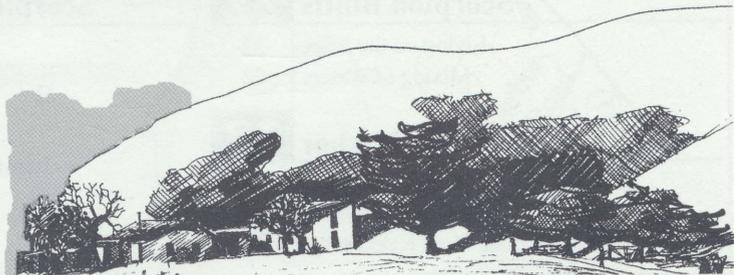


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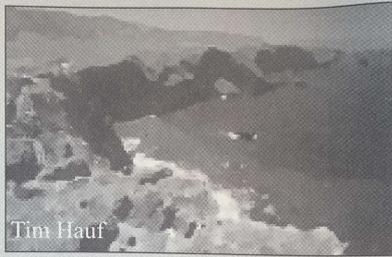
interpretive guide
EASTERN **SANTA CRUZ** ISLAND



Trail Guide

4

Scorpion Beach to Cavern Point



Tim Hauf

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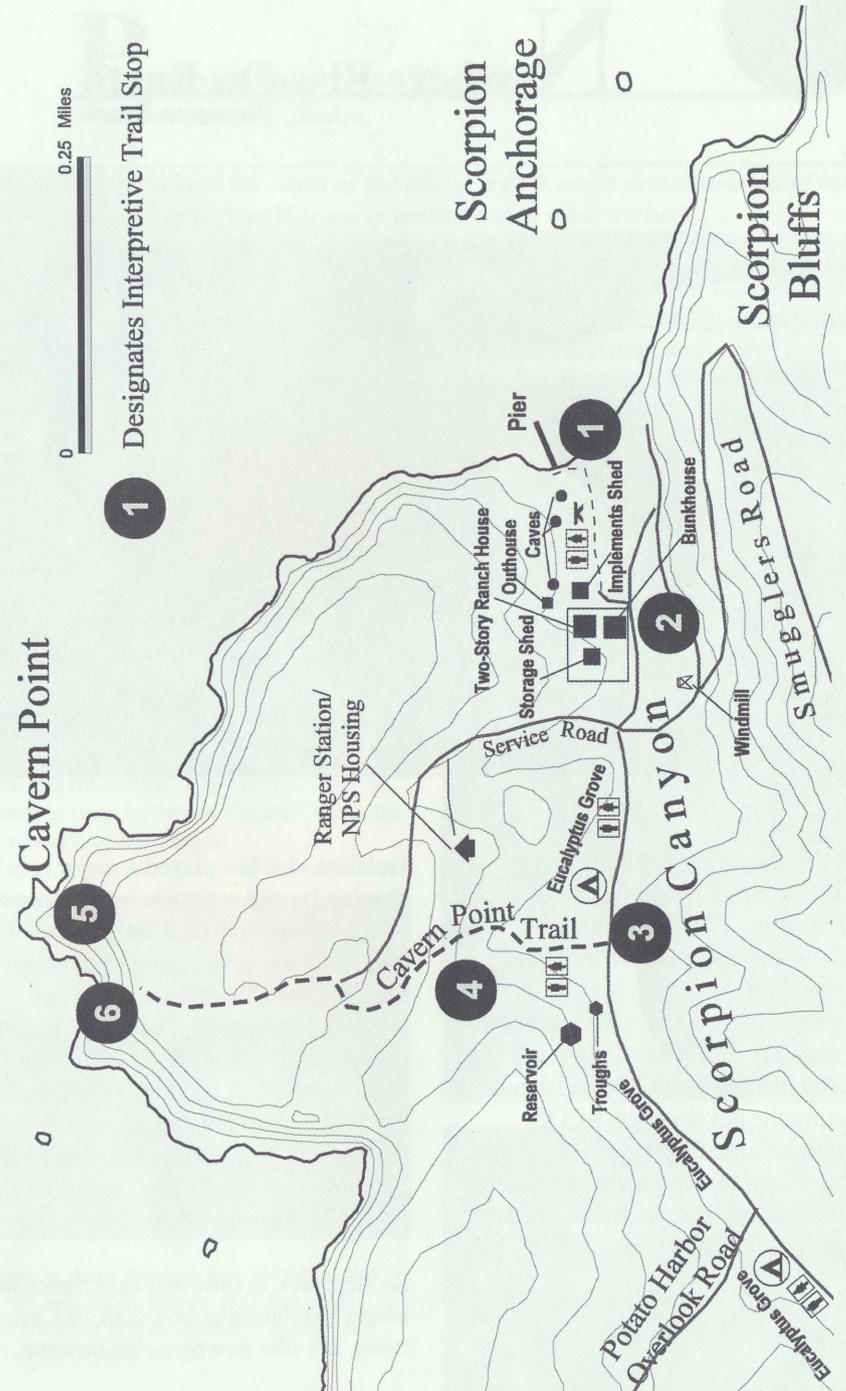
How To Use This Guide

The Trail Guide provides six interpretive stops along the one-mile walk from Scorpion Beach to Cavern Point. The second part covers other areas throughout eastern Santa Cruz Island with in-depth descriptions.

We recommend that you begin with the Scorpion Beach to Cavern Point trail for a general overview of eastern Santa Cruz Island. Then, if there is still time, select another area to visit according to your interest and ability. For a more detailed hiking map, trail descriptions, mileage, and safety and resource protection information please see the "Hiking Eastern Santa Cruz Island" bulletin available at island bulletin boards.

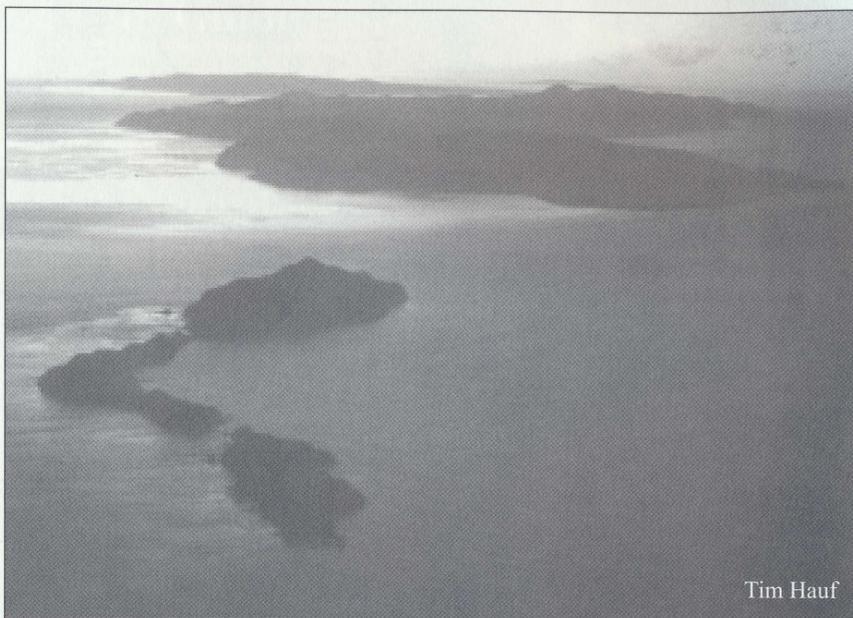
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Nowhere Else On Earth

Scorpion Beach



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Close to the mainland yet worlds apart, Santa Cruz Island, along with the other Channel Islands, is home to plants and animals that are found nowhere else on earth. Like on the Galapagos Islands of South America, isolation has allowed evolution to proceed independently on the islands, fostering the development of 145 endemic or unique species. Santa Cruz Island is host to 60 of these endemic species. Some, like the island jay, are found only on Santa Cruz.

Isolation also has played a major role in shaping human activities on the island. While the southern California coastal main-land has seen extensive development, the Channel Islands have remained relatively untouched. The island's separation from the mainland by 25 miles of an often turbulent ocean has limited and directed human use and occupation for thousands of years. And it continues today, giving us a chance to see coastal southern California as it once was.

So step back in time and experience the island's isolation as you walk to Cavern Point. It's like nowhere else on earth.

Preserving the Past

Scorpion Ranch Complex

Isolated and far behind the times as the island was, it was a demonstration of how a group living as we did could learn to make do with what we had.

-former ranch superintendent, Clifford McElrath, *On Santa Cruz Island*

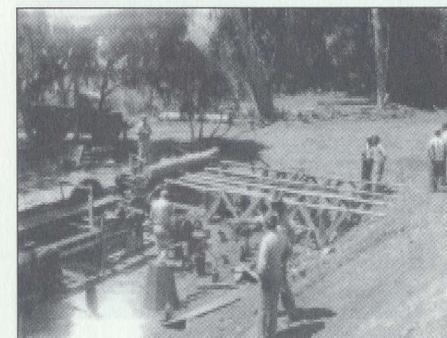
While the isolated island offered ranchers several advantages over the mainland, including no predators and the world's best fence (the ocean), it created special challenges as well. Supplying such a remote outpost was probably the biggest challenge. The transportation of supplies and stock onto and off the island was always an adventure—the distance to the mainland, rough seas, and expense made it very difficult. However, as former ranch superintendent Clifford McElrath wrote in his memoir *On Santa Cruz Island*, ranchers would adapt to the difficulties of isolated island life through self-reliance and by “learning to make do with what [they] had.” Pier Gherini, former owner of the eastern portion of the island, wrote a humorous story in “Island Rancho” about the self-reliance of Joe Griggs:

“Joe could do most anything, except write. An expert rider, huntsman, and general ranch worker, Joe also was a mechanical whiz. He once took a 1915 Waterloo Boy tractor that had been “mothballed” because the early workmen wouldn’t touch it, and used the parts to make a sawmill. The fact that we didn’t need a mill in no way detracted from the ingenuity and skill that went into its making. All of these people had one common characteristic. They knew and loved the Island. Each in his own way was rugged and self-reliant. They took its beauties and hardships in stride.”

continued on next page



Unloading sheep, Scorpion pier, 1977 (top, left). Sawmill built by Joe Griggs, 1955 (top, right; photos courtesy of John Gherini). Sawmill as it looks today (bottom, right).



Tim Hauf

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Scorpion Ranch Complex

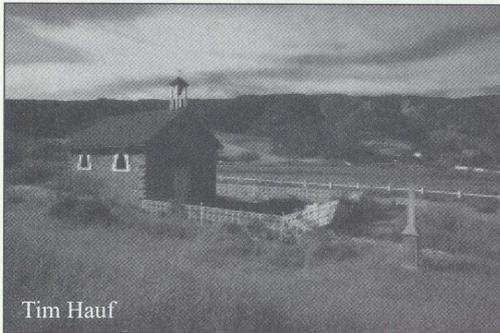


Historic bunkhouse, ranch house and grader at Scorpion Ranch

Under the direction of Justinian Caire beginning around 1880, a variety of agricultural and ranching endeavors were developed in an effort to create a self-sufficient operation on the island. In *California's Channel Islands*, Marla Daily writes that, "Buildings including several ranch houses, bunkhouses, barns, wineries, a chapel, mess hall, blacksmith shop, and saddle shop were constructed. Wherever possible, native island materials were used. Kilns were built for the manufacture of bricks and limestone mortar. Stones were quarried and cut to shape on the island. A resident blacksmith forged wrought-iron fittings, railings, and hinges used on many of the buildings. Employees included masons, carpenters, dairymen, team drivers, vintners, a wagon maker, cobbler, butcher, seasonal grape pickers and sheep shearers, a sea captain and

Since the island was too large to manage from the one main ranch in the Central Valley, other facilities, or out-ranches like the one at Scorpion, were developed. Built in 1887, the two-story Scorpion ranch house, and later, the wooden bunkhouse (1918), were home to ranch hands who tended the flocks of sheep and cattle and the crop fields on the broad plateaus and rich black soils on this eastern end of the island. Known as the "granary of the island," the Scorpion and Smugglers ranches were the bases that supplied much of the food and hay for the island operation.

Sheep ranching for meat and wool by descendants of Justinian Caire, the Gherini family, continued on the eastern end of Santa Cruz Island between 1926 and 1984. The Gherini era ended in February 1997 when the National Park Service acquired the last interest from the family. Today, the National Park Service is preserving the historic area so visitors always will have the chance to remember and understand this unique part of the island's past.



Historic chapel in the central valley

sailors to run the company's 60-foot schooner. Hay, vegetables, and over a dozen varieties of grapes were grown, in addition to almond, walnut and other fruit and ornamental trees. Sheep, cattle, horses, and pigs were raised."

Return of the Natives
Eucalyptus Grove/Cavern Point Trail Junction

The over 100-year-old blue gum eucalyptus grove that spreads out behind the ranch area was one of many groves that were planted throughout the island during the ranching era for use as windbreaks, fuel, and wharf piles. Fortunately, these non-native trees are not invasive and are easy to control. Many other non-native plants that reached the islands during the ranching period, however, are not as benign.

What was once an island covered with 80-90 percent shrubs and trees and 10-20 percent native grasslands, has been reduced largely to non-native, European grazing grasses and an assortment of weeds. Coastal sage-scrub, chaparral, oak scrub, oak woodland, and native grasslands (both annuals and perennial)

have given way to oats, bromes, fox-tails, thistles, mustard, and fennel. Today, nearly 25 percent of the plant species found on eastern Santa Cruz are introduced by humans, providing approximately 90 percent of the ground cover.

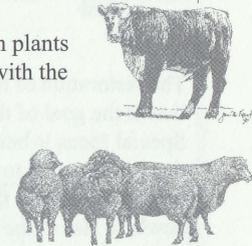
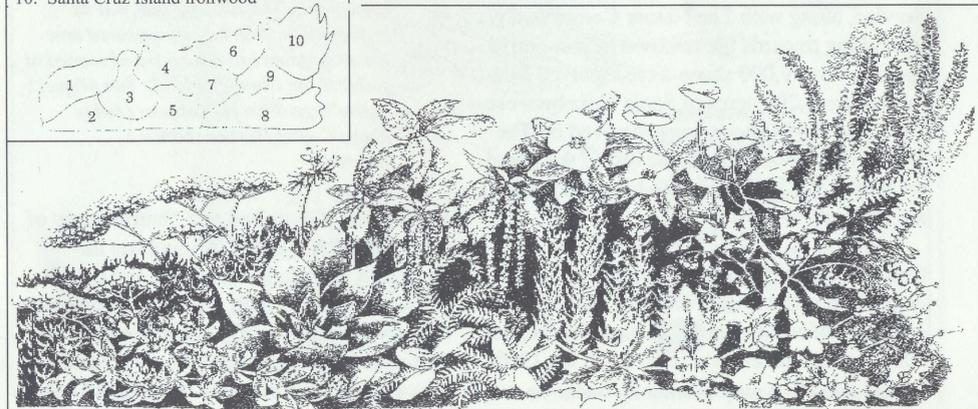
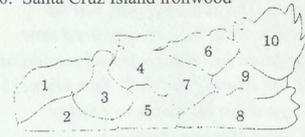
Native plants that developed in isolation often are vulnerable to competition from hardier introduced or alien species. Many of these alien plants have evolved with grazing pressure, whereas the native island plants have not co-existed with grazers or browsers on the islands since the pygmy mammoths, nearly 12,000 years ago. With sheep, cattle, horses, and pigs grazing and browsing on the native vegetation and disturbing the soil, the alien plants spread rapidly, competing with the natives for limited soil and moisture. The non-natives eventually overwhelm the natives, which often have longer germination and growth cycles.

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Endemic Plants

Santa Cruz Island

1. Santa Cruz Island buckwheat
2. Santa Cruz Island silver lotus
3. Channel Islands live-forever
4. Island oak
5. San Miguel Island locoweed
6. Island bush poppy
7. Island paintbrush
8. Santa Cruz Island bush mallow
9. Northern island nightshade
10. Santa Cruz Island ironwood



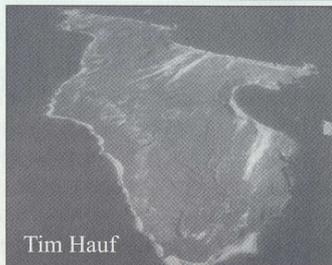
Trail Stop
3

Trail Stop
4

continued
Eucalyptus Grove/Cavern Point Junction



ENDANGERED



Tim Hauf



San Miguel Island in 1930 (top). San Miguel in January 2000 from about the same angle. The sandspit that was so prominent in 1930 has disappeared now that vegetation has returned and started to stabilize the island (middle). San Miguel's native vegetation as it appears today above Cuyler Harbor (bottom).

Santa Cruz. Described as a "barren lump of sand" in the 1930s, San Miguel has undergone a remarkable recovery and now is densely vegetated with a diverse assemblage of native plants. In fifty years, we hope to write about the remarkable recovery and return of the native plants of Santa Cruz Island.

The restoration of the island's native vegetation is the goal of the National Park Service. Special focus is being placed on the plants that are endemic to the islands, those occurring only on the Channel Islands and nowhere else in the world. Eight of these occur only on Santa Cruz Island. Nine of these endemic plants are listed as endangered species. To ensure the survival of these unique species and encourage the recovery of the island's native vegetation, the National Park Service, along with The Nature Conservancy, is working towards the removal of non-native species. Over 9,000 sheep were removed from the eastern 6,200 acres of Santa Cruz between 1997 and 1999 (Sheep were removed by The Nature Conservancy from the rest of the island by 1989.) Pig eradication and weed control are currently underway.

One needs only to look at the recovery of vegetation, reduction of erosion, and the condition of archeological sites on San Miguel since the removal of sheep in the 1950s to envision what may eventually occur on

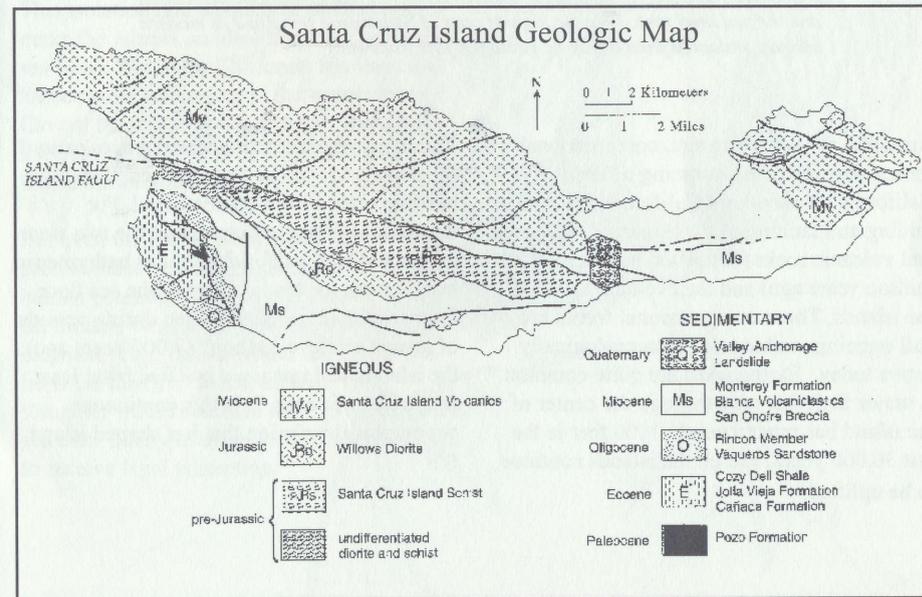
Geographical Isolation
Halfway up the Canyon

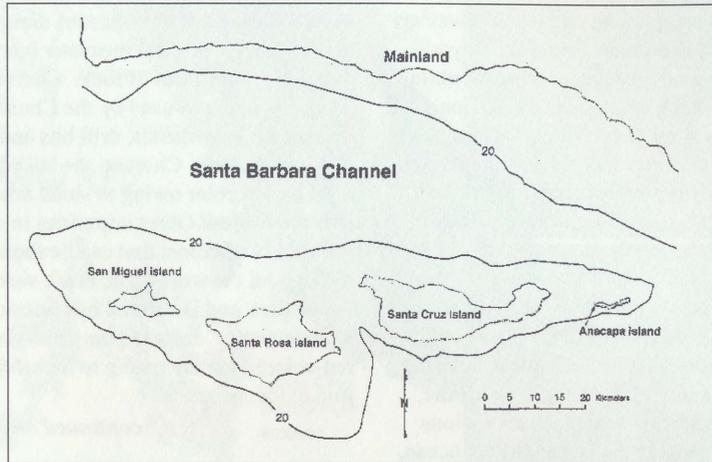
As you hike up to Cavern Point, take a moment and rest halfway up the canyon. As you have been hiking, you probably have noticed areas of bright white, chalky rock that have been exposed along the hillsides due to erosion. While this excessive erosion due to overgrazing is detrimental to the island's native vegetation, it does give us the chance to take a closer look at part of the island's complex geology.

This white layer is known as diatomaceous earth. It is derived from very small single-cell sea plants called diatoms, which are made of silica (silicon dioxide). As these plants die, their silica skeletons settle into the various marine sediments at the bottom of the ocean, often enmasse. It is from this

diatomaceous earth that the mineral chert is derived—some of the siliceous diatoms are dissolved by water and then later recrystallized as a dense hard form of rock. Chert fractures like glass and was used by the Chumash Indians for arrowheads, drill bits and scraping and cutting tools. Chert on the islands has a light brown color owing to small amounts of iron impurities. Other impurities in chert give it a variety of colors that can be found throughout the world. The black variety is called flint and is colored by inclusions of organic matter. Jasper is the name given to the red-colored variety owing to inclusions of an iron oxide, hematite.

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continued
Halfway up the Canyon

Although never connected to the mainland by a land bridge, the four northern islands were once part of the Pleistocene 'superisland' known as Santarosae, nearly four times as large as the combined areas of the modern Channel Islands. The contour line labeled "20" on the map depicts ancient coast of Santarosae and California around 20,000 years ago when sea level was 100 meters (approximately 350 feet) lower than it is today. As the ice sheets and glaciers melted and the sea level rose, only the highest parts of Santarosae remained as modern islands. (Adapted from a map by geologist Tom Rockwell)

Around 5 million years ago, compressional forces, caused by the ramming of Baja California into southern California, resulted in folding and faulting of these marine sediments and volcanic rocks (deposited between 15-30 million years ago) and the eventual uplift of the islands. These compressional forces are still ongoing, making this area geologically active today. Earthquakes are quite common. A major fault that runs through the center of the island has moved nearly 1000 feet in the last 30,000 years, and all the islands continue to be uplifted.

Ever since these compressional forces caused the islands to emerge from the sea, they have been separated from the mainland. For decades, scientists assumed that the two were connected by a landbridge, but as bathymetric information (or topography) of the sea floor improved, it revealed that even during periods of lowest sea levels (about 17,000 years ago), the islands still remained isolated by at least four miles of ocean. It is this continuous geographical isolation that has shaped island life.

An Ideal Isolated Island Home
Cavern Point

A cool, salty mist fills the air as you approach Cavern Point. The ever-present western gulls and graceful pelicans often can be sighted soaring along the steep, rugged volcanic cliffs. These cliffs, their numerous caves, and the rest of Santa Cruz Island's coastline and neighboring islets are home to eleven different species of nesting seabirds and shorebirds, including ashy storm-petrels, Brandt's cormorants, Cassin's auklets, pigeon guillemots, and black oystercatchers.

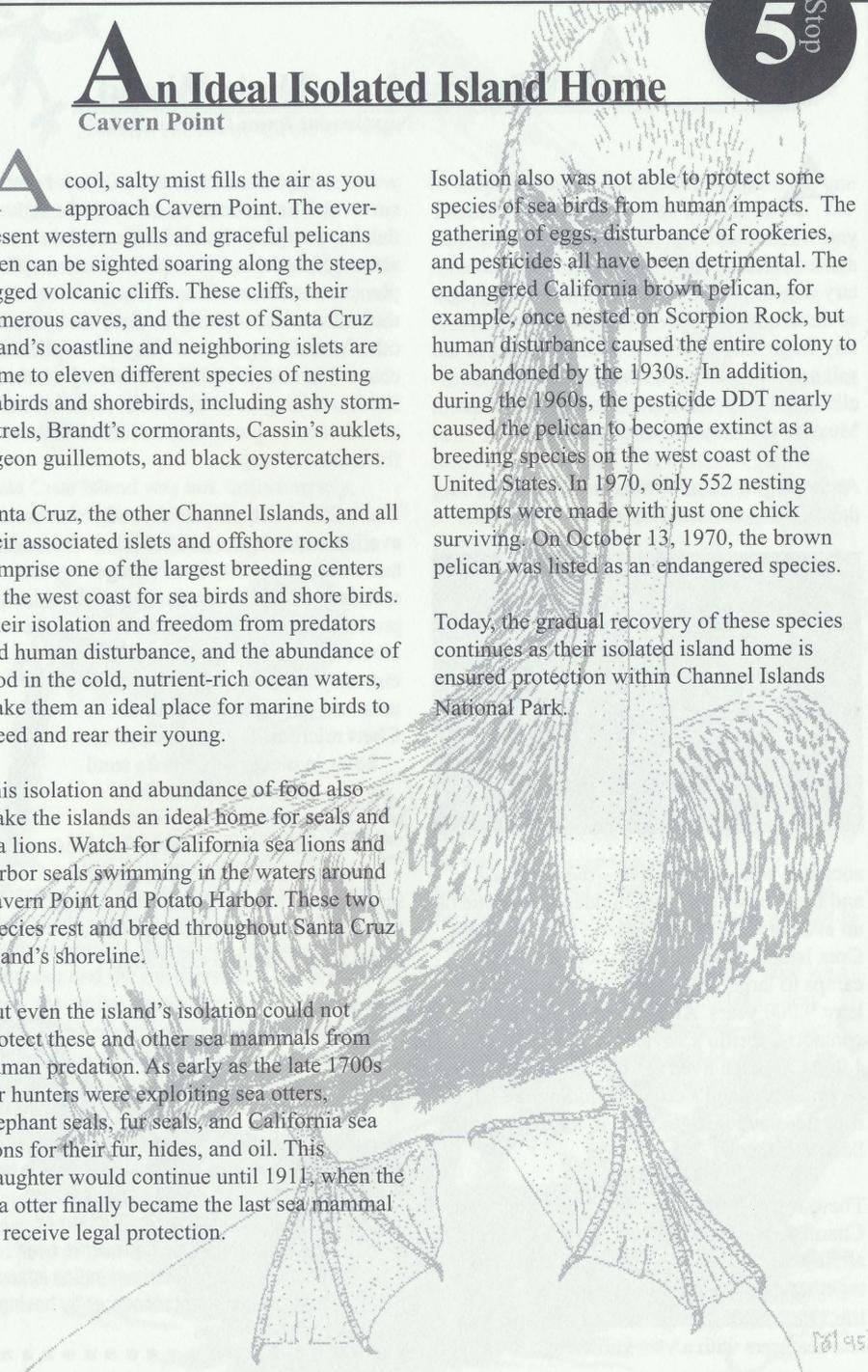
Santa Cruz, the other Channel Islands, and all their associated islets and offshore rocks comprise one of the largest breeding centers on the west coast for sea birds and shore birds. Their isolation and freedom from predators and human disturbance, and the abundance of food in the cold, nutrient-rich ocean waters, make them an ideal place for marine birds to breed and rear their young.

This isolation and abundance of food also make the islands an ideal home for seals and sea lions. Watch for California sea lions and harbor seals swimming in the waters around Cavern Point and Potato Harbor. These two species rest and breed throughout Santa Cruz Island's shoreline.

But even the island's isolation could not protect these and other sea mammals from human predation. As early as the late 1700s fur hunters were exploiting sea otters, elephant seals, fur seals, and California sea lions for their fur, hides, and oil. This slaughter would continue until 1911, when the sea otter finally became the last sea mammal to receive legal protection.

Isolation also was not able to protect some species of sea birds from human impacts. The gathering of eggs, disturbance of rookeries, and pesticides all have been detrimental. The endangered California brown pelican, for example, once nested on Scorpion Rock, but human disturbance caused the entire colony to be abandoned by the 1930s. In addition, during the 1960s, the pesticide DDT nearly caused the pelican to become extinct as a breeding species on the west coast of the United States. In 1970, only 552 nesting attempts were made with just one chick surviving. On October 13, 1970, the brown pelican was listed as an endangered species.

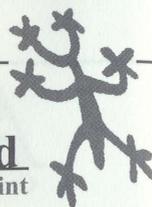
Today, the gradual recovery of these species continues as their isolated island home is ensured protection within Channel Islands National Park.



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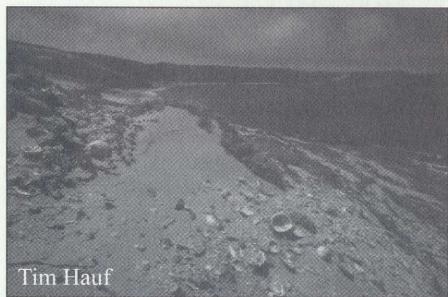
A Window Into Their World

Northwest from Cavern Point



As you return from Cavern Point and head off to the right (southwest) you will see a change in rock type—from the darker volcanic rocks to a lighter, sedimentary deposit. Look carefully without digging or disturbing the area and soon you will see tiny fragments of broken shell glittering in the soil and a pile of shells falling out from the cliff edge. How did these shells get up here? Must be the ocean at work—or is it?

Archeologists identify this as a “midden,” a debris pile containing remnants of those



Tim Hauf

societies who came before—the Chumash and their ancestors. This midden is just one of an estimated 3,000 prehistoric sites on Santa Cruz Island, ranging from small temporary camps to larger villages and dating back at least 9,000 years. At the time of European contact (Cabrillo’s voyage in 1542), at least 1,200 Chumash lived in 10 villages distributed around the island’s coast, including the largest historic island village, Swaxil, located near the Scorpion ranch.

These midden sites offer us a window into the Chumash world. By examining these sites, archeologists and anthropologists can piece together a picture of their ancient island life. The Chumash were skilled crafts people and seafarers with a vast knowledge of the

world around them and how to use it for their survival. The predominance of shells and fish bones within the midden reveal that although the islanders exploited terrestrial plant resources, such as acorns and cherries, they subsisted primarily on fish, shellfish, and other marine organisms. They often plied the channel in search of this rich variety of marine food, traveling in swift *tomols* (canoes) made of redwood or pine planks caulked with tar from natural seeps.

The midden also reveals that other items not available in this isolated island environment had to be traded for, from villages on the mainland or other islands. One of the principal products manufactured and traded by the islanders was shell beads, which were the currency of trade in the Chumash area and throughout California.

Chert microdrills were used to bore holes in pieces of *Olivella* snail shells to produce these beads. Not only did the islands have an abundance of *Olivella* shells, but, even more importantly, eastern Santa Cruz Island had considerable natural deposits of chert, a hard durable silica rock.



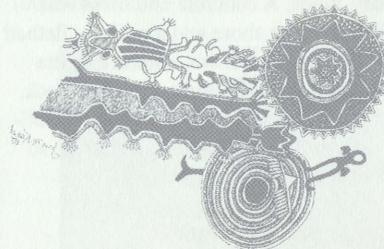
Taking from or disturbing of any archeological site or artifacts is a violation of state and federal law. Help preserve over 13,000 years of Native American Indian island culture and other cultural resources by having respect for these sites.



continued Northwest from Cavern Point

Eastern Santa Cruz Island was the center for manufacturing chert microdrills, as this location had the only chert of proper type and quality for such tools within coastal Chumash territory. One particular site contains evidence of the highest density of microdrill production in North America. Other sites on Santa Cruz have been labeled by archeologists as “bead factories,” with amazing amounts of discarded drills and bead debris.

Santa Cruz Island was not, unfortunately, isolated enough to protect the Chumash from the diseases the Spanish brought with them



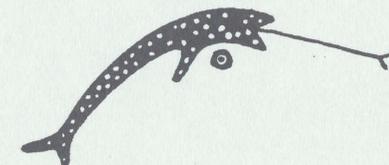
This is why Channel Islands National Park was established by Congress in 1980—to protect, preserve and teach us about the islands’ unique past and fragile resources, including: the island Chumash and the ranchers who came after them; the native plants that are struggling to recover; the complicated geologic story; the pinnipeds, sea birds and shore birds that depend on these isolated islands for survival; and the wide variety of other natural and cultural resources not mentioned in this trail guide. By understanding these resources and the role isolation plays on these islands, we can avoid repeating the mistakes of the past and help preserve them for future generations to study and enjoy.

as they began colonizing California in the late 1700s. By the early 1800s, the island Chumash population had been devastated by measles and other introduced epidemics. The last of the Chumash islanders would leave their traditional island home in 1822.

Although much has been lost, enough remains to remind us of this unique part of the island’s past. These archeological sites, along with today’s descendants of the island Chumash, give us a window into this ancient world and remind us on another level how important and sacred these isolated islands are.

Protecting the Islands

But the National Park Service needs your help as well. We encourage you to explore and learn more about Santa Cruz Island and the rest of the Channel Islands. We ask you not to stop there, though. In recognizing the importance of these islands, please take your awareness to the action level. Make every effort to safeguard—to preserve—the plants, animals, and cultures found not only within this park, but throughout the world as well.



SCORPION RANCH AREA

Place Name

It is unclear how Scorpion was named; it may be the shape of the valley or the fact that there are small scorpions present.

Pier

Prior to the construction of the first pier at Scorpion Harbor, small boats, or "lighters," were used to offload supplies. According to John Gherini in his book *Santa Cruz Island: A History of Conflict and Diversity*, "The freight was unloaded onto a pontoon, and a heavy rope ran from the schooner to a deadman on the beach. The crew working on the pontoon would guide it to shore as a team of horses on the beach would pull the lighter ashore."

Eventually a pier was constructed in the center of the beach at Scorpion Harbor in the early 1930s, using the thick trunks of eucalyptus trees as pilings for the wharf. "With a pier in place," states Gherini, "ranch hands herded the sheep (about 1,000 to 1,500 annually) onto the rickety wharf, through the wooden corrals and into the loading chute which hung precariously over the side of the pier. The sheep often leaped from the chute onto the boat which frequently moved with the surging currents. The boat, loaded with sheep, sailed for Santa Barbara with deckhands moving among the packed sheep and lifting up the animals who had fallen to prevent them from suffocating. The trip ended at Stearns Wharf

where the sheep were off-loaded. In later years, the boats cruised down to Port Hueneme in Ventura County, which was better equipped to handle livestock. From the mainland ports, the sheep were moved into waiting trucks and driven to the livestock yards and slaughtered for meat."

After this first pier was destroyed by winter storms, Pier Gherini constructed a combination concrete and wood wharf in 1938 and, later, a steel pier was erected in 1966. Violent winter storms destroyed the wharves, no matter what the design. In summer 1999, the National Park Service took its turn at building a pier. The revenues from the recreational and concession fee programs provided the necessary funds. A concrete abutment was constructed on the shore and a military flatbed railroad car was laid down, connecting the new abutment to the historic concrete block. This pier has increased safety and accessibility on eastern Santa Cruz Island and has, so far, survived the winter storms.

Flooding in Scorpion Valley

The El Niño event of 1997-1998 had a devastating impact upon the Scorpion Ranch area. During the night of December 5, 1997, over 12 inches of rain fell on eastern Santa Cruz Island, sending over one billion gallons of water down the valley in which you



are standing. Flood waters crested at almost four feet above the valley floor, inundating the area with mud and alluvial deposits over two feet thick. This torrent destroyed the campground and caused extensive damage to trails, property, and the structures in the historic ranch area. The storms swept away the historic blacksmith shop, barn, and moved the wooden bunkhouse (1918) 30 feet off its foundation.



Preservation work on the historic ranch features is still in progress. After repairs are completed, the two-story ranch house will be opened to the public.

Two-Story Ranch House

According to early unpublished maps and diaries researched by John Gherini in his book, the ranch at Scorpion was in full operation by 1885 with a work force of 8 to 12 men. Scorpion Ranch played a significant role in the development of Justinian Caire's island-wide enterprise:

"Early maps depict many buildings, sheds and other structures at the Scorpion ranch including a residence, wood sheds, carpenter shop, a blacksmith shop, baking ovens, wool sheds, a bakery, a granary, a general storage building, a *matanza*, a butcher shop, tallow furnaces, a garden store, barns, stables, corrals, a wagon shed, a chicken yard, wells, windmills, a water tank, water troughs, and a concrete reservoir..... [and] vineyards and large vegetable gardens."

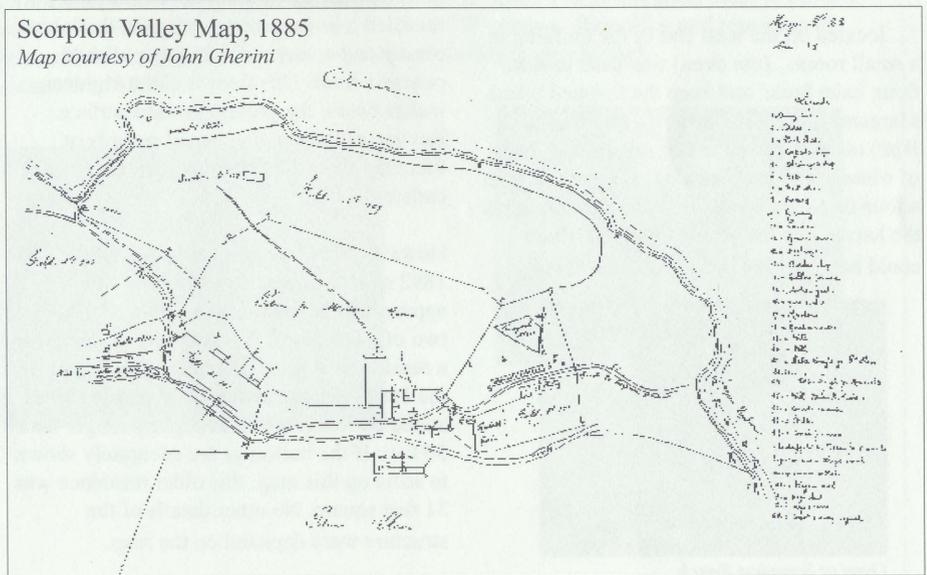
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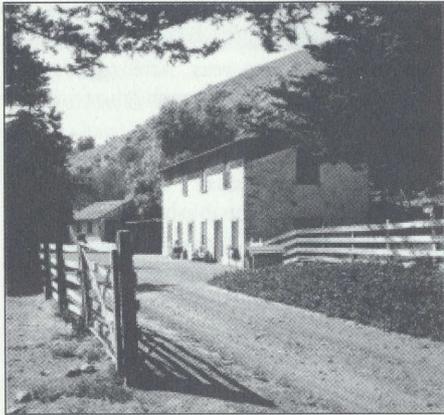


Scorpion Valley and the first wharf built at Scorpion Harbor in the 1930s. (Photo courtesy of John Gherini)

Scorpion Valley Map, 1885

Map courtesy of John Gherini

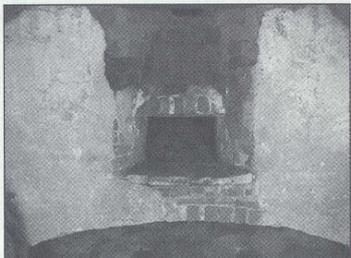




Scorpion Ranch house as it appeared in 1960.
(Photo courtesy of John Gherini)

The first reference to the still standing two-story ranch house was made in 1887, by the company foreman, when he wrote in his diary that there is "work on the attic of the new house." Although often referred to as an "adobe," ranch staff built this building of rubble masonry, using island rocks held together by a lime and cement mortar. Only part of the interior walls are constructed of adobe blocks. Gherini describes the bread oven as one of the most prominent features of this building:

"...located on the west end of the building in a small room...(the oven) was used to store flour, bake bread and keep the finished bread. Margaret Eaton (in *Diary of a Sea Captain's Wife*) observed that the large oven was made of white bricks and had a large iron door. With a four-foot-long wooden spatula, the cook put the loaves into the piping hot oven which could bake twenty-five loaves at a time."



Oven at Scorpion Ranch

Although this room is no longer used for bread making, it still has an important role in providing the appropriate environmental conditions (temperature, light, access, etc.) for a winter and maternity roost (spring-summer) for Townsend's big-eared bats. With the species in decline in general, and with recent documented loss of maternity colonies in California, maintenance of this colony and protection of the roost site at Scorpion is important for conservation of the species in California.

This historic ranch house is currently being rehabilitated with special efforts being made to protect this roosting site. The downstairs will be opened as a museum and visitor contact station in the near future.

Bunkhouse

The existing wooden bunkhouse dates from the summer of 1918, when lumber, windows, and five carpenters were brought to Scorpion Ranch. By the end of the year, island hands were painting the new bunkhouse. After this building floated thirty feet downstream during the El Niño flood of 1997, an archeological test pit was excavated near the original northeast corner of the foundation. This test revealed a low masonry wall with thick lime plaster and a very solid, highly polished concrete floor. This floor is about eighteen inches below the present ground surface. Review of the existing island records or literature did not reveal any mention of an earlier building.

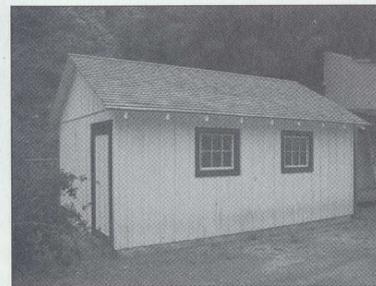
However, three maps, dated 1876, 1885, and 1892 show a square structure in what appeared to be the same location. On the later two of these maps, this structure is labeled as a residence. None of the maps has a scale, but the 1892 map shows the existing two story adobe building, which is slightly longer than 50 feet. If the buildings are accurately shown to scale on this map, this older residence was 31 feet square. No other details of the structure were depicted on the map.

According to rainfall records on the mainland, the winter of 1917-1918 was an extremely wet year. It is possible that this older building was destroyed in flooding and then, in the spring of 1918, the current wood bunkhouse was constructed in its place. The park is in the process of repairing and preserving this historic structure.



Storage Shed

This small shed is similar in construction to the 1918 bunkhouse and is believed to have been constructed at the same time. It houses a generator that was used to provide power to the ranch and was also used for storage. The building was extremely deteriorated due to termite damage and slumping of the hillside against the back wall. The National Park Service substantially rebuilt the shed during the summer of 1999.



Caves

According to Gherini, early island maps show that the volcanic caves within the ranch area were used as "dairy caves" to store dairy products. Prior to refrigeration, the caves offered the coolest place on the island for these items. Doors were often constructed at the entrance way to protect the food from animals such as mice, foxes, ravens, and skunks. Today, Townsend's big-eared bats sometimes roost in these small cavelets.



Outhouse

The small 2-hole outhouse dates to the late 19th century. Reroofing and repairs to the building are planned.



continued on next page

Implement Shed

In 1998, archeological excavations around and within this building revealed artifacts and materials that suggested that this may have been the location of the "forge" or blacksmith shop shown on an 1892 map. In addition to a distinct layer of ash that was discovered, the excavation also revealed other materials that easily could be associated with the craft of blacksmithing, including bits of charcoal, fused and oxidized metal, chunks of mixed ash, charcoal debris, several horse shoes, nails, and a pair of rusty pliers. Built sometime between 1885-1892, this shop is one of the oldest wood buildings on the east end of the island.

Despite being built on a small bench above the flood plain, years of flooding and deposition had caused the structure to tilt significantly to the south and in May of 1998 it was on the verge of collapse. The National Park Service stabilized the building and added a new roof to preserve it.

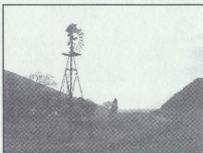
Today, this shop helps to remind us of the unique island ranching operation and the important role that blacksmiths played in it. With the nearest mainland blacksmith over 25 miles away, it was essential to have working shops on the island to repair the equipment, fix and sharpen tools, and shoe horses.

**Eucalyptus Trees**

The Scorpion Valley eucalyptus trees were planted in the 1880s for shade, fuel, pier pilings, and other building projects.

Scorpion Water System

The Scorpion Ranch area depended upon a water system, constructed in the 1880s, to provide water for the ranch operation. The system included three hand-dug wells (approximately 30-35 feet in depth and lined with stone), a windmill and adjacent 3,000 gallon water tank (across the road but no longer there), a covered reservoir capable of storing 26,000 gallons (located on the hill next to the first campsite) and several concrete watering troughs. The water tank and reservoir were at the same elevation so one could overflow into the other.

**Private Telephone System**

Scorpion and Smugglers were part of a system of 10 out-ranches developed by Justinian Caire over the entire island. "Because of the widespread locations and the topographical separation of the areas of operation, Justinian Caire established the largest known private telephone system so that there could be communication from the outlying ranches to the Main Ranch. His workers took four years (1885-1888) to build the communication system. The company installed hand crank telephones powered by 1.5 volt batteries at different locations." (Gherini, p88) There were phones at both Scorpion and Smugglers and you can still see some of the telephone poles on the Montañon ridge.

***Farm Implements**

For information about the historic farm equipment, please refer to a separate bulletin entitled "Farm Implements" available at Scorpion Ranch near the implements shed or at the mainland visitor center.

References: *Santa Cruz Island: A History of Conflict and Diversity*, John Gherini, 1997.

DRY STONE MASONRY STRUCTURES

Dry stone masonry structures (retaining walls, check dams, stone piles) are found throughout Santa Cruz Island. Over 200 of the structures are located on the east end of the island. These features were constructed by Italian stone masons between 1880 and 1900 for the Justinian Caire family, which owned the island. Although the work was probably carried out by both skilled stone masons and less skilled workers, as differences in quality can be detected in the various structures, the masonry involved has been examined by experts and has been judged as "good quality work, built to high standards."

Retaining Walls and Check Dams

Retaining walls were constructed for road support and erosion control. The early records of the various ranch foremen describe these projects. The stone retaining wall supporting the road out of Scorpion Valley towards Smugglers Cove is notable for its massive size, the large size and number of rocks used to build it, and the difficulty of constructing such a large structure in its steep hillside location. Walls are still visible today along the Scorpion and Smugglers stream beds and along the Cavern Point trail.



Historic rock wall along Scorpion Valley stream bed



Check dams were built in the drainages leading into the developed valleys to slow the force and amount of water entering these valleys and to capture the eroding sediment. Evidence of flooding at Scorpion Ranch has been found as far back as 1916; the dams were an effort to protect the ranch structures from erosion and flooding. Some of the best examples of these dams can be found along the trail to Cavern Point.

Many of the retaining walls and check dams have deteriorated over time from erosion, flooding, and lack of maintenance. In an effort to preserve this slice of history, the National Park Service began repairing these dry stone structures on the east end of the island during the summer of 1999. Efforts were focused on structures that required minimal repairs, structures that could function to prevent or slow flooding and erosion, and structures in areas of high visitor visibility, such as the check dams along the Cavern Point trail. Nearly 100 retaining walls and check dams were repaired during this period.

Stone Piles

"To make better use of the land, workers cleared the fields of rocks; then piled the huge rocks into cairns which remain today as a monument to their labor," wrote Gherini about the large rock piles that can be seen as one hikes along the road to Smugglers Cove. The "better use of the land" Gherini writes about is the planting of a variety of crops such as wheat, corn, potatoes, beans, barley, onions, hay, and alfalfa in these cleared fields between Scorpion and Smugglers. These crops supplied many of the food products and hay for the island operation and led to the east end of the island, known as the "granary."



SMUGGLERS COVE

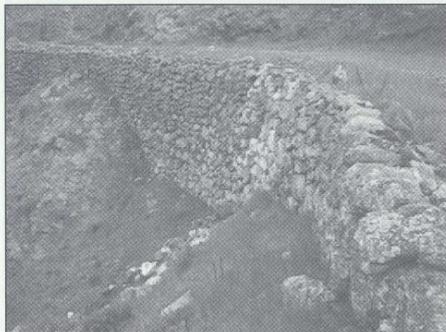
Place Name

Smugglers Cove received its name because there was wide spread smuggling around the back side of the island by sea otter traders and others, known as *contrabandista* during both the Spanish and Mexican years (1769-1848).

Road

Construction on the road between Scorpion Valley and Smugglers Cove began in 1892. This was not the original road, however. An older road had been built farther up Scorpion Canyon, but was determined to be unsatisfactory due to washouts from the rains. Parts of this road are still visible today.

According to Gherini, "In early June 1892, laborers began work on the new Scorpion road located on the side of the Scorpion Valley hill near the beach. The hill had large outcroppings of volcanic rock. The foreman described the work as 'lavora alla pietra' (work at the rock). This work continued until the end of November 1892 and involved as many as thirteen workers a day. Usually the daily work crew consisted of nine to ten workers....map 92, dated 1892, indicated for the first time that there was a road at this location leading out of the Scorpion Valley to Smugglers. The rock walls built to support the road were the largest rock walls built on the island. When Margaret Eaton first observed the road-work in 1909 she quipped, '... Some stonemason who knew his business built that road.'"



Oil Well

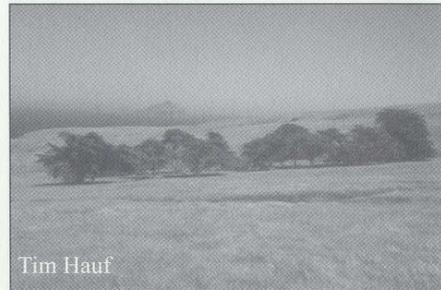
The oil well that is visible from the road was drilled by Atlantic Richfield in 1966. This exploratory well yielded water instead of oil. Although the Gherinis would enter into a lease with Union Oil in 1969, the devastating Union Oil spill in January of 1969 off the coast of Santa Barbara mobilized the environmental movement against further oil exploration on the island.



Tim Hauf

Delphine's Grove

Delphine Caire, oldest child of Justinian Caire, was extremely fond of cultivating young trees, including the cypress grove (early 1900s) that is visible from the road. Although there was no water up in this area, the young trees survived and became known as "Delphine's Grove."



Tim Hauf



Tim Hauf

Ranch House

While Scorpion Ranch was the headquarters for the east end island operations, Smugglers Ranch served as an outpost for laborers who worked in the olive orchard and the vineyards located in Smugglers Valley. Although early maps show a residence at Smugglers as early as 1885, the building bears the date "1889." Like the two-story ranch house at Scorpion, the Smugglers ranch house often is referred to as an "adobe," despite its construction of rock masonry with only its interior walls made of adobe. The quarry for the limestone used in the construction of the ranch house and other structures can be seen off the west corner of the house. According to Gherini, early maps show that the ranch facility consisted of "...a residence, a separate one-room building for the foreman, a cookery, a bake oven, a tool shed, a supply shed, a stable, a well, a hog corral and water closets." The rehabilitation of this historic area is in progress.

Eucalyptus and Olive Groves

The eucalyptus trees around Smugglers Ranch were planted in 1887 under the direction of Justinian Caire. In addition, he had his company plant fig, walnut, plum, chestnut, orange, and acacia trees. The olive grove also was planted around 1887 and according to Gherini "...demonstrates Caire's intent to make maximum use of the island's resources."

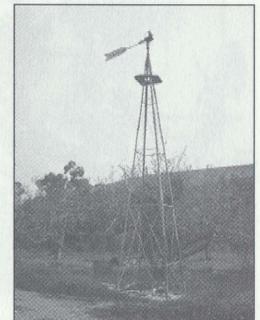
"In 1885, the *Santa Barbara Daily Independent* reported that the olive industry was attracting attention and that California was the only state that had a suitable climate for olives. The newspaper article pointed out that olives did well in dry, rocky soil unusable for other crops or grazing of animals. This helps explain why Caire planted olive trees on the island. The island company probably harvested and produced the fruit for both island consumption and occasional sales. The olive grove, which has been unattended for years, still remains at Smugglers."



Tim Hauf

Windmill and Well

The windmill was constructed over a stone-lined well, which was probably constructed in the 1880s. Projecting stones form steps down into the well—a common European construction technique. In contrast, the three wells at Scorpion have no stone steps.



References: *Santa Cruz Island: A History of Conflict and Diversity*, John Gherini, 1997.

SCORPION BLUFFS

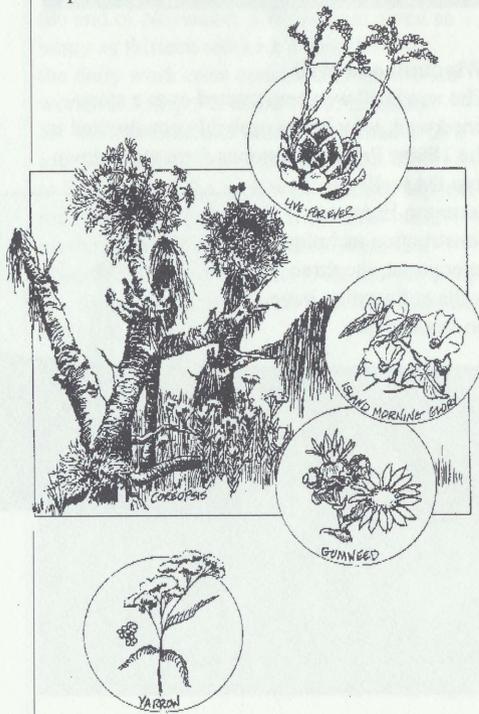
Living on the Edge

Before sheep, cattle, and pigs were introduced to the island, a lush plant community, including such plants as the island morning glory, island monkey flower, live-forever, island buckwheat, yarrow, coastal sagebrush, gumplant, and goldfields, covered the marine terraces upon which you now are standing. Once, huge stands of giant coreopsis blanketed the bluffs, emerging every spring from their summer dormancy with thick green foliage and bright, yellow flowers. But years of grazing left these plants literally living on the edge, growing only on the inaccessible ocean cliffs below you. On The Nature Conservancy portion of the island, where the sheep have been removed since 1985, the coreopsis and other plants have spread beyond the cliffs and established themselves in many parts of the island. With the removal of the sheep, and the planned removal of the pigs, we hope that the east end of the island will experience a similar revival of native flora.

Mixing of Waters and the Diversity of Marine Life

The Channel Islands lie within a large embayment known as the Southern California Bight—an area just below Point Conception where the California coastline turns sharply to the east. Within this area, the sea floor is comprised of canyons, banks, escarpments, sea mounts, and deep basins (the Santa Cruz Basin off the island's south coast is deeper than the Grand Canyon). Nutrient-rich waters upwelling from these depths mix and mingle with cool waters from the north (California Current) and warm southern waters (California Countercurrent), creating the Santa Barbara Gyre—a swirling eddy that circulates nutrients and supports a wealth of marine plants and animals, from giant kelp forests and blue whales to tiny crabs and plankton. Here northern and southern species overlap, creating a transition zone between the Oregonian and Californian marine biogeographic provinces. Santa Cruz Island lies in the middle of this transition zone. The western half of the island harbors numerous northern species, while southern species are more common on this eastern end of the island.

Santa Cruz also serves as the meeting ground for sea birds and shore birds that rarely occur together, such as black oystercatchers from the north and American oystercatchers from the south. Both species, as well as hybrids between the two, have nested at Fraser Point on the island's west end. Other northern birds, such as pelagic cormorants and pigeon guillemots, overlap with additional southern species, such as Xantus' murrelets and California brown pelicans.



POTATO HARBOR

Diatomaceous Earth

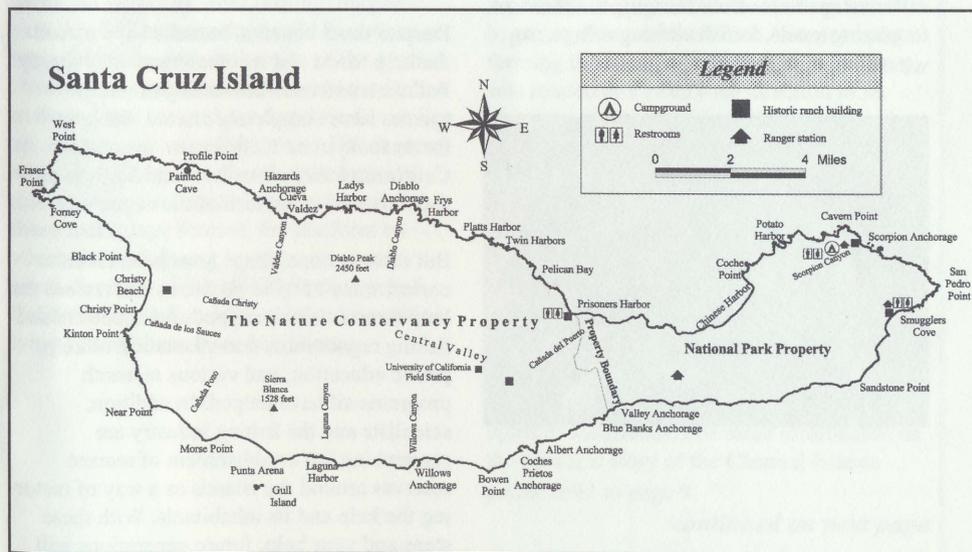
As you follow the road to Potato Harbor, you will notice areas of bright white sedimentary rock that have been exposed on the hillsides due to erosion. This is the same rock type that is evident along the Cavern Point trail. It is known as diatomaceous earth. It is derived from very small single-cell sea plants called diatoms, which are made of silica (silicon dioxide). As these plants die, their silica skeletons settle down to the various marine sediments at the bottom of the ocean, often enmasse. Diatomaceous earth is mined throughout the world for use in filters, such as pool filters, and as an insecticide.

Please refer to page 9 for more information on diatomaceous earth.

The Rest of Santa Cruz Island

Once you have reached the overlook at Potato Harbor you can probably guess as to how this harbor received its name—its oval shape resembles that of a potato. From the overlook you also have a magnificent view to the west and the rest of Santa Cruz Island. Santa Cruz is the largest island off the west coast of the U.S. At 96 square miles, around 62,000 acres, it is about four-times the size of Manhattan. Nearly 75 percent of the island is owned by The Nature Conservancy, a private, non-profit organization, with similar goals as the National Park Service—the preservation of the islands' natural resources. The National Park Service and The Nature Conservancy work together to ensure the protection of these island resources.

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The Giant Kelp Forest.

From this vantage point, one also has the opportunity to gaze upon another part of the park—the marine environment. One nautical mile of water around each island in the park is part of Channel Islands National Park.

Within this ocean realm below one may be able to see or hear California sea lions. These playful animals are often spotted just to the west of Potato Harbor, hauled-out on the rocks. Sea lions, along with a variety of other marine species, depend upon the extensive kelp forests that can be found around Santa Cruz and the other Channel Islands. While urban and industrial development has altered much of the southern California coastal mainland, the islands contain the most undisturbed stretches of coastline in this region, providing some of the best conditions for kelp forests and their inhabitants. Kelp is a type of seaweed that, under ideal conditions (cold, nutrient-rich water), is one of the fastest growing plants on earth—it can grow 2 feet per day. This foliage provides food, shelter, and protection for over 800 different species—from foraging nudibranchs, to grazing snails, to fish seeking refuge, to whales seeking a plankton snack.



But we must not forget about ourselves. Not only do we feed upon some of the animals that depend upon the kelp forest, but those of us who eat ice cream, salad dressing, and even use tooth-paste are all using a little bit of kelp as well. Kelp is harvested for a natural ingredient called *algin*, which is used as a suspending, stabilizing, emulsifying, gel-producing, and film-forming additive in more than 70 commercial products. In addition, marine plants such as kelp provide the earth with 75 percent of its oxygen.

Despite these benefits, humans have placed the kelp forest and its inhabitants in jeopardy. Pollution and over-harvesting of marine species have completely altered the kelp forest ecosystem. Kelp forests in southern California today cover less than half the area they covered at the turn of the century.

But there is hope. Steps have been taken to correct some of these problems and restore the kelp forests. Improved pollution controls and fishing regulations, transplantation of kelp, public education, and various research programs all have helped. In addition, scientists and the fishing industry are researching the establishment of marine reserves around the islands as a way of restoring the kelp and its inhabitants. With these steps and your help, future generations will have a chance to experience this wonderful marine world of the giant kelp forest.

SCORPION CANYON

Volcanism

Above the canyon lies a layer of the Monterey Formation, a siliceous shale. Within the canyon, erosion has exposed the volcanic rocks lying underneath. These rocks reveal a fascinating story about the formation of the Channel Islands. Between 15-30 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. In some places the lava accumulated to as much as 10,000 feet thick. A certain type of lava, pillow lava, found in some of these rocks is evidence that much of the volcanic action took place below the surface of the ocean. In other places, oyster shells and other marine fossils are found embedded in the lava. At times, the buildup of lava was great enough that volcanic islands formed. These islands probably were short lived and were eroded to below sea level after the volcanic action ceased.

The reason for these volcanic eruptions can be found within the magnetic particles in the rocks. As the rocks were cooling, magnetic particles within the rocks would have been set in line with the magnetic poles of the earth. However, magnetic measurements now taken in these same rocks show that they do not line up. In fact, they are off by about 100 degrees, with the oldest rocks showing the largest discrepancy. Geologists believe that when these rocks were formed, the platform on which the islands rest lined up in a north-south direction along the southern coast of California, with San Miguel Island's position lying just offshore from San Diego.



As the Pacific plate made contact with and began to slide past the North American plate, forming the San Andreas fault, this platform was rotated in a clockwise direction to its present east-west position. As it rotated, the crust of the ocean thinned and the resulting reduction of pressure allowed molten magma to form and ascend from the mantle, erupting under the sea as lava.

Around 5 million years ago, compressional forces, caused by the ramming of Baja California into southern California, resulted in folding and faulting of these volcanic rocks, a variety of marine sediments, and the eventual uplift of the islands. For more information on the geologic story of the Channel Islands please refer to page 9.

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Native Plants

With the islands never being connected to the mainland, plants, seeds, and spores over millions of years were carried from the mainland by ocean currents, wind, birds or in the fur of animals that reached the islands. Due to continuous isolation from the mainland, many plant communities on the islands are unique, including the absence of some common mainland species and the presence of many *island endemics* (a species that grows naturally only on one or more of the Channel Islands).

Since the Chumash did not practice agriculture, they used these native plants as a primary source of food and medicine. Native plants also provided important construction materials for canoes, houses, bows, arrows, nets, baskets, beds, clothing, footwear, ornaments, and a variety of other items used in daily life.

With the sheep now removed, many native plants are spreading beyond the steep canyon walls and cliffs where they remained protected from grazing for nearly 150 years and reestablishing themselves throughout the island. Take time to look carefully and you should see some of the following species.

Toyon

Also known as Christmas berry or California holly, this plant is an evergreen chaparral and coastal sage scrub species that grows on all of the larger islands and on the mainland as well. Due to sheep grazing and fire suppression, toyons on the island are more tree-like than most found on the mainland.

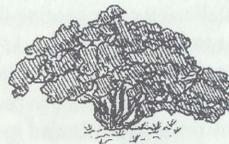


During the summer and fall the small flowers decorating the tips of the branches give way to clusters of bright red berries. During the winter, these berries provided an important food supply for birds as well as for the Chumash.

The Chumash roasted toyon berries or let them wilt in the hot sun before eating. Toyon was also a valuable source of hardwood for manufacturing a variety of implements such as arrows, harpoons, fish spears, digging sticks, and gaming pieces. The Chumash often used heat or steam to shape and form objects made from toyon and other hardwoods. For example, bundles of toyon arrows were steamed in earth ovens to make the rods pliable; the shafts were then straightened and allowed to dry. After drying, the arrows were trimmed to the proper size, the points shaped and hardened in hot ashes, and feathers added.

Island Scrub Oak, Coast Live Oak, and Island Cherry

Island scrub oak is a short, thin-branched tree with flat, smooth-edged leaves that

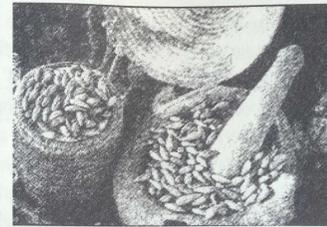


Island scrub oak

are rich green on the upper surface, and a dull gray underneath. Coast live oak is much taller and stouter than scrub oaks with spiny-edged, cupped leaves and "hairy armpits." Turn over one of the leaves and look for a small, fuzzy white patch where some of the side veins of the leaf join the central vein.



Coast live oak

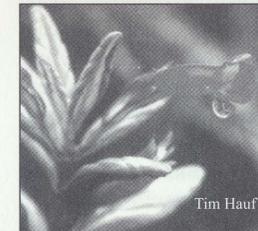


The acorns from these oaks, along with those from seven other species that grow on Santa Cruz Island, were an important food source for the island Chumash and many other California Indian groups. Each fall acorns were gathered, hulled, dried, and stored in large granary baskets. When prepared, acorns were ground into meal, leached to remove the tannic acid and bitter flavor, and cooked into mush. Other seeds and herbs may have been added to enhance the (generally bland) flavor.

Although the island Chumash gathered acorns, oaks are less abundant on the islands than on the mainland. To increase their supply of acorns and other medicinal and food plants, the islanders engaged in trade or undertook gathering expeditions to the mainland. The island Chumash also compensated for the short supply of acorns by substituting other plant foods in their place. One important alternative was island cherry. Most often, island cherry grows as a large shrub. However, in deep, moist soils and sunshine it can grow to a forty-foot tree. This plant blooms from spring through early summer; when ripe, the fruit ranges in color from dark purple to black and is characterized by a large seed and pulpy flesh. In addition to eating the pulp, the pits were boiled in several changes of water to release the toxic chemicals. Then the pits were mashed to the consistency of refried beans.

Monkey Flower

Monkey flower is common in chaparral throughout California. Known as "sticky" monkey flower because the deep green leaves secrete a gluey substance, they bloom from January to May and were named for the monkey face that sometimes can be seen within the orange to pale yellow flowers. A mainland species, endemic island species, and a hybrid between the two occur here on Santa Cruz Island. The island endemic species differs from the mainland species in the lack of sticky leaves and its bright red flowers. The hybrid

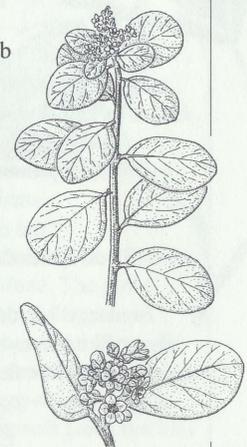


Tim Hauf

produces peach or bronze-colored flowers. These plants are commonly seen on rock walls where the non-native animals could not reach.

Lemonade Berry

Lemonade berry is a shrub with thick, leathery leaves. Like many other chaparral plants, these leaves produce toxic compounds that leach into the soil, preventing seeds of other plants from germinating. The Chumash would steep the sticky, lemon-tasting berries in water to make juice, or they would suck on them like candy. One should be careful, however, since lemonade berry belongs to the same family as poison oak and can trigger a skin rash in those sensitive to it.



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Santa Cruz Island Ironwood

Thousands of years ago the Channel Islands had moister climate, as did much of southern

California. Different plant communities and different animals, such as pygmy mammoths, existed on the islands. The Santa Cruz Island ironwood is a reminder of this earlier environment. Fossil evidence indicates that ironwoods once grew on the mainland as far north as Washington and as far east as Nevada.

Today the ironwood grows only on islands in locations where conditions approximate California's earlier, wetter climate. Small groves of these trees are often found on Santa Rosa and Santa Cruz Islands, where they grow mostly in north-facing canyons cooled by fog.

In fact, fog is an important element in the ironwood's successful adaptation and survival.

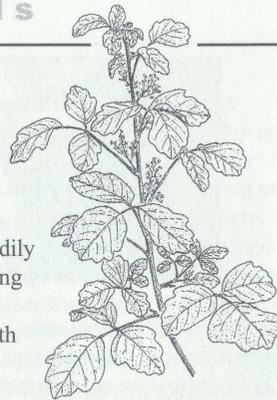
Moisture from fog collects on the leaves and drips down to the soil surrounding the trunk, thereby increasing the amount of water available to the tree.

This also helps to sustain the other larger tree species on Santa Cruz and the other islands.

Ironwood has dark green, highly serrated, finger-like leaves and in summer produces many small white flowers.

Poison Oak

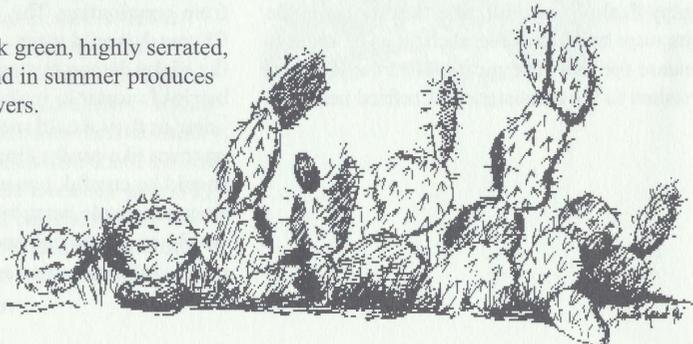
Poison oak grows on all of the Channel Islands except Santa Barbara Island, and is readily identified in spring as a three-leaved shrub or vine with bronze-green foliage. During late summer and fall the leaves turn a red or rust color, and white berries develop. **Poison oak can cause painful allergic reactions and rashes if it comes in contact with the skin. Please do not touch.** The Chumash used poison oak to treat warts, cankers, and skin cancer and to staunch blood flow.



Coastal Prickly Pear

The coastal prickly pear is a cactus that blooms in May and June, producing a shiny yellow flower with dense layers of petals. The plant's shallow root system spreads over a wide area to extract maximum moisture while its sharp spines reflect the sun and wind to help protect the plant from dehydration.

The spines also helped protect the plant from cattle, sheep, and pigs, allowing it to spread into the overgrazed sage scrub and grasslands. At the request of rancher Edwin Stanton, agricultural scientists from UC Riverside introduced cochineal insects

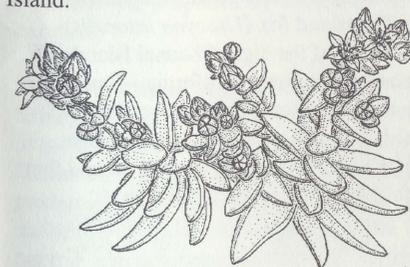


in an attempt to improve cattle-grazing conditions by controlling the native prickly pear. The cochineal insect appears as small, silvery white mounds on the cactus pads. These insects weaken and eventually kill the cactus by sucking sap from the plant. The cochineal greatly reduced the prickly pear stands, perhaps to below natural levels. This was one of the first successful biological control efforts in California.

The Chumash harvested the sweet prickly pear fruit and used its beet-red juice as a paint and dye. The long, sharp cactus thorns were used for decorative ear piercing and tattooing. Vertical and transverse lines were commonly tattooed on the cheeks and chin, although tattoo designs were applied also to the forehead, arms, and other parts of the body. To create a dark blue tattoo, the skin was pricked with a cactus thorn and the punctures rubbed with charcoal. When the wounds healed the pigment was sealed under the skin.

Dudleya (Live Forever or Hens-and-chickens)

Perhaps no plant is more versatile in adapting to different habitats than dudleya. These low-growing, fleshy succulents coated with a waxy coating commonly grow on dry, rocky outcroppings like the walls of Scorpion Canyon. However, they also can be found on stabilized sand dunes, grasslands, and scrub habitats in conditions varying from full sun to shade. This adaptability is reflected in the variety of dudleyas found on the Channel Islands, including three species on Santa Cruz Island.



Santa Cruz Island live-forever

Greene's Dudleya



Candleholder Dudleya



On these canyon walls one can find candleholder dudleya and Greene's dudleya. These Channel Island endemics also occur on San Miguel and Santa Rosa Islands. The third dudleya species, Santa Cruz Island live-forever, occurs just on Santa Cruz Island—nowhere else in the world—and it grows only on the island's western tip.

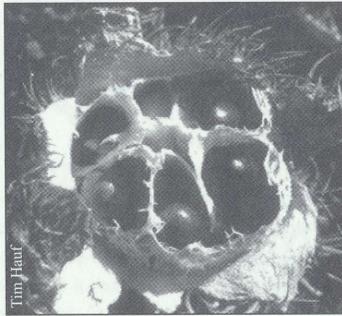
Wild Cucumber

Another plant that evolved to deal with the dry conditions of southern California (average rainfall on Santa Cruz is approximately 19 inches) is the vine-like wild cucumber that often can be seen along the hillsides in the oak understory. This plant has an immense, poisonous, fleshy root or underground tuber that stores water and nutrients.

Wild cucumber is one of the very first flowers to bloom from January to June. The plant sprawls over trees, shrubs and the ground, leaving a tangle of dried stems and leaves by midsummer. In spring, however, the wild cucumber forms a large, egg-shaped, bright green fruit covered with big soft green prickles that turn hard and spiny as the fruit dries.

continued on next page





Wild cucumber seeds

Inside are several large black seeds. The Chumash made necklaces of these seeds, polishing them along their oiled bodies. They were used also as marbles by Chumash children.

Other Native Plant Species

Other plants to look for within the canyon include lupine, the endemic northern island *hazardia*, sticky snapdragon, white everlasting, and three species of buckwheat, all endemic to the Channel Islands.

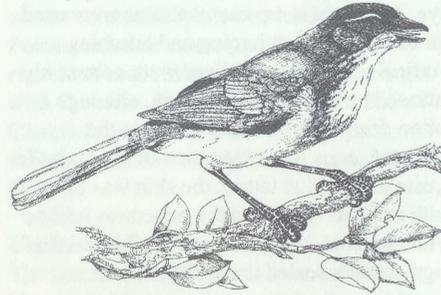
For more information on the plants of Santa Cruz Island please refer to page 7.

References (for native plant information):
 -*The Santa Cruz Island Interpretive Trail: Prisoners' Harbor to Pelican Bay*, The Nature Conservancy.

-*Native Plant Garden Guide to Island Chumash Indians Plant Usage and Native Plant Garden Guide to Island Plant Adaptations*, Channel Islands National Park.
 -*A Flora of Santa Cruz Island*, Junak, S., T. Ayers, R. Scott, D. Wilken, and D. Young, 1995.

Island Jay

The native vegetation found within Scorpion Canyon provides the perfect habitat for the endemic island jay. This vegetation begins about a mile up the canyon where it forks. Look carefully among the oak, cherry, and toyon trees for the jay, as it is often seen before it is heard in this area. The island jay is not found on any other island besides Santa Cruz. Its bright blue color, larger size (by one-third), and heavier bill distinguish it from its mainland counterpart and ancestor, the scrub jay.



This bird represents a case of island "gigantism." Lack of competition and predators has allowed this island species to exploit a much wider range of habitats and resources than mainland jays. On Santa Cruz, island jays range from oak woodlands and chaparral (where it behaves like the California thrasher, which does not occur on the island) into pine forests (where it replaces the absent Stellar's jay).

Island Fox

Island foxes occasionally are seen in Scorpion Canyon and around the campground area. The island fox (*Urocyon littoralis*) lives on six of the eight Channel Islands off the coast of southern California—San Miguel, Santa Rosa, Santa Cruz, Santa Catalina, San Nicolas and San Clemente. Each island has its own subspecies, and they are found nowhere else in the world.

The island fox is the largest native mammal on the Channel Islands, but one of the smallest foxes in the world. They average from 12 to 13 inches in height, 23 to 27 inches in length (including tail), and three to four pounds in weight—about the size of a housecat. This is nearly 20 percent smaller than its closest relative, the mainland gray fox (*Urocyon cinereoargenteus*). Similar in appearance to the gray fox, the island fox has a gray back, rufous sides (reddish-brown) and white undersides. There are distinctive black, white and rufous markings on the face. Island foxes tend to have more rufous coloring than the gray fox and have two less tail vertebrae. Unlike nocturnal gray foxes, which hunt at night to avoid predators, island foxes are active during daylight hours. As "generalist omnivores," they eat almost all available foods on the islands, including fruits, vegetation, insects, mice, and crabs. Mating takes place in February and March with pupping usually in April or May. Average litter size is two. The adult males play an important role in the raising of young.

Although geologists believe that the northern Channel Islands never were connected to the mainland, the fossil record shows the arrival of foxes at least 16,000 years ago. During the last ice age, 10–20,000 years ago, ocean levels were up to 400 feet lower than today's. The channel between the islands and mainland narrowed, perhaps to just four to five miles across. The northern islands became one large island we call Santarosae. Gray foxes could have "rafted" to this island on driftwood, propelled by a storm or currents.

The foxes adapted to their new island home, evolving into a dwarf, or smaller, form of the gray fox. Environmental and ecological factors such as overcrowding, reduction in predators, food limitations and genetic variations could have contributed to the natural selection for a smaller size. As the

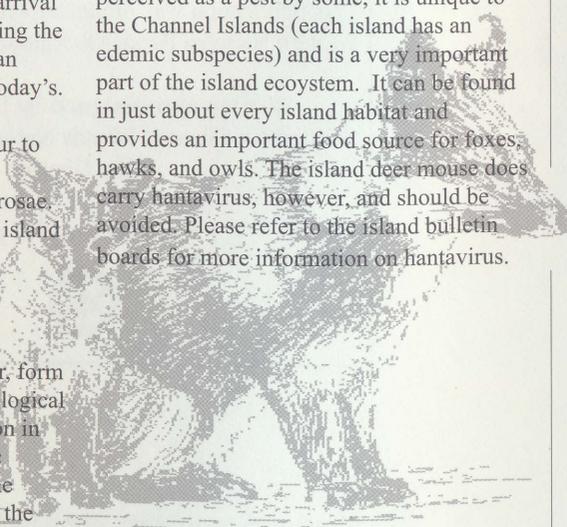
climate warmed and ocean levels began to rise, canyons filled with seawater. Santarosae was divided into the islands of San Miguel, Santa Rosa, Santa Cruz and Anacapa. Because of a lack of permanent freshwater, the island fox did not persist on Anacapa, but the other three northern islands had all the requirements for foxes.

In recent years island foxes almost have disappeared on the three northernmost islands—San Miguel, Santa Rosa and Santa Cruz. A park monitoring program on San Miguel Island has seen their numbers drop from around 450 in 1994 to perhaps 15 in 1999. Santa Rosa and Santa Cruz Island have seen similar declines.

Channel Islands National Park is coordinating a recovery effort with the help of many individuals and organizations throughout the country. To learn more about this recovery effort and the island fox please refer to the park newspaper, "Island Views," or the site bulletin entitled "The Island Fox: Here Today....."

Island Deer Mouse

While the island deer mouse may be perceived as a pest by some, it is unique to the Channel Islands (each island has an edemic subspecies) and is a very important part of the island ecosystem. It can be found in just about every island habitat and provides an important food source for foxes, hawks, and owls. The island deer mouse does carry hantavirus, however, and should be avoided. Please refer to the island bulletin boards for more information on hantavirus.





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