Governing Marine Protected Areas in the Channel Islands on the California Coast

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This case study was created as a source document for the social-ecological system analysis in the Social-Ecological Library of the Channel Islands National Park social-ecological system. The case, alongside other supporting documentation, is intended to support the development of the IAD analysis and Systems Representation in the library.

Abstract

Marine sanctuary waters include 1,128 square nautical miles from mean high tide to 6 nautical miles offshore San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara Islands. Warm and cool currents support a great variety of flora and fauna, including giant kelp, fish and invertebrates, marine birds, pinnipeds, and cetaceans. The key resources (natural infrastructure) in the system are the marine food web. The key shared resource relevant to the commons dilemma faced by the community are the fish stocks and their productivity (common-pool) as well as world recognized heritage and biodiversity. This case does not catalog individual fishers or individual fisheries because this information is beyond the current scope of available documentation. The resource unit in the SES are targeted fish in the MPA areas. Fishers are required to obtain licenses to fish in the National Marine Sanctuary (or anywhere in California) and MPAs restrict the activities in specific areas which have been designated as key breeding grounds for fish stocks or sites of high biodiversity.

CA Channel Islands

There are eight Channel Islands along the Santa Barbara Channel off of the southern California coast which total in 479,652 ha above land. The Channel Islands include: Anacapa, Santa Barbara, Santa Rosa, San Miguel, Santa Cruz, San Clemente, San Nicolas & Santa Catalina. The rocks that make up the island are over 100 million years old and there is evidence of human activity on the Channel Islands as early as 13,000 years ago (Howell 1976). Not having been connected to the mainland mass of North America for millions of years there are multiple endemic species on the island and the islands are at times referred to as the "Galapagos of North America" for their biological diversity. For these many reasons, the islands have been the site of both state and federal conservation activities for the last several decades.

On April 26th, 1938, Anacapa island and Santa Barbara island was designated a national monument (National Park Foundation 2018). Then, in 1976 all eight of the Channel Islands were designated the Channel Islands Biosphere Reserve:

"Situated west of Los Angeles the Channel Islands Biosphere Reserve represents one of the last examples of natural Mediterranean ecosystems in North America and some of the few remaining natural southern California coastal ecosystems. Characteristic features are coastal sage scrub communities on the islands and exceptionally pristine tidepools on the marine terraces surrounding them.

The area's major terrestrial ecosystem type is evergreen sclerophyllous woodland, with a coastal/marine component. Characteristic features are coastal sage scrub communities on the islands.

Marine sanctuary waters include 1,128 square nautical miles from mean high tide to 6 nautical miles offshore San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara Islands. Warm and cool currents support a great variety of flora and fauna, including giant kelp, fish and invertebrates, marine birds, pinnipeds, and cetaceans.

The sanctuary's secluded, relatively undisturbed waters also provide full or part-time homes for several endangered species, including blue, humpback, and sei whales, southern sea otters, the California brown pelican, and the California least tern." (UNESCO 2017)

On March 5, 1980 five of the eight Channel Islands were designated a national park (US Congress 1980). These five islands are: Santa Barbara, Anacapa, San Miguel, Santa Rosa and Santa Cruz. In total the park consists of 249,554 acres half of which are on the land and half of which are underwater (National Park Foundation 2017). Santa Cruz island is the largest of the eight islands in the Channel Islands, and five in the national park and 75% of it is under the management of The Nature Conservancy (TNC 2018). The National Park Service reports an average of 307,829 tourist visitors to the Channel Islands National Park per year since 2008 (NPS 2017).

Channel Islands National Marine Sanctuary includes waters six nautical miles around the Channel Islands National Park spanning 1,470 square miles (NOAA 2018). The National Oceanic and Atmospheric Administration cites:

"Channel Islands National Marine Sanctuary is one of 14 federally designated marine protected area administered by the National Oceanic and Atmospheric Administration (NOAA), within the Department of Commerce. The sanctuary encompasses 1,110 square nautical miles (1,470 square miles) of water from mean high tide to six nautical miles offshore of Santa Barbara, Anacapa, Santa Cruz, Santa Rosa, and San Miguel islands.

The sanctuary is a special place for species close to extinction, sensitive habitats, shipwrecks and maritime heritage artifacts. *Many valuable commercial and recreational activities, such as fishing, shipping, and tourism occur in the sanctuary.* A comprehensive ecosystem- based management approach is used to promote long term conservation of sanctuary waters, wildlife, habitats, and cultural resources, while allowing compatible human uses.

The sanctuary's remote, isolated position at the confluence of two major ocean currents creates remarkable biodiversity. The mingling of cool, nutrient-rich waters from the north with warm currents from the south form a dynamic transition zone that is home to a myriad of sea life from microscopic plankton to blue whales." (Emphasis added, NOAA 2018)

The Marine Protect Areas of the Channel Islands National Park are a part of a larger set of Marine Protected Areas in California that were established by the State of California Fish and Wildlife Commission in 2003.

Statewide network of MPAs in CA

In 1999 California Legislature passed the Marine Life Protection Act which "aims to protect California's marine natural heritage through establishing a statewide network of marine protected areas (MPAS) designed, created, and managed using sound science and stakeholder input," states the CA Department of Fish and Wildlife (Ca.gov 2018). As such, the Marine Protected Areas as outlined in the Marine Life Protection Act allowed for a tiered description of activities and protections to be in place in the MPAs ranging from marine reserves, marine conservation areas, and marine parks (Ca.gov 2018). The Southern California MPAs are the "southernmost component of a statewide MPA network" and range from "Point Conception to the California-Mexico border" (Ca.gov 2018).

According to the National Park Service:

"The majority of the waters in the national park and marine sanctuary are open to "state and federally regulated commercial and/or recreational activities like fishing, the MPAs function more like a marine refuge, similar to terrestrial national parks…They are open for public enjoyment of non-consumptive activities like boating, surfing or SCUBA fiving, but fishing and other activities that involve the "take" of recourses are limited or entirely prohibited. No-take marine reserves are the primary type of MPA in Channel Islands National Park prohibiting the take of living, geological or cultural resources. Marine conservation areas are similar but allow exceptions for specific commercial and/or recreational fisheries (National Park Service 2017)."

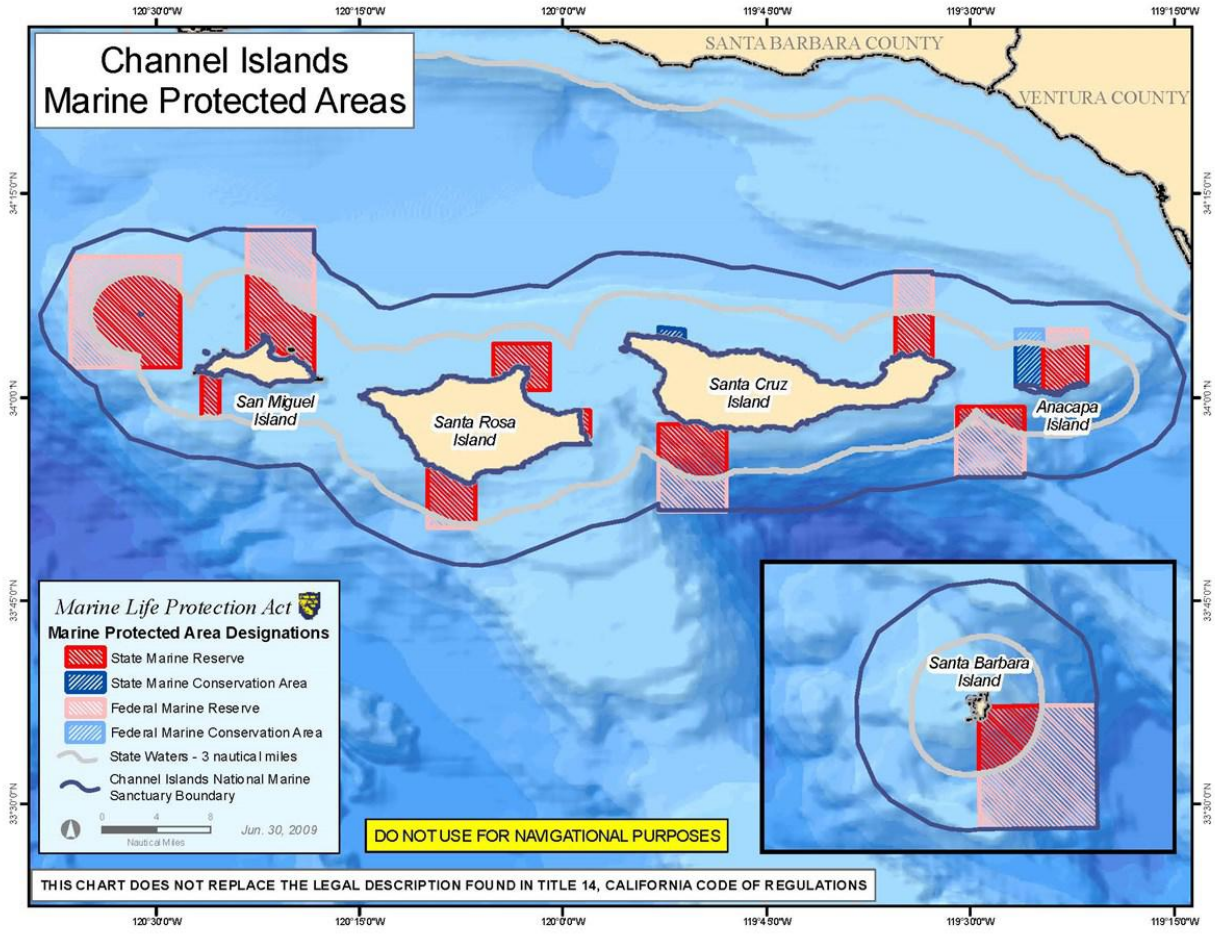
Section 2852 of the Marine Life Protection Act (which was passed by CA state legislature as stated above) further outlines the MPA distinction:

"A "Marine protected area" (MPA) means a named, discrete geographic marine or estuarine area seaward of the high tide line or the mouth of a coastal river, including any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna that has been designated by law, administrative action, or voter initiative to protect or conserve marine life and habitat. *MPA classifications include marine life reserves (the equivalent of the state marine reserve classification), state marine parks, which allow recreational fishing and prohibit commercial extraction, and state marine conservation areas, which allow for specified commercial and recreational activities, including fishing for certain species but not others, fishing with certain practices but not others,* and kelp harvesting, provided that these activities are consistent with the objectives of the area and the goals and guidelines of this chapter. (emphasis added).

MPAs are primarily intended to protect or conserve marine life and habitat and are therefore a subset of marine managed areas (MMAs), which are broader groups of named, discrete geographic areas along the coast that protect, conserve, or otherwise manage a variety of resources and uses, including living marine resources, cultural and historical resources, and recreational opportunities. Marine managed area classifications include state water quality

protection area, state marine cultural preservation area, and state marine recreational management area."

The State of California Fish and Game Commission "established 13 Marine Protected Areas (MPAs) within the state water of Channel Islands National Park" in 2003 (NPS 2017). These boundaries were extended into the Channel Islands National Marine Sanctuary federal waters in 2006 and 2007 and now combine to protect as much as 21% of the water in the Channel Islands National Park and Channel Islands National Marine Sanctuary in the MPAs (NPS 2017). The image below shows the overlapping and intersecting state and federally protected MPAs around the Channel Islands National Park.



Map of Channel Islands Marine Protected Areas. Marine Protected Areas designated as Marine Reserves are in red, and areas designated as Marine Conservation Areas are in blue [1]

[1] Source: https://www.nps.gov/chis/learn/nature/marine-protected-areas.htm

In the Channel Islands National Park, fishing is permitted with the possession of a California state fishing license and all California Department of Fish and Wildlife, but fishing (particularly commercial fishing) is restricted in MPAs.

The goals for establishing the MPAs as stated by the National Park Service included:
"to serve a sanctuary for marine life to preserve species diversity and abundance; to protect marine habitats and ecosystems that species rely on; to minimize short-term social and economic losses while maintaining long-term benefits such more productive and sustainable regional fisheries; to maintain areas for visitors' recreational, educational, and spiritual use that are minimally impacted by human disturbance; and to provide scientific points of reference to assist with resource management decisions in the MPAs and surrounding waters (MPAs, NPS 2017).

Since the Channel Island National Park MPAs are both state and federally mandated, they are monitored in different ways by the different bodies. An interview with a lobster fisher revealed that the federal government monitor's the MPAs via satellite data and to date has been unsuccessful in using this satellite data to prosecute anyone in court, as it has been essentially improvable that the vessels in the MPAs were illegally fishing, as opposed to passing through or anchoring. CA Department of Fish and Wildlife monitors the MPAs with the use of 3 offshore vessels and 10 smaller shore based boats to monitor all of southern California's MPAs. The rest of the monitoring is done informally by fishers themselves and people spending time on vessels near the MPAs. The fisher I spoke with said if he sees someone in the MPA fishing he would absolutely say something to them. He also said that because of the MPAs, there is increased pressure on places where people can fish and as a result there has been an increase in conflict amongst fishers (fishers are cutting one another's lobster traps etc.)

Formal Rules that Apply to All MPAS according to California Department of Fish and Wildlife are explicated in the following section. Ostrom's rules have been coded onto the formal institutional rules as laid out by the California Department of Fish and Wildlife on their website. All material other than the Ostrom rules is directly quoted from the ca.gov website:

Access (CCR Title 14, Section 632 (a)(4)): Access into marine protected areas or marine managed areas for non-consumptive uses including but not limited to swimming, surfing, diving, boating, hiking and walking is allowed unless otherwise specified in individual MPA regulations.
Choice Rule.

Introduction of Species (CCR Title 14, Section 632)
Unless authorized by the commission or as a result of authorized fishing activities, the release of any fish or wildlife species, including domestic or domesticated species, or the introduction of any plant species, is prohibited. The department may reintroduce endemic species to marine protected areas or marine managed areas for management purposes.
Choice Rule.

Feeding of Fish and Wildlife (CCR Title 14, Section 632 (a)(6))

The feeding of fish and wildlife is prohibited except permitted scientific collection pursuant to Section 650 or as a result of authorized fishing within state marine conservation areas, state marine parks, and state marine recreational management areas, or unless feeding of fish is specifically authorized in individual MPA regulations for purposes of marine life viewing.
Choice rule.

Anchoring (CRR Title 14, Section 632(a)(7))
Vessels shall be allowed to anchor in any marine protected area or marine managed area with catch onboard unless otherwise specified in individual MPA regulations. Fishing gear shall not be deployed in the water while anchored in a state marine reserve. Fishing gear, except legal fishing gear used to take species identified as allowed for take in individual MPA regulations, shall not be deployed in the water while anchored in a state marine recreational management area, state marine park or state marine conservation area. Anchoring regulations shall be consistent with federal law and allowances made for anchoring required by emergency or severe weather.
Choice rule: while anchored in marine protected area, fishing gear shall not be deployed in water

Transit or Drifting (CCR Title 14, Section 632 (a)(8))
Vessels shall be allowed to transit through MPAs and marine managed areas (MMAs) with catch onboard. Fishing gear shall not be deployed in the water while transiting through a state marine reserve. Fishing gear, except legal fishing gear used to take species identified as allowed for take in individual MPA regulations, shall not be deployed in the water while transiting through a state marine recreational management area, state marine park or state marine conservation area.

Spearfishermen with or without catch shall be allowed to transit through MPAs and MMAs. While transiting areas that prohibit spearfishing or while in possession of species not identified as allowed for take in the area being transited, spearfishing gear shall be in an unloaded condition, not carried in hand, and the diver shall remain at the surface.
Choice rule.

Water Quality Monitoring (CCR Title 14, Section 632 (a)(9))
Sampling of water, sediment and marine life, for water quality monitoring or pollution research, or as required in a Monitoring and Reporting Program of a National Pollutant Discharge Elimination System (NPDES) Permit and Waste Discharge Requirements issued by the State or Regional Water Boards pursuant to the United States Clean Water Act and the California Water Code, is allowed within state marine reserves, state marine conservation areas, state marine parks, and state marine recreational management areas pursuant to a valid scientific collecting permit issued by the department.
Information rule. Choice Rule.

Public Safety (CCR Title 14, Section 632 (a) (10))

Public safety activities, including installation, maintenance and/or seasonal placement and removal of safety-related artificial structures, including but not limited to lifeguard towers, are allowed within any MPA classification pursuant to any required federal, state and local permits, or as otherwise authorized by the department.
Choice rule.

Tribal Take (CCR Title 14, Section 632 (a)(11))
"Federally recognized tribe" means any tribe on the *List of Indian Entities Recognized and Eligible to Receive Services from the United States Bureau of Indian Affairs*, published annually in the Federal Register. Any member of a federally recognized tribe authorized to take living marine resources from an area with area-specific take restrictions in individual MPA regulations, when engaging in take within an authorized area shall possess on his person, in his immediate possession, or where otherwise specifically required by law to be kept, any valid license, report card, tag, stamp, validation, permit, or any other entitlement that is required in the Fish and Game Code, or required by other state, federal, or local entities, in order to take living marine resources. Members shall possess a valid photo identification card issued by a federally recognized tribe that contains expiration date, tribal name, tribal member number, name, signature, date of birth, height, color of eyes, color of hair, weight, and sex; and display any of the items listed above upon demand to any peace officer. Members taking living marine resources under this provision are subject to current seasonal, bag, possession, gear and size limits in existing Fish and Game Code statutes and regulations of the Commission, except as otherwise provided for in individual MPA regulations. No member, while taking living marine resources, may be assisted by any person who does not possess a valid tribal identification card and is not properly licensed to take living marine resources. Nothing in the regulation is intended to conflict with, or supersede, any state or federal law regarding the take of protected, threatened or endangered species.
Position rule: position tribal member
Boundary rule: has to be tribal member; federally recognized photo identification
Scope Rule: provision is limited to current seasonal, bag, possession, gear & size limits in existing Fish and Game code statutes and regulations; does not supersede federal laws regarding protected, threatened or endangered species.

Shore Fishing (CCR Title 14, Section (a)(12))
Take from shore, or shore fishing, means take of living marine resources from shore, including beaches, banks, piers, jetties, breakwaters, docks, and other man-made structures connected to the shore. Unless specifically authorized in individual MPA regulations, no vessel, watercraft (motorized or non-motorized), or floating device may be used to assist in the take, transport or possession of species taken while shore fishing, except that a float tube or similar flotation device may be used when taking abalone only.
Position rule: there is no position rule.
Choice rule: no vessel, watercraft (motorized or non-motorized), or floating device may be used to assist in the take, transport or possession of species taken while shore fishing
Position rule: abalone fisher
Boundary rule: you are fishing abalone

Choice rule: you can use a float tube or similar flotation device.

Definitions: Take, Finfish, Pelagic Finfish, and Coastal Pelagic Species (from ca.gov 2018)
Take (Fish and Game Code, Section 86) means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill. ("Take" is also defined in CCR Title 14, Section 1.80)

Finfish (CCR Title 14, Section 632(a)(2)), as defined for purposes of MPA regulations, are any species of bony fish or cartilaginous fish (sharks, skates and rays). Finfish do not include amphibians, invertebrates, plants or algae.

Pelagic finfish (CCR Title 14, Section 632(a)(3)), as defined for purposes of MPA regulations, are a subset of finfish defined as: northern anchovy (Engraulis mordax), barracudas (Sphyraena spp.), billfishes* (family Istiophoridae), dolphinfish (Coryphaena hippurus), Pacific herring (Clupea pallasii), jack mackerel (Trachurus symmetricus), Pacific mackerel (Scomber japonicus), salmon (Oncorhynchus spp.), Pacific sardine (Sardinops sagax), blue shark (Prionace glauca), salmon shark (Lamna ditropis), shortfin mako shark (Isurus oxyrinchus), thresher sharks (Alopias spp.), swordfish (Xiphias gladius), tunas (family Scombridae), including Pacific bonito (Sarda chiliensis), and yellowtail (Seriola lalandi). *Marlin is not allowed for commercial take.

Coastal pelagic species (CCR Title 14, Section 1.39), as defined for purposes of MPA regulations, include the following: northern anchovy (Engraulis mordax), Pacific sardine (Sardinops sagax), Pacific mackerel (Scomber japonicus), jack mackerel (Trachurus symmetricus) and market squid (Doryteuthis (Loligo) opalescens).

Surf Smelt (CCR Title 14, Section 28.45)
(Night Smelt, Day Fish, Whitebait Smelt)
Limit: Twenty-five pounds in combination
(Ca.gov 2018)

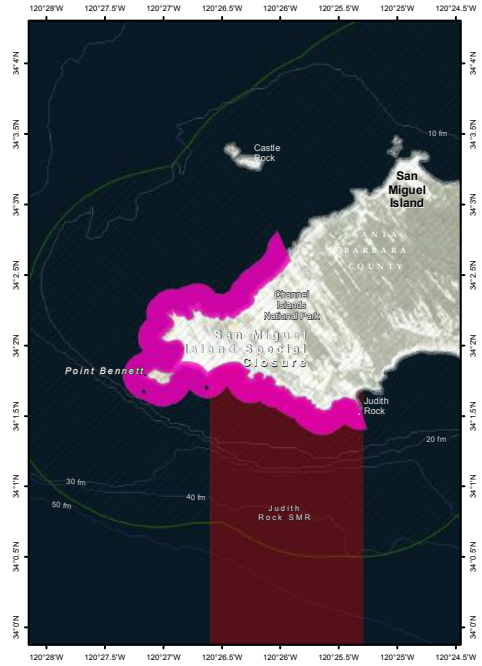
Richardson Rock State and Federal Marine Reserve (San Miguel Island):

Scope Rule: This area is bounded by the mean high tide line of Richardson Rock and straight lines connecting the following points in the order listed:

34° 02.211' N. lat. 120° 28.200' W. long.;
34° 02.211' N. lat. 120° 36.290' W. long.;
34° 10.400' N. lat. 120° 36.290' W. long.;
34° 10.400' N. lat. 120° 28.200' W. long.; and
34° 02.211' N. lat. 120° 28.200' W. long.

Choice/Scope Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resources
-State and Federal reserve share the same regulations

San Miguel Island Special Closure



Special restrictions on boating and access apply to San Miguel Island as follows:

Scope Rules: Boating is allowed at San Miguel Island except west of a line drawn between Judith Rock (34° 01.500' N. lat. 120° 25.300' W. long.) and Castle Rock (34° 03.300' N. lat. 120° 26.300' W. long. where boats are prohibited closer than 300 yards from shore.

1. Notwithstanding the 300-yard boating closure between Judith Rock and Castle Rock, the following shall apply:
    a. Boats may approach San Miguel Island no nearer than 100 yards from shore during the period(s) from March 15 through April 30, and October 1 through December 15; and
    b. Boats operated by commercial sea urchin divers may enter waters of the 300-yard area between the western boundary of the Judith Rock State Marine Reserve at 120° 26.60’ W. long. and Castle Rock for the purpose of fishing sea urchins during the period(s) from March 15 through April 30, and October 1 through December 15.

Position Rule:
Potision of Commercial Sea Urchin Diver

2. The Department may rescind permission for boats to enter waters within 300 yards between Judith Rock and Castle Rock upon finding that impairment to the island marine mammal resource is imminent. Immediately following such closure, the Department will request the commission to hear, at its regularly scheduled meeting, presentation of documentation supporting the need for such closure.

Other Requirements:

1. Boats traveling within 300 yards of the shoreline or anchorages shall operate with a minimum amount of noise and shall not exceed speeds of five miles per hour.
2. Except as permitted by federal law or emergency caused by hazardous weather, boats may be anchored overnight only at Tyler Bight and Cuyler Harbor.
3. Landing is allowed on San Miguel Island only at the designated landing beach in Cuyler Harbor.
4. No person shall have access to all other offshore rocks and islands at San Miguel Island.

Harris Point State and Federal Marine Reserve (San Miguel Island)

Scope rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:
34° 03.160' N. lat. 120° 23.300' W. long.;
34° 12.295' N. lat. 120° 23.300' W. long.;
34° 12.295' N. lat. 120° 18.400' W. long.; and
34° 01.755' N. lat. 120° 18.400' W. long.

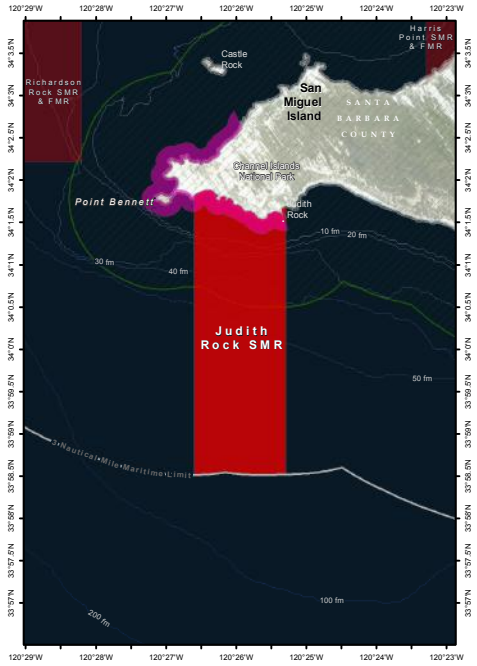
Choice/Scope Rule:

1. It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.

If Scope then Choice Rule:

2. An exemption to the reserve, where commercial and recreational take of living marine resources is allowed, exists between the mean high tide line in Cuyler Harbor and a straight line between the following points:
   34° 03.554' N. lat. 120° 21.311' W. long.; and
   34° 02.908' N. lat. 120° 20.161' W. long.

Judith Rock State Marine Reserve (San Miguel Island)



Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed except where noted:
34° 01.802' N. lat. 120° 26.600' W. long.;
33° 58.513' N. lat. 120° 26.600' W. long.; thence eastward along the three nautical mile offshore boundary to
33° 58.518' N. lat. 120° 25.300' W. long.; and
34° 01.689' N. lat. 120° 25.300' W. long.

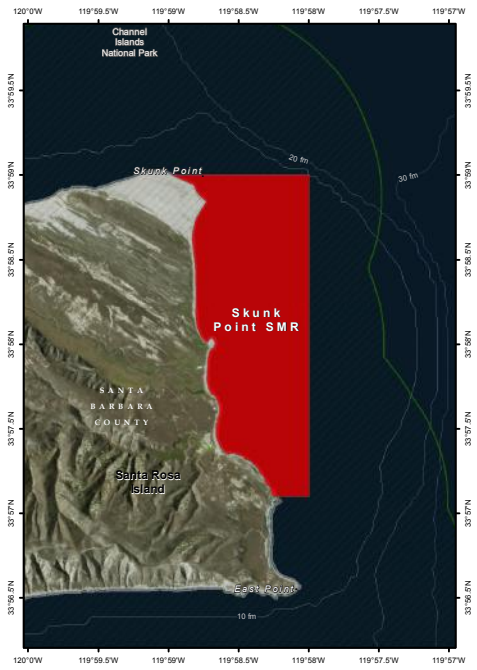
Choice/Scope Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.

Carrington Point State Marine Reserve (Santa Rosa Island)

Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:
34° 01.280' N. lat. 120° 05.200' W. long.;
34° 04.000' N. lat. 120° 05.200' W. long.;
34° 04.000' N. lat. 120° 01.000' W. long.;
34° 00.500' N. lat. 120° 01.000' W. long.; and
34° 00.500' N. lat. 120° 02.930' W. long.

Choice/Scope Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.

Skunk Point State Marine Reserve (Santa Rosa Island)

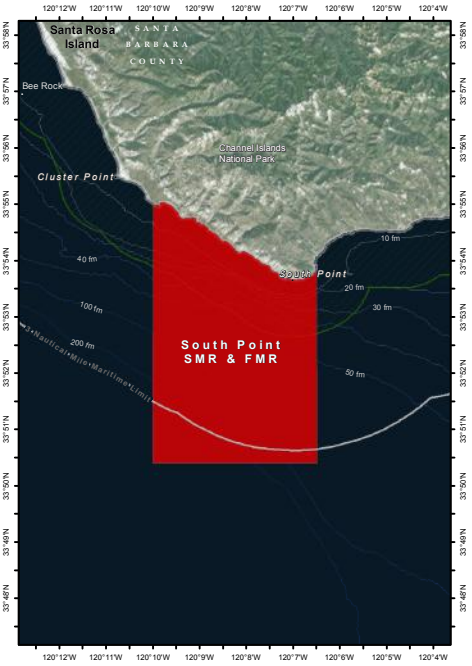


Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:

33° 59.000' N. lat. 119° 58.985' W. long.;
33° 59.000' N. lat. 119° 58.000' W. long.;
33° 57.100' N. lat. 119° 58.000' W. long.; and
33° 57.100' N. lat. 119° 58.257' W. long.

Choice/Scope Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.

South Point State and Federal Marines Reserve (Santa Rosa Island)

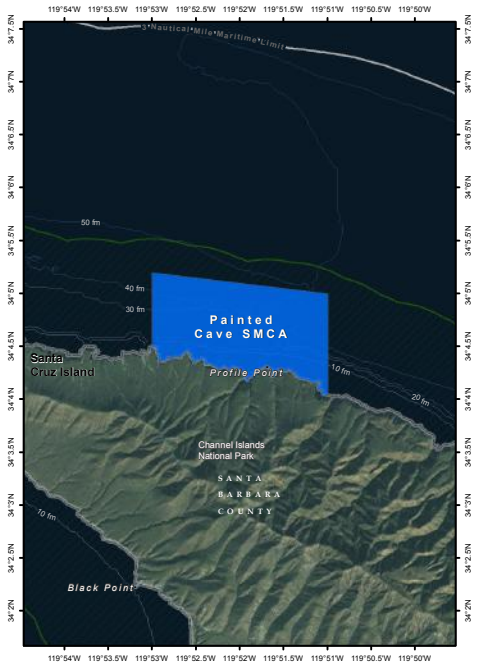


Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:

33° 55.014' N. lat. 120° 10.000' W. long.;
33° 50.400' N. lat. 120° 10.000' W. long.;
33° 50.400' N. lat. 120° 06.500' W. long.;
33° 53.800' N. lat. 120° 06.500' W. long.; and
33° 53.800' N. lat. 120° 06.544' W. long.

Choice/Scope rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.

Painted Cave State Marine Conservation Area (Santa Cruz Island)



Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed except where noted:

34° 04.492' N. lat. 119° 53.000' W. long.;
34° 05.200' N. lat. 119° 53.000' W. long.; thence eastward along a line one nautical mile offshore to
34° 05.000' N. lat. 119° 51.000' W. long.; and
34° 04.034' N. lat. 119° 51.000' W. long.

Choice/Scope Rules:
It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for commercial and/or recreational purposes, with the following specified exceptions:

The recreational take of spiny lobster and pelagic finfish.

Gull Island State and Federal Marine Reserve (Santa Cruz Island)

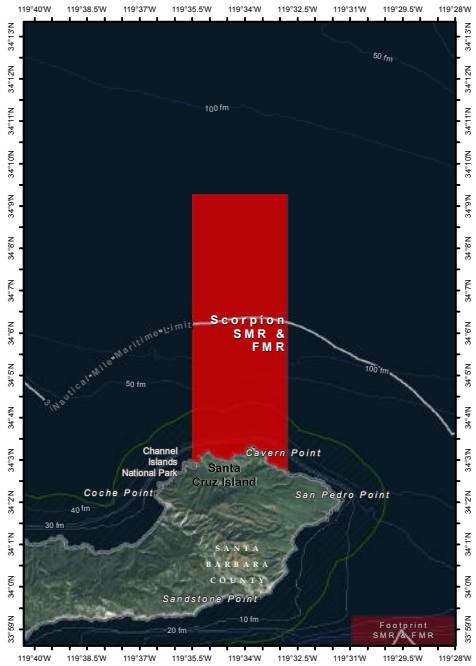
Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed except where noted:

33° 58.065' N. lat. 119° 50.967' W. long.;
33° 58.000' N. lat. 119° 51.000' W. long.;
33° 58.000' N. lat. 119° 53.000' W. long.;
33° 51.717' N. lat. 119° 53.000' W. long.;
33° 51.717' N. lat. 119° 48.000' W. long.; and
33° 57.759' N. lat. 119° 48.000' W. long.

Scope/Choice Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.

-State and Federal reserve share the same regulations

Scorpion State and Federal Marine Reserve (Santa Cruz Island)

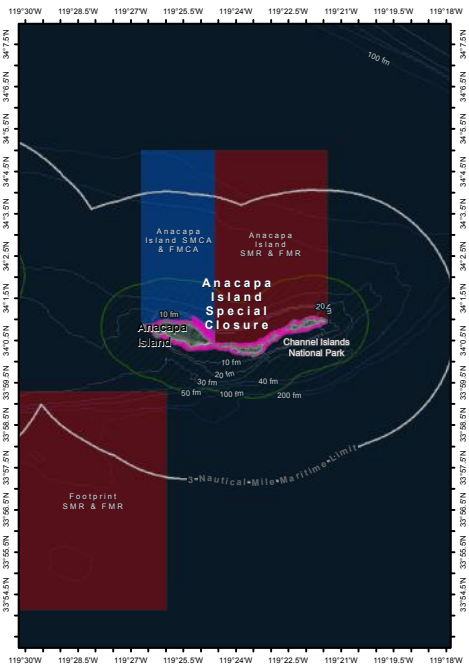


Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:

34° 02.958' N. lat. 119° 35.500' W. long.;
34° 09.270' N. lat. 119° 35.500' W. long.;
34° 09.270' N. lat. 119° 32.800' W. long.; and
34° 02.700' N. lat. 119° 32.800' W. long.

Scope/Choice Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.
-State reserve and federal reserve share identical regulations.

Anacapa Island Special Closure



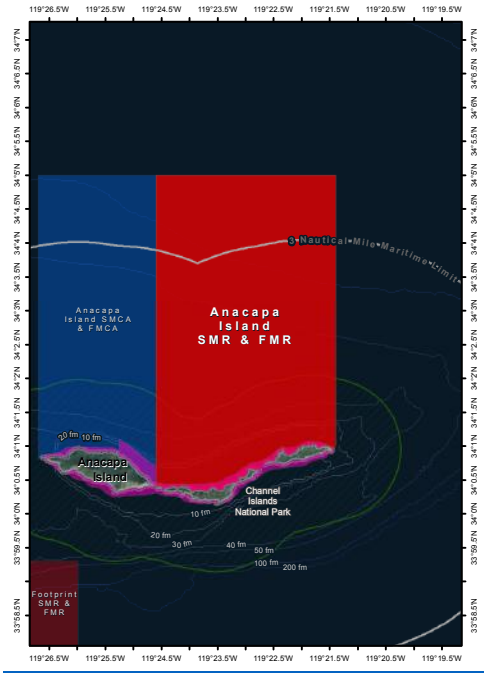
Choice Rule: No net or trap may be used in waters less than 20 feet deep off the Anacapa Islands commonly referred to as Anacapa Island.

Scope Rule: A brown pelican fledgling area is designated from the mean high tide mark seaward to a water depth of 20 fathoms (120 feet) on the north side of West Anacapa Island between a line extending 000° True off Portuguese Rock (34° 00.910’ N. lat. 119° 25.260’ W. long.) to a line extending 000° True off the western edge of Frenchy’s Cove (34° 00.411’ N. lat. 119° 24.600’ W. long.), a distance of approximately 4,000 feet. No person except Department employees or employees of the National Park Service in the performance of their official duties shall enter this area during the period January 1 to October 31.

Position Rule: Position of Department employee

Position of National Park Service employee

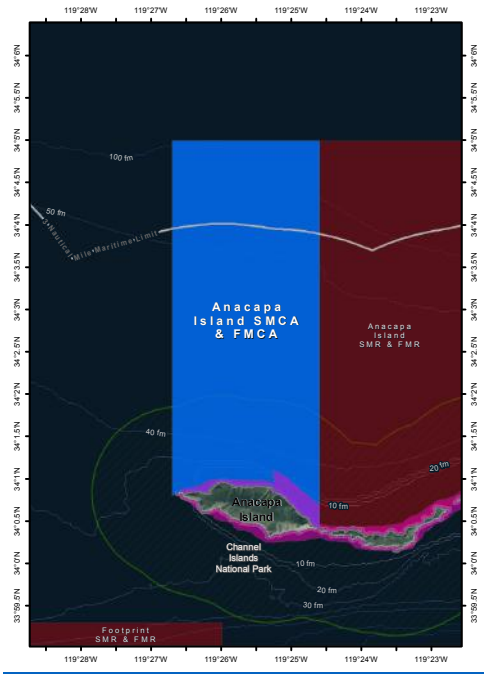
Anacapa Island State and Federal Marine Reserve



Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:
34° 00.411' N. lat. 119° 24.600' W. long.;
34° 04.998' N. lat. 119° 24.600' W. long.;
34° 04.998' N. lat. 119° 21.400' W. long.;
34° 01.000' N. lat. 119° 21.400' W. long.; and
34° 00.960' N. lat. 119° 21.463' W. long.

Scope/Choice Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.
- state reserve and federal reserve share identical regulations.

Anacapa Island State and Federal Marine Conservation Area

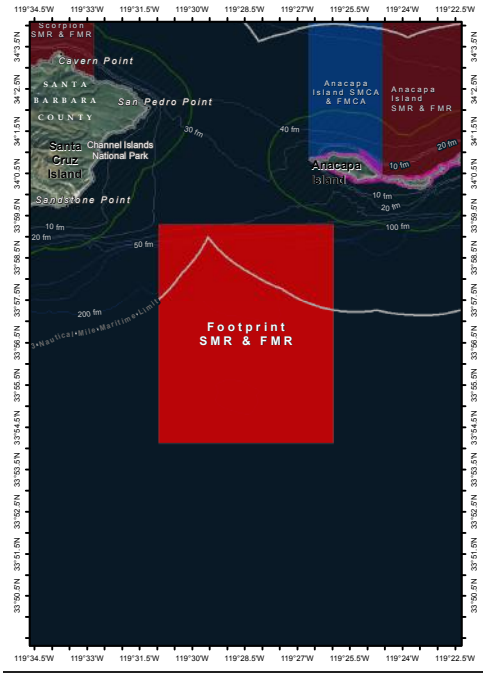


Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:
34° 00.828' N. lat. 119° 26.623' W. long.;
34° 00.800' N. lat. 119° 26.700' W. long.;
34° 04.998' N. lat. 119° 26.700' W. long.;
34° 04.998' N. lat. 119° 24.600' W. long.; and
34° 00.411' N. lat. 119° 24.600' W. long.

Scope/Choice Rule:

1. It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for commercial and/or recreational purposes, with the following specified exceptions:
   a. The recreational take of spiny lobster and pelagic finfish and the commercial take of spiny lobster is allowed.

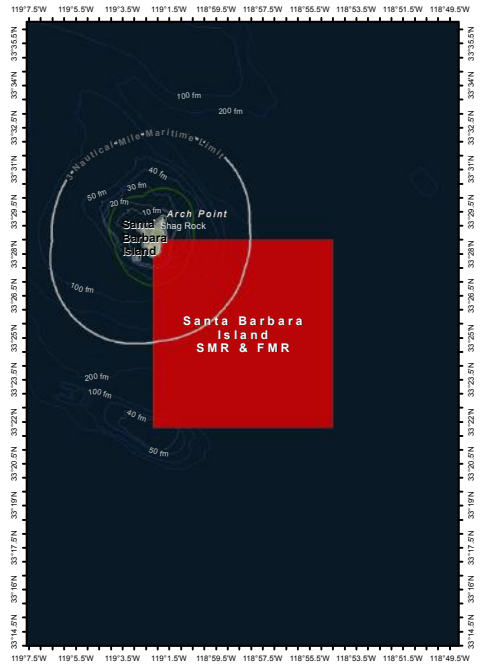
Footprint State and Federal Marine Reserve



Scope Rule: This area is bounded by the straight lines connecting the following points in the order listed:
33° 59.300' N. lat. 119° 30.965' W. long.;
33° 54.119' N. lat. 119° 30.965' W. long.;
33° 54.119' N. lat. 119° 25.987' W. long.;
33° 59.300' N. lat. 119° 25.987' W. long.; and
33° 59.300' N. lat. 119° 30.965' W. long.

Scope/Choice Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.
- state reserve and federal reserve share identical regulations.

Santa Barbara Island State and Federal Marine Reserve (Santa Barbara Island)



Scope Rule: This area is bounded by the mean high tide line and straight lines connecting the following points in the order listed:
33° 28.500' N. lat. 119° 01.813' W. long.;
33° 28.500' N. lat. 118° 54.527' W. long.;
33° 21.792' N. lat. 118° 54.527' W. long.;
33° 21.792' N. lat. 119° 02.200' W. long.; and
33° 27.911' N. lat. 119° 02.200' W. long.

Scope/Choice Rule: It is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource.
-state reserve and federal reserve share identical regulations

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APENDIX A (background on different MPA categories and terms from California Department of Fish and Wildlife)

The California Department of Fish and Wildlife defines the following terms and specific types of restricted marine areas as outlines in the Marine Life Protection Act (Fish and Game Code Section 2852) and the Marine Managed Areas Improvement Act (Public Resources Code 36602 and 36700) (Ca.gov 2018):

Adaptive Management [2852(a) FGC]

"Adaptive management," with regard to marine protected areas, means a management policy that seeks to improve management of biological resources, particularly in areas of scientific uncertainty, by viewing program actions as tools for learning. Actions shall be designed so that, even if they fail, they will provide useful information for future actions, and monitoring and evaluation shall be emphasized so that the interaction of different elements within marine systems may be better understood.

Marine Managed Area [36602(d) PRC]

"Marine Managed Area" (MMA) is a named, discrete geographic marine or estuarine area along the California coast designated by law or administrative action, and intended to protect, conserve, or otherwise manage a variety of resources and their uses. The resources and uses may include, but are not limited to, living marine resources and their habitats, scenic views, water quality, recreational values, and cultural or geological resources. General areas that are administratively established for recreational or commercial fishing restrictions, such as seasonal or geographic closures or size limits, are not included in this definition.

Marine Protected Area [2852(c) FGC]

"Marine protected area" (MPA) means a named, discrete geographic marine or estuarine area seaward of the high tide line or the mouth of a coastal river, including any area of intertidal or subtidal terrain, together with its overlying water and associated flora and fauna that has been designated by law, administrative action, or voter initiative to protect or conserve marine life and habitat. MPA classifications include marine life reserves (the equivalent of the state marine reserve classification), state marine parks, which allow recreational fishing and prohibit commercial extraction, and state marine conservation areas, which allow for specified commercial and recreational activities, including fishing for certain species but not others, fishing with certain practices but not others, and kelp harvesting, provided that these activities are consistent with the objectives of the area and the goals and guidelines of this chapter.

MPAs are primarily intended to protect or conserve marine life and habitat and are therefore a subset of marine managed areas (MMAs), which are broader groups of named, discrete geographic areas along the coast that protect, conserve, or otherwise manage a variety of resources and uses, including living marine resources, cultural and historical resources, and recreational opportunities. Marine managed area classifications include state water quality protection area, state marine cultural preservation area, and state marine recreational management area.

Marine Life Reserve [2852(d) FGC]

"Marine life reserve," for the purposes of this chapter, means a marine protected area in which all extractive activities, including the taking of marine species, and, at the discretion of the commission and within the authority of the commission, other activities that upset the natural ecological functions of the area, are prohibited. While, to the extent feasible, the area shall be open to the public for managed enjoyment and study, the area shall be maintained to the extent practicable in an undisturbed and unpolluted state.

Fish and Game Code Section 2860(b) further clarifies permissible activities in "marine life reserves": "Notwithstanding any other provision of this code, the taking of a marine species in a marine life reserve is prohibited for any purpose, including recreational and commercial fishing, except that the commission may authorize the taking of a marine species for scientific purposes, consistent with the purposes of this chapter, under a scientific collecting permit issued by the department."

Simplified Classification System

In January 2000 the Resources Agency released a report titled "Improving California's System of Marine Managed Areas". The culmination of an 18-month process involving 11 state agencies and substantial public input, the report contains recommendations for a simplified classification system for state marine managed areas (MMAs). Marine protected areas are a subset of MMAs; MPAs include state marine reserves, state marine parks, and state marine conservation areas. Some MMAs (state marine cultural preservation areas and state marine water quality areas) were not addressed as part of the MLPA process.

The following six classifications for designating managed areas in the marine and estuarine environments were established in Public Resources Code, Section 36700. These became effective January 1, 2002 and replace the 18 classifications which were previously used to categorize state MMAs. Where the term "marine" is used, it refers to both marine and estuarine environments.

State Marine Reserve

In a state marine reserve, it is unlawful to injure, damage, take, or possess any living geological, or cultural marine resource, except under a permit or specific authorization from the managing agency for research, restoration, or monitoring purposes. While, to the extent feasible, the area shall be open to the public for managed enjoyment and study, the area shall be maintained to the extent practicable in an undisturbed and unpolluted state. Access and use for activities including, but not limited to, walking, swimming, boating, and diving may be restricted to protect marine resources. Research, restoration, and monitoring may be permitted by the managing agency. Educational activities and other forms of no consumptive human use may be permitted by the designating entity or managing agency in a manner consistent with the protection of all marine resources. (PRC Section 36710(a))

State Marine Park

In a state marine park, it is unlawful to injure, damage, take, or possess any living or nonliving marine resource for commercial exploitation purposes. Any human use that would compromise protection of the species of interest, natural community or habitat, or geological, cultural, or recreational features, may be restricted by the designating entity or managing agency. All other uses are allowed, including scientific collection with a permit, research, monitoring, and public recreation, including recreational harvest, unless otherwise restricted. Public use, enjoyment, and education are encouraged, in a manner consistent with protecting resource values. (PRC Section 36710(b))

State Marine Conservation Area

In a state marine conservation area, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for commercial or recreational purposes, or a combination of commercial and recreational purposes, that the designating entity or managing agency determines would compromise protection of the species of interest, natural community, habitat, or geological features. The designating entity or managing agency may permit research, education, and recreational activities, and certain commercial and recreational harvest of marine resources. (PRC Section 36710(c))

State Marine Recreational Management Area

In a state marine recreational management area, it is unlawful to perform any activity that, as determined by the designating entity or managing agency, would compromise the recreational values for which the area may be designated. Recreational opportunities may be protected, enhanced, or restricted, while preserving basic resource values of the area. No other use is restricted. (PRC Section 36710(e)). The Fish and Game Commission may designate, delete, or modify state marine recreational management areas for hunting purposes. (PRC Section 36725(a))

Special Closure

A special closure is an area designated by the Fish and Game Commission that prohibits access or restricts boating activities in waters adjacent to sea bird rookeries or marine mammal haul-out sites.

Source: California Fish and Wildlife (2018)

APENDIX B (background on geological history of the from the National Park Service)

Geological History

The story of the rocks that make up the islands goes back well over 100 million years and is a history of the changes wrought by plate tectonics in southern California. Up to about 30 million years ago, the western edge of North America was a place where two large plates of the Earth's crust converged. As the oceanic Farallon plate approached the continental North American plate from the west, it descended into a deep trench and was destroyed by melting in the mantle (subduction). Landward of the trench, a marine basin was formed and for many millions of years the sediments that washed off the land into this basin collected and solidified to become some of the 'basement' rocks that we see on the islands today.

All of this changed about 30 million years ago when the Farallon plate ran out of material in southern California. The plate behind it - the Pacific plate - began to slide past the continent. Between 27 and 18 million years ago, the Pacific plate made contact with North America and continental pieces began to break off and join the Pacific plate, gradually establishing the modern San Andreas plate boundary where, in southern California, the two plates are sliding by each other, moving laterally in opposite directions along the San Andreas fault. Between 18 to 5 million years ago, compressive forces ceased, to be replaced by a slight extensional regime (transtension).

The orientation of the islands and their uplift in the last five million years are directly attributable to the plate tectonic forces caused by the Pacific plate's arrival at the edge of the North American continent.

The Islands as Part of the Transverse Ranges

Most of the mountain ranges of California trend north-south, but the Transverse Ranges, including the Santa Monica Mountains and their extension into the ocean, the northern Channel Islands, trend east-west. Geologists believe that, 20 million years ago, the platform on which the islands are located was oriented north-south along the coast, with San Miguel lying just offshore of San Diego. Forces resulting from relative movements of the Pacific and North American plates have caused the western Transverse Ranges to rotate clockwise to their present position. It is as if one sliver of the continent - the Transverse Ranges -got caught up in the shear between the plates. It rotated 'much like a floating plank that has one end snagged on the river bank, while the other end is dragged along by the current'. Evidence for this rotation is found, in part, by magnetism in the rocks of the islands. When the rocks of the northern Channel islands were formed, magnetic particles in the rocks would have been in line with the magnetic poles of the Earth. Measurements now taken in the rocks of the northern Channel Islands show that the magnetic particles differing by about 100 degrees from a polar orientation, with the oldest rocks showing the greatest variance. This suggests that the islands have rotated clockwise about 100 degrees since the formation of the rocks.

East of the rotating block, a gap opened, creating the space now partially occupied by the Los Angeles basin. The space was filled from below by igneous rocks and the uplift and unroofing of mid-crustal metamorphic rocks like the Catalina schist.

Submarine Volcanism

The rotation of the platform on which the islands are located caused the ocean crust to thin and the resulting reduction in pressure allowed molten rock to erupt under the sea. Between 19 and 15 million years ago, lava flows and volcanoes covered much of the area that now comprises the northern Channel Islands and the western Santa Monica Mountains. The thickness of the volcanic rock in some places is as much as 10,000 feet. In the Santa Monica Mountains, the name given to this vast volcanic sequence is the Conejo Volcanics. Contemporaneous flows found on the Channel Islands have slightly different chemical compositions and are often named for the islands on which they are found, such as the Santa Rosa Island Volcanics and the San Miguel Island Volcanics. Although they did not necessarily have the same magma source, there is little doubt that they were formed by the same mechanism of decompression during the rotation of the western Transverse Ranges block. The islands of Santa Barbara and Anacapa are composed almost entirely of volcanic rocks from this period of eruptions.

Pillow lava, a type of lava found in some of the rocks, is evidence that much of the volcanic action took place underwater. In other places, oyster shells and other marine fossils are found embedded in the lava. At times, the outpouring of the lava was so great that the volcanic piles reached above sea level and formed volcanic islands, some of which were 5000 feet high. Evidence for this is the presence of volcanic 'bombs', where pieces of lava were thrown into the air and twisted into shapes of footballs as they fell back to the surface. Volcanic bombs have been found in the Conejo Volcanics and in the Santa Rosa Island Volcanics. These islands were probably short lived and were eroded to below sea level after volcanic action ceased.

Sedimentary Rocks

Many of the rocks of the northern Channel Islands are sedimentary, made up of sediment washed out to sea from the mainland, reworked volcanic deposits, and shells and skeletons of marine organisms. Much is shale, deposited as mud, but there is also sandstone that formed by sand being swept out to sea from the mainland in huge submarine landslides.

Not all the sedimentary rocks were deposited below the surface of the ocean, however. As the last piece of the Farallon plate was subducted beneath the continent, the East Pacific Rise - an under-sea mountain range that separated the Farallon plate from the Pacific plate - came into contact with the North American plate. This probably led to an uplift of the area and the deposit of sediment in an alluvial plane, much like the present alluvial plain of the Santa Clara river in the Oxnard-Ventura area. The pink-colored rocks of the Sespe Formation were deposited about 30 million years ago in this uplifted area. Iron-rich minerals in terrestrial environments commonly are oxidized, giving them red, orange and yellow colors. This period of uplift was short lived, however, because the later sediments, which date between 25 and 5 million years ago, were deposited first in shallow marine environments, then in progressively deeper marine settings.

Analysis of some of the sedimentary rocks provide additional evidence that the islands have rotated 100 degrees clockwise from their original position adjacent to the coast. On San Miguel Island, rocks dating 50-30 million years ago contain well-rounded pieces of rhyolite that are chemically identical to the rhyolite found in similar age deposits in San Diego county. The inference is that these pieces of rhyolite reached the islands in a submarine fan deposit when the islands were positioned off the coast of San Diego. Analysis of the direction of the currents flowing at that time shows that they came from a southerly direction. However, the only possible source of these sediments is from the mainland, which lies to the east of the islands, giving geologists one more reason to believe that the islands have rotated 90-100 degrees in the last 20 million years.

Uplift of the Islands--Folding and Faulting

The last of the marine rocks are only about five million years old, so we know that the islands must have started to rise after that time. The northern Channel Islands, together with the Santa Monica Mountains and the Coast Range, rose because of compressional forces connected with an event in the geologic history of the area that took place five million years ago. At that time, the Pacific plate captured Baja California and began transporting it northwestward, ramming its northern end into southern California. Transtension ceased, and the resulting compression caused folding and faulting of the rocks and the uplift of the islands. There are large faults running through the centers of Santa Cruz and Santa Rosa Islands. These major faults are marked by valleys, owing to rocks in the fault zone being crushed and eroding more easily. Lateral and vertical movement along these faults have made the surface features of the north and south parts of those islands appear to be quite dissimilar. These compressional forces are still on-going and make this area of California an active earthquake area. In 1812, a large earthquake, centered in the Santa Barbara Channel, caused landslides on the islands and is often cited as the reason that the last of the Chumash Indians were persuaded to leave the islands and relocate at the mission in Santa Barbara. The 1925 Santa Barbara; 1971 Sylmar; and the 1994 Northridge earthquakes are all related to these compressive stresses.

One Large Island During the Ice Ages; Mammal Fossils and Marine Terraces

Even in comparatively recent times, the islands have not always looked as they do today. During the last Ice Age, which lasted until about ten thousand years ago, sea level was about 400 feet lower than it is today. The four northern islands that are now separated by water were once connected into one large island, which geologists have named 'Santa Rosae', the nearest point at that time being about five miles from the mainland. Large Columbian mammoths swam to Santa Rosae island and soon, because of isolation and dwindling food supplies, became much smaller. Evidence of these animals has been found as fossils of pygmy mammoths on the islands of Santa Cruz, Santa Rosa, and San Miguel.

Because of the continuing uplift of the islands during the last million years and the fluctuating sea level caused by glacial advances and retreats, there is evidence on the islands of ancient shorelines at different elevations. The rise in sea level over the last 10,000 years has caused many of the ancient shorelines to be lost below sea level, but others remain. These ancient shorelines form flat areas of land, called marine terraces. Marine terraces are found at many

different elevations, from 20 feet above sea level to as much as 1000 feet above, giving graphic evidence of how the islands have changed in their configuration over time.

Erosion

Weathering and erosion are natural geologic processes that gradually change the look of the landscape, as rocks are broken up into smaller particles that are carried away by rivers and wind to be deposited elsewhere as sand and gravel. Erosion is slow in areas covered by vegetation and rapid where ground cover is depleted. There were two periods when erosion on the islands was greatly increased. During one of these periods, 15,000 to 10,000 years ago, there was extensive stripping of vegetation by mammoths. One possible reason for mammoth extinction may be this denuding of vegetation. Much more recent is the extensive erosion caused by sheep, cattle, and other feral animals which were introduced on most of the islands over one hundred years ago. During times of food shortage, probably caused by years of drought, sheep ate not only all accessible vegetation, but they also ate the roots. During these periods of denudation, both ancient and modern, the land stripped of its cover eroded very quickly, forming steep canyons through the hillsides and increased deposition of sand on the beaches. Fierce winds, common on the northern islands, blow the beach sand over the island -- and the beaches were more extensive during the Ice Age - resulting in vast areas of the islands being covered by sand. In recent times, the erosion caused by sheep on San Miguel island transformed the island into little more than one huge sand dune.

The good news is that the islands have recovered their vegetation where the animals have been removed. On San Miguel Island, which has been sheep free for over forty years, vegetation has spread from the steep canyons, where it was able to survive during the grazing years, and has now recovered nearly the entire island, restoring the island's natural beauty. More recently, sheep and pigs have been removed from Santa Cruz Island, so we can look forward to a similar reversal of the extensive erosion that is currently in evidence on hillsides there.

Caliche

Visitors to San Miguel Island have the opportunity to view the caliche 'forest', where the root system of vegetation that grew on the island several hundred years ago has been turned into caliche casts and caliche root sheaths

Caliche Casts: Caliche is calcium-carbonate cemented soil that is formed in semi-arid climates. Calcium carbonate is derived by the dissolution of shells and shell fragments that have blown across the island from the beaches, especially during the Ice Age when the sea level was much lower and the beaches were more extensive. Rain is a weak acid, formed by reactions between water vapor and carbon dioxide in the atmosphere, and it is this acid that dissolves the shell fragments. San Miguel has a semi-arid climate; so when it rains, the volume of water is too small to carry dissolved materials away from the area, and they remain in the topsoil. This groundwater dissolves the calcium carbonate from shells in the surface layer and re-precipitates it a little lower in the surface profile, where it will act as a cement, binding the soil material into a hard substance that is called 'caliche', or 'calcrete', or 'hardpan'.

On San Miguel Island, the deep root system of trees that grew several hundreds of years ago decomposed, and the molds of the roots filled with the abundant sand that makes up much of the topsoil of the island. The calcium carbonate preferentially cemented the sand-filled molds, possibly because they were more porous and provided an easy pathway for the groundwater.

Caliche Root Sheats: Another form of caliche is where living vegetation, generally a root in the soil, gets a 'sheath' of caliche. The living roots may exude a weak acid, or draw soil moisture towards them by capillary action. In either case, a solution of calcium carbonate from the soil is concentrated around the roots which, when precipitated later, forms a sheath of caliche. When the root dies and rots, the sheath will remain, either as a hollow form, or may be filled with sand, which may become a caliche cast, by the method described above. Many such examples of both hollow forms and filled sheaths can be found on San Miguel Island.

The caliche 'forest' of San Miguel Island was created when strong winds blew away the uncemented sandy soil surrounding the caliche casts and the root sheaths. The visitor to San Miguel Island is treated to this rare glimpse of a landscape turned inside out -- the roots and lower trunks of these ancient plants now stand as 'forests'.

Chert

The mineral chert is an extremely hard material that is found in many places on the islands. Whereas caliche is derived from calcium carbonate in shells, chert forms from very small sea plants, called diatoms, which are made from opaline silica, silicon dioxide. The process by which chert was formed probably took place in the mud at the bottom of the ocean which contained very large numbers of siliceous diatoms and small amounts of calcium carbonate shells and fish bones. Water dissolved some of the silica, which later precipitated out in the form that is called chert. Eventually the mud solidified to form a shale rich in diatoms, with nodules of very hard chert in places. Chert fractures like glass and was used by the Chumash Indians for arrowheads and scraping and cutting tools. Chert on the islands has a light brown color, owing to small amounts of iron impurities. Impurities in chert give it a variety of colors. The black variety is called flint and is colored by inclusions of organic matter. Jasper is the name given to the red-colored variety and is colored by inclusions of an iron oxide mineral, hematite.

The Geologic Future of the Islands

The current compressional regime in our area is expected to last until the San Andreas Fault straightens out from its present bent shape, which might take a few million years. During that time, the islands will continue to rise as uplift continues to be greater than erosion. Earthquakes will continue to be felt, both on the islands and on the mainland. When compression ends, erosion will be the main force, and the islands will gradually erode into the ocean.

Sea level will rise and fall as ice ages come and go. At some times the islands will again be one, as they were during the last ice age. New marine terraces will be cut into the islands.

Acknowledgements and Further Reading:

The information above was written by volunteer George Roberts. Much of what was written here was taken from articles by Tana M. Atwater; John J. Woolley; Thomas W. Dibblee Jr., and Helmut E. Ehrenspeck in Weigand P. W., editor, 1998, Contributions to the Geology of the Channel Islands, Southern California, Pacific Section American Association of Petroleum Geologists, Miscellaneous Publication 45, 196 p.

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https://www.nps.gov/chis/learn/nature/geologicformations.htm Retrieved November 29th, 2018