10.3.5 Existing MPAs, Marine Managed Areas, and Coastal Protected Areas.....	147
10.3.6 Other Issues.....	147
10.4 Double Point to Point San Pedro (Subregion 4).....	148
10.4.1 Ecological Setting.....	148
10.4.2 Land-Sea Interactions .....	148
10.4.3 Socioeconomic Setting.....	149
10.4.4 Research and Monitoring .....	149
10.4.5 Existing MPAs, Marine Managed Areas, and Coastal Protected Areas.....	149
10.4.6 Other Issues.....	149
10.5 Point San Pedro to Pigeon Point (Subregion 5).....	150
10.5.1 Ecological Setting.....	150
10.5.2 Land-Sea Interactions .....	150
10.5.3 Socioeconomic Setting.....	151
10.5.4 Research and Monitoring .....	151
10.5.5 Existing MPAs, Marine Managed Areas, and Coastal Protected Areas.....	151
10.5.6 Other Issues.....	151
10.6 Farallon Islands (Subregion 6) .....	151
10.6.1 Ecological Setting.....	152
10.6.2 Land-Sea Interactions .....	152
10.6.3 Socioeconomic Setting.....	152
10.6.4 Research and Monitoring .....	152
10.6.5 Existing MPAs, Marine Managed Areas, and Coastal Protected Areas.....	153
10.6.6 Other Issues.....	153
11.0 Conclusion .....	154
12.0 References Cited .....	155

## Tables

Table 1: Approximate Amount of Each Habitat in North Central Coast Study Region, Bioregion, and Statewide in State Waters .....	8
Table 2: Depth Zone as Percent of North Central Coast Study Region.....	11
Table 3: Summary of the Amount of Shoreline Habitats in Study Region.....	14
Table 4: Approximate Amount of Hard and Soft Bottom Habitats by Depth Zone in Study Region.....	21
Table 5: Oceanic Seasons in North Central California.....	23
Table 6: Major Watersheds in the Study Region.....	40
Table 7: SWQPA's in the North Central Coast Study Region.....	42
Table 8: Critical Coastal Areas in the Study Region.....	42
Table 9: Impaired Water Bodies in Region 1 .....	44
Table 10: Impaired Water Bodies in Region 2 .....	45
Table 11: Beach Closings/Advisories by County: Year-to-Year Comparison.....	46
Table 12: Beach Closures in 2005 in the Study Region by County .....	47
Table 13: Point Sources in the North Central Coast Study Region.....	51
Table 14: Population, Unemployment, Per-Capita Income, Median Household Income, and % of Population Below Poverty Line for Some Communities Within the Study Region .....	60
Table 15: Total Population, Population Change, and Projected Growth in Coastal Counties in the Study Region .....	63
Table 16: Average Annual Commercial Landings from 1992-2006 at North Central Coast Study Region Ports that had Landings Activity in Recent Years (2003-2006) .....	65
Table 19: Kelp Bed Location and Lease Status in the North Central Coast Study Region.....	79
Table 20: Summary of Active Tomales Bay and Drakes Estero Aquaculture Lessees, Lease Acreage, Acreage in Use, Approved Species, and Approved Culture Methods. ....	80
Table 21: 2006 Estimated Angler Days by Fishing Mode .....	85
Table 22: Average Annual Landings (2005–2006) for Commercial and Recreational Fisheries within the North Central Coast Study Region. ....	89
Table 23: Estimated Chinook Salmon Harvest in the North Central Coast Study Region* from 1986 to 2006.....	91
Table 24: Number of scientific collecting permits issued by DFG statewide from 1989-2006. ....	93
Table 25: Number of scientific collecting permits with marine organism authorizations issued by DFG statewide in 2005 and 2006. ....	93
Table 26: Percent Scientific Collecting Permit reports filed in each subregion of total submitted for North Central Coast study region (65), over 1-1/2 year period.....	93
Table 27: Methods of capture used for scientific collecting permits within the North Central Coast study region, and number of times the method was used.....	94
Table 28: Ten Most Frequently Visited California State Parks Adjacent to the Shore in Study Region...	95
Table 29: Participation in Coastal Recreation in California.....	96
Table 30: California State Park Revenue for Parks Located Adjacent to Shore in North Coast Study Region 2004/2005 .....	97
Table 31: Surfing Spots in the Study Region .....	98
Table 32: Facilities at Beaches in the North Central Coast Study Region.....	99
Table 33: Boats and boaters information summarized from California Boating Facilities.....	100
Table 34: Number of Trailored Private and Rental Boats surveyed by CRFS in the months January through November 2006. ....	101
Table 35: Number of registered recreational marine or aquatic vessels in the North Central Coast Study Region as of December 31, 2005 .....	101
Table 36: Marinas in or Adjacent to the Study Region.....	102

Table 37: Boat Launch Locations within the Study Region.....	103
Table 38: Some SCUBA Diving Sites in the Study Region.....	103
Table 39: Partial List of Popular Kayak Sites in the Study Region.....	104
Table 40: Tidepooling Sites .....	105
Table 41: Active Lighthouses in Study Region .....	105
Table 42: Research and Monitoring Programs in the Study Region.....	108
Table 43: Academic, research, and education institutions with a focus on coastal and marine ecosystems in north central California.....	113
Table 44: National Parks Adjacent to the Study Region. ....	118
Table 45: California State Parks Located Adjacent to Shore in Study Region 2004/2005.....	120
Table 47: Summary of Terrestrial Protected Areas.....	130
Table 48: Overall Summary for Existing State MPAs in the North Central Coast Study Region .....	131
Table 49: Individual Existing State MPAs in the North Central Coast Study Region (from North to South) .....	131
Table 50: Habitat Representation in Existing State MPAs.....	132
Table 51: Names, Regulations, and SAT Protection Level for Existing MPAs in the North Central Coast Study Region (from North to South) .....	133
Table 52: Distance Between North Central Coast MPAs (mi).....	138
Table 53: Subregional Summary of Habitats [square miles (% of total in study region)] .....	141

## **Figures**

Figure 1: Mendocino County Ocean Economy Wages by Sector.....	56
Figure 2: Sonoma County Ocean Economy Wages by Sector .....	57
Figure 3: Marin County Ocean Economy Wages by Sector.....	58
Figure 4: San Francisco County Ocean Economy Wages by Sector.....	59
Figure 5: San Mateo County Ocean Economy Wages by Sector .....	60
Figure 6: Employment by Sector of the Economy for Several Coastal Communities Within the Study Region .....	61
Figure 7: Total and Projected Population for Mendocino, Sonoma, Marin, San Francisco, and San Mateo Counties for 2000, 2010, and 2050 .....	63
Figure 8: Total Number of Commercial Fishermen and Vessels for All Ports within the North Central Coast Study Region and San Francisco Bay, 1992-2006.....	68
Figure 9: Total Number of Commerical Fishermen and Vessels for All Ports within Point Arena and Anchor Bay Ports, 1992-2006.....	69
Figure 10: Total Number of Commerical Fishermen and Vessels for All Ports within the Bodega Bay Port Complex, 1992-2006 .....	69
Figure 11: Total Number of Commercial Fishermen and Vessels for All Ports within the San Francisco Port Complex, 1992-2006.....	70
Figure 12: Total Number of Commerical Fishermen and Vessels for All Ports within Princeton and Half Moon Bay Ports, 1992-2006 .....	70
Figure 13: Total Landings and Values for All Ports within the North Central Coast Study Region and San Francisco Bay, 1992-2006.....	76
Figure 14: Total Landings and Values from the San Francisco Port Complex, 1992-2006 .....	77
Figure 15: Total Landings and Values from the Bodega Bay Port Complex, 1992-2006.....	77
Figure 16: Total Landings and Values from the Point Arena and Anchor Bay Ports, 1992-2006 .....	78
Figure 17: Total Landings and Values from the Princeton / Half Moon Bay Ports, 1992-2006.....	78



Figure 18: Resident Sport Fishing Licenses for All Waters; Pacific Ocean Only Sport Fishing Licenses; and Abalone Stamps: 1980-2006 .....86  
Figure 19: Statewide Registered Commercial Passenger Fishing Vessel Licenses: 1980-2006.....87  
Figure 20: Total Travel Spending by County, 1994-2004 .....95  
Figure 21: Legal jurisdictions offshore California ..... 116  
Figure 22: Area Covered by Existing MPAs by designation and protection level ..... 135  
Figure 23: Analysis of Habitat Protection in Existing MPAs by Subregion..... 136  
Figure 24: Size Analysis for Existing MPAs in North Central Coast Study Region ..... 138  
Figure 25: Replicate Habitats in Existing MPAs ..... 139

## Maps

Map 1: North Central Coast Study Region and Existing State Marine Protected Areas

Map 2: Intertidal and Nearshore Habitats

- Map 2a: Intertidal and Nearshore Habitats – Subregion 1
- Map 2b: Intertidal and Nearshore Habitats – Subregion 2
- Map 2c: Intertidal and Nearshore Habitats – Subregion 3
- Map 2d: Intertidal and Nearshore Habitats – Subregion 4
- Map 2e: Intertidal and Nearshore Habitats – Subregion 5
- Map 2f: Intertidal and Nearshore Habitats – Subregion 6

Map 3: Soft and Hard Bottom and Canyon Habitats

- Map 3a: Soft and Hard Bottom and Canyon Habitats – Subregion 1
- Map 3b: Soft and Hard Bottom and Canyon Habitats – Subregion 2
- Map 3c: Soft and Hard Bottom and Canyon Habitats – Subregion 3
- Map 3d: Soft and Hard Bottom and Canyon Habitats – Subregion 4
- Map 3e: Soft and Hard Bottom and Canyon Habitats – Subregion 5
- Map 3f: Soft and Hard Bottom and Canyon Habitats – Subregion 6

Map 4: Oceanographic Patterns

- Map 4a: Oceanographic Patterns, Temperature and Chlorophyll
- Map 4b: Oceanographic Patterns, Typical and El Niño Year

Map 5: Seabird and Marine Mammal Biodiversity

- Map 5a: Seabird and Marine Mammal Biodiversity – Subregion 1
- Map 5b: Seabird and Marine Mammal Biodiversity – Subregion 2
- Map 5c: Seabird and Marine Mammal Biodiversity – Subregion 3
- Map 5d: Seabird and Marine Mammal Biodiversity – Subregion 4
- Map 5e: Seabird and Marine Mammal Biodiversity – Subregion 5
- Map 5f: Seabird and Marine Mammal Biodiversity – Subregion 6

Map 6: Areas of Fish Biodiversity

- Map 6a: Areas of Fish Biodiversity – Northern Portion of Study Region
- Map 6b: Areas of Fish Biodiversity – Southern Portion of Study Region

Map 7: Rockfish Hotspots

- Map 7a: Rockfish Hotspots – Canary Rockfish
- Map 7b: Rockfish Hotspots – Boccacio
- Map 7c: Rockfish Hotspots – Black Rockfish
- Map 7d: Rockfish Hotspots – Lingcod
- Map 7e: Rockfish Hotspots – Yelloweye Rockfish

Map 8: Coastal Watershed Impacts

- Map 8a: Coastal Watershed Impacts – Percent Agriculture
- Map 8b: Coastal Watershed Impacts – Percent Urban
- Map 8c: Coastal Watershed Impacts – Road Density

Map 9: Areas of Water Quality Concern

- Map 9a: Areas of Water Quality Concern – Northern Portion of Study Region
- Map 9b: Areas of Water Quality Concern – Southern Portion of Study Region

Map 10: Commercial Logbook Data

- Map 10a: Commercial Logbook Data – Rockfish
- Map 10b: Commercial Logbook Data – California Halibut
- Map 10c: Commercial Logbook Data – Dungeness and Rock Crab
- Map 10d: Commercial Logbook Data – Herring
- Map 10e: Commercial Logbook Data – Surfperch
- Map 10f: Commercial Logbook Data – Flatfish
- Map 10g: Commercial Logbook Data – Red Urchin
- Map 10h: Commercial Logbook Data – Squid
- Map 10i: Commercial Logbook Data – Salmon
- Map 10j: Commercial Logbook Data – Sharks, Skates, and Rays

Map 11: Commercial Passenger Fishing Vessel Survey

- Map 11a: Commercial Passenger Fishing Vessel Survey – Halibut
- Map 11b: Commercial Passenger Fishing Vessel Survey – Rockfish
- Map 11c: Commercial Passenger Fishing Vessel Survey – Salmon

Map 12: California Recreational Fisheries Survey

- Map 12a: California Recreational Fisheries Survey – Halibut
- Map 12b: California Recreational Fisheries Survey – Rockfish
- Map 12c: California Recreational Fisheries Survey – Salmon

Map 13: Recreational Abalone Landings

- Map 13a: Recreational Abalone Landings – Subregion 1
- Map 13b: Recreational Abalone Landings – Subregion 2
- Map 13c: Recreational Abalone Landings – Subregion 3

Map 14: Coastal Access and Recreational Use Areas

- Map 14a: Coastal Access and Recreational Use Areas – Subregion 1
- Map 14b: Coastal Access and Recreational Use Areas – Subregion 2
- Map 14c: Coastal Access and Recreational Use Areas – Subregion 3
- Map 14d: Coastal Access and Recreational Use Areas – Subregion 4
- Map 14e: Coastal Access and Recreational Use Areas – Subregion 5
- Map 14f: Coastal Access and Recreational Use Areas – Subregion 6

Map 15: Research, Education and Monitoring sites

- Map 15a: Research, Education and Monitoring Sites – Subregion 1
- Map 15b: Research, Education and Monitoring Sites – Subregion 2
- Map 15c: Research, Education and Monitoring Sites – Subregion 3
- Map 15d: Research, Education and Monitoring Sites – Subregion 4
- Map 15e: Research, Education and Monitoring Sites – Subregion 5
- Map 15f: Research, Education and Monitoring Sites – Subregion 6

Map 16: Existing Marine and Coastal Managed Areas

- Map 16a: Existing Marine and Coastal Managed Areas – Subregion 1
- Map 16b: Existing Marine and Coastal Managed Areas – Subregion 2
- Map 16c: Existing Marine and Coastal Managed Areas – Subregion 3
- Map 16d: Existing Marine and Coastal Managed Areas – Subregion 4

- Map 16e: Existing Marine and Coastal Managed Areas – Subregion 5
- Map 16f: Existing Marine and Coastal Managed Areas – Subregion 6

Map 17: Groundfish Closed Areas

- Map 17a: Groundfish Closed Areas – Northern Portion of Study Region
- Map 17b: Groundfish Closed Areas – Southern Portion of Study Region

## **Appendices**

Appendix I: Spatial Data Layers Available for MPA Planning on the North Central Coast – revised 1/1/07

Appendix II: Species Likely to Benefit from MPAs and Special Status Species in the North Central Coast

Appendix III: Profile of Commercial Fisheries for the North Central Coast Study Region

Appendix IV: Profile of Major Recreational Fisheries in the North Central Coast Study Region

Appendix V: Preliminary Descriptions of State Marine Protected Areas in the North Central Coast  
(CDFG 2004b)

## Acronyms and Abbreviations

<b>ASBS</b>	areas of special biological significance	<b>NCCOS</b>	National Centers for Coastal Ocean Science
<b>BLM</b>	Bureau of Land Management	<b>NCCRSRG</b>	(MLPA) North Central Coast Regional Stakeholder Group
<b>BNA</b>	California Boating Facilities Needs Assessment	<b>NERR</b>	national estuarine research reserve
<b>BRTF</b>	blue ribbon task force	<b>nmi</b>	nautical miles
<b>ESA</b>	endangered species act	<b>NMFS</b>	National Marine Fisheries Service
<b>CCA</b>	critical coastal area	<b>NMS</b>	national marine sanctuary
<b>CBNMS</b>	Cordell Bank National Marine Sanctuary	<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>CDFG</b>	California Department of Fish and Game	<b>NPS</b>	National Park Service
<b>CENCOOS</b>	Central and Northern California Ocean Observing System	<b>NPSP</b>	Non-point source pollution
<b>CFIS</b>	Commercial Fisheries Information System	<b>PISCO</b>	Partnership for Interdisciplinary Studies of Coastal Oceans
<b>COSEE</b>	California Center for Ocean Sciences Education Excellence	<b>PRBO</b>	Point Reyes Bird Observatory Conservation Science
<b>CPFV</b>	commercial passenger fishing vessel	<b>RCA</b>	rockfish conservation area
<b>CRFS</b>	California Recreational Fisheries Survey	<b>RWQCB</b>	regional water quality control board
<b>ESI</b>	environmental sensitivity index	<b>SAT</b>	MLPA Master Plan Science Advisory Team
<b>ESU</b>	evolutionarily significant unit	<b>SMCA</b>	state marine conservation area
<b>ft</b>	feet	<b>SMP</b>	state marine park
<b>fm</b>	fathoms	<b>SMR</b>	state marine reserve
<b>GIS</b>	geographic information system	<b>SWRCB</b>	State Water Resources Control Board
<b>GFNMS</b>	Gulf of the Farallones National Marine Sanctuary	<b>SWQPA</b>	state water quality protection area
<b>LCP</b>	local coastal plan	<b>TMDL</b>	total maximum daily load
<b>m</b>	meters	<b>USEPA</b>	United States Environmental Protection Agency
<b>MBNMS</b>	Monterey Bay National Marine Sanctuary	<b>USFWS</b>	United States Fish and Wildlife Service
<b>mi</b>	statute miles	<b>USGS</b>	United States Geological Survey
<b>MLPA</b>	Marine Life Protection Act		
<b>MPA</b>	marine protected area		



## Executive Summary

The Marine Life Protection Act Initiative is public-private partnership designed to help the State of California implement the Marine Life Protection Act (MLPA), using the best readily available science as well as the advice and assistance of scientists, resource managers, experts, stakeholders and members of the public. The MLPA directs the state to redesign California's system of marine protected areas to increase its coherence and effectiveness in protecting the state's marine life and habitats, marine ecosystems, and marine natural heritage, as well as to improve recreational, educational and study opportunities provided by marine ecosystems.

Redesigning the system of marine protected areas (MPAs) in state waters along California's 1,100 mile coastline is such a large task that it was decided to take a regional approach and implement the MLPA in phases. In the first phase of the initiative, a master plan framework was created to help guide the planning process within individual geographic areas, called study regions. After the framework was created, the first effort to redesign a group of MPAs in a region took place along the central coast, from Pigeon Point in San Mateo County to Point Conception in Santa Barbara County. The north central coast, from Alder Creek in Mendocino County to Pigeon Point in San Mateo County, represents the second study region to be evaluated.

In December 2006, the California Resources Agency announced that MPAs within the MLPA North Central Coast Study Region would be evaluated and redesigned with input from a regional stakeholder group, a science advisory team, a blue ribbon task force, the California Department of Fish and Game, and other interested parties. This document, the draft *Marine Life Protection Act Regional Profile for the North Central Coast*, is intended to assist that process by providing background information and data on the biological, oceanographic, socioeconomic and governance characteristics of the study region. It is anticipated that the regional profile will be reviewed and revised based on input from regional stakeholders, a science advisory team and the public. This profile will assist stakeholders and decision-makers in evaluating existing MPAs in the study region and developing alternative proposals for arrays of MPAs that meet the goals of the MLPA and that form a component of the statewide MPA network.

*Regional Overview:* The MLPA North Central Coast Study Region spans a straightline distance of about 146 miles of the California coastline (with 363 miles of actual shoreline) from Pigeon Point (San Mateo County) to Alder Creek, five miles north of Point Arena (Mendocino County). Encompassing approximately 763.5 square miles of coastal waters, the study region extends from the shoreline (mean high tide) to a maximum depth of approximately 382 feet (63.7 fathoms, 116 meters) off the Farallon Islands. The study region does not include San Francisco Bay, but does include state waters around the Farallon Islands. The broad diversity of marine habitats and oceanographic conditions in the study region have made this area one of the most biologically productive in the world. Some of the north central coast's unique features are:

- globally rare and significant upwelling-driven ecosystem that supports high marine biodiversity in open waters (plankton, invertebrates, fish, marine mammals, seabirds, and sharks);
- miles of rocky coasts and sandy beaches, numerous rocky headlands;
- a broad, flat continental shelf with rocky reefs and expansive sand bottom habitats, all less than 200 meters (656 feet, 33 fathoms) in depth;
- kelp forests dominated by bull kelp and associated fish assemblages (such as many species of rockfish);
- rare and regionally important estuaries (Bollinas Lagoon, Drakes Estero, Tomales Bay, and others);
- the Farallon Islands, an important biological hotspot 28 miles west of San Francisco, that provides nesting sites for 12 species of seabirds (the largest number of nesting seabirds in the continental United States) and serves as a migratory stopover site for many others;
- waters around the Farallon Islands, which host at least 33 species of marine mammals and serve as an important feeding ground for marine mammals, seabirds, and white sharks;
- rich and productive fisheries that support coastal communities and provide fresh seafood to the region and world;
- recognition as a renowned diving, kayaking, fishing, and whale-watching destination where marine recreational activities help support coastal tourism and coastal communities; and
- state waters that include part of the Monterey Bay National Marine Sanctuary and the Gulf of the Farallones National Marine Sanctuary, and are adjacent to the Cordell Bank National Marine Sanctuary in federal waters.

San Francisco Bay, the largest estuary on the West Coast, is not part of the study region. However, the mouth of the bay, and the large tidal plume of brackish-fresh water that extends outside the Golden Gate Bridge on ebb tides, is a unique feature included in the study region. The mouth of San Francisco Bay is also an important migratory corridor for salmon, sturgeon, Dungeness crab, California halibut and many other species of fish and invertebrates that use the bay as a migration route or nursery ground.

*Ecological Setting:* The MLPA North Central Coast Study region is characterized by high productivity, high biodiversity, and large concentrations of top predators (seabirds, marine mammals, sharks). The biodiversity of this study region was one of the driving factors in the designation of the Monterey Bay National Marine Sanctuary, the Gulf of the Farallones National Marine Sanctuary, and the adjacent Cordell Bank National Marine Sanctuary.

All of the habitats listed in the MLPA or recommended by the science advisory team for representation in MPA are found within the study region, with the exception of seamounts, submarine canyons, and soft and hard bottom seafloor greater than 200 meters. For most of these habitats, there are some mapped data available for use in the planning process.

- Most of the study region is relatively shallow and ranges in depth from 0 to 116 meters (382 feet, 63.7 fathoms) and the continental shelf is quite broad.
- Intertidal zones include sandy beaches, rocky shores, coastal marsh and tidal flats.
- Estuaries, with their associated tidal flats, coastal marsh, eelgrass, soft bottom, and open water habitats, are relatively rare in the study region, although there are several large examples (Tomales Bay, Drakes Estero, and Bolinas Lagoon). There are numerous small estuaries where coastal streams meet the ocean; some of these streams are populated by coho and Chinook salmon and steelhead trout which use them as migratory corridors.
- Eelgrass (*Zostera* sp.) beds are found in Bolinas Lagoon, Drakes Estero, and Tomales Bay. While they cover a relatively small area, eelgrass beds provide critical nursery habitats for fish and invertebrates and are foraging areas for migratory shorebirds and waterfowl in the region. Surfgrass (*Phyllospadix* sp.), which fringes the open coast, is found along the shallow subtidal zone.
- Bull kelp (*Nereocystis* sp.) is the dominant canopy-forming kelp in the study region in areas where rocky substrata make it possible for kelp to attach. Kelp beds have been mapped at a fine-scale resolution in six annual surveys (1989, 1999, 2002, 2003, 2004 and 2005). Kelp beds are more persistent in some areas than others due to changes in climatic and environmental conditions over time. Kelp beds are more abundant in the northern half of the study region (Mendocino and Sonoma coasts) than the southern half (San Francisco and San Mateo coasts).
- Hard bottom habitats (rocky reefs) are much less common than soft bottom habitats in the region in all depth zones (15.4% of the region is hard substrata versus 84.2% for soft substrata based on coarse-scale data). Coarse-scale extrapolated data for substrata type is available for the entire study region, but these data do not reflect actual mapping of many near-shore areas in state waters and tend to underestimate the amount of rocky habitat. Higher resolution (“fine-scale”) substrata data are currently being developed for the majority of the study region and will provide a much more accurate representation of the amount of hard and soft bottom habitat.
- Underwater pinnacles are rocky cones or outcrops that can be important areas where fish and other species aggregate. Underwater pinnacles exist in the study region, but have not been mapped.
- Submarine canyons do not occur in state waters in the study region; however, there are large submarine canyons in federal waters, including Bodega Canyon and Pioneer Canyon.
- Upwelling centers occur seasonally at major headlands (Point Arena and Point Reyes) and along much of the coast in the northern half of the study region. The upwelling center around Point Reyes is the largest in the region and extends well offshore and around the Farallon Islands. In the upwelling shadow or lee of headlands, warmer water retention areas can develop. Upwelling centers and retention areas are dynamic features and are not easily represented on static maps, but temperature and other data can be used to identify general spatial patterns for these oceanographic features.



- The large brackish water tidal plume that extends outward from San Francisco Bay to at least the 40 meter (131 feet, 6.7 fathoms) depth contour on an ebb tide provides a unique habitat that is an important seasonal foraging area for seabirds and other species. Freshwater plumes, which are not mapped, are likely found near the mouths of larger rivers in the study region such as the Garcia, Gualala, and Russian rivers.

The diverse habitats of the study region host a wide diversity of species that may benefit from MPAs. This document describes some of the species that have special relevance to the MPA planning process, including:

- regionally important species that are likely to benefit from MPAs (listed in Appendices IIa and IIb);
- depleted or over-fished species (described in Section 3.2.2), which include bocaccio, canary rockfish, cowcod, darkblotched rockfish, widow rockfish, yelloweye rockfish, five species of abalone, and several other species of concern; and
- special status species such as coho and Chinook salmon, steelhead trout, green sturgeon, sea otters, pinnipeds (including sea lions, elephant seals, fur seals and harbor seals), cetaceans and seabirds found in the study region (listed in Appendix IIc).

*Land – Sea Interaction:* Ecological linkages between the marine and terrestrial environments are significant factors to consider when designing MPAs. Some of the most important ecological linkages include:

- anadromous fish, including coho and Chinook salmon, steelhead trout, and white and green sturgeon which migrate up major rivers in the study region and through the mouth of San Francisco Bay;
- shorebirds and waterfowl that inhabit coastal lagoons, estuaries, and salt marshes. (estuaries and bays of the study region form part of the Pacific Flyway, one of the four principal bird migration routes in North America);
- marine mammals, including the federally protected Steller and California sea lion, elephant seals, harbor seals, and fur seals, that use coastal rocks, offshore islands, beaches, and marshes as haul-out and rookery sites; and
- estuaries and their associated intertidal habitats, which provide shelter, food, and nursery grounds for many organisms from both the open ocean and coastal environments.

Terrestrial activities can have significant impacts on coastal water quality and habitat condition. Nearly 4,200 square miles of land in 6 major watersheds drain directly to the study region and an additional 59,000 square miles of land drain to San Francisco Bay, which empties into the study region under the Golden Gate Bridge. Some of the most important water quality issues include:

- impaired rivers and waterbodies that have been identified under Section 303(d) of the federal Clean Water Act and are mapped and described in this regional profile;

- recognized water quality management areas including State Water Quality Protection Areas (SWQPAs), Areas of Special Biological Significance (ASBSs), and California Critical Coastal Areas (CCAs);
- beach closures that have occurred throughout the study region, mostly due to high bacteria levels;
- nonpoint sources of pollution, such as agriculture, forestry, urban areas, marinas and recreational boating, and hydromodification, that are found throughout the study region; and
- point sources of pollution, such as wastewater treatment plants, that empty into the coastal environment and may cause localized impacts.

*Socioeconomic Setting:* The MLPA North Central Coast Study Region supports many industries and economic sectors that depend on marine resources. Recreational and commercial fishing and non-consumptive activities, such as beachgoing, surfing, boating, scuba diving, kayaking, and wildlife viewing, make significant contributions to coastal community economies in the five counties adjacent to the study region. Several types of socioeconomic information are included in this regional profile:

- Brief descriptions of the five coastal counties in the study region (Mendocino, Sonoma, Marin, San Francisco, and San Mateo counties), including ocean-based economies wages and population statistics.
- Commercial fishing statistics. Major commercial fisheries within the study region include Dungeness crab, market squid, salmon, red urchin, dover sole/thornyheads/sablefish, California halibut, and others. Over the past 14 years, average annual landings in the study region totaled nearly 17 million pounds at a value of nearly \$18 million. The commercial fishing ports in and adjacent to the study region include Point Arena/Anchor Bay, Bodega Bay, San Francisco, and Princeton/Half Moon Bay. Over the past 14 years, the number of commercial fishing vessels in the study region has dropped from approximately 1750 to 750 and landings have dropped from approximately 30 million pounds to 10 million pounds.
- Locations of aquaculture leases in the study region. Though all kelp beds within the north central coast are closed to leasing, mariculture operations for oysters, clams, and mussels occur in Tomales Bay and Drakes Estero and include 14 active submerged land leases, covering a total of 1,573 acres.
- Recreational fishing statistics. Major recreational fisheries within the study region include nearshore rockfish and associated species, salmon, albacore, abalone, sanddabs, surfperch, clams, Dungeness crab, and California halibut. Common fishing modes include Commercial passenger fishing vessels (CPFVs), private/rental vessels, beach and bank fishing, and fishing from manmade structures, as well as kayak angling, spearfishing, and abalone shore-picking and free-diving. Fishing from manmade structures accounted for 47% of recorded angler days (over 280,000 angler days) while private/rental, beach and bank, and CPFVs accounted for 25%, 17%, and 11% respectively in 2006. In addition, over 100,000 abalone trips have been estimated annually.

- Information on scientific collecting, for which approximately 65 permits have been issued recently by CDFG. Most of these permits are issued in the vicinity of Bodega Head and are for hand take of marine fish, invertebrates, and plants.
- Information on coastal tourism, including coastal park visitation rates. Sonoma Coast State Beach is the most visited coastal state park (3 million visitors annually), while Half Moon Bay State Beach generates the most revenue (\$600,000 annually).
- Descriptions of non-consumptive activities, including beachgoing, surfing, boating, scuba diving kayak, tidepooling, and wildlife viewing.
- Shipping information. San Francisco Bay is the busiest port in the vicinity of the study region, with more than 6,000 commercial vessels annually that cross the study region under the Golden Gate Bridge.

*Academic Institutions, Research, Public Outreach, and Education:* There are over 22 institutions with marine research or educational objectives in the study region. The locations of major research institutions, scientific collecting sites, educational sites, and monitoring stations from research programs (Partnership for Interdisciplinary Studies of Coastal Oceans, Longterm Monitoring Program and Experiential Training for Students, Multi-agency Rocky Intertidal Network, Cooperative Research and Assessment of Nearshore Ecosystems, and others) have been compiled in this regional profile and represent potential opportunities for future research and education associated with MPAs.

*Jurisdiction and Management:* Numerous federal, state and local government bodies have jurisdiction in the study region. In addition, 15 federally recognized Native American groups, as well as numerous federally unrecognized groups are located within coastal areas along the study region.

*Existing MPAs, Marine Managed Areas, and Coastal Protected Areas:* Existing state MPAs, marine managed areas, fishery closures, and other coastal protected areas are described for the region, including:

- descriptions of the 13 existing state MPAs within the study region, which cover 3.5% of the total study region area;
- information on other marine managed areas within the study region (such as national marine sanctuaries) and fishery closures (such as the Rockfish Conservation Areas and Groundfish Essential Fish Habitat no-trawl or no-bottom contact zones);
- recognition that there are currently no military or power plant closures in the study region that may function as *de facto* MPAs; and
- information on terrestrial protected areas, such as national monuments, national seashores, wildlife refuges and state parks, that may have relevance to MPAs for public access and management purposes.

*Evaluation of Existing State MPAs:* A preliminary evaluation of existing MPAs, using methods developed by the science advisory team during the central coast planning process, is included to identify the potential role of existing MPAs as part of a network of MPAs. The analysis includes an evaluation of the amount of different habitats present in existing state MPAs in the

study region, as well as the size and spacing of existing MPAs. A preliminary evaluation of existing state MPAs, including an assessment of their effectiveness, conducted by the California Department of Fish and Game in 2004 is also included as Appendix V.

*Subregional Summary:* The study region has been divided into six subregions for ease of data display and analysis and to facilitate identification of important local issues. This regional profile summarizes the main ecological, socioeconomic, and management attributes of each subregion. The six subregions, from north to south, are:

- Alder Creek to Horseshoe Point (subregion 1)
- Horseshoe Point to Bodega Head (subregion 2)
- Bodega Head to Double Point (subregion 3)
- Double Point to Point San Pedro (subregion 4)
- Point San Pedro to Pigeon Point (subregion 5)
- The Farallon Islands (subregion 6).

*Conclusion:* The MLPA North Central Coast Study Region is a biologically productive region that is globally significant for its concentration of top predators and breeding seabirds and marine mammals. The study region has many unique features such as the Farallon Islands, the mouth of San Francisco Bay, Point Reyes, Tomales Bay and Bolinas Lagoon. Parts of the Monterey Bay National Marine Sanctuary and Gulf of the Farallones National Marine Sanctuary overlap with the study region. California's marine and coastal environments form part of the state's identity and support important economies that depend on healthy ocean resources, such as fisheries and coastal tourism.