

California MLPA Master Plan Science Advisory Team
Evaluations of Benefits to Marine Birds from Proposed Marine Protected
Areas in the South Coast Study Region
Revised October 13, 2009

Overview

Marine birds are long-lived species, often living more than 20 years (Clapp et al. 1982) that feed at the top of marine food webs; they produce few offspring and provide a large amount of parental care compared to most marine species. Thus, marine bird populations can be slow to rebound from adverse human and environmental impacts. Additionally, because marine birds are highly visible, relatively inexpensive to study and respond to oceanographic variability, they are often viewed as indicators of the marine environment (see Cairns 1992).

Marine birds can be categorized into four broad categories based on habitat use: seabirds, shorebirds, waterfowl and marsh birds. Seabirds use coastal waters and at-sea habitats and typically come to land only to breed. However, there are a number of seabird species breeding in the south coast study region (SCSR) that depend on land for resting and preening throughout the year. Shorebirds consist of multiple species of sandpipers and plovers that utilize intertidal habitat along the coast and within bays and estuaries. Waterfowl consist of ducks, grebes and loons that forage and raft in protected nearshore waters and within bays and estuaries. Marsh birds consist of herons and egrets that typically forage along the vegetated coasts of bays and estuaries. There are over 40 species of seabirds, over 25 species of shorebirds, over 25 species of waterfowl, and six species of marsh birds that use the SCSR for breeding, migration, and/or overwintering. Additionally, there are six species of raptors that utilize marine resources within the SCSR. Bald Eagles and Osprey feed on nearshore marine fishes and Peregrine Falcons, Northern Harriers, American Kestrels, and Loggerhead Shrikes prey on marine birds or their offspring.

While marine birds are not targeted by recreational or commercial fisheries, they can benefit both directly and indirectly from the establishment of marine protected areas (MPAs). Direct benefits include reduced disturbance at breeding and roosting sites and lower probability of interaction with humans and fishing gear at foraging areas. Indirect benefits include reduced competition for important prey resources. We conducted five separate analyses on proposed MPA arrays to estimate levels of direct and indirect benefits to marine birds: 1) protection of seabird breeding colonies, 2) protection of major seabird roosts, 3) protection of nearshore foraging areas, 4) protection of neretic foraging “hot spots”, and 5) protection of estuary and coastal habitats. In this document, proposed MPAs for the SCSR are evaluated for their potential benefits to marine birds. Evaluations follow the methods described in “Draft Methods Used to Evaluate MPA Proposals in the MLPA South Coast Study Region.” Evaluations are subdivided by bioregions (North Mainland, South Mainland, East Channel Islands, Mid Channel Islands, West Channel Islands).

Protection at Seabird Breeding Colonies and Roosting Sites

Some seabird species breeding in the SCSR such as guillemots, murrelets, and petrels only come to land to breed and spend the remainder of their lives at sea. Others, such as most pelicans, cormorants and gulls, come to shore on a daily basis to rest and preen. For pelicans and cormorants, trips ashore are essential for survival because their wettable plumage must

be dried to avoid hypothermia (Palmer 1962). Thus, it is important that both breeding and roosting sites be protected against human disturbances. For most species, preferred breeding habitats are on offshore rocks, islands, or mainland cliffs free of mammalian predators. However, in the SCSR, several species of terns, including the endangered California Least Tern, nest in the open on the ground of coastal beaches and sand bars within bays and estuaries.

Most species are known to be sensitive to human disturbance to varying degrees (summarized in Carney and Sydeman 1999). Impacts of human disturbance are known to be greatest at breeding sites, where reproduction can be dramatically affected. Because most seabirds are colonial breeders (i.e., nesting in high concentrations), high proportions of populations can be affected by severe or frequent disturbances. Impacts to birds tend to be most pronounced when humans enter the immediate area. Responses vary by species and location, but for many species, intrusion results in most if not all birds fleeing from the immediate area. Birds on nests often will flee, leaving the eggs or chicks behind. During that time, nest contents are susceptible to predators such as gulls. While some birds return to nests once an intruder has gone, others tend to abandon nesting efforts. For example, Brandt's Cormorants have been observed to abandon nests en masse from even single events of human intrusion to the colony (McChesney 1997). Many studies have documented reductions in breeding success and colony attendance, as well as colony abandonment, resulting from human intrusion (Carney and Sydeman 1999).

Although often not as easily identified, activities such as close approaches to colonies and roosts or loud noises can evoke responses similar to direct human intrusions. Close approaches can include humans on foot, boats, low-flying aircraft, motor vehicles, surfers, or other sources (Jaques et al. 1996, Carney and Sydeman 1999, Jaques and Strong 2002). Studies of such disturbances on seabirds and other waterbirds have shown various results that often depend on species, location, habitat and level of habituation to human activity. However, several studies have shown reductions in breeding success or population sizes as a result of such human disturbance (e.g., Wallace and Wallace 1998, Carney and Sydeman 1999, Thayer et al. 1999, Beale and Monaghan 2004, Bouton et al. 2005, Rojek et al. 2007). In some cases, reductions in breeding success from disturbance can occur in the absence of visible behavioral changes (Beale and Monaghan 2004).

Protection of Food Resources and Foraging Areas

During the breeding season, marine birds are central place foragers, continuously returning to the breeding site throughout the day to provision young. Provisioning young is energetically taxing to breeding adults and the spatial constraints of central place foraging makes them highly dependent on localized prey availability (Pichegru et al. 2009). Marine birds may benefit from MPA establishment if there is a subsequent increase in their forage base. Prey availability has been shown to affect coloniality (whether birds form large or small colonies), the timing of reproduction, clutch sizes and levels of egg abandonment, chick growth and non-predator related chick mortality (Anderson and Gress 1984, Safina and Burger 1988, Pierotti and Annetti 1990, Massey et al. 1992, Ainley et al. 1995, Monaghan 1996, Golet et al. 2000).

We have identified two general foraging strategies used by seabirds within the SCSR: 1) nearshore foraging that occurs close to the breeding colony and 2) foraging at neritic “hot spots” that attract congregations of pelagic prey. For our purposes, we defined nearshore foraging as a strategy used by breeding seabirds that typically forage within three miles of the colony. These species are sensitive to changes in local prey availability that can have dramatic effects on breeding success, survivorship and population status (Ainley and Boekelheide 1990, Nur and Sydeman 1999, Sydeman et al. 2001). For example, the Pelagic Cormorant and Pigeon Guillemot colonies at the Southeast Farallon Islands have undergone declines in reproductive performance and population size that are consistent with a decline in the local availability of juvenile rockfish (Sydeman et al. 2001, Warzybok and Bradley 2007). Additionally, Robinette et al. (2007) showed that both spatial and temporal variability in sanddab recruitment was reflected in the diet of Pigeon Guillemots breeding at Point Arguello, central California. Establishing MPAs adjacent to the breeding colonies of seabirds with short foraging ranges will provide protection by decreasing competition for local prey resources. ‘Hot spot’ foraging is a strategy used by both central place foragers and migrant and overwintering birds not constrained to a breeding colony. Many studies have shown that neritic foraging seabirds congregate in predictable areas (e.g., Ford et al. 2004, Yen et al. 2004) and it has even been suggested that these congregations can be used to select areas for MPA establishment (see Harris et al. 2007, Pichegru et al. 2009). Establishing MPAs in areas of high seabird concentrations will reduce direct interactions with humans similarly targeting these areas of high prey concentrations.

Protection of Estuary and Coastal Habitats

The coastal estuaries and beaches of the south coast study region are recognized for high diversity and abundance of wintering and migrant shorebirds (Hubbard and Dugan 20003). As with seabirds, prey availability is a critical factor acting on shorebird communities. Dugan et al. (2008) found that shorebird communities were two times less rich and three times less abundant in habitats with depleted prey availability. Protecting the intertidal habitat of estuaries and coastal beaches will have direct benefits for shorebirds. For waterfowl, the eelgrass beds of the coastal estuaries provide food that is crucial for several species of geese and dabbling ducks. Additionally, waterfowl have been shown to be impacted by human caused disturbances (see Peters and Otis 2006). Protection of eelgrass beds, and estuarine habitat in general, would provide direct benefits to these birds. Finally, protecting the prey base of foraging marsh birds will provide benefits through reduced competition with humans.

Methods

Evaluations follow the methods described in the “Draft Methods Used to Evaluate Marine Protected Area Proposals in the MLPA South Coast Study Region June 5, 2009”. The Marine Life Protection Act (MLPA) SCSR evaluation uses the five bioregions identified by the MLPA Master Plan Science Advisory Team. The evaluation includes analyzing the potential benefits to: 1) seabird breeding areas, 2) seabird roosting areas 3) nearshore seabird foraging areas,

4) neritic seabird foraging areas, and 5) estuary and coastal habitats used by shorebirds, marsh birds and waterfowl.

Results

Seabird Breeding Colonies

The abundance and distribution of all seabird species breeding within the south coast study region are shown in Table 1. Thirteen of the 18 species are most abundant at the Middle and West Channel Islands, with the West Channel Islands containing almost half of the total breeding population for the study region. Terns and skimmers are the most abundant species breeding in the North and South Mainland bioregions, with the endangered California Least Tern showing the highest abundance in both.

The Seabird Breeding Colony Analysis investigated the eight highest ranking species on the south coast study region list of species likely to benefit from MPAs. These were the Ashy Storm-Petrel, Black Oystercatcher, Brandt's Cormorant, Pelagic Cormorant, California Brown Pelican, Pigeon Guillemot, Xantus's Murrelet, and California Least Tern. Only state marine reserves (SMRs) were included in this analysis because they are the most likely to decrease boat traffic enough to reduce disturbance at seabird colonies.

Tables 3 through 5 show the potential benefits provided by each MPA within the three SCRSG MPA proposals. All proposals were identical in benefits offered within the Mid Channel Islands bioregions, and almost identical in the West Channel Islands bioregion with the exception of SCRSG MPA Proposal 3 which included the San Nicolas Island Alpha Area Pending Military Closure. These islands contain recently established MPAs that will not be changed during the MLPA process. Additionally, only one MPA within the East Channel Islands bioregion (Blue Cavern SMR) contained seabird colonies (see Tables 3 and 5).

All three SCRSG MPA proposals provide increased protection over Proposal 0 in the North Mainland and South Mainland bioregions. All three were identical in terms of protection provided within the North Mainland bioregion, protecting 100% of the Pigeon Guillemot, Pelagic Cormorant, and Black Oystercatcher populations, but providing no protection to the California Least Tern population (Table 6). SCRSG MPA Proposal 3 provides the most protection within the South Mainland bioregion due to designating the Bolsa Chica MPA as a SMR. The Bolsa Chica SMR will protect 22.9% of the bioregion's California Least Tern population and 37% of the bioregion's total seabird population (Table 5). In addition to the Least Tern, six species scoring lower on the 'Species Likely to Benefit' list breed within the Bolsa Chica SMR. All three proposals will protect 100% of the Brandt's Cormorant population within the South Mainland bioregion (Table 5).

Major Seabird Roosts

Data on California Brown Pelican roosting abundance and distribution were used in this analysis to identify major seabird roosts. California Brown Pelicans have been well studied in

the south coast study region and use all habitats used by other roosting seabirds. Despite the attention pelicans have received, only data from the North and South Mainland bioregions have been compiled in a manner compatible with this analysis. Therefore, only the MPAs proposed within the North and South Mainland bioregions could be analyzed. As with the breeding colony analysis, only SMRs were considered for the roost analysis. All pelican roosts were placed in one of three categories dependent on the number of pelicans observed at the roosts when the data were collected. Roosts were placed in the 'high' category if >1,000 pelicans were consistently observed, 'medium' if 500-1,000 pelicans were consistently observed, and 'low' if 100-499 pelicans were consistently observed.

Table 7 shows the number of roosts captured by all proposed MPAs while Table 8 shows the number of roosts captured by SMRs for each proposal. Proposal 0 did not capture any important pelican roosts in the North Mainland bioregion and only one in the South Mainland bioregion. All proposals captured 1 high-use roost in both the North and South Mainland bioregions. SCRSG MPA Proposal 1 captured the most medium-use roosts in both the North and South Mainland bioregions (3 and 4, respectively). Overall, SCRSG MPA Proposal 1 captured the most roosts of all classifications in the North Mainland bioregion (6 total) while SCRSG MPA Proposal 3 captured the most in the South Mainland bioregion (10 total).

Nearshore Seabird Foraging Areas

The nearshore foraging analysis focused on five species with limited foraging ranges during the breeding season: Brandt's Cormorant, Pelagic Cormorant, Pigeon Guillemot, Bald Eagles and California Least Terns. Only MPAs that met the criteria outlined in the methods document were included in this analysis. Weighted areas were calculated by multiplying seabird colony size as a percent of the bioregion population with the amount of that colony's foraging area captured by a given MPA. Tables 9 through 12 show the weighted area captured by each proposed MPA. Table 13 compares all proposals based on the total weighted areas captured by MPAs that met the criteria for this analysis.

All three SCRSG MPA proposals increased benefits to nearshore foraging seabirds over Proposal 0. However, SCRSG MPA proposals were very similar with differences limited to three species and few bioregions. SCRSG MPA Proposal 3 provides the most benefits to Brandt's Cormorants in the South Mainland bioregion and Bald Eagles in the East Channel Islands bioregion. SCRSG MPA Proposals 2 and 3 provide the most benefits to Least Terns in the North Mainland bioregion while SCRSG MPA Proposal 1 provides the most benefits to Least Terns in the South Mainland bioregion. The South La Jolla Reefs SMR accounted for most protection to Brandt's Cormorants while the North Catalina Island SMR accounted for most protection for Bald Eagles (both in SCRSG MPA Proposal 3). Least Terns will receive the most protection from the Helo SMR (SCRSG MPA Proposal 1) on the North Mainland and the Ocean Beach SMR (SCRSG MPA Proposal 1) and Sunset Cliffs SMR (SCRSG MPA Proposal 2) on the South Mainland.

Neritic foraging “hot spots” (includes California sea lion and coastal bottlenose dolphin)

The neritic foraging analysis identified areas of persistent use by pelagic foraging seabirds and marine mammals and quantified the amount of these areas captured by proposed MPAs. Most of the identified “hot spots” occurred within the North and South Mainland bioregions (Figure 1). Only MPAs that met the criteria outlined within the methods document were included in this analysis. Tables 14 through 17 show the areas captured by MPAs from each proposal. Table 18 compares the total protected ‘hot spot’ areas among proposals.

All SCRSG MPA proposals increased benefits to neritic-foraging seabirds over Proposal 0. All SCRSG MPA proposals were very similar with SCRSG MPA Proposal 3 providing slightly more protection in the North and South Mainland bioregions. Within SCRSG MPA Proposal 3, the Point Conception and UCSB SMRs provide the most protection in the north and the Palos Verdes and South La Jolla Reefs SMRs provide the most protection in the south.

Estuary and Coastal Habitats

The estuary and coastal habitats analysis quantified the amount of estuary, tidal flat, coastal marsh and beach habitat protected by proposed MPAs. Table 19 compares the amount of each habitat type protected by each proposal. Only MPAs that met the criteria outlined in the methods document were used for this analysis. All SCRSG MPA proposals increased protection to marine birds over Proposal 0. SCRSG MPA Proposal 3 provides the most protection to beach habitat in the North and South Mainland and East and West Channel Islands bioregions; and to coastal marsh, tidal flat, and estuarine habitat in the South Mainland bioregion. SCRSG MPA Proposal 1 provides the most protection to coastal marsh and estuarine habitat in the North Mainland bioregion.

Summary

Differences in seabird protection among the three SCRSG MPA proposals were for the most part subtle. All SCRSG MPA proposals provide increased protection over Proposal 0. Aside from the Bolsa Chica SMR in SCRSG MPA Proposal 3, all proposals were identical in their protection to seabird breeding populations. Overall, SCRSG MPA Proposal 3 provides the most protection over the most categories, including Bald Eagle foraging habitat, neritic “hot spots”, and beach, coastal marsh and tidal flat habitats. SCRSG MPA Proposal 1 provided most protection for seabird roosts. And SCRSG MPA Proposals 2 and 3 provided more protection to Least Tern foraging habitat over SCRSG MPA Proposal 1.

Because existing MPAs within the Mid and West Channel Island bioregions will not be changed under the MLPA process, most differences among SCRSG MPA proposals occur within the North and South Mainland bioregions. The greatest difference in the East Channel Islands bioregion is the protection of Bald Eagle foraging area afforded by the North Catalina Island SMR in SCRSG MPA Proposal 3. Below is a summary of specific MPAs within the North and South Mainland bioregions that provide the most protection under each analysis category.

Seabird Breeding Colonies. The dominant seabird in the North and South Mainland bioregions is the California Least Tern. There is no added protection to Least Tern breeding colonies in the North Mainland bioregion under any of the proposals. Elevating the Point Mugu SMRMA to SMR status would greatly increase protection in the north. In the south, the Bolsa Chica SMR provides the most protection for Least Terns. It also provides protection for six other species of breeding marine birds. Elevating the SCRSG MPA Proposal 3 Tijuana River Mouth SMCA to SMR status would greatly increase protection to Least Terns in the south.

Seabird Roosting Sites. The Point Conception, Carpinteria Salt Marsh and Point Dume SMRs are providing much of the protection to seabird roosts in the North Mainland bioregion. Elevating the Point Mugu SMRMA to SMR status would increase the number of 'High Use' roosts protected in this bioregion. In the South Mainland bioregion, the Laguna, La Jolla Cove, La Jolla South, Ocean Beach, Cabrillo, and Sunset Cliffs SMRs are providing the most protection for seabird roosts.

Nearshore Foraging Areas. The SCRSG MPA Proposal 1 Helo SMR provides the most protection to Least Tern foraging areas in the North Mainland bioregion. Elevating the Point Mugu SMRMA to SMR status would greatly increase protection in the north. The Batiquitos Lagoon, Bolsa Chica, and Sunset Cliffs SMRs are providing the most protection to Least Tern foraging areas in the South Mainland bioregion. Elevating the Tijuana River Mouth SMCA to SMR status would greatly increase protection in the south.

Neritic Foraging Areas. The Point Conception, Helo, and Point Dume SMRs provide the most protection to neritic foraging areas in the North Mainland bioregion. Elevating the Mishopsno SMCA to SMR status would increase protection in the north. The Palos Verdes, Del Mar, and South La Jolla Reefs SMRs provide the most protection to neritic foraging areas in the South Mainland bioregion.

Special Closure Areas. The SMCAs and SMRs currently proposed would provide protection only against consumptive activities. Non-consumptive activities such as kayaking and surfing can still create disturbances at seabird breeding and roosting sites. In the MLPA North Central Coast Study Region, this issue was addressed through the use of Special Closure Areas. There are no new Special Closure Areas proposed within any of the SCRSG MPA proposals. Protection at major breeding and roosting sites would be greatly increased if Special Closure Areas were established within all bioregions.

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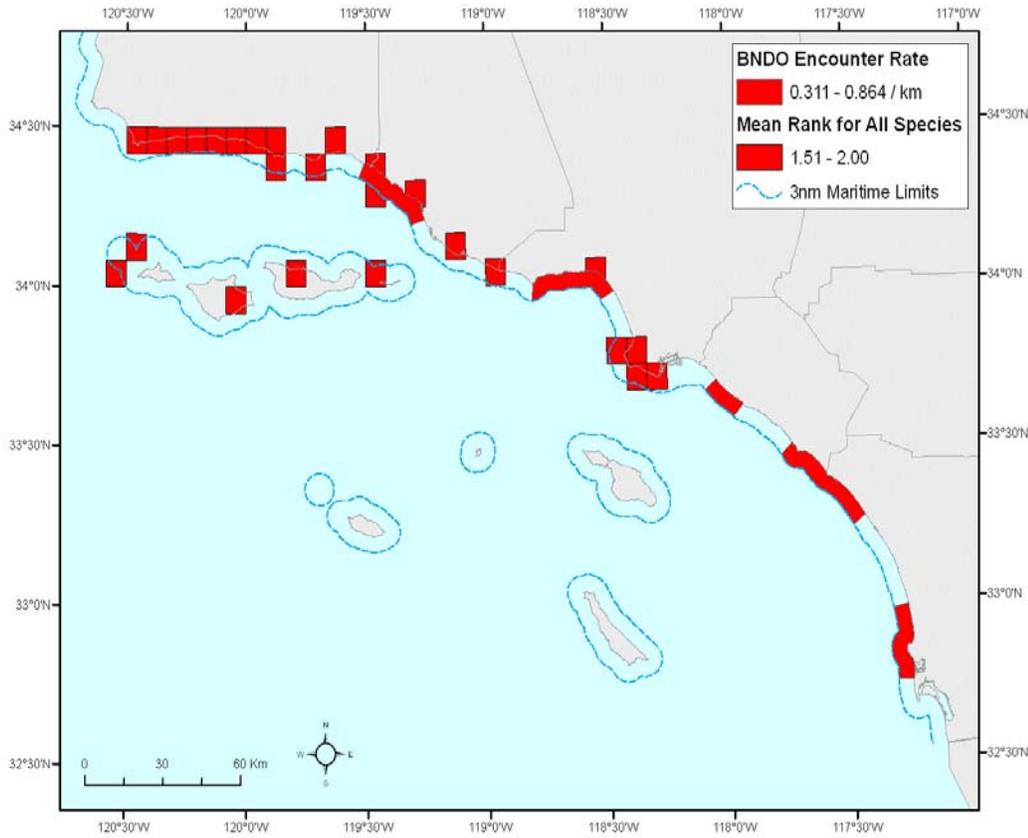
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FIGURES AND TABLES

Figure 1. Neritic foraging “hot spots” for bottlenose dolphins and other species



Note: BNDO = Coastal bottlenose dolphins.

Table 1. Numbers of breeding seabirds of 18 species within each of the five bioregions of the south coast study region

	Bioregion					Total
	North Mainland	South Mainland	East Channel Islands	Mid Channel Islands	West Channel Islands	
No. of Species	5	9	4	11	10	18
Total Breeding Population	753	16151	3460	16179	30818	67361
ASSP	0	0	0	373	801	1174
BLOY	2	0	6	36	53	97
BLSP	0	0	0	150	0	150
BLSK	0	395	0	0	0	395
BRCO	0	6	40	476	5400	5922
BRPE	0	0	0	2690	0	2690
CATE	0	1100	0	0	0	1100
CAAU	0	0	0	490	22020	22510
DCCO	0	0	0	266	150	416
ELTE	0	2900	0	0	0	2900
FOTE	0	2200	0	0	0	2200
LESP	0	0	0	0	4	4
LETE	714	9518	0	0	0	10232
PECO	6	0	0	62	362	430
PIGU	29	0	0	140	1010	1179
ROTE	0	8	0	0	0	8
WEGU	2	24	164	8313	3958	12461
XAMU	0	0	160	3183	150	3493

¹ Species codes: ASSP – Ashy Storm-Petrel, BLOY – Black Oystercatcher, BLSP – Black Skimmer, BRCO – Brandt’s Cormorant, BRPE – Brown Pelican, CATE – Caspian’s Tern, CAAU – Cassin’s Auklet, DCCO – Double-crested Cormorant, ELTE – Elegant Tern, FOTE – Forster’s Tern, LESP – Least Storm-Petrel, LETE – California Least Tern, PECO – Pelagic Cormorant, PIGU - Pigeon Guillemot, ROTE – Royal Tern, WEGU – Western Gull, XAMU – Xantus’s Murrelet.

Table 2. Proposal 0 summary of numbers of breeding birds, percent of bioregional totals, and combined total for species likely to benefit. See Table 1 for species codes. Proposed marine protected areas not listed here did not contain breeding populations of these bird species.

NAME	No. of Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
South Mainland																			
Bolsa Chica SMP ¹	7	3128	19.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	400	4.2%	0	0.0%	0	0.0%	0	0.0%
Upper Newport Bay SMP ¹	1	7	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	7	0.1%	0	0.0%	0	0.0%	0	0.0%
Batiquitos Lagoon SMP ¹	1	1142	7.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1142	12.0%	0	0.0%	0	0.0%	0	0.0%
Laguna Beach SMCA ¹	1	100	0.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100	1.1%	0	0.0%	0	0.0%	0	0.0%
La Jolla SMCA ¹	2	10	0.1%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mid Channel Islands																			
Scorpion SMR	5	543	3.4%	40	10.7%	2	5.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9	6.4%	0	0.0%
Anacapa Island SMR	7	7669	47.4%	0	0.0%	2	5.6%	4	0.8%	2516	93.5%	0	0.0%	4	6.5%	10	7.1%	0	0.0%
Anacapa Island SMCA ¹	3	202	1.2%	0	0.0%	1	2.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	100.0%	0.00031 4169	0.0%
Gull Island SMR	6	466	2.9%	2	0.5%	8	22.2%	134	28.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.1%

NAME	No. of Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
West Channel Islands																			
Harris Point SMR	10	24500	72.3%	601	75.0%	7	12.7%	1824	33.8%	0	0.0%	0	0.0%	216	59.7%	560	55.4%	150	100.0%
Carrington Point SMR	4	138	0.4%	0	0.0%	0	0.0%	54	1.0%	0	0.0%	0	0.0%	24	6.6%	0	0.0%	0	0.0%

¹Not included in Table 6 because benefits to seabirds are reduced by allowed take activities.

Table 3. SCRSG MPA Proposal 1 summary of numbers of breeding birds, percent of bioregional totals, and combined total for species likely to benefit. See Table 1 for species codes. Proposed marine protected areas not listed here did not contain breeding populations of these bird species.

NAME	No. Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
North Mainland																			
Point Conception SMR	4	39	39.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%	29	100.0%	0	0.0%
South Mainland																			
Bolsa Chica SMCA ¹	7	2978	34.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	250	12.6%	0	0.0%	0	0.0%	0	0.0%
Upper Newport Bay SMCA ¹	1	7	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	7	0.4%	0	0.0%	0	0.0%	0	0.0%
Laguna SMR	1	100	1.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100	5.0%	0	0.0%	0	0.0%	0	0.0%
Batiquitos Lagoon SMR	1	55	0.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	55	2.8%	0	0.0%	0	0.0%	0	0.0%
San Elijo Lagoon SMR	1	34	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	34	1.7%	0	0.0%	0	0.0%	0	0.0%

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NAME	No. Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
San Dieguito Lagoon SMR	1	10	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.5%	0	0.0%	0	0.0%	0	0.0%
Los Penasquitos Marsh SMR	1	30	0.3%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	30	1.5%	0	0.0%	0	0.0%	0	0.0%
La Jolla Cove SMR	2	10	0.1%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tijuana River Mouth SMCA ¹	1	50	0.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	50	2.5%	0	0.0%	0	0.0%	0	0.0%
East Channel Islands																			
Blue Cavern SMR	1	52	25.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mid Channel Islands																			
Scorpion SMR	5	543	3.4%	40	10.7%	2	5.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9	6.4%	0	0.0%
Anacapa Island SMR	7	7669	47.4%	0	0.0%	2	5.6%	4	0.8%	2516	93.5%	0	0.0%	4	6.5%	10	7.1%	0	0.0%
Anacapa Island SMCA ¹	3	202	1.2%	0	0.0%	1	2.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
Gull Island SMR	6	466	2.9%	2	0.5%	8	22.2%	134	28.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.1%
West Channel Islands																			
Harris Point SMR	10	24500	72.3%	601	75.0%	7	12.7%	1824	33.8%	0	0.0%	0	0.0%	216	59.7%	560	55.4%	150	100.0%
Carrington Point SMR	4	138	0.4%	0	0.0%	0	0.0%	54	1.0%	0	0.0%	0	0.0%	24	6.6%	0	0.0%	0	0.0%

¹Not included in Table 6 because benefits to seabirds are reduced by allowed take activities.

Table 4. SCRSG MPA Proposal 2 summary of numbers of breeding birds, percent of bioregional totals, and combined total for species likely to benefit. See Table 1 for species codes. Proposed marine protected areas not listed here did not contain breeding populations of these bird species.

NAME	No. Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
North Mainland																			
Point Conception SMR	4	39	39.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%	29	100.0%	0	0.0%
Point Mugu SMRMA ¹	1	24	24.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	24	39.3%	0	0.0%	0	0.0%	0	0.0%
South Mainland																			
Bolsa Chica SMCA ¹	7	2978	34.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	250	12.6%	0	0.0%	0	0.0%	0	0.0%
Upper Newport Bay SMCA ¹	1	7	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	7	0.4%	0	0.0%	0	0.0%	0	0.0%
Laguna South SMCA ¹	1	100	1.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100	5.0%	0	0.0%	0	0.0%	0	0.0%
San Dieguito Lagoon SMR	1	10	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.5%	0	0.0%	0	0.0%	0	0.0%
La Jolla SMR	2	10	0.1%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
East Channel Islands																			
Bird Rock SMCA ¹	1	52	25.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mid Channel Islands																			
Scorpion SMR	5	543	3.4%	40	10.7%	2	5.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9	6.4%	0	0.0%
Anacapa Island SMR	7	7669	47.4%	0	0.0%	2	5.6%	4	0.8%	2516	93.5%	0	0.0%	4	6.5%	10	7.1%	0	0.0%
Anacapa Island SMCA ¹	3	202	1.2%	0	0.0%	1	2.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%

NAME	No. Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
Gull Island SMR	6	466	2.9%	2	0.5%	8	22.2%	134	28.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.1%
West Channel Islands																			
Harris Point SMR	10	24500	72.3%	601	75.0%	7	12.7%	1824	33.8%	0	0.0%	0	0.0%	216	59.7%	560	55.4%	150	100.0%
Carrington Point SMR	4	138	0.4%	0	0.0%	0	0.0%	54	1.0%	0	0.0%	0	0.0%	24	6.6%	0	0.0%	0	0.0%

¹Not included in Table 6 because benefits to seabirds are reduced by allowed take activities.

Table 5. SCRSG MPA Proposal 3 summary of numbers of breeding birds, percent of bioregional totals, and combined total for species likely to benefit. See Table 1 for species codes. Proposed marine protected areas not listed here did not contain breeding populations of these bird species.

NAME	No. Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
North Mainland																			
Point Conception SMR	4	39	39.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%	29	100.0%	0	0.0%
Mugu Lagoon SMRMA ¹	1	24	24.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	24	39.3%	0	0.0%	0	0.0%	0	0.0%
South Mainland																			
Bolsa Chica SMR	7	2978	34.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	250	12.6%	0	0.0%	0	0.0%	0	0.0%
Upper Newport Bay SMR	1	7	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	7	0.4%	0	0.0%	0	0.0%	0	0.0%
Laguna Beach SMR	1	100	1.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	100	5.0%	0	0.0%	0	0.0%	0	0.0%
Batiquitos Lagoon SMR	1	55	0.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	55	2.8%	0	0.0%	0	0.0%	0	0.0%
San Elijo Lagoon SMR	1	34	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	34	1.7%	0	0.0%	0	0.0%	0	0.0%

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NAME	No. Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
San Dieguito Lagoon SMR	1	10	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10	0.5%	0	0.0%	0	0.0%	0	0.0%
Matlahuayl SMR	2	10	0.1%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Tijuana River Mouth SMCA ¹	1	50	0.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	50	2.5%	0	0.0%	0	0.0%	0	0.0%
East Channel Islands																			
Blue Cavern SMR	1	52	25.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mid Channel Islands																			
Scorpion SMR	5	543	3.4%	40	10.7%	2	5.6%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	9	6.4%	0	0.0%
Anacapa Island SMR	7	7669	47.4%	0	0.0%	2	5.6%	4	0.8%	2516	93.5%	0	0.0%	4	6.5%	10	7.1%	0	0.0%
Anacapa Island SMCA ¹	3	202	1.2%	0	0.0%	1	2.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%
Gull Island SMR	6	466	2.9%	2	0.5%	8	22.2%	134	28.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	2	0.1%
West Channel Islands																			
Harris Point SMR	10	24500	72.3%	601	75.0%	7	12.7%	1824	33.8%	0	0.0%	0	0.0%	216	59.7%	560	55.4%	150	100.0%
Carrington Point SMR	4	138	0.4%	0	0.0%	0	0.0%	54	1.0%	0	0.0%	0	0.0%	24	6.6%	0	0.0%	0	0.0%
San Nicolas Alpha Area Military Closure ¹	3	3092	9.1%	0	0.0%	2	3.6%	290	5.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

¹Not included in Table 6 because benefits to seabirds are reduced by allowed take activities.

Table 6. Comparison between proposals of numbers and percentages of marine birds breeding within proposed MPAs in each bioregion and overall.

NAME	No. of Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
North Mainland																			
Proposal 0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
SCRSG MPA Proposal 1	4	39	39.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%	29	100.0%	0	0.0%
SCRSG MPA Proposal 2	4	39	39.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%	29	100.0%	0	0.0%
SCRSG MPA Proposal 3	4	39	39.0%	0	0.0%	2	100.0%	0	0.0%	0	0.0%	0	0.0%	6	100.0%	29	100.0%	0	0.0%
South Mainland																			
Proposal 0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
SCRSG MPA Proposal 1	3	239	2.8%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	229	11.5%	0	0.0%	0	0.0%	0	0.0%
SCRSG MPA Proposal 2	3	20	0.2%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	10	0.5%	0	0.0%	0	0.0%	0	0.0%
SCRSG MPA Proposal 3	8	3194	37.0%	0	0.0%	0	0.0%	6	100.0%	0	0.0%	456	22.9%	0	0.0%	0	0.0%	0	0.0%
East Channel Islands																			
Proposal 0	0	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
SCRSG MPA Proposal 1	1	52	25.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
SCRSG MPA	1	52	25.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

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NAME	No. of Species	Total Birds	Total Birds Pct.	ASSP	ASSP Pct.	BLOY	BLOY Pct.	BRCO	BRCO Pct.	BRPE	BRPE Pct.	LETE	LETE Pct.	PECO	PECO Pct.	PIGU	PIGU Pct.	XAMU	XAMU Pct.
Proposal 2																			
SCRSG MPA Proposal 3	1	52	25.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Mid Channel Islands																			
Proposal 0	18	8678	53.6%	42	11.3%	12	33.3%	138	29.0%	2516	93.5%	0	0.0%	4	6.5%	19	13.6%	2	0.1%
SCRSG MPA Proposal 1	18	8678	53.6%	42	11.3%	12	33.3%	138	29.0%	2516	93.5%	0	0.0%	4	6.5%	19	13.6%	2	0.1%
SCRSG MPA Proposal 2	18	8678	53.6%	42	11.3%	12	33.3%	138	29.0%	2516	93.5%	0	0.0%	4	6.5%	19	13.6%	2	0.1%
SCRSG MPA Proposal 3	18	8678	53.6%	42	11.3%	12	33.3%	138	29.0%	2516	93.5%	0	0.0%	4	6.5%	19	13.6%	2	0.1%
West Channel Islands																			
Proposal 0	14	24638	72.7%	601	75.0%	7	12.7%	1878	34.8%	0	0.0%	0	0.0%	240	66.3%	560	55.4%	150	100.0%
SCRSG MPA Proposal 1	14	24638	72.7%	601	75.0%	7	12.7%	1878	34.8%	0	0.0%	0	0.0%	240	66.3%	560	55.4%	150	100.0%
SCRSG MPA Proposal 2	14	24638	72.7%	601	75.0%	7	12.7%	1878	34.8%	0	0.0%	0	0.0%	240	66.3%	560	55.4%	150	100.0%
SCRSG MPA Proposal 3	14	24638	72.7%	601	75.0%	7	12.7%	1878	34.8%	0	0.0%	0	0.0%	240	66.3%	560	55.4%	150	100.0%

Table 7. Major Brown Pelican roosts by roost size category within proposed mainland MPAs. Proposed MPAs not shown do not contain Brown Pelican roosts.

MPA Name	Roost Category	Number of Roosts	MPA Name	Roost Category	Number of Roosts
North Mainland			South Mainland continued		
<i>Proposal 0</i>			<i>SCRSG MPA Proposal 1</i>		
None	N/A	0	Bolsa Chica SMCA ¹	Low	1
<i>SCRSG MPA Proposal 1</i>			Crystal Cove SMCA ¹	Medium	1
Kashtayit SMP ¹	Low	1	Crystal Cove SMCA ¹	Low	1
Point Conception SMR	Medium	1	Laguna SMR	Low	2
Point Conception SMR	High	1	Laguna SMR	Medium	1
Point Conception SMR	Low	1	Dana Point SMCA ¹	Low	1
Devereux Lagoon SMR	Medium	1	San Elijo Lagoon SMR	Low	1
Helo SMR	Low	1	La Jolla Cove SMR	High	1
Carpinteria Salt Marsh SMR	Medium	1	La Jolla South SMR	Medium	1
Point Dume SMCA ¹	Medium	1	Ocean Beach Pier SMCA ¹	Low	1
<i>SCRSG MPA Proposal 2</i>			Ocean Beach SMR	Medium	1
Point Conception SMR	Medium	1	Cabrillo SMR	Medium	1
Point Conception SMR	High	1	<i>SCRSG MPA Proposal 2</i>		
Point Conception SMR	Low	1	Abalone Cove SMCA ¹	Medium	1
Point Mugu SMRMA ¹	High	1	Bolsa Chica SMCA	Low	1
Point Dume SMCA ¹	Medium	1	Laguna North SMCA ¹	Low	1
<i>SCRSG MPA Proposal 3</i>			Laguna SMR	Low	1
Point Conception SMR	Medium	1	Laguna SMR	Medium	1
Point Conception SMR	High	1	Laguna South SMCA ¹	Low	2
Point Conception SMR	Low	1	La Jolla SMR	High	1
Mishopsno SMCA	Low	1	Ocean Beach Pier SMCA ¹	Low	1
Mishopsno SMCA		1	Sunset Cliffs SMR	Medium	1
Mugu Lagoon SMRMA ¹	High	1	Cabrillo SMR	Medium	1
Point Dume SMR	Medium	1	<i>SCRSG MPA Proposal 3</i>		
South Mainland			Palos Verdes SMR	Low	2
<i>Proposal 0</i>			Bolsa Chica SMR	Low	1
Abalone Cove SMP ¹	Medium	1	Newport Coast SMCA ¹	Low	1
Bolsa Chica SMP ¹	Low	1	Laguna Beach SMR	Low	2
Irvine Coast SMCA ¹	Low	1	Laguna Beach SMR	Medium	1
Crystal Cove SMCA ¹	Low	1	Dana Point SMCA ¹	Low	1
Laguna Beach SMCA ¹	Low	2	San Elijo Lagoon SMR	Low	1
Laguna Beach SMCA ¹	Medium	1	Matlahuayl SMR	High	1
Heisler Park SMR	Medium	1	South La Jolla Reefs SMR	Medium	1
Dana Point SMCA ¹	Low	1	Cabrillo SMR	Medium	1
San Elijo Lagoon SMP ¹	Low	1			
La Jolla SMCA ¹	High	1			
Mia J Tegner SMCA ¹	Medium	1			

¹Not included in Table 8 because benefits to seabirds are reduced by allowed take activities.

Table 8. Comparison between proposals of size and number of Brown Pelican roosts within proposed MPAs in the mainland bioregions.

North Mainland			
	High	Medium	Low
Proposal 0	0	0	0
SCRSO MPA Proposal 1	1	3	2
SCRSO MPA Proposal 2	1	1	1
SCRSO MPA Proposal 3	1	2	1
South Mainland			
	High	Medium	Low
Proposal 0	0	1	0
SCRSO MPA Proposal 1	1	4	3
SCRSO MPA Proposal 2	1	3	1
SCRSO MPA Proposal 3	1	3	6

Table 9. Proposal 0 weighted contributions to foraging areas for five species of breeding seabirds within proposed MPAs. MPAs not shown did not contribute to foraging area for any of these species.

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
North Mainland					
Goleta Slough SMP ¹	0.00	0.00	0.00	N/A	<0.01
South Mainland					
Point Fermin SMP ¹	0.00	0.00	0.00	N/A	0.01
Batiquitos Lagoon SMP ¹	0.00	0.00	0.00	N/A	0.17
Bolsa Chica SMP ¹	0.00	0.00	0.00	N/A	0.02
Encinitas SMCA ¹	0.00	0.00	0.00	N/A	0.01
La Jolla SMCA ¹	0.77	0.00	0.00	N/A	0.00
San Diego-Scripps SMCA ¹	0.11	0.00	0.00	N/A	0.00
East Channel Islands					
Catalina Marine Science Center SMR	0.00	0.00	0.00	0.06	N/A
Lover's Cove SMCA ¹	0.00	0.00	0.00	0.02	N/A
Mid Channel Islands					
Anacapa Island SMCA ¹	0.05	0.40	0.44	0.00	N/A
Anacapa Island SMR	0.08	0.63	0.70	0.00	N/A
Footprint SMR	0.01	0.09	0.00	0.00	N/A
Gull Island SMR	7.37	12.98	0.11	11.21	N/A
Santa Barbara Island SMR	2.79	0.67	4.48	0.00	N/A
Scorpion SMR	0.00	0.00	0.48	0.00	N/A

West Channel Islands					
Carrington Point SMR	0.13	0.83	0.00	0.00	N/A
Harris Point SMR	11.41	12.38	12.68	0.00	N/A
Judith Rock SMR	0.48	0.20	0.28	0.00	N/A
Richardson Rock SMR	1.17	0.48	0.69	0.00	N/A

MPAs not shown did not contribute to foraging area for any of these species.

¹Not included in Table 13 because benefits to seabirds are reduced by allowed take activities.

Table 10. SCRSG MPA Proposal 1 weighted contributions to foraging areas for five species of breeding seabirds within proposed MPAs. MPAs not shown did not contribute to foraging area for any of these species.

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
North Mainland					
Point Conception SMR	0.00	14.24	14.24	N/A	0.00
Helo SMR	0.00	0.00	0.00	N/A	68.76
Devereux Lagoon SMR	0.00	0.00	0.00	N/A	0.72
Goleta Slough SMR	0.00	0.00	0.00	N/A	1.60
South Mainland					
Point Fermin SMCA ¹	0.00	0.00	0.00	N/A	218.53
Batiquitos Lagoon SMR	0.00	0.00	0.00	N/A	431.40
Bolsa Chica SMCA ¹	0.00	0.00	0.00	N/A	246.62
La Jolla Cove SMR	0.77	0.00	0.00	N/A	0.00
La Jolla South SMCA ¹	0.89	0.00	0.00	N/A	46.72
La Jolla South SMR	1.47	0.00	0.00	N/A	0.00
Famosa Slough SMR	0.00	0.00	0.00	N/A	26.56
Ocean Beach Pier SMCA ¹	0.00	0.00	0.00	N/A	22.66
Ocean Beach SMR	0.00	0.00	0.00	N/A	875.42
Cabrillo SMR		0.00	0.00	N/A	11.42
Tijuana River Mouth SMCA ¹	0.00	0.00	0.00	N/A	722.41
East Channel Islands					
Blue Cavern SMR	0.00	0.00	0.00	0.85	N/A
Cat Harbor SMCA ¹	0.00	0.00	0.00	0.25	N/A
Emerald Bay SMCA ¹	0.00	0.00	0.00	0.22	N/A
Long Point SMR	0.00	0.00	0.00	3.54	N/A
Lover's Cove SMCA ¹	0.00	0.00	0.00	0.06	N/A
San Clemente Pending Military Closure 1 ¹	1.45	0.00	0.00	0.00	N/A
San Clemente Pending Military Closure 2 ¹	0.64	0.00	0.00	0.00	N/A
Mid Channel Islands					
Anacapa Island SMCA ¹	0.05	0.40	0.44	0.00	N/A
Anacapa Island SMR	0.08	0.63	0.70	0.00	N/A

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
Footprint SMR	0.01	0.09	0.00	0.00	N/A
Gull Island SMR	7.37	12.98	0.11	11.21	N/A
Santa Barbara Island SMR	2.79	0.67	4.48	0.00	N/A
Scorpion SMR	0.00	0.00	0.48	0.00	N/A
West Channel Islands					
Carrington Point SMR	0.13	0.83	0.00	0.00	N/A
Harris Point SMR	11.41	12.38	12.68	0.00	N/A
Judith Rock SMR	0.48	0.20	0.28	0.00	N/A
Richardson Rock SMR	1.17	0.48	0.69	0.00	N/A

¹Not included in Table 13 because benefits to seabirds are reduced by allowed take activities.

Table 11. SCRSG MPA Proposal 2 weighted contributions to foraging areas for five species of breeding seabirds within proposed MPAs. MPAs not shown did not contribute to foraging area for any of these species.

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
North Mainland					
Point Conception SMR	0.00	14.24	14.24	N/A	0.00
Campus Point SMR	0.00	0.00	0.00	N/A	63.57
Goleta Slough SMR	0.00	0.00	0.00	N/A	1.60
Point Mugu SMRMA	0.00	0.00	0.00	N/A	199.25
South Mainland					
Bolsa Chica SMCA ¹	0.00	0.00	0.00	N/A	246.57
La Jolla SMR	0.77	0.00	0.00	N/A	0.00
Ocean Beach Pier SMCA ¹	0.00	0.00	0.00	N/A	44.23
Sunset Cliffs SMR	0.00	0.00	0.00	N/A	915.72
Cabrillo SMR	0.00	0.00	0.00	N/A	11.31
East Channel Islands					
Bird Rock SMCA ¹	0.00	0.00	0.00	0.45	N/A
Blue Cavern SMR	0.00	0.00	0.00	0.40	N/A
Lover's Cove SMCA ¹	0.00	0.00	0.00	0.06	N/A
San Clemente Pending Military Closure 1 ¹	1.45	0.00	0.00	0.00	N/A
San Clemente Pending Military Closure 2 ¹	0.64	0.00	0.00	0.00	N/A
Mid Channel Islands					
Anacapa Island SMCA ¹	0.05	0.40	0.44	0.00	N/A
Anacapa Island SMR	0.08	0.63	0.70	0.00	N/A
Footprint SMR	0.01	0.09	0.00	0.00	N/A
Gull Island SMR	7.37	12.98	0.11	11.21	N/A
Santa Barbara Island SMR	2.79	0.67	4.48	0.00	N/A
Scorpion SMR	0.00	0.00	0.48	0.00	N/A

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
West Channel Islands					
Carrington Point SMR	0.13	0.83	0.00	0.00	N/A
Harris Point SMR	11.41	12.38	12.68	0.00	N/A
Judith Rock SMR	0.48	0.20	0.28	0.00	N/A
Richardson Rock SMR	1.17	0.48	0.69	0.00	N/A

¹Not included in Table 13 because benefits to seabirds are reduced by allowed take activities.

Table 12. SCRSG MPA Proposal 3 weighted contributions to foraging areas for five species of breeding seabirds within proposed MPAs. MPAs not shown did not contribute to foraging area for any of these species.

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
North Mainland					
Point Conception SMR	0.00	14.24	14.24	N/A	0.00
UCSB SMR	0.00	0.00	0.00	N/A	64.02
Goleta Slough SMR	0.00	0.00	0.00	N/A	1.60
Mugu Lagoon SMRMA	0.00	0.00	0.00	N/A	199.25
South Mainland					
Bolsa Chica SMR	0.00	0.00	0.00	N/A	246.37
Batiquitos Lagoon SMR	0.00	0.00	0.00	N/A	649.80
Swami's SMCA ¹	0.00	0.00	0.00	N/A	159.88
San Diego-Scripps Coastal SMCA ¹	1.42	0.00	0.00	N/A	0.00
Matlahuayl SMR	1.11	0.00	0.00	N/A	0.00
South La Jolla Reefs SMR	3.43	0.00	0.00	N/A	103.73
Cabrillo SMR		0.00	0.00	N/A	22.57
Tijuana River Mouth SMCA ¹	0.00	0.00	0.00	N/A	1563.09
East Channel Islands					
North Catalina SMR	0.00	0.00	0.00	8.60	N/A
Blue Cavern SMR	0.00	0.00	0.00	0.60	N/A
Long Point SMR	0.00	0.00	0.00	1.67	N/A
San Clemente Pending Military Closure 1 ¹	1.45	0.00	0.00	0.00	N/A
San Clemente Pending Military Closure 2 ¹	0.64	0.00	0.00	0.00	N/A
Mid Channel Islands					
Anacapa Island SMCA ¹	0.05	0.40	0.44	0.00	N/A
Anacapa Island SMR	0.08	0.63	0.70	0.00	N/A
Footprint SMR	0.01	0.09	0.00	0.00	N/A
Gull Island SMR	7.37	12.98	0.11	11.21	N/A
Santa Barbara Island SMR	2.79	0.67	4.48	0.00	N/A
Scorpion SMR	0.00	0.00	0.48	0.00	N/A

MPA Name	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagles	California Least Tern
West Channel Islands					
Carrington Point SMR	0.13	0.83	0.00	0.00	N/A
Harris Point SMR	11.41	12.38	12.68	0.00	N/A
Judith Rock SMR	0.48	0.20	0.28	0.00	N/A
Richardson Rock SMR	1.17	0.48	0.69	0.00	N/A
San Nicolas Alpha Area Military Closure	0.62	0.00	0.00	0.00	N/A

¹Not included in Table 13 because benefits to seabirds are reduced by allowed take activities.

Table 13. Comparison of proposals to total contributions of weighted foraging areas for five species of breeding seabirds in the study region by bioregion.

	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagle	California Least Tern
North Mainland					
Proposal 0	0.00	0.00	0.00	N/A	0.00
SCRSO MPA					
Proposal 1	0.00	14.24	14.24	N/A	71.08
SCRSO MPA					
Proposal 2	0.00	14.24	14.24	N/A	264.41
SCRSO MPA					
Proposal 3	0.00	14.24	14.24	N/A	264.87
South Mainland					
Proposal 0	0.00	0.00	0.00	N/A	0.00
SCRSO MPA					
Proposal 1	2.24	0.00	0.00	N/A	1344.80
SCRSO MPA					
Proposal 2	0.77	0.00	0.00	N/A	927.04
SCRSO MPA					
Proposal 3	4.54	0.00	0.00	N/A	1022.47
East Channel Islands					
Proposal 0	0.00	0.00	0.00	0.00	N/A
SCRSO MPA					
Proposal 1	0.00	0.00	0.00	4.39	N/A
SCRSO MPA					
Proposal 2	0.00	0.00	0.00	0.40	N/A
SCRSO MPA					
Proposal 3	0.00	0.00	0.00	10.87	N/A
Mid Channel Islands					
Proposal 0	10.26	14.38	5.77	11.21	N/A
SCRSO MPA					
Proposal 1	10.26	14.38	5.77	11.21	N/A
SCRSO MPA					
Proposal 2	10.26	14.38	5.77	11.21	N/A

	Brandt's Cormorant	Pelagic Cormorant	Pigeon Guillemot	Bald Eagle	California Least Tern
SCRSG MPA Proposal 3	10.26	14.38	5.77	11.21	N/A
West Channel Islands					
Proposal 0	13.19	13.89	13.65	0.00	N/A
SCRSG MPA Proposal 1	13.19	13.89	13.65	0.00	N/A
SCRSG MPA Proposal 2	13.19	13.89	13.65	0.00	N/A
SCRSG MPA Proposal 3	13.81	13.89	13.65	0.00	N/A

Table 14. Proposal 0 contributions to neritic foraging area “hot spots” based on 11 species of seabirds and 2 marine mammals within proposed MPAs. MPAs not shown did not contribute to neritic foraging area “hot spots”.

MPA Name	Area of Overlap (sq mi)
North Mainland	
Goleta Slough SMP ¹	0.19
Refugio SMCA ¹	1.03
Big Sycamore Canyon SMR	0.01
South Mainland	
Abalone Cove SMP ¹	0.10
Point Fermin SMP ¹	0.07
Niguel SMCA ¹	0.48
Dana Point SMCA ¹	0.20
Doheny SMCA ¹	0.19
Doheny Beach SMCA ¹	0.14
San Diego-Scripps SMCA ¹	0.11
La Jolla SMCA ¹	0.77
Mid Channel Islands	
Anacapa Island SMCA ¹	5.80
West Channel Islands	
Richardson Rock SMR	15.65

¹Not included in Table 18 because benefits to seabirds are reduced by allowed take activities.

Table 15. SCRSG MPA Proposal 1 contributions to neritic foraging area “hot spots” based on 11 species of seabirds and 2 marine mammals within proposed MPAs. MPAs not shown did not contribute to neritic foraging area “hot spots”.

MPA Name	Area of Overlap (sq mi)
North Mainland	
Point Conception SMR	11.30
Kashtayit SMP ¹	1.54
Naples SMCA	2.57
Helo SMR	11.81
Devereux Lagoon SMR	0.09
Goleta Slough SMR	0.19
Point Dume SMR	4.24
South Mainland	
Palos Verdes SMR	8.77
Point Fermin SMCA ¹	0.16
Dana Point SMCA ¹	2.35
Del Mar SMR	8.43
La Jolla Cove SMR	0.77
La Jolla South SMR	2.12
La Jolla South SMCA ¹	2.77
Ocean Beach Pier SMCA ¹	0.08
Ocean Beach SMR	2.13
Mid Channel Islands	
Anacapa Island SMCA ¹	5.80
West Channel Islands	
Richardson Rock SMR	15.65

¹Not included in Table 18 because benefits to seabirds are reduced by allowed take activities.

Table 16. SCRSG MPA Proposal 2 contributions to neritic foraging area “hot spots” based on 11 species of seabirds and 2 marine mammals within proposed MPAs. MPAs not shown did not contribute to neritic foraging area “hot spots”.

MPA Name	Area of Overlap (sq mi)
North Mainland	
Point Conception SMR	13.90
Campus Point SMR	10.35
Goleta Slough SMR	0.19
Point Mugu SMRMA ¹	1.67
South Mainland	
Point Vicente SMR	4.38
Abalone Cove SMCA ¹	4.78
Laguna SMR	0.11
Laguna South SMCA ¹	0.65
Del Mar SMR	11.29
La Jolla SMR	0.77

MPA Name	Area of Overlap (sq mi)
Ocean Beach Pier SMCA ¹	0.16
Sunset Cliffs SMR	2.50
Mid Channel Islands	
Anacapa Island SMCA ¹	5.80
West Channel Islands	
Richardson Rock SMR	15.65

¹Not included in Table 18 because benefits to seabirds are reduced by allowed take activities.

Table 17. SCRSG MPA Proposal 3 contributions to neritic foraging area “hot spots” based on 11 species of seabirds and 2 marine mammals within proposed MPAs. MPAs not shown did not contribute to neritic foraging area “hot spots”.

MPA Name	Area of Overlap (sq mi)
North Mainland	
Point Conception SMR	16.56
Naples SMR	2.57
UCSB SMR	10.44
Goleta Slough SMR	0.19
Mishopsno SMCA ¹	14.62
Mugu Lagoon SMRMA ¹	1.67
Point Dume SMR	4.55
South Mainland	
Palos Verdes SMR	12.67
Laguna Beach SMR	0.15
Dana Point SMCA ¹	2.32
San Diego-Scripps Coastal SMCA ¹	1.42
Matlahuayl SMR	1.11
South La Jolla Reefs SMR	9.98
Mid Channel Islands	
Anacapa Island SMCA ¹	5.80
West Channel Islands	
Richardson Rock SMR	15.65

¹Not included in Table 18 because benefits to seabirds are reduced by allowed take activities.

Table 18. Comparison of proposals to total contributions of neritic foraging area “hot spots” for 11 species of breeding seabirds and 2 marine mammals in the south coast study region.

	North Mainland	South Mainland	West Channel Islands
Proposal 0	0.01	0.00	15.65
SCRSG MPA Proposal 1	30.20	22.22	15.65
SCRSG MPA Proposal 2	24.44	19.05	15.65
SCRSG MPA Proposal 3	34.31	23.91	15.65

Table 19. Comparison of proposals to total contributions of coastal habitats used by shorebirds and waterfowl.

	North Mainland	South Mainland	East Channel Islands	Mid Channel Islands	West Channel Islands
Beaches (linear miles)					
Proposal 0	0.00	0.21	0.08	3.90	6.33
SCRSG MPA Proposal 1	5.75	11.49	5.18	3.90	6.33
SCRSG MPA Proposal 2	3.84	9.16	1.66	3.90	6.33
SCRSG MPA Proposal 3	7.24	13.62	10.60	3.90	7.72
Coastal Marsh (square miles)					
Proposal 0	0.00	0.01	N/A	N/A	N/A
SCRSG MPA Proposal 1	0.46	0.81	N/A	N/A	N/A
SCRSG MPA Proposal 2	0.19	0.17	N/A	N/A	N/A
SCRSG MPA Proposal 3	0.19	1.74	N/A	N/A	N/A
Tidal Flats (linear miles)					
Proposal 0	0.00	0.00	N/A	N/A	N/A
SCRSG MPA Proposal 1	0.59	0.70	N/A	N/A	N/A
SCRSG MPA Proposal 2	0.56	0.66	N/A	N/A	N/A
SCRSG MPA Proposal 3	0.56	3.56	N/A	N/A	N/A
Estuary (square miles)					
Proposal 0	0.00	0.04	N/A	N/A	N/A
SCRSG MPA Proposal 1	0.62	1.90	N/A	N/A	N/A
SCRSG MPA Proposal 2	0.25	0.55	N/A	N/A	N/A
SCRSG MPA Proposal 3	0.25	3.45	N/A	N/A	N/A