

# Alolkooy

**Treasures of the Islands**



**The  
Publication  
of the  
Channel  
Islands  
National  
Marine  
Sanctuary**

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## *Inside*

*Conservation  
and Islands*

*Species Development  
on the Channel Islands*

*Island Journeys:  
Anacapa, Santa Rosa,  
Santa Cruz, Santa  
Barbara, San Miguel,  
Santa Catalina*

## **Research**

*GIS Management Tools*

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Direct correspondence, submissions, and address changes to Editor, Alolkoy, CINMS, 113 Harbor Way, Santa Barbara, CA 93109, 805/966-7107.

Editor: Cynthia Anderson  
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SANTA BARBARA MUSEUM  
OF NATURAL HISTORY

CHANNEL ISLANDS



NATIONAL MARINE  
SANCTUARY

## From the Bridge

# A Legacy of Preservation

By Ed Cassano, Sanctuary Manager

Emerging from the haze in the early morning or bathed in the light of a full moon, the Channel Islands intrigue, mystify, and beckon the human tide washed upon the mainland shores. In 1971, the State of California established ecological reserves around the four northern Channel Islands. In 1987, the Nature Conservancy assumed ownership of 90% of Santa Cruz Island. In March 1980 the Channel Islands National Park was designated, ensuring protection for Santa Barbara, Anacapa, East Santa Cruz, Santa Rosa, and San Miguel islands. In September 1980, the Channel Islands National Marine Sanctuary came into being.

Together, these efforts have resulted in the protection of five of the eight Channel Islands from their mountaintops to the depths of the marine basins surrounding them. The overlapping jurisdiction of the CINP, State of California, and CINMS within one nautical mile of the islands greatly enhances the overall preservation of these national treasures.

At the heart of the Channel Islands National Marine Sanctuary lie the island ecosystems that are so inextricably linked to the marine environment. To get a sense of these islands, our staff and the staff of the Sea Center visited them first-hand to experience their rich diversity and rugged beauty. The articles in this issue convey experiences that capture the imagination, and we hope many others will be inspired to explore the environment that is forever preserved around these islands.

## Editor's Watch

# Island Journeys

By Cynthia Anderson, Alolkoy editor

Islands are vitally important storehouses of the world's biodiversity. In this issue of *Alolkoy*, renowned biologist Dr. Daniel Simberloff, who specializes in the study of introduced species and islands, contributes his insights on islands and species conservation issues around the globe. Closer to home, Dr. Lyndal Laughrin takes a look at the factors that determine species development on the Channel Islands. On our research page, Dr. Leal A. K. Mertes of UCSB explains the exciting new Channel Islands Geographic Information System (CIGIS).

The remainder of this issue focuses on recent visits to the Channel Islands by staff members of the Channel Islands National Marine Sanctuary and the Sea Center. Our neighbor to the south, Santa Catalina Island, is also featured here. Kids are encouraged to check out our Pod Press page on Santa Cruz Island.

An important note: before visiting the Channel Islands, it is essential to obtain the proper permits and permissions. For information, call the Channel Islands National Park at (805) 658-5700. For a schedule of boat trips, call Island Packers at (805) 642-1393.

Cover: View from  
Inspiration Point,  
Anacapa Island.  
Photo ©1997,  
Laura Gorodezky.

# Conservation and Islands

by Dr. Daniel Simberloff

Earth's half million islands comprise only 5% of the land, but these bits of land contain a disproportionate fraction of biodiversity. For example, almost 20% of bird species are insular, and over 25% of land snails. Islands are renowned for their strange creatures: giants such as the Komodo dragon and the elephant birds of Madagascar; dwarfs such as the extinct mammoths of the Channel Islands and the Cuban bee hummingbird; wingless birds and insects; and herbs that have evolved into shrubs and trees, like the woody lettuces of the Juan Fernandez Islands, the Canary Islands, and San Clemente Island.

The diversity and oddity of island species have inspired evolutionists, ecologists, biogeographers, geologists, and now conservation biologists. Charles Darwin, studying birds and reptiles in the Galapagos Archipelago, and Alfred Russel Wallace, observing animals in the Malay Archipelago, developed the concept of evolution by natural selection. A century later, variation between island populations helped Ernst Mayr understand how two species can arise from one.

Ecologists have exploited the isolation and simplicity of island communities to understand how nature works. In a study of the biota of Isle Royale, in Lake Superior, an added predator (wolves) sta-

bilized the interaction between herbivores (moose) and plants. Likewise, the removal of foxes and martens from one island (Bergon) in the Baltic Sea but not from a similar one (Rånön) demonstrated their impact on grouse populations. The fact that grazers can lower the diversity of species they feed on was first demonstrated on Ynys Seriol, a Welsh island. When a viral disease devastated rabbit populations there, the number of plant species rose from 61 to 102.

Island communities have also been testing grounds for ecological management schemes. For example, the release of irradiated sterile male screwworm flies to control this cattle pest by preventing females from fertile mating was tested on Florida's Sanibel Island, then Curaçao in the West Indies. Virginia's Parramore Island was used to test for ecological side effects of an experimental rabies vaccine for raccoons.

The relationships of island species constitute crucial evidence for biogeographers and geologists in their quest to understand continental drift and species dispersal. The presence of southern beeches, whose seeds are not easily dispersed, in eastern Australia, Tasmania, New Guinea, New Britain, New Caledonia, New Zealand, and southern South America shows the former connections among the southern landmasses, as well as the movements of continental plates and islands. Nearby island biotas indicate dramatic sea level changes and suggest that separated landmasses had formerly been united.

In the 1800s Wallace recognized that a "line" passing through narrow straits, like those between Bali and Lombok or Borneo and



Dr. Daniel Simberloff.

the Celebes, separates two distinct realms of animals—though the islands are within sight of each other. This line defines the eastern limit of almost all large mammals, as well as many birds and fishes; all islands west of the line were connected to Asia when sea levels were lower. Wallace's insight defined the two great classes of islands: continental islands, on continental shelves and connected to continents in recent geological history; and oceanic islands, not on shelves and not recently connected to continents.

More recently, islands have inspired conservation biologists because island species comprise so much threatened biodiversity. About 23% of island birds are threatened, but only 11% of birds worldwide; 33% of the world's threatened plants are island endemics, though only 16% of all plant species are found on islands. Many famous extinctions by humans have occurred on islands: the dodo of Mauritius, the wolf of Tasmania, the great auk of the North Atlantic, the moa of New Zealand.

The prevailing view about island species is that they inevitably lose in competition with mainland species, which are introduced to islands at an ever-increasing rate. Island species have been called "evolutionary backwaters and dead ends,"

*Continued on page 4*



Tidepools are just one example of the rich species diversity characteristic of island ecosystems.

©Ralph Clevenger/National Park Service

# Conservation

Continued from page 3

“museum pieces,” “inefficient, unafraid, and obsolescent.” It is easy to see why people believe island species are misfits. Mammals (including humans) and reptiles never colonized distant islands, so island species did not evolve to deal with threats later posed by them. Birds and insects became flightless. Some island birds evolved to be giants, nesting on the ground in the absence of predators. Many plants lost their ancestors’ prickles and thorns. In the absence of pathogens, island species possessed little genetic resistance to diseases from the large continents.

Small wonder that island species suffered a wave of extinctions as humans arrived with their animals and plants. The fat, slow, fearless dodo was hunted to extinction by the Dutch in just 30 years. The introduced brown tree snake extirpated almost all forest birds on Guam in three decades. Rats, cats, dogs, pigs, sheep, goats, mice, and other fellow-travelers of humans extinguished plant and animal species primarily by eating them or ruining their habitats, but also by competing for resources. Introduced plants played their part, often overgrowing or otherwise outcompeting the natives.

Many island species succumbed to diseases brought by resistant invaders.



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**The kelp forests surrounding the Channel Islands support abundant marine life.**

Major factors in the endangerment and extinction of over half of Hawaii’s rich bird fauna are avian pox and malaria, imported with Asian songbirds and vectored by mosquitoes. Even genes of mainland species seem stronger than those of island species! For example, mallards from North America are causing a genetic extinction of the native Hawaiian duck and the grey duck of New Zealand by mating with them; more and more hybrids appear increasingly mallard-like.

However, evolutionary principles combined with simple observations cause skepticism that island species are always weaklings. The Sri Lankan water plant, hydrilla, outcompetes native plants in Florida, California, and Virginia; and many continental areas, like south Florida, are as devastated by introduced species as islands. An epidemic of Asian rinderpest killed African ruminants and through them enormous ecosystems, much as diseases have devastated islands. Many more species are introduced from continents to islands than vice-versa, so there are more chances for continental species to harm island ones. Finally, if natural selection adapts species to their local environment, it is odd that so many island species turn out to be less adapted than invading species.

Nevertheless, the fact that entire groups of animals, like mammalian predators and large grazers, are missing from most islands places endemic species at risk when such animals are introduced. To understand why island species and communities seem so fragile, it is necessary to examine the species and communities that are especially imperiled, which is exactly what conservation biologists do.

Through the 1980s, conservation biology was guided by the dynamic equilibrium theory of island biogeography, which states that island species continually become extinct and other species arrive to take their place. The two forces balance so that the number of species stays the same. Although this theory is

now viewed as too simplistic, it nevertheless focused attention on causes and rates of extinction of island populations.

At the heart of modern conservation biology is research on the genetic and ecological factors that make populations particularly prone to extinction, as well as causes of documented extinctions—especially recent extinctions of island populations. For example, studies of fire, introduced grazers, and plants on Santa Cruz Island’s Nature Conservancy Preserve suggest methods for dealing with



©1981, Drosz/National Park

**The island night lizard is an example of an endemic species on Santa Barbara Island.**

similar problems on other islands and the mainland. Detailed studies of Santa Cruz island fox and island spotted skunk guide conservation efforts for isolated populations of small carnivores elsewhere. Studies on the effects of feral pigs, goats, and sheep in the Channel Islands provide technology useful in many other areas, like the Great Smoky Mountains National Park and the Hawaiian archipelago.

The signal role that islands have played in science is continued by the relationship between islands and conservation. The very aspects of island species and communities that make them so unique put them at high risk of extinction, while at the same time creating ideal models for conservation research. This research, in turn, aids conservation efforts all over the world.

*Dr. Daniel Simberloff specializes in the study of both introduced species and islands. He has been on the faculty of Florida State University for many years and, beginning July 1, will be the Nancy Gore Hunger Professor of Environmental Science at the University of Tennessee in Knoxville.*

# Species Development on the Channel Islands

by Dr. Lyndal Laughrin

As a group, California's Channel Islands are an example of a continental shelf or "fringing archipelago." As such, one finds many similarities between them and the adjacent mainland, as well as distinctive features not found elsewhere.

The eight islands are often subdivided into two groups: the northern Channel Islands, Anacapa, Santa Cruz, Santa Rosa, and San Miguel, a string of four that lie near the Santa Barbara/Ventura coastline; and the southern Channel Islands, Santa Barbara, San Nicolas, Santa Catalina, and San Clemente, four widely spaced islands farther south and east.

The degree of isolation, size, geographic position relative to the Channel's ocean and wind currents, terrestrial topography, surrounding submarine topography, geological diversity, microclimatic diversity, and human use patterns vary significantly among these islands. These factors all contribute to the assemblages of plants and animals found on the islands. Furthermore, these are dynamic systems, and present conditions and organisms differ significantly from those of the past.



*The end of Scorpion Trail, looking west toward the Nature Conservancy Preserve, Santa Cruz Island. The foreground shows the devastation caused by grazing and feral animals.*

©1982, B. Craig/National Park Service

Of the factors that determine which species arrive at the Channel Islands, foremost is the islands' relative isolation. Each island's degree of isolation is affected by three factors: the distance from one island to other islands or the mainland; the location of an island relative to prevailing ocean and wind currents; and the dispersal abilities of individual species. The northern islands are likely to receive

drifting organisms from the north via the California Current, while currents coming up from Baja influence the southern islands. Species that can fly, float in the air or on the water, and tolerate high levels of salinity have the greatest likelihood of crossing the Channel's waters. For example, more bat species are found on most of the islands than other terrestrial mammals.

Within the Channel Islands group there is a distance gradient

for degree of isolation. Water spaces that must be crossed today range from 11 miles between the mainland and Anacapa to 61 miles between the mainland and San Nicolas. Distances between islands range from just three miles between San Miguel and Santa Rosa to 24 miles between Santa Barbara and Santa Catalina. These distances were quite different in the past. Around 18,000 years ago, lowered Pleistocene sea levels exposed the northern Channel Islands as one large island mass, "Santarosae." Distances to the mainland were only three to five miles—a much easier crossing for many organisms, including the pygmy mammoths.

The size gradient within the Channel Islands is considerable, ranging from one square mile for Santa Barbara to 96 square miles for Santa Cruz. Gradients also occur for geological, topographical, and microclimatic diversity. Usually the larger islands like Santa Cruz and Santa Catalina have the greatest species diversity, and the smaller islands like Anacapa and Santa Barbara have the least. Santa Cruz is at the high end of the species diversity gradient for most groups of well-

*Continued on page 6*



*Pygmy mammoth excavation on Santa Rosa Island, 1994.*

©1994, Faulkner/National Park Service

# Development

Continued from page 5

studied organisms. For example, Santa Cruz has the most native flowering plants (480 species), highest number of breeding birds (53 species), and greatest number of butterflies and moths (543 species).

If one considers endemic species, the larger Channel Islands often have the greatest number of forms but not necessarily the highest overall percentage of endemics. Endemism among vascular plants varies from 6% to 13%, with the more isolated islands of Santa Barbara and San Clemente showing the highest percentage of endemics. Some endemic organisms are examples of evolved insular “dwarfism and gigantism,” including the extinct pygmy mammoth, the present-day island fox (a dwarf form of the mainland gray fox), the island scrub jay (a larger-bodied relative of the mainland jay), and the larger island subspecies of the white-footed deer mouse. Local insular evolution also produced a wingless grasshopper species on Santa Cruz and a flightless goose (known only from fossils) on San Miguel.

Much of our knowledge of island species comes from research conducted at field stations. Research station facilities are operated by Resource Management Divisions of the U. S. Navy on San Clemente and San Nicolas, by the Catalina Conservancy and University of Southern California on Santa Catalina, and by the University of California Santa Barbara’s Santa Cruz Island Reserve on Santa Cruz. In addition, the staffs of three island-owning and administering organizations do work directly related to managing island resources: Channel Islands National Marine Sanctuary, Channel Islands National Park, and The Nature Conservancy. Other mainland-based institutions like the Santa Barbara Botanic Garden and Santa Barbara Museum of Natural History maintain programs related to island resource management.

Biodiversity within the Channel Islands is changing, and not necessarily for

the better. There have been a few extinctions of species, as well as decreases in abundance of native species, including endemics. One of the major concerns is the number of introduced non-native, exotic, or alien species and their impact on native species and ecosystems. Increasingly, researchers, students, classes, and resource managers are investigating native and non-native species interactions. Eradication efforts have targeted problem species and those in the first stages of colonization. Methods used for control include physical removal, biocontrol, fire, herbicides, and pesticides.

Since the mid-18th century, all of the Channel Islands have had varying degrees of livestock introductions and grazing



©1987, Nielsen/National Park Service

**The island fox, a dwarf form of the mainland gray fox, is endemic to the Channel Islands.**

pressures, resulting in an abundance of Mediterranean annual grasses. These introductions, whether for economic, esthetic, recreational, or accidental reasons, have consequences for native species and habitats. Recent introductions have included earwigs and Argentine ants. Humans and their associated activities are unquestionably the easiest means introduced species have for crossing the natural isolation barriers to the islands.

Another way to look at the human factor is to consider the evolution of human activities on the islands. The earliest humans to arrive on the Channel Islands (at least 10,000 years ago) may have had a smaller water gap to cross. Later, the Chumash constructed seagoing vessels called tomols and traveled regularly between the mainland and the islands,

establishing sizable villages on the larger islands. Human influence upon species distribution began with their travels. For example, it is now thought that the island fox populations of the three southern Channel Islands were derived from foxes brought by Native Americans from the northern Channel Islands.

Native American populations on the islands gradually declined, and those remaining were removed to the mainland in the early 1800s. Almost all of the islands then underwent a period of relative isolation. But soon, human activities throughout the Channel Islands increased as livestock ranches, the city of Avalon, and military bases were established. This development resulted in purposeful or accidental opportunities for colonization by new species, as well as opportunities for genetic exchange among closely related forms.

Today, we have a consolidation of island ownership, greater awareness of resources (and their associated management concerns), and greater mandated and self-imposed conservation efforts.

Simultaneously, there is greater opportunity for public visitation, and the islands’ fragile ecosystems continue to be at risk.

When you look across the Channel to the islands, hopefully these facts will help as you ponder the often-asked questions: What is out there? How did it get there? What is not there? Keep in mind that the concept and process of isolation must be conserved as well as the organisms themselves. As visitation to the islands increases, we must be careful which species we introduce, either intentionally or unintentionally.

*Dr. Lyndal Laughrin, director of UC Santa Barbara’s Santa Cruz Island Reserve, has been a researcher and resident of Santa Cruz Island for 30 years. His research interests include the natural history of the island fox, and fire and disturbance ecology on the Channel Islands.*

# Overnight at Anacapa Island

by Gary Robinson

The three islands of Anacapa—East, Middle, and West Anacapa—rise abruptly from the sea. From the air they look like the withered skeletal spine of a giant sea creature. Steep, eroded cliffs, rocky spires, and wash rocks in small pocket coves, as well as caves and arches both above and below water, are monuments to the ceaseless action of the waves.

East Anacapa Island sports the only true lighthouse of the Channel Islands, as well as the Landing Cove, visitor center, ranger residences, and other support facilities maintained by the staff of the Channel Islands National Park. That the only real lighthouse is on this island seems appropriate. Anacapa is the closest island to the mainland, only 11 miles away, serving both as gateway to the Santa Barbara Channel for passing ships and as the primary introduction to the Channel Islands for approximately 20,000 visitors yearly.

My latest visit to East Anacapa Island came in late May, courtesy of the National Park Service. Anacapa's sheer cliffs and surging tideline greeted me with an invitation to scale over 150 steps to its mesa-like top. So with backpack, I scampered up 8 ladder rungs to the landing deck, then plodded up 18 concrete steps to 50 resonant iron steps pinned to the cliff. From there without embarrassment I loudly puffed up a series of 85 concrete steps to the top of the island.

Since this was the beginning of the western gull breeding season, I fully expected to be attacked by mobs of nesting gulls once I made it to the top. Visitors frequently hear that Alfred Hitchcock filmed some of the scenes in *The Birds* at Anacapa Island. Since I obviously survived to write this article, I learned that this year, the western gulls are not enjoying tremendous breeding success—in fact, the numbers of nesting gulls are less than half that of the previous year.

Nowhere on the island does the vegetation stand more than three or four feet tall. The island coreopsis is long past its explosive display of yellow flowers and lush greenery. Instead, they stand like an army of intriguing, grotesque



© 1997, Gary Robinson

**Anacapa Island is a major breeding site for western gulls.**

figures with withered hair, frozen in place by the stiff sea breeze that buffets the island. In contrast, a view from the cliffs into Cathedral Cove on the north side of the island reveals

extensive growths of giant kelp and other seaweed clinging to the rocks, just waiting to be explored.

Park Ranger Tom Dore, who serves as an interpreter for Anacapa Island visitors, guided me to Cathedral Cove by kayak. I was introduced to the challenge of negotiating the wind tunnel of an arch through a promontory. My unfamiliarity with kayaking had me stuck in this ocean washing machine for some time.

We tied our kayaks to the kelp and snorkeled in the shallows of Cathedral Cove. In the diffuse light we found ourselves among 20-30 leopard sharks milling about the shallows. Bat rays were here, too. Apparently, these animals congregate here regularly; the waters nearshore to the northside of East Anacapa Island are a state ecological reserve and are completely protected from fishing.

During my overnight stay on the island, I was able to snorkel, kayak, photograph, and walk the trails three times, each time seeing the island and the surrounding ocean in a different light—a reminder of why the Chumash name for Anacapa was *Eneepah*, meaning “ever-changing.”

*Gary Robinson is the manager of the Sea Center on Stearns Wharf in Santa Barbara, a joint project of the Santa Barbara Museum of Natural History and the Channel Islands National Marine Sanctuary.*



© 1976, Channel Islands National Marine Sanctuary

**Over 150 steps lead from Landing Cove to the top of East Anacapa Island.**

## Anacapa Island Facts

**Area:** 1.1 square miles

**Highest point:** Summit Peak, 930 feet (West Anacapa)

**Geographic features:** 135 sea caves (including Cathedral Cave), Arch Rock, Keyhole Rock, Inspiration Point

**Boat travel time from mainland:** 1 to 1-1/4 hours

**Endemic plants:** 17 Channel Islands endemics

**Endemic animals:** Deer mouse

**Nesting birds:** California brown pelican, western gull, Xantus' murrelet, double-crested cormorant, pelagic cormorant, pigeon guillemot

# East Santa Cruz Island

by Mike Donnellan and Kari Boylan

February 10, 1997— With first light came the dawn of a new era in the history of Santa Cruz Island. The National Park Service assumed full ownership of the eastern 10% of the island, affording the area the highest level of protection in the federal lands system. The land transfer did not come without legal and political conflict. Due to the recent arrests of three individuals for a variety of resource disturbance charges and difficulties in acquiring private land into the park, Santa Cruz Island has made the headlines for months.

When viewed from the mainland, Santa Cruz Island seems too serene to be a hotbed of controversy. However, as one draws closer for inspection, as we did on a recent weekend in May, it became apparent that the island has its own story to tell: a story of ecological disruption and imbalance.

As we approached on the Island Packer's vessel *Vanguard*, we were struck by the rugged, mountainous topography, the denuded vegetation, and the sheer 300-foot volcanic cliffs rising starkly from the turbulent sea below. Upon landing, an easy quarter-mile hike past historic adobes and abandoned machinery led us to the eucalyptus-shaded campground that would be our base camp.

After hanging our food to discourage opportunistic feral pigs, we set out on foot across the landscape. With no particular destination in mind, we wandered through oak and ironwood groves and a maze of winding, narrow canyons. The near-vertical canyon walls were particularly striking in that they, like the steep coastal bluffs, harbored relatively intact communities of native vegetation. It is virtually only in these "refuges," inaccessible to the ever-hungry sheep, that rare and endemic plants like the island monkey flower and the candleholder dudleya can thrive.

A tricky scramble up crumbling slopes spit us out on top of Peak Mountain. At 1,808 feet, the highest point on



*A navanax searches for food among the rocks.*

© 1991, Dan Richards/National Park Service

Santa Cruz's east end commands spectacular 360-degree vistas of Anacapa Island, the west side of Santa Cruz, and the mainland ranges. After soaking up the scenery, a two-hour ankle-busting traverse over Martian-like volcanic terrain (devoid of soil and vegetation) and vast fields of non-native grasslands found us back at Scorpion Camp for the night.

Next morning, we woke to the incessant warbling of house finches gearing up for a day's feeding in fields of introduced milk thistle. We then donned SCUBA gear to explore the underwater side of Santa Cruz. Geographically situated so it's bathed in both the cold California Current and the warmer California Countercurrent, the island supports a particularly rich diversity of marine life. This was evident as soon as we kicked out to a nearby kelp bed and dropped below the surface. Massive spawning bat rays were abundant in the shallows, as were the large depressions they left behind littered with crushed turban and topsnail shells.

In contrast to the subtle hues of the island's terrestrial realm (with the notable exception of the Santa Cruz Island jay) the rocky reef was alive with vibrant color. Red, green, and brown macroalgae swayed in the surge. Volkswagen-sized boulders covered with innumerable invertebrates, red and cobalt sponges, and coral-like gorgonians provided food and habitat for reef denizens like bluebanded gobies and garibaldi. Hordes of basketball-sized sea hares spewed spaghetti-like egg chains onto the ocean floor, while delicate Spanish shawls danced in the current and a voracious navanax patrolled the rocks in search of food. Unfortunately, large game fish and delicacies such as scallops, lobster, and abalone were scarce, yet underwater sightseers will surely not be disappointed by the abundant life teeming in these waters.

Though introduced herbivores and plants continue their assault on Santa Cruz's terrestrial flora and fauna, the process of recovery will soon begin when the Park Service initiates removal of the remaining 3,000 sheep. We intend to visit frequently in the years ahead to watch the island's healing process firsthand, and we encourage you to do the same.

*Mike Donnellan is a graduate student formerly employed by the Channel Islands National Park. Kari Boylan, also a graduate student, was most recently administrative assistant at the CINMS office.*



*Kari Boylan climbs the sheep trails to the top of Peak Mountain.*

© 1997, Mike Donnellan



# West Santa Cruz Island

by Robin Rene Roe

The unmistakable smell of pine drifts on a breeze damp with salt spray. The elevation affords sweeping views of woodlands and grasses, mountains and canyons, cliffs and ocean. A remarkably large and brilliant jay erupts in familiar squawks from a nearby oak. Not an exceptional jay, but an average member of a species which has claimed and customized a niche here and *nowhere else on earth*.

In 10 years as a naturalist for The Nature Conservancy's Santa Cruz Island Preserve, I have never tired of sharing this and many more once-in-a-lifetime experiences with hundreds of visitors, young and old. My personal connection to the island and unwavering support of The Nature Conservancy fuel my enthusiasm every morning I step on the boat. And you can't beat the commute! I share the oceanic road with sea lions, common dolphins, Risso's dolphins, Dall's porpoises, gray whales, humpbacks, and blue whales.

Cruising along Santa Cruz Island's north shore, it's easy to appreciate the diverse geology and terrain. Monterey shale dominates the area known as Chinese Harbor. Softer and more easily eroded than the surrounding volcanic deposits, the shale has produced the narrow isthmus, or "neck," of the island. Volcanic rocks created by underwater eruptions 20 million years ago comprise the remainder of Santa Cruz's north side. The resulting coastline from Prisoners' Harbor westward is steep, sprinkled with wave-carved arches and sea caves. The most famous of these is Painted Cave, which extends a quarter mile inside the island.

Prisoners' Harbor, the site of an unsuccessful deposit of Mexican convicts in 1831, lies at the mouth of Canada del Puerto. Dividing the North Ridge in two, this large canyon

follows one of many perennial streams three miles into the Central Valley. Since the early ranching days in the mid-1800s, Prisoners' Harbor and its pier have served as the front door to the island's commercial activities. At the opposite end of the canyon corridor is the historic Main Ranch. Built in the late 1800s as home and headquarters of sheep ranching entrepreneur Justinian Caire, it later served Edwin Stanton and his son Carey in their cattle business.

In 1978, The Nature Conservancy and Carey Stanton sealed a deal that would protect western Santa Cruz Island in perpetuity. The Conservancy purchased 12,000 acres on the island's north shore outright, received a conservation easement for the rest of Stanton's land, and began preservation work. Carey Stanton continued his ranching business

on Santa Cruz Island until his death in 1987, when full ownership of his holdings, including 90 percent of the island, was transferred to The Nature Conservancy. Since that time, the Main Ranch complex has been home and headquarters for Conservancy staff.

The Prisoners' Harbor to Pelican Bay Trail is one of the best on the islands. Traveling along the north shore in and out of numerous canyons over steep, rocky terrain, this 2 1/2 mile trail journeys through incredible diversity. Coastal

bluff, sage scrub, grassland, oak woodland, island woodland, island chaparral, and rocky intertidal are some of the communities along the way. Island endemics such as the silver lotus, monkey flower, ironwood, buckwheat, and manzanita are just a few of the 120+ plant species along this trail. Join flocks of birders checking off the newly designated island scrub jay, glimpse an island fox in the brush, or observe sea lions in the offshore kelp.

Since 1981, The Nature Conservancy has provided educational day hikes to share the unique character of this island with the public. A national, private, nonprofit organization, The Conservancy envisions Santa Cruz Island as a premier example of integrated, cooperative ecological management.

Sharing the island with visitors is like introducing a dear old friend to new ones. You're all invited to join us! Be sure to wear hiking boots and bring plenty of film.

*Robin Rene Roe is a seasonal preserve naturalist with The Nature Conservancy on Santa Cruz Island.*



©Robin Rene Roe

*View of the Prisoners' Harbor to Pelican Bay Trail.*

## Santa Cruz Island Facts

**Area:** 96 square miles

**Highest point:** Picacho Diablo, 2,470 feet

**Boat travel time from mainland:** 2 to 2-1/2 hours

**Endemic plants:** Santa Cruz Island manzanita, SCI live-forever, SCI bush mallow, SCI silver lotus, SCI lacepod

**Endemic animals:** SCI fox, SCI deer mouse, SCI gopher snake, Channel Islands spotted skunk, island fence lizard

# Santa Rosa Adventure

by Laura Gorodezky and Steve Francis

Santa Rosa Island, known as *Wimal* (translated as “driftwood”) to the Chumash who lived there for thousands of years, offers an uncrowded venue for exploration and discovery, even on Memorial Day weekend.

Island Packers out of Ventura is the only authorized Park Service boat concessionaire offering day and camping trips to Santa Rosa Island. The crossing to this wind-swept oasis takes four to five hours. Soon there will be a boat concession out of Santa Barbara Harbor which will shorten the travel time considerably (two to three hours).

The journey through the channel can be an adventure in itself. On the way out, we saw a magnificent pair of humpbacks leaping out of the water, and crashing down in a way that demonstrated the true meaning of the phrase “splash-down.” We also came across a small minke whale and some huge blue whales gliding through their aquatic firmament.

Once we reached the island, a National Park Service truck and Ranger Bill

Faulkner greeted the boatload of visitors and helped offload equipment for 50 campers who were to spend four days on the island. The campsite is in Water Canyon, near the beach and a stream that runs from the upper reaches of the island to the sea. Permanent windbreaks protect each campsite.

We took sea kayaks with us and planned to explore some of the sandy beaches and bays that surround the island, but the 20 knot winds made paddling futile. So instead, we spent our time hiking

with the park rangers and some of the other campers. Not only did the rangers know the best places on the island, showing us sheltered white pocket beaches, unusual eroded rock formations, and spectacular coastal headlands and valleys, but they also imparted a wealth of knowledge about the flora and fauna, pointing out many species found nowhere else on earth.

## Santa Rosa Island Facts

**Area:** 84 square miles

**Highest point:** 1,589 feet

**Boat travel time from mainland:**  
4 to 5 hours

**Geographic features:** Marine terraces, rolling hills, isolated sandy beaches, thick kelp forests

**Endemic plants:** Live-forever, Torrey pine, manzanita

**Endemic animals:** Island fox, Pacific treefrog, spotted skunk, deer mouse



Ranger-led hike to the Torrey pine forest.

© 1997, Laura Gorodezky

We visited a beautiful Torrey pine forest (one of two on the planet). This healthy grove of 4,000 trees provided shade, shelter, and a pleasant resting place from the unrelenting wind. We also wandered the island's East Point which contains a vibrant salt marsh rich in bird life, the largest wetland area on any of the Channel Islands.

The ranger-led hikes offered a chance to explore areas of the island that most visitors would not reach by themselves, including four-wheel drive transport to faraway trailheads like Lobo Canyon, a breathtaking hike encompassing natural sandstone amphitheaters sculpted by the wind.

If even 15 people hiking together seems like too much of a crowd, then you can always explore the island on your own. Santa Rosa has recently been opened to hikers except for the area immediately surrounding the still-active cattle ranch buildings.

Thriving kelp beds just off the beach provide great snorkeling and diving. In the fall months, which tend to be less windy, it is possible to explore the coast by kayak, even to circumnavigate the island and camp on secluded beaches. But at any time of year, Santa Rosa Island is a great place to journey back in time, relax, and enjoy.

Laura Gorodezky is education coordinator at the Channel Islands National Marine Sanctuary. Steve Francis is a computer network manager at UCSB.

## Winging it to Santa Rosa

by Sarah Ettman-Sterner

“Yahoo!” I thought when I learned my assignment to Santa Rosa Island was approved. That's because I would be breezing my way across the Channel in relative luxury aboard an aircraft, instead the usual boat trip.

The flight I took is one of several fly-in adventures offered by Channel Islands Aviation. Pilots Bud Jourden and Mary Johnson provide informative commentary throughout the 30-minute flight. Landings take place at Becher's Bay on Santa Rosa's northeast side. There you'll be greeted by a Park Service interpretive ranger, who will introduce you to the unique natural history of the island during a four-hour, four-wheel drive and hiking tour.

For more information on flights to Santa Rosa Island and the other Channel Islands, call Channel Islands Aviation at (805) 987-1301.

Sarah Ettman-Sterner is education coordinator at the Sea Center.

# Santa Barbara Island: Center of the Channel Islands

by Shauna Fry and Michelle McCutchan

On a clear day from Signal Peak on Santa Barbara Island, you can see all but one of California's eight Channel Islands. This central location, which connects the northern and southern island groups, designates Santa Barbara Island as the heart of this region. But at more than 38 miles from shore, 24 miles from neighbor Santa Catalina, and 40 miles from its nearest Sanctuary neighbor, Anacapa, Santa Barbara Island is isolated. Spending time on this small volcanic outpost conveys the realities of life on a water planet.

Santa Barbara Island's sheer cliffs erupt out of deep Pacific waters, forming a mesa covered with prairie grasses. The highest point on the island is Signal Peak at 635 feet. Landing Cove, on the northeast end of the island, provides the only landing access. One hundred and thirty-one steps scale the hillside and lead to a small but informative visitors center, the public campground, and Channel Islands National Park ranger and research housing.

There are 5.5 miles of marked nature trails with spectacular vistas of the ocean and sunsets. The trail makes a figure eight, rising up North Peak and Signal Peak and descending to Elephant Seal Cove. The trail bisects one of 15 archeological sites on the island, with middens containing numerous abalone shells from the Gabrielino Indians. The lack of fresh water prohibited permanent Indian settlements, but the island provided a useful stopover for travelers.

The trail to Elephant Seal Cove passes through a western gull nesting area, with numerous exposed nests near the trail containing brown, speckled eggs. In late May gull chicks were just beginning to hatch, and we saw one set of three fluffy spotted gull chicks. On the way to Signal Peak, which offers an excellent view of tiny Sutil Island and the surrounding kelp forest, a short trail offshoots to the sea lion rookery. From our vantage point high on the cliff we heard

sea lion bulls barking and saw day-old pups nursing.

Pelagic Xantus' murrelets have the largest nesting colony in the world on Santa Barbara Island. At night when the adult murrelets return from feeding, you can hear their enchanting calls to their mates sitting on the nest, indicating a shift change in incubating the eggs. Once the chicks have hatched, they spend two days in the nest. Then, at the beckoning calls of their parents, the flightless chicks tumble down the volcanic cliffs into the sea.

Xantus' murrelets are only one of many marine bird species that nest here. Others include ashy and black storm petrels, double-crested cormorants, pelagic cormorants, Brandt's cormorants, black oystercatchers, brown pelicans, and pigeon guillemots.

Sea kayaking at Santa Barbara Island is excellent. The five miles of rocky shoreline encompassing the island make an easy distance to circumnavigate. Kayaking offers close-up views of rocky intertidal marine life, seabirds, marine mammals, caves, and spectacular Arch Point. The water is very clear, with visibility averaging between 40 and 50 feet (in the fall it can reach 100 feet).

The snorkeling and diving are memorable, and during our May visit we snorkeled without wetsuits in Landing Cove. Curious sea lions tagged along on our dives, and we watched them chase abundant schools of anchovies. We also saw bright orange garibaldi, huge bat rays, kelp bass, and opaleye swimming throughout the kelp forest.

Santa Barbara Island is an important habitat for an abundance of marine life found in the Channel Islands National Marine Sanctuary, with incredible views of seabird colonies, elephant seals, and sea lions. Island Packers offers transportation to Santa Barbara Island for single and multi-day trips. Paddle Sports, located in Santa Barbara, can arrange guided kayak tours of Santa Barbara Island and the other Channel Islands.

Shauna Fry is coordinator for the Whale Corps Program at the Santa Barbara Museum of Natural History. Michelle McCutchan is the Sea Center education program assistant.



*This sea lion wanted to go kayaking, too.*

## Santa Barbara Island Facts

**Area:** 1 square mile

**Highest point:** Signal Peak, 635 feet

**Boat travel time from mainland:** 3 hours

**Geographic features:** Steep cliffs, marine terraces, Shag Rock, Sutil Rock

**Endemic plants:** Santa Barbara Island live-forever, SBI cream cups, SBI buckwheat, SBI chicory

**Endemic animals:** Island night lizard, horned lark, orange-crowned warbler, house finch, deer mouse

## Channel Tidings

### California Clean Boating Network

The Channel Islands National Marine Sanctuary has recently joined the California Clean Boating Network (CCBN) as a representative from the Santa Barbara area.

The Santa Monica Bay Restoration Project is coordinating a boater's outreach program for CCBN in Santa Barbara, Ventura, Los Angeles, and Orange counties. As a Santa Barbara representative, CINMS will help compile educational videos and the Southern California Boater's Guide.

For more information, contact Carrie Katsumata at the Santa Monica Bay Restoration Project, (213) 266-7566.

### Cousteau Supports Great American Fish Count

The participation of celebrity divers is focusing national and international attention on the Great American Fish Count, which took place this year between July 1-14 across the country.

On July 7, Jean-Michel Cousteau participated in the GAFC by diving with CINMS staff and recreational divers off Anacapa Island. Mr. Cousteau rendezvoused with the RV Ballena and Truth Aquatics' diveboat Vision, accompanied by news crews from various local and national networks. David Brown of Passage Productions provided a live video uplink during the dive.

Continued on page 13

# A Visit to San Miguel Island

by Colleen Angeles

As we approached the northernmost of the eight Channel Islands, I was surprised at what lay before me. With what little I knew about this windswept and foggy island, I had painted an image of rocks and dirt in my mind. But that was not the case. The island was a magnificent array of green vegetation and opalescent sand. The water surrounding the island, known as a "ship's graveyard" due to many wrecks caused by drastic weather conditions, was a beautiful turquoise color with luscious kelp beds swaying in the current.

After traveling six hours by boat to our destination, I was eager to explore, but more importantly, to experience the "wild nature" of San Miguel Island. Prepared with enough water, food, and supplies, I climbed down the ladder of the Island Packers' vessel *Jeffrey Arvid* onto a skiff which shuttled me to crescent-shaped Cuyler Harbor.

Once on the island, my first surprise was that we had to hike one mile (with all of our gear)—uphill! The narrow trail was surrounded by 30 years of undisturbed natural growth. Evidence of fresh springs was apparent on cliff walls and in the small ponds at their bases. At the end of the trail I surveyed my surroundings. To the east, I sighted Santa Rosa Island, which sits three miles away, and to the north, Prince Island. This extraordinary view would be with me every morning and evening for the next four days.

The first evening the wind hurried fog across the sky in vibrant patches of orange, yellow and red. The days and nights to follow were absent of fog, but the wind was constant.

I awoke to the chirping of song sparrows, with the ocean already turning a misty white. The first hike we took was to Point Bennett, the westernmost point of the island. Traveling past the monument dedicated to explorer Juan Rodriguez Cabrillo and the remains of the old ranch house of the early 1900's, we hiked until we approached a Y in the path. We veered to the right and I was suddenly amazed by the eerie forest of tree trunks and roots covered with a ghostly white matter called caliche (calcium carbonate).

As we continued our hike, I could hear loud barking sounds of seals and sea lions, con-



Elephant seals use Point Bennett as a favorite haul-out.

© 1997, Dan Richards/National Park Service

firmed that Point Bennett was nearby. Upon reaching the final peak, I saw thousands of California sea lions frolicking along the shore among lethargic, sunbathing elephant seals. As one of 19 people on the island that weekend, I instantly realized that it was not our island, but theirs.

On the following day, the park ranger led a group hike to Harris Point which overlooks Simonton Cove. Along the way I was confronted by the wind's power. Never before have I experienced such force. For every step I took forward, the wind pushed me back another. The sheer beauty of the cove was worth it—peregrine falcons soared above and colossal waves crashed below.

I hope that many others will take the opportunity to experience the pristine environment of San Miguel Island, now and in the future.

Colleen Angeles is education program specialist at the Channel Islands National Marine Sanctuary.

## San Miguel Island Facts

- Area:** Approx. 15 square miles
- Highest point:** San Miguel Hill, 831 feet
- Boat travel time from mainland:** 6 hours
- Geographic features:** Prince Island, Point Bennett, Castle Rock, Cardwell Point, Harris Point, Caliche Forest
- Endemic plants:** Coreopsis, silver lupine, island buckwheat, locoweed, dudleya, arroyo willow
- Endemic animals:** Channel Islands fox, deer mouse

# Santa Catalina Island

by Dr. William W. Bushing

The treasures of Santa Catalina Island are far more valuable than the rumored gold sought by miners in the 1800's. These treasures are the island's geological, ecological, archaeological, and historical heritage, all of which had their origin in events that began over 100 million years ago.

Long ago, volcanic activity produced both plutonic rocks and lava flows, while the island's uplift and fluctuating glacial sea levels formed fossil and sedimentary deposits. The island's geologic treasures were later used by Native Americans, who fashioned

stone bowls and tools; miners, who took lead, zinc and silver; quarry operators, who produced rock for mainland streets and breakwaters; and artists, who made beautiful ceramic products.

With over 600 plant species, Catalina's vegetation ranges from dry maritime desert scrub typical of Baja California to riparian remnants in moister canyon floors. Several plants are endemic to Catalina, including the rarest tree in California, the Catalina mahogany. Catalina's endemic animal species include the rare ornate shrew, Catalina mountain snail, Beechey ground squirrel, and island fox. Nearly 280 species of birds have been recorded.

Native American cultures arrived at least 6,800 years ago. The Gabrielino (or Pimugnans) fished, gathered shellfish, and harvested native plants for food. These early islanders may have introduced food and medicinal plants, rattlesnakes, and foxes to the island.

Cabrillo's discovery of the island in 1542 led to its settlement by Europeans and Mexicans. Ranching operations introduced nearly 30,000 sheep, cattle, and goats which preferred to graze on the island's native plants. Exotic plants, introduced as animal feed or in fur, often outcompeted native species in this increasingly disturbed ecosystem.

In 1919, William Wrigley Jr. joined a group of investors who purchased stock in the Santa Catalina Island Company (SCICo) as a speculative venture. Mr. Wrigley bought out his partners

and took steps to reduce environmental damage. In 1972, members of the Wrigley and Offield families established the Santa Catalina Island Conservancy as a nonprofit conservation organization, and in 1975 deeded 88% of the island to the Conservancy in perpetuity.

The Conservancy's mandate is to preserve the island's native plants and animals, biological communities and geological formations, and provide for controlled educational and recreational use. Although the Conservancy's mandate does not include the marine environment, the ecological health of the surrounding waters is addressed by the Catalina Conservancy Divers (CCD).

Avalon, the only incorporated city on the Channel Islands, has a resident population of about 3,200. Many of the island's visitors camp in one of the island's 10 campgrounds, hike or mountain bike its trails, and swim or SCUBA dive along its 54-mile coastline.

To learn more about the Conservancy and Santa Catalina Island, please visit our web site at <http://www.catalinas.net/seer>.

*Dr. William W. Bushing is the Conservancy's vice president for science, education and ecological restoration. Misty Gay, director of education, assisted in providing factual information for this article, which was also reviewed by native plant horticulturist Janet Takara.*



**Catalina combines civilization with many natural treasures.**

## Santa Catalina Facts

**Area:** 76 square miles

**Highest point:** Mt. Orizaba, 2,097 feet

**Boat travel time from mainland:** 1 to 2 1/2 hours depending on port (Redondo Beach, San Pedro, Long Beach, Newport Beach, Dana Point, San Diego)

**Geographic features:** Mt. Black Jack, Mt. Orizaba, Two Harbors, Bird Rock, Ship Rock

**Endemic plants:** Catalina mahogany, Catalina manzanita, Catalina live-forever, St. Catherine's lace, Catalina ironwood

**Endemic animals:** ornate shrew, Beechey ground squirrel, island fox, western harvest mouse, deer mouse, Catalina quail, Bewick's wren, Hutton's vireo

## Tidings, continued

### "Lonely Abalone" Update

Alolkoy's Summer 1995 issue reported that Soren, the lonely male white abalone, was seeking a mate. His caretakers launched a match-making effort through TV and radio news coverage, newspaper articles, and communications with dive groups. In September 1996, the Scripps Institute of Oceanography located a single female white abalone, named "Phoebe," after the Greek deity of light. The happy couple has yet to conceive.

### Research Vessel Activities

The R/V Ballena spent March through May:

- Continuing support for UCSB's Institute for Computational Earth System Science "Plumes and Blooms" research project.
  - Providing ABC/Kane contract cinematographer Tom Fitz a platform from which to document dolphins in the Sanctuary.
  - Providing Sisse Brimberg, staff photographer for National Geographic, with the opportunity to shoot photographs of the Sanctuary.
  - Providing UCSB's Deep Sea Biology class with a full day of trips to study organisms caught using a one-meter bongo net.
  - Completing the first of five 2 1/2 day cruises to monitor marine mammals, sea birds, krill, copepods, and physical oceanographic conditions in the northwest part of the Sanctuary.
- The R/V Ballena also received some upgrades during its annual haulout in May.

## Research

# GIS Management Tools at the Land-Marine Interface

By Leal A. K. Mertes

Resource management of coastal environments requires an understanding of how materials from the land affect the ocean, and vice versa. Viewing the coastal area as an ecosystem that includes both marine and terrestrial inputs and outputs—air, water, plants, animals, and other materials—allows managers to consider the entire range of processes influencing the health of the region.

Management on this “whole ecosystem” basis presents challenges that can be partially met through combining field data, modeling, and digital technologies. In particular, the digital databases, remote sensing data, and spatial analysis tools embedded in a Geographic Information System (GIS) provide opportunities to study relationships among environmental variables. In addition to scientific challenges, coastal regions involve management by multiple agencies which can benefit from GIS analyses.

To meet the challenges of managing the Central California coastal region and the Channel Islands, we have developed a Channel Islands Geographic Information System (CIGIS). This is a cooperative project among the Department of Geography at the University of California, Santa Barbara (UCSB); the Channel Islands National Marine Sanctuary (CINMS); the Channel Islands National Park (CINP); the Santa Cruz Island Reserve (SCIR); the University of California Natural Reserve System, Minerals Management Services; and the State of California Fish & Game, Office of Oil Spill Prevention and Response.

As a resource management tool, the CIGIS provides information on flora and fauna (e.g., kelp, sea grass, harbor seals, seabird colonies, shellfish); the location of sensitive

archeological sites; and the location and dimensions of sea caves, shipping lanes, oil platforms, bathymetry, geology, vegetation cover, soils, and topography.

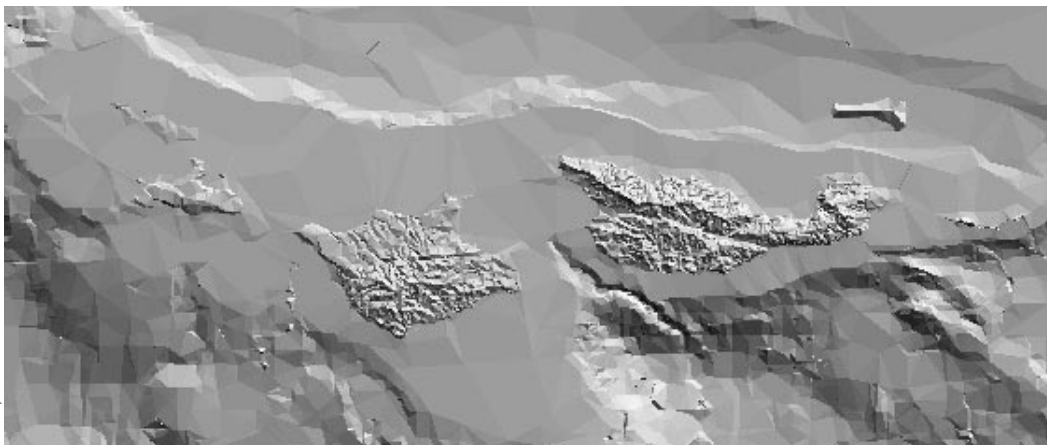
The CIGIS is customized to meet the needs of many individual users. The master database resides at UCSB in ARC/Info and ARCView (UNIX and PC versions), while users receive ARC/Info and ARCView versions with data relevant for their particular agency. ARCView versions now reside at a field station (SCIR) and on a boat (CINMS). We have also developed multimedia visualization techniques to display data, including low-altitude virtual fly-bys of island coastlines. The fly-by animations are a virtual reality tool that give a realistic view of possible events—for example, topographic vulnerability to an oil spill.

Our experience with multiple users shows that by promoting cooperation among agencies, it is possible to create a database much more useful to the whole than if we had only addressed the needs of a single group. In addition, through pooling resources, each agency benefits from access to the entire database rather than data related only to its specific mission.

The success of the GIS project is not measured by the size of the database, but rather by new insights gained through spatial analysis of the environment. The illustration below shows a shaded relief map of the bathymetric surface of the Channel Islands National Marine Sanctuary surrounding the northern Channel Islands. The point data for the bathymetric surface are from the National Geophysical Data Center National Ocean Service (NOS) Hydrographic Survey of U.S. Coastal Waters. The topography of the islands is based on United States Geological Survey (USGS) digital elevation data.

The CIGIS is a living database that is continuously being updated. Currently we are creating new visualization interfaces to enhance use of the database by managers and to provide educational material to the public.

*The CIGIS project team at the Department of Geography, University of California, Santa Barbara, consists of Leal A. K. Mertes, Ben Waltenberger, Melodee Hickman, John Dvorsky, and Amy L. Bortman.*



©1997, CIGIS.

*The bathymetric and topographic surfaces shown here provide the base map for all other layers in CIGIS.*



# The Pod Press



Vol. 1 No. 2

## Make a Tomol Model

By Meaghan Clark, Breana Lopez, and Tannia Esparza

We are showing you this project because the Chumash used this special canoe, the tomol, to get from Santa Cruz Island to the mainland to trade.



### What You Need

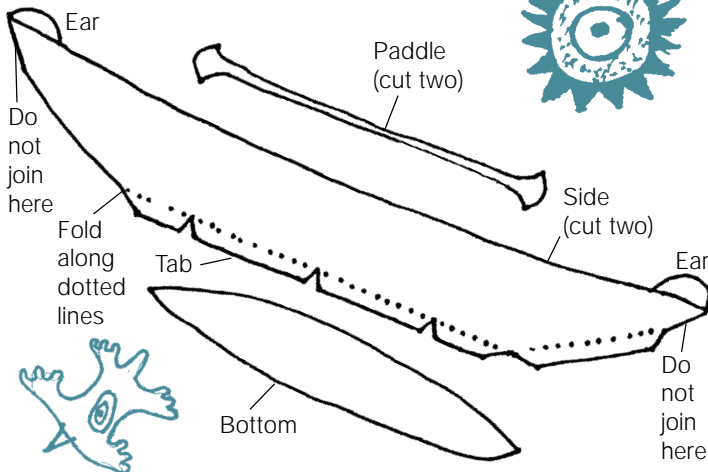
paper • pencil • scissors • glue or tape  
felt pens, colored pencils, or crayons • toothpicks

### What To Do

1. You can make a tiny tomol or use a copy machine to make 2 copies of the pattern below, 2 times bigger in size.
2. Cut out the pattern pieces and trace around them onto a piece of paper.
3. Cut out 2 side pieces, 1 bottom piece, and 2 paddles for each canoe.
4. Tomols were made out of redwood planks. Draw the planks on your canoe. They were usually painted red with designs on them, especially on the ears.
5. Place the side pieces together so there is a tab at each end. Fold the tabs on the dotted line.
6. Tape or glue the side pieces together at each end. Don't attach the ears together, so that there is a V-shaped space between them.
7. Place the bottom between the 2 sides on top of the folded tabs. Tape or glue the bottom to the tabs.
8. To make the paddles stronger, tape or glue a toothpick or wooden skewer to them.



We hope you have fun with your tomol!



## Santa Cruz Word Cruise

B	L	P	K	N	K	G	M	N	O	A	L	P	G	G	S	F	J
F	M	K	P	C	I	D	C	F	G	H	Q	R	O	I	C	O	C
F	C	M	I	G	B	D	O	G	P	I	K	I	P	L	R	X	P
K	F	M	Q	B	P	H	L	F	E	G	J	S	H	F	U	P	O
B	D	O	L	P	H	I	N	S	L	N	H	O	E	O	B	P	E
J	J	H	F	E	R	A	L	P	I	G	S	N	R	D	J	N	S
N	Q	N	B	A	N	K	H	J	C	I	C	E	S	M	A	C	E
L	B	C	Q	A	C	N	P	I	A	E	N	R	N	I	Y	H	A
T	R	E	E	F	R	O	G	S	N	H	B	S	A	R	Q	U	L
L	L	P	B	S	E	D	I	L	C	H	A	H	K	O	O	M	I
O	N	M	O	E	L	B	E	A	P	Q	N	A	E	N	A	A	O
M	C	I	D	A	C	H	A	N	N	E	L	R	Q	W	Q	S	N
K	G	G	E	L	G	B	N	D	O	C	A	B	N	O	K	H	S
D	C	J	N	S	O	B	I	M	A	J	N	O	G	O	N	G	L
S	P	O	T	T	E	D	S	K	U	N	K	R	D	D	B	F	B
G	Q	A	D	L	H	N	E	P	G	A	L	O	L	K	O	Y	B
H	E	E	O	A	P	A	I	N	T	E	D	C	A	V	E	P	O
B	Q	P	S	A	N	T	A	C	R	U	Z	K	O	Q	O	E	E

- |            |                  |               |
|------------|------------------|---------------|
| ALOLKOY    | GOPHER SNAKE     | SANTA CRUZ    |
| CHANNEL    | IRONWOOD         | SCRUB JAY     |
| CHUMASH    | ISLAND           | SEA LIONS     |
| DOLPHINS   | PAINTED CAVE     | SEALS         |
| FERAL PIGS | PELICAN          | SPOTTED SKUNK |
| FOX        | PRISONERS HARBOR | TREE FROG     |

## Dear Crabby



Dear Crabby,

Why is it called Santa Cruz Island?

—A Puzzled Pal

In 1769, an expedition led by Portola went to the island. On the boat there was a priest along with the crew. While they were at the island, the priest walked to the top of a hill and, by mistake, left his walking stick that had a small iron cross on the top. The next day, one of the Chumash Indians found it and brought it to the boat. The Spanish thought it was so neat that they named the island "Santa Cruz," which means "holy cross."

Research done by Amber Sabiron

If you have a question about the islands within the Sanctuary, please write to Dear Crabby at Santa Barbara Museum of Natural History, 2559 Puesta del Sol Rd., Santa Barbara, CA, 93105, or e-mail to: losmar@sbnature.org.

This page was written and illustrated by fifth grade students in the Los Marineros program at Adams School, Santa Barbara, California. Illustrators: Meaghan Clark, Breana Lopez, Tannia Esparza, Cedric Mercer, Jessica Roca, Sean Sweeney, and Hilary Cadiz.

If you have comments, suggestions, or submissions for this page, please send them to the *Alolkoy* office, Channel Islands National Marine Sanctuary, 113 Harbor Way, Santa Barbara, CA 93109.



U. S. Department of Commerce  
 National Oceanic and Atmospheric Administration  
 Channel Islands National Marine Sanctuary  
 113 Harbor Way  
 Santa Barbara, CA 93109

Address Correction Requested

# Alolkoy

**Need more information?  
 Contact:**

**Channel Islands  
 National Marine  
 Sanctuary**  
 113 Harbor Way  
 Santa Barbara, CA 93109  
 805/966-7107  
 Email: [cinms@rain.org](mailto:cinms@rain.org)  
 Web Page: [www.cinms.rain.org](http://www.cinms.rain.org)

**Channel Islands  
 National Park**  
 1901 Spinnaker Drive  
 Ventura, CA 93001  
 805/658-5700  
 Web Page: [www.nps.gov/chis/](http://www.nps.gov/chis/)

**Santa Barbara Museum  
 of Natural History**  
 2559 Puesta del Sol Road  
 Santa Barbara, CA 93105  
 805/682-4711  
 Web Page: [www.sbnature.org](http://www.sbnature.org)

**Sea Center**  
 211 Stearns Wharf  
 Santa Barbara, CA 93101  
 805/962-0885

## Things to Do, Places to Go

### Summer Sanctuary Cruises

The Channel Islands National Marine Sanctuary and the Santa Barbara Museum of Natural History are cosponsoring Sanctuary cruises aboard the 88-foot *Condor* on the following dates: July 13 and 27, and August 10. These unique full-day excursions travel along the western end of Santa Cruz Island, viewing bird rookeries, sea lions, and harbor seals. Kelp forests and underwater reefs are seen close via a live underwater uplink provided by Passage Productions. Cost is \$65 for adults and \$35 for children. Call Sea Landing for reservations, (805) 963-3564.

### Teachers Dive into Marine Science

CINMS and the Santa Barbara Museum of Natural History are planning two workshops for educators this summer taught by Dr. F. G. Hochberg, the museum's curator of invertebrate zoology.

On August 5 from 1:30-4:30 p.m., "The Incredible Squid" will introduce the science and lore of this mysterious creature. On August 7 from 1:30-4:30 p.m., "Nature Impressions" will give teachers the opportunity to learn the art of nature printing, with a special emphasis on shells and mollusks.

For more details, contact Sheila Cushman at (805) 682-4711 ext. 311 or by email at [mariner@sbnature.org](mailto:mariner@sbnature.org).

### Midden Mysteries and Mollusk Money

Decode shell middens and discover

the origins of shell money at a lecture titled "Midden Mysteries and Mollusk Money" with Dr. John Johnson, curator of anthropology, and Jan Timbrook, senior curator, department of anthropology at the Santa Barbara Museum of Natural History. This event will be held on August 14 at 3 p.m. at the Fleischmann Auditorium as part of the museum's "Shellabration of Summer." Free with museum admission. For more information call (805) 682-4711.

### Sea Center Summer Schedule

The Sea Center on Stearns Wharf is bustling with activities through September 1 as part of the "Shellabration of Summer." For a complete schedule call (805) 962-0885. The Sea Center is a cooperative project between the Channel Islands National Marine Sanctuary and the Santa Barbara Museum of Natural History.

