Marine Life Protection Act Initiative

Draft Science Advisory Team Analysis of Military Use Areas in the South Coast

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(Draft of proposed presentation to the MLPA Blue Ribbon Task Force)

Presented to the MLPA Master Plan Science Advisory Team
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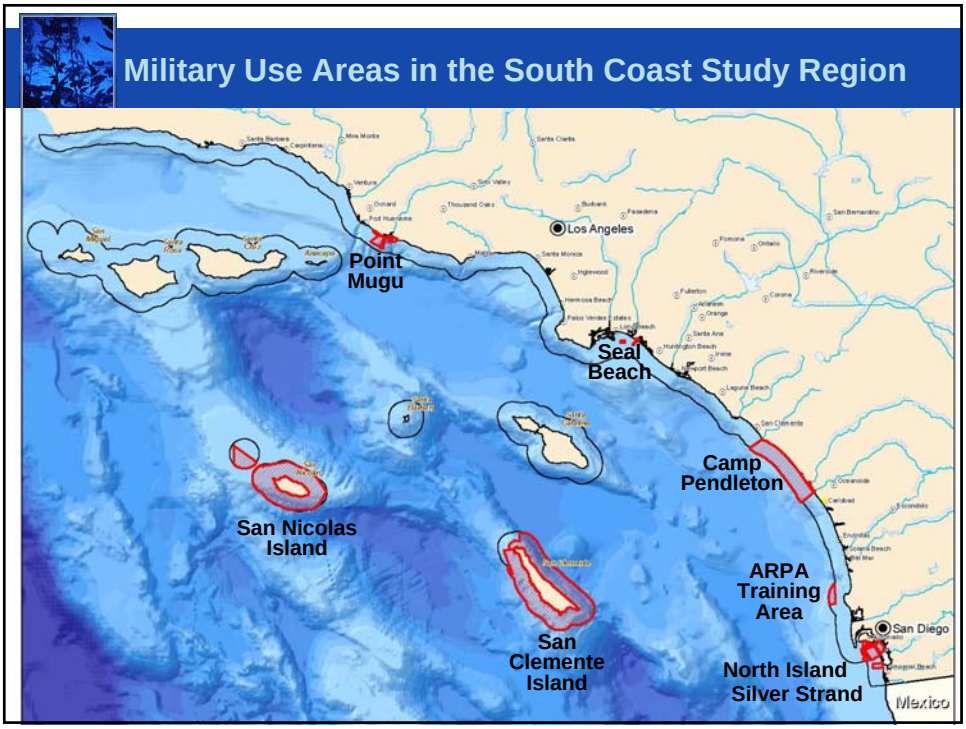
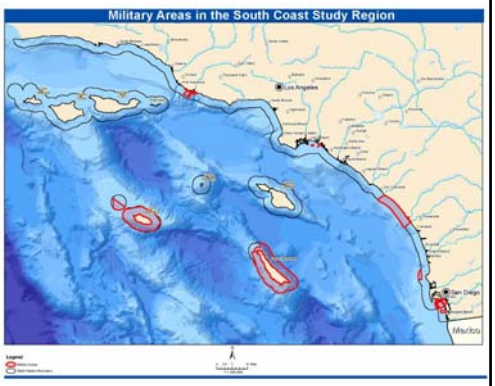


Military Use Areas in the South Coast Study Region

Habitat	South Coast Study Region Total	Percent (%) in Military Areas
Beaches (mi)	379.81	17%
Rocky Shores (mi)	280.51	19%
Kelp (mi)	198.21	28%
Hard 0-30m proxy (mi)	199.44	26%
*Hard 0-30m (sq mi)	161.98	20%
Hard 30-100m (sq mi)	183.53	30%
Hard 100-200m (sq mi)	74.98	27%
Hard 200-3000m (sq mi)	96.60	31%
Soft 0-30m proxy (mi)	359.33	12%
*Soft 0-30m (sq mi)	499.25	16%
Soft 30-100m (sq mi)	816.60	10%
Soft 100-200m (sq mi)	147.03	12%
Soft 200-3000m (sq mi)	317.50	27%

*Accuracy of area estimates for shallow substrate is limited by barriers to mapping nearshore habitats.



Ecological Features of Navy Islands

- **San Clemente and San Nicolas islands are the most isolated and remote islands in the Southern California Bight**
- **Less accessible to various interest groups**
  - Larger kelp bass, sheephead and lobsters
  - Abundant giant seabass
- **Less likely to be affected by mainland pollution**
- **Least impacted by invasive species**
  - E.g., *Sargassum filicinum*
- **Unique larval sink and source processes**

Ecological Features of Navy Islands

- **Disproportionate amount of (more) quality rocky reef habitat and kelp beds**
  - Less pollution and sedimentation, and presence of large predators contribute to abundant kelp
- **Significantly deeper kelp habitat**
  - Due to water clarity
- **Unusually large stands of surfgrass**
- **Largest populations of purple hydrocoral**
  - Excluding Farnsworth Bank (Santa Catalina)
- **Critical and substantial marine mammal haulouts and bird roosting areas**

Marine Birds on Military Properties

- **7 marine bird species breed on military properties**
  - Brandt's Cormorant (*Phalacrocorax penicillatus*)
  - Western Gull (*Larus occidentalis*)
  - California Least Tern (*Sternula antillarum browni*)
  - Western Snowy Plover (*Charadrius alexandrinus nivosus*)
  - Black Oystercatcher (*Haematopus bachmani*)
  - Ashy Storm-petrel (*Oceanodroma homochroa*)
  - Xantus's Murrelet (*Synthliboramphus hypoleucus*)

Status of Marine Birds on Military Properties

- **Brandt's Cormorant – Endemic to west coast, vulnerable to human-caused disturbance**
- **Western Gull – Endemic to California Current**
- **California Least Tern – Endangered (U.S. and CA) due to loss of breeding habitat**
- **Western Snowy Plover – Threatened (U.S.) due to loss of breeding habitat**
- **Black Oystercatcher – Species of conservation concern (U.S. Fish and Wildlife Service)**
- **Ashy Storm-petrel – Species of conservation concern (USFWS and CA Department of Fish and Game)**
- **Xantus's Murrelet – Threatened (CA), candidate (U.S.)**

Marine Mammals on Military Properties

- **4 marine mammal species rest and forage on military properties**
  - California sea lion (*Zalophus californianus*)
  - Pacific harbor seal (*Phoca vitulina richarii*)
  - Northern elephant seal (*Mirounga angustirostris*)
  - Southern sea otter (*Enhydra lutris nereis*)
- **All protected under the U.S. Marine Mammal Protection Act**
- **Southern sea otter listed as threatened under Endangered Species Act of 1973**

Marine Habitats: South Mainland

[1] Includes Seal Beach, Camp Pendleton, Advanced Research Projects Agency (ARPA) Training Area, Silver Strand and North Island

Habitat	South Mainland Bioregion	Percent (%) in Military Areas[1]
Beaches (mi)	147.70	16%
Rocky Shores (mi)	28.88	6%
Kelp (mi)	30.07	6%
Hard 0-30m proxy (mi)	28.68	0%
*Hard 0-30m (sq mi)	46.72	3%
Hard 30-100m (sq mi)	13.59	21%
Hard 100-200m (sq mi)	0.77	2%
Hard 200-3000m (sq mi)	1.20	0%
Soft 0-30m proxy (mi)	128.58	15%
*Soft 0-30m (sq mi)	245.27	24%
Soft 30-100m (sq mi)	148.57	13%
Soft 100-200m (sq mi)	21.44	6%
Soft 200-3000m (sq mi)	68.56	0%

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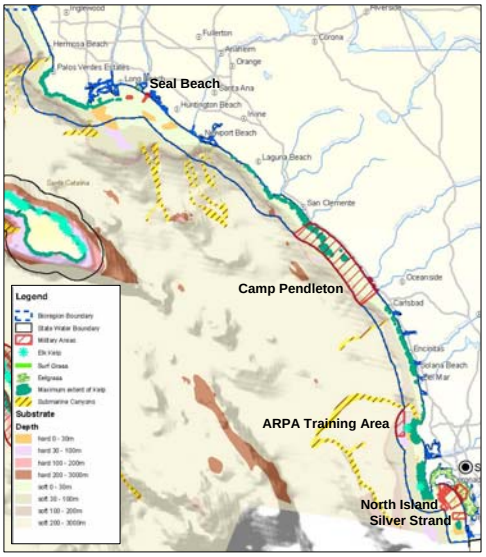
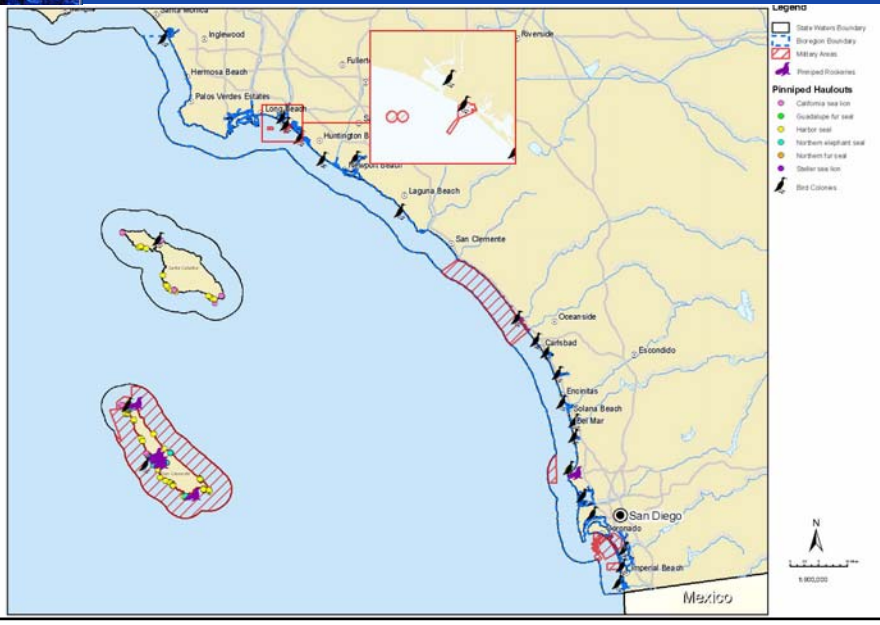


Birds and Mammals: South Mainland

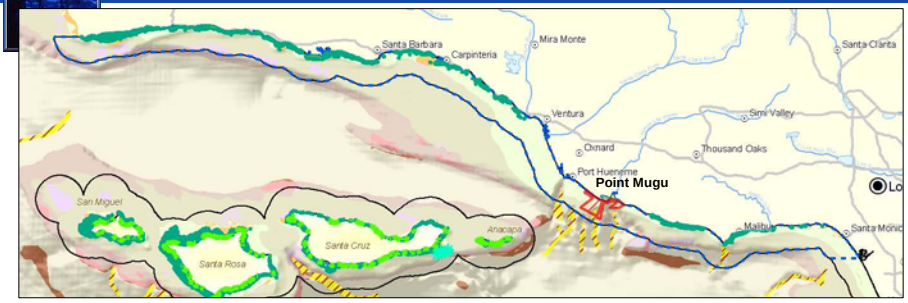
- **Camp Pendleton and the Navy's property in San Diego Bay supports:**
  - Large proportions of California least tern and western snowy plover populations for both the South Mainland Bioregion and the Southern California Bight

Seal Beach Navy	Colony or Haulout Size	Percent (%) of South Mainland Bioregion Population	Percent (%) of Southern California Bight Population
California Least Tern	332	2.8%	2.4%
Camp Pendleton			
California Least Tern	3,208	27.0%	23.3%
Western Snowy Plover	117	43.8%	25.2%
San Diego Navy (all)			
California Least Tern	2,948	24.8%	21.4%
Western Snowy Plover	56	21.0%	12.0%

Birds and Mammals: South Mainland



Marine Habitats: North Mainland



Habitat	North Mainland Bioregion	Percent (%) in Military Areas
Beaches (mi)	102.51	5%
Rocky Shores (mi)	30.40	0%
Kelp (mi)	24.23	0%
Hard 0-30m proxy (mi)	13.19	0%
*Hard 0-30m (sq mi)	31.35	0%
Hard 30-100m (sq mi)	22.63	0%
Hard 100-200m (sq mi)	2.39	0%
Hard 200-3000m (sq mi)	1.01	0%

Habitat	North Mainland Bioregion	Percent (%) in Military Areas
Soft 0-30m prox (mi)	117.93	4%
*Soft 0-30m (sq mi)	155.09	2%
Soft 30-100m (sq mi)	215.82	2%
Soft 100-200m (sq mi)	21.23	1%
Soft 200-3000m (sq mi)	22.03	0%

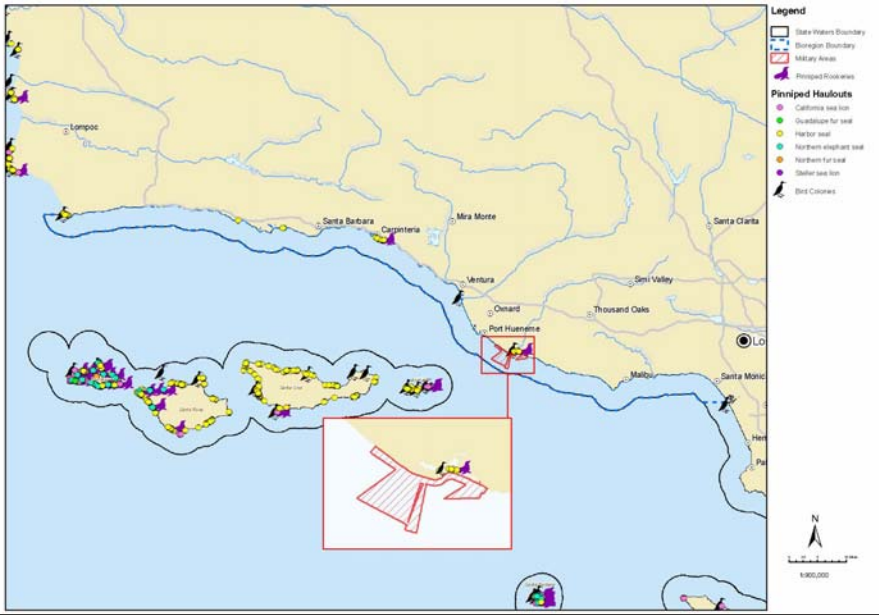
*Accuracy of area estimates for shallow substrate is limited by barriers to mapping nearshore habitats

Birds and Mammals: North Mainland

- **Point Mugu supports:**
  - Large proportion of California least terns and western snowy plovers for the North Mainland Bioregion
  - Large proportion of the western snowy plovers from the Southern California Bight
  - 1 of 2 Pacific harbor seal rookeries in the North Mainland Bioregion of only 3 existing for the entire Southern California Bight

Point Mugu Navy	Colony or Haulout Size	Percent (%) of North Mainland Bioregion Population	Percent (%) of Southern California Bight Population
California Least Tern	760	40.0%	5.5%
Western Snowy Plover	60	40.3%	12.9%

Birds and Mammals: North Mainland



Marine Habitats: West Channel Islands

Habitat	West Channel Islands Bioregion	Percent (%) in Military Areas[1]
Beaches (mi)	40.70	26%
Rocky Shores (mi)	75.01	21%
Kelp (mi)	70.38	30%
Hard 0-30m proxy (mi)	42.85	40%
*Hard 0-30m (sq mi)	46.07	35%
Hard 30-100m (sq mi)	41.24	46%
Hard 100-200m (sq mi)	6.90	5%
Hard 200-3000m (sq mi)	0.13	6%
Soft 0-30m proxy (mi)	72.44	25%
*Soft 0-30m (sq mi)	70.13	18%
Soft 30-100m (sq mi)	250.01	18%
Soft 100-200m (sq mi)	54.30	10%
Soft 200-3000m (sq mi)	29.12	68%

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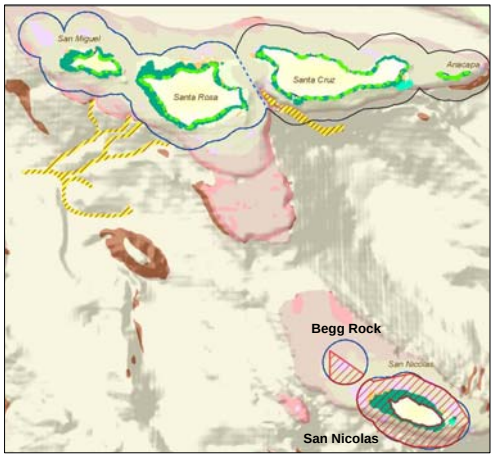


[1] Includes San Nicolas Island and Begg Rock

Ecological Features of San Nicolas

- **Significantly deeper eelgrass habitat**
  - Due to water clarity
- **Largest remaining remnant populations of endangered black abalone**
- **Presence of large predators enhances ecosystem function**
  - Larger predatory fish (e.g. kelp bass, sheephead, giant seabass) and invertebrates (e.g., lobster)
  - Resident southern sea otter population

Ecological Features of Begg Rock

- **Emergent sheer pinnacle reef 10 miles west of San Nicolas**
- **Unique invertebrate assemblage, including:**
  - Purple hydrocoral
  - Shallow aggregations of *Metridium* and other anemones

Birds and Mammals: San Nicolas Island

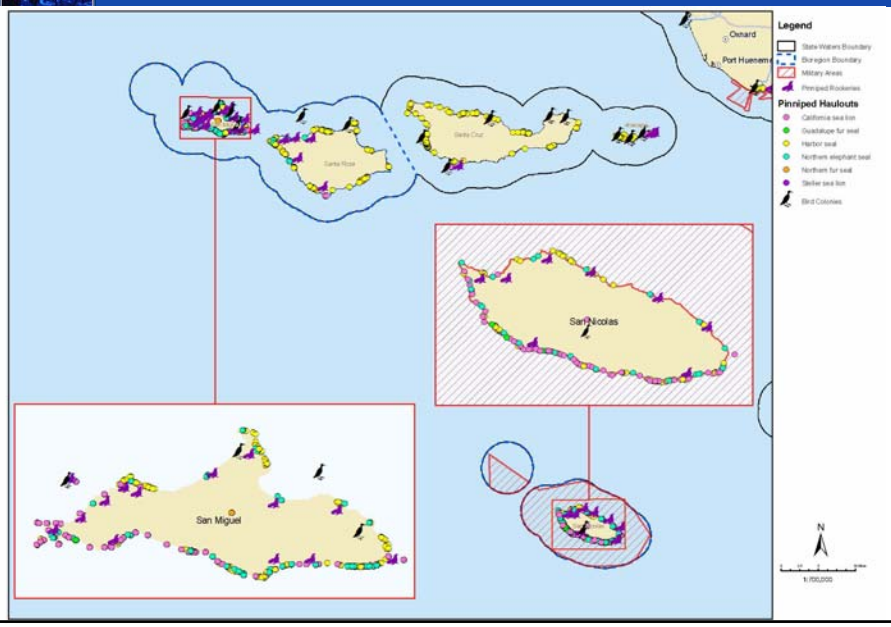
- **San Nicolas Island supports:**
  - Majority of western gulls and western snowy plovers
  - Resident southern sea otter population
  - Large proportion of the California sea lions, Pacific harbor seals and northern elephant seals within West Channel Islands Bioregion
  - Large proportion of the Southern California Bight's populations of western gull, California sea lion, and northern elephant seal populations
  - 12% of the California sea lion and 32% of the northern elephant seal rookeries for the West Islands Bioregion and 12% and 26% for the Southern California Bight, respectively

Birds and Mammals: San Nicolas Island

San Nicolas Island	Colony or Haulout Size	Percent (%) of West Channel Islands Bioregion Population	Percent (%) of Southern California Bight Population
Brandt's Cormorant	290	5.4%	5.0%
Black Oystercatcher	2	3.8%	2.4%
Western Gull	2,800	70.7%	28.1%
Western Snowy Plover	44	89.8%	9.5%
California Sea Lion	51,397	44.4%	41.0%
Pacific Harbor Seal	784	20.3%	10.2%
Northern Elephant Seal	11,301	36.7%	36.6%
Southern Sea Otter	40	TBD	*31%

*Population of southern sea otter at San Nicolas Island represents 100% of the breeding population in the Southern California Bight

Birds and Mammals: West Channel Islands



Marine Habitats: East Channel Islands

[1] San Clemente area is based on military operation areas around San Clemente Island and is a slightly smaller area than all the state waters around San Clemente Island

Habitat	East Channel Islands Bioregion	Percent (%) in Military Areas[1]
Beaches (mi)	61.39	40%
Rocky Shores (mi)	62.31	56%
Kelp (mi)	49.40	67%
Hard 0-30m proxy (mi)	71.65	50%
*Hard 0-30m (sq mi)	25.27	56%
Hard 30-100m (sq mi)	89.28	38%
Hard 100-200m (sq mi)	55.22	35%
Hard 200-3000m (sq mi)	84.41	35%
Soft 0-30m proxy (mi)	4.31	86%
*Soft 0-30m (sq mi)	3.69	88%
Soft 30-100m (sq mi)	15.26	80%
Soft 100-200m (sq mi)	15.58	71%
Soft 200-3000m (sq mi)	129.89	50%

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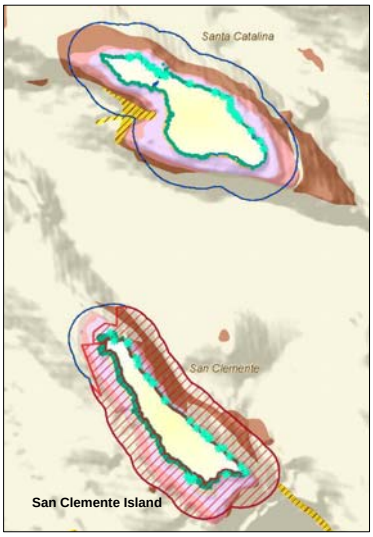


Unique Features of San Clemente

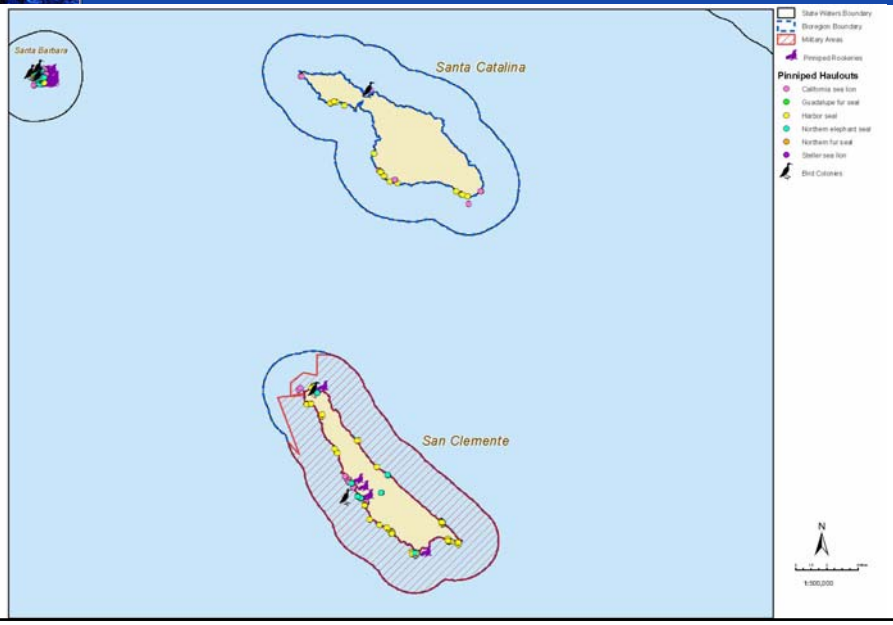
- **Northern range extensions of Panamic species**
  - Panamic arrow crab (*Stenorhynchus debilis*)
  - Warty sea slug (*Pleurobranchus areolatus*)
  - Arbacia sea urchin (*Arbacia incisa*)
  - Guadalupe cardinalfish (*Apogon guadalupensis*)
  - Pink cardinalfish (*A. pacificus*)
  - Swallow damselfish (*Azurina hirundo*)
  - Purple brotula (*Oligopus diagrammus*)
- **Only rock-based morph of elk kelp (*Pelagophycus porra*) at the islands**

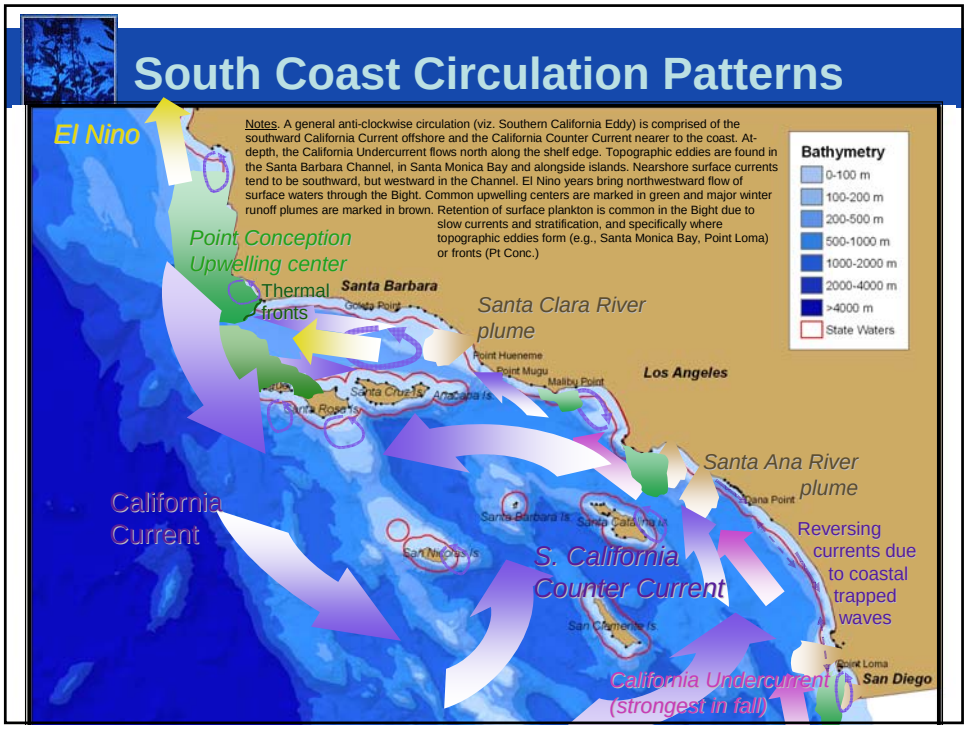
Birds and Mammals: San Clemente Island

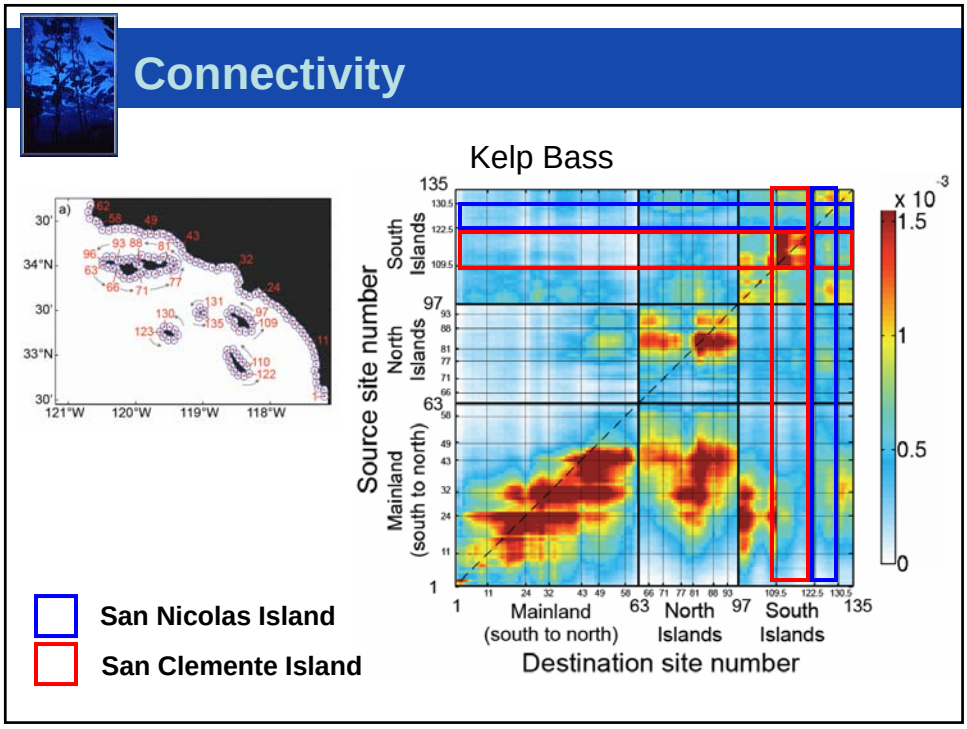
- **San Clemente Island supports:**
  - All of the Brandt's cormorants and black oystercatchers
  - Majority of the ashy storm-petrels and western gulls
  - Large proportion of Xantus's murrelets and Pacific harbor seals for the East Channel Islands Bioregion.
  - All of the California sea lion and northern elephant seal rookeries for the East Islands Bioregion and 15% and 3% for the Southern California Bight, respectively

San Clemente Island	Colony or Haulout Size	Percent (%) of East Channel Islands Bioregion Population	Percent (%) of Southern California Bight Population
Ashy Storm-Petrel	<100	~50%	3.2%
Brandt's Cormorant	40	100%	0.7%
Black Oystercatcher	4	100%	4.9%
Western Gull	112	68.3%	1.1%
Xantus's Murrelet	20	28.6%	1.1%
Pacific Harbor Seal	104	35.0%	1.4%

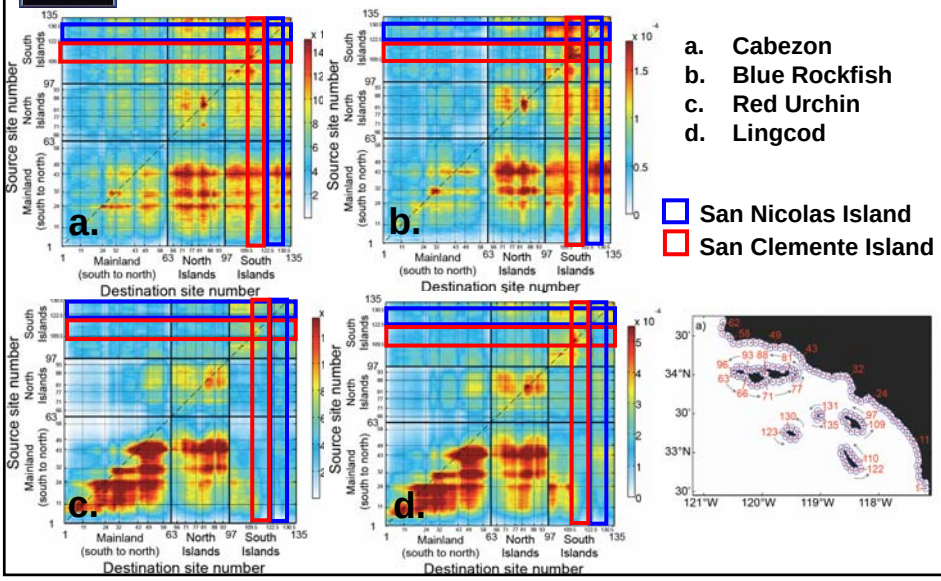
Birds and Mammals: East Channel Islands




South Coast Circulation Patterns
El Nino
Notes. A general anti-clockwise circulation (viz. Southern California Eddy) is comprised of the southward California Current offshore and the California Counter Current nearer to the coast. At-depth, the California Undercurrent flows north along the shelf edge. Topographic eddies are found in the Santa Barbara Channel, in Santa Monica Bay and alongside islands. Nearshore surface currents tend to be southward, but westward in the Channel. El Nino years bring northwestward flow of surface waters through the Bight. Common upwelling centers are marked in green and major winter runoff plumes are marked in brown. Retention of surface plankton is common in the Bight due to slow currents and stratification, and specifically where topographic eddies form (e.g., Santa Monica Bay, Point Loma) or fronts (Pt Conc.)
Bathymetry
0-100 m
100-200 m
200-500 m
500-1000 m
1000-2000 m
2000-4000 m
>4000 m
State Waters
Point Conception
Upwelling center
Thermal fronts
Santa Barbara
Santa Clara River plume
Point Hueneme
Point Mugu
Malibu Point
Los Angeles
Santa Cruz Is.
Anacapa Is.
Santa Rosa Is.
Santa Ana River plume
Dana Point
California Current
Santa Barbara Is.
Santa Catalina Is.
San Nicolas Is.
S. California Counter Current
Reversing currents due to coastal trapped waves
San Clemente Is.
Point Loma
San Diego
California Undercurrent (strongest in fall)


Connectivity
Kelp Bass
a)
30°
34°N
33°N
121°W
120°W
119°W
118°W
Source site number
Mainland (south to north)
North Islands
South Islands
Destination site number
x 10^-3
1.5
1
0.5
0
San Nicolas Island
San Clemente Island

Connectivity



Summary: Habitats

- Military areas represent 18% of the MLPA South Coast Study Region
- Military areas account for greatest percentage of habitats in East Channel Islands Bioregion (44.9%) and West Channel Islands Bioregion (26.9%)
- Because of their geology and geography, San Clemente and San Nicolas contain important and sometimes large amounts of habitat that are not replicated or are poorly replicated in the study region
- Due to their location at long distances from the mainland, San Nicolas and San Clemente are exposed to reduced anthropogenic stressors common in other locations of the study region

Summary: Biotic Features

- Waters of San Nicolas, San Clemente and Begg Rock are *areas of special biological significance* in recognition of their biologically unique and sensitive marine ecosystems
- San Nicolas Island supports threatened southern sea otter, endangered black abalone, and unusual, deep eelgrass
- San Clemente supports rare purple hydrocoral, only rock-based morph and one of two locations for sand-based morph of elk kelp
- Kelp beds at San Clemente and San Nicolas account for 88.9% and 34.8% of this habitat in East and West Channel Island bioregions, respectively

Summary: Birds and Mammals

- Military properties support the majority of the endangered least tern (52.6%) and threatened snowy plover (59.6%) breeding populations within the Southern California Bight
- San Clemente supports majority of breeding colonies and haul-outs for the East Channel Islands bioregion due to the high human presence at Santa Catalina
- San Nicolas is a significant island for California sea lions, northern elephant seals and southern sea otter within the Southern California Bight
- Reducing the number of boats approaching these areas and protecting the prey base close to colonies and haul-outs will help sustain the longevity of these populations

Summary: Connectivity

Modeling results suggest:

- San Clemente Island has high local recruitment and tends to receive larvae from other places in the study region, but has a limited role as a source of larvae, with the strongest connections to Santa Catalina Island
- San Nicolas Island is connected to Santa Barbara, San Clemente, Santa Catalina and, in some cases, San Miguel islands though exchange of larvae and San Nicolas also receives larvae that originate along the mainland coast

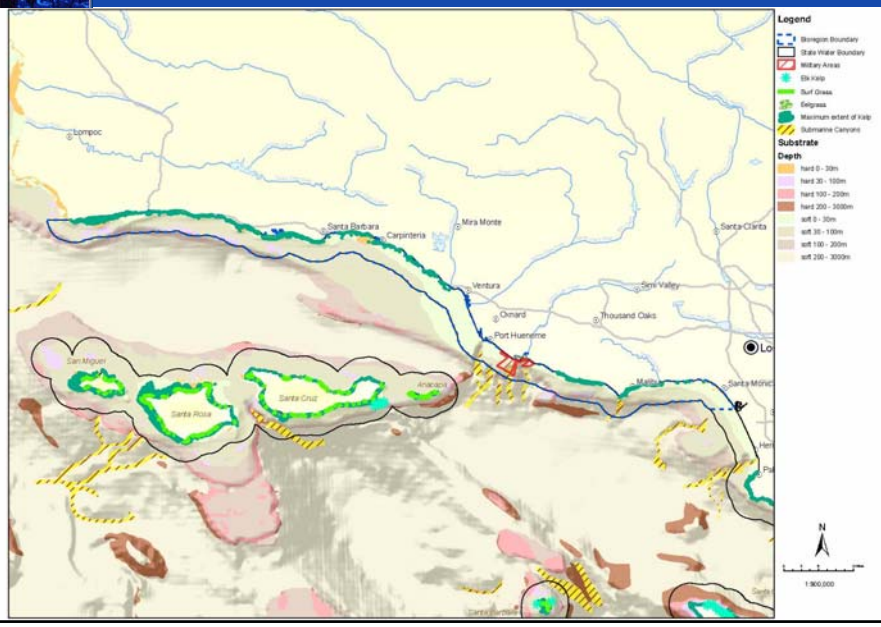
Conclusions

- Because the military use areas include large amounts of key habitat and contain unique biological communities within the MLPA South Coast Study Region, these areas will play significant roles in meeting the science objectives of the Marine Life Protection Act (MLPA)
- The military use areas on San Nicolas Island (including Begg Rock) and San Clemente Island are particularly important to meeting MLPA objectives within the West Channel Islands and East Channel Islands Bioregions

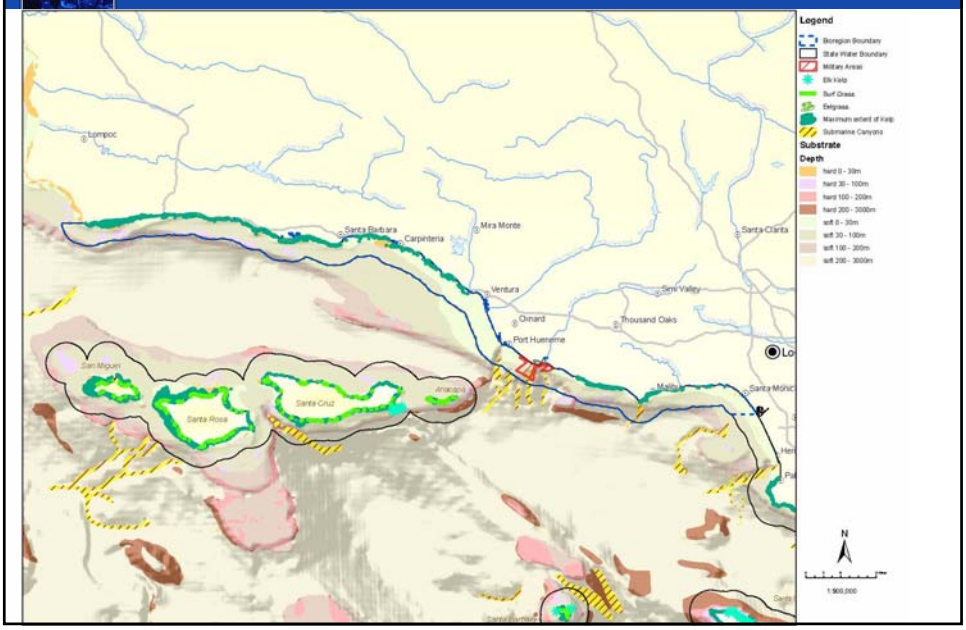
Conclusions

- Contributions to the MLPA made by any proposed closures in military use areas can best be determined in the context of alternative MPA proposals for the entire study region
- Consequently, the SAT recommends that any proposed closures in military use areas be considered as part of the full SAT evaluation of these alternative MPA proposals
  - To assess the contribution of proposed closures to ecosystem protection within each bioregion and the entire study region
  - To determine the role of proposed closures as part of an integrated regional network of MPAs

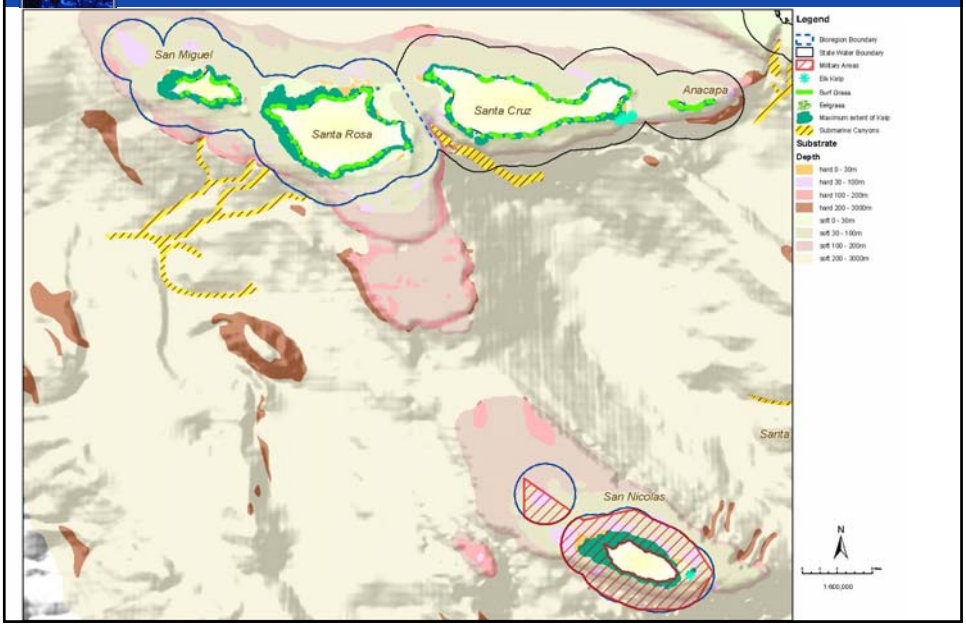
Marine Habitats: South Mainland



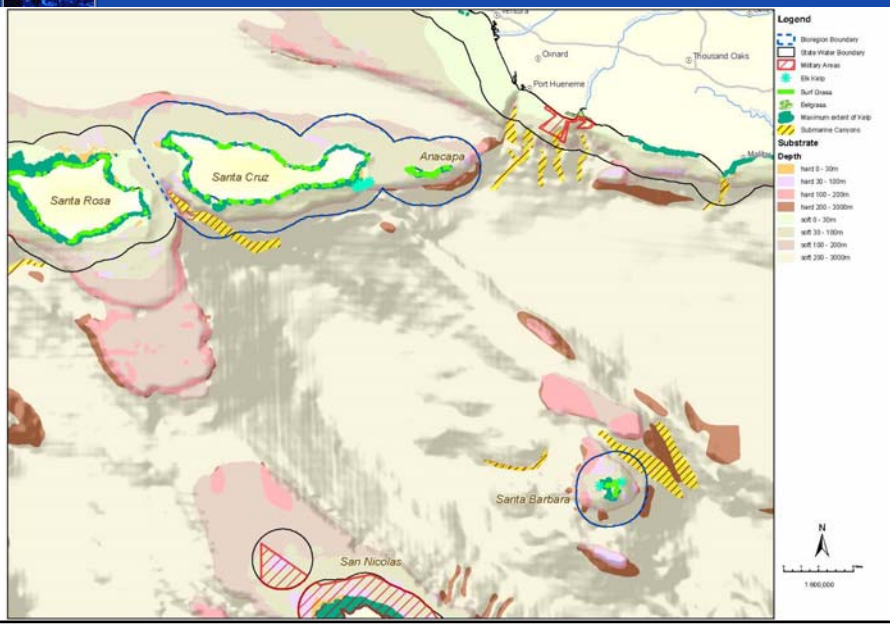
Marine Habitats: North Mainland



Marine Habitats: West Channel Islands



Marine Habitats: Mid Channel Islands



Marine Habitats: East Channel Islands