

The Resources Agency of California  
Department of Fish and Game  
Marine Resources Operations  
California State Fisheries Laboratory  
Terminal Island, California

Cruise Reports 63-S-5, 63-M-1 - Abalone  
Prepared by Keith W. Cox

Vessels: N.B. SCOFIELD  
MOLLUSK

Dates: August 1 - August 22, 1963

Locality: Mainland coastal areas at San Simeon and Morro Bay, and the Channel Islands: San Miguel, Santa Rosa, San Clemente, and Santa Catalina.

Purposes: 1) To examine abalone beds in San Simeon area to determine effects of sea otters.

2) To examine areas in the vicinity of Morro Bay and Avila to determine extent of abalones.

3) To check established abalone-observation stations at the Channel Islands and tag abalones for continued growth study.

4) To conduct shipboard experiments to induce spawning in aquaria to obtain larvae for study.

Results: Sea Otter Depredation: A special field trip was conducted in the San Simeon area (Figure 1) with representatives of the commercial fishery and divers from Wildlife Protection to determine the effects of sea otters on the abalone beds. Dives were made in areas where sea otters had been reported and in areas where sea otters were present. Broken shells, characteristic of sea otter depredation, were present in all areas where abalones were found. The amount of broken shell appeared to be in direct proportion to the numbers of abalones. An estimated 20 to 30 sea otters were in the area. While it was impossible to place a numerical figure on the amount of depredation, it was obvious that otters had been taking abalones and represented serious competition to divers on the same beds.

Morro Bay - Avila Beds: Hard-hat gear was used on most dives in this area to enable the diver to remain longer underwater, and to provide direction via the telephone since the water is cold and visibility poor.

Abalones here (Figure 1) showed well-developed gonads and appeared to be within 2 to 3 weeks of spawning. The gonads of the larger specimens (190-228 mm) were better developed than those of the smaller ones (178-188 mm). Many showed little or no shell growth in contrast with last year when most abalones had added 1 to 2 cm of new growth.

Spot dives were made along the coast north of Avila for comparison with observations made on last year's cruise. Abalones were found only in the Lion Rock area although the bottom and kelp appeared suitable in most places.

#### Channel Island Stations:

San Miguel. Bottom conditions at station 1-SM (Figure 2) were much the same as found in 1962; considerable sand still remained, but kelp growth had not been inhibited to any extent. Several large areas were thickly covered with sea urchins. At the eastern and western ends of the station, abalones were scarce, but were plentiful in the central section. Samples were taken for Marineland of the Pacific and for transplanting to Santa Catalina Island. The water was thick with plankton, mostly salps and dense schools of minute shrimp.

Ninety-two specimens 165 to 234 mm long, had gonad tissue in stages of development from very early to nearly maximum maturation. Spawning may have occurred recently for most of these abalones. A few showed recent shell growth.

Santa Rosa - Station 1SR. Recovery of 20 black abalones of 130 tagged in 1961 showed no evidence of migration, and no appreciable growth between September 1961 and August 1963. Other tagged shells were seen that could not be recovered due to heavy swells. With favorable weather, probably 50 to 75 percent of the original 130 could have been recovered.

In a shallow bay adjacent to the station a school of over 1,000 leopard sharks was observed. These sharks are reported to congregate in this area during summer.

San Clemente. Abalones were less numerous at stations 2SC and 3SC (Figure 2) than a year ago, and growth during the year had been very slight. Gonad samples indicated that some were spent, while in others the tissues had not developed and would not spawn this year.

Dives were made to 100-105 feet, but only a few pink abalones were found at these depths. Kelp growth was moderate, about the same as last year.

Santa Catalina. Abalones at station 2C (Figure 2), Catalina Harbor, were not as numerous as last year. The bottom appeared to have undergone considerable change. Large rocks and boulders were piled over the bottom, probably the result of storms. Eight marked abalones were recovered: five had been released in 1958, three in 1962. Growth ranged from 0 to 18 mm. All were recovered at approximately the same depth and in the same area of release except one which had moved from 25 into 50 feet of water.

Numerous abalones of all sizes were found on the undersides of rocks and boulders, buried in 6 to 10 inches of sand and gravel. The abalones appeared to be dormant. How long they remain under the rocks is unknown.

At station 1C, Isthmus Reef, 39 red abalones from San Miguel were tagged and placed in water 100-105 feet deep off the side of the reef in the same general area to which survivors of the first red abalone transplant in 1957 had moved. The water at the depth is 4 to 5 degrees cooler (58°C) and elk kelp (Pelagophycus porra) rather than giant kelp (Macrocystis pyrifera) is the dominant species.

At station 3C, Avalon Harbor, approximately 30 tagged abalones released in 1957 and 6 shells of abalones tagged in 1958 were recovered. One live, pink abalone tagged in 1958 and released in 25 feet of water was recovered from 80 feet. When tagged, it measured 140 mm, when recovered, 150 mm. The station looks much better than last year, more kelp is growing and more fish and invertebrates were present, although the abalone population had not increased appreciably.

Holding Experiments: Attempts to keep abalones alive in aquaria aboard ship were not successful. Several methods of circulating and aerating sea water were tried without success. None of the abalones survived more than 24 hours, and all attempts to induce spawning were unsuccessful.

Salvage Operation: A special dive was made to recover the anchor of the Alaska, fouled and left marked by bouy earlier this year. The anchor was found in 85 feet of water off Gaviota (Figure 2), one fluke caught under an undersea oil pipe. A line was attached and the anchor brought aboard the N.B. SCOFIELD.

Personnel:	R.B. Mitchell	Captain N.B. SCOFIELD
	K. Cox	Biologist in Charge
	R. Poole	Biologist in Charge Apr. 12 - Apr. 16
	G. Bickford	Diver, Deckhand
	W. Thomas	Diver, Deckhand
	Dr. P.C. Orr	Santa Barbara Museum (Guest)
	H. Leahy	San Mateo County Sportsmen's Council (Guest)

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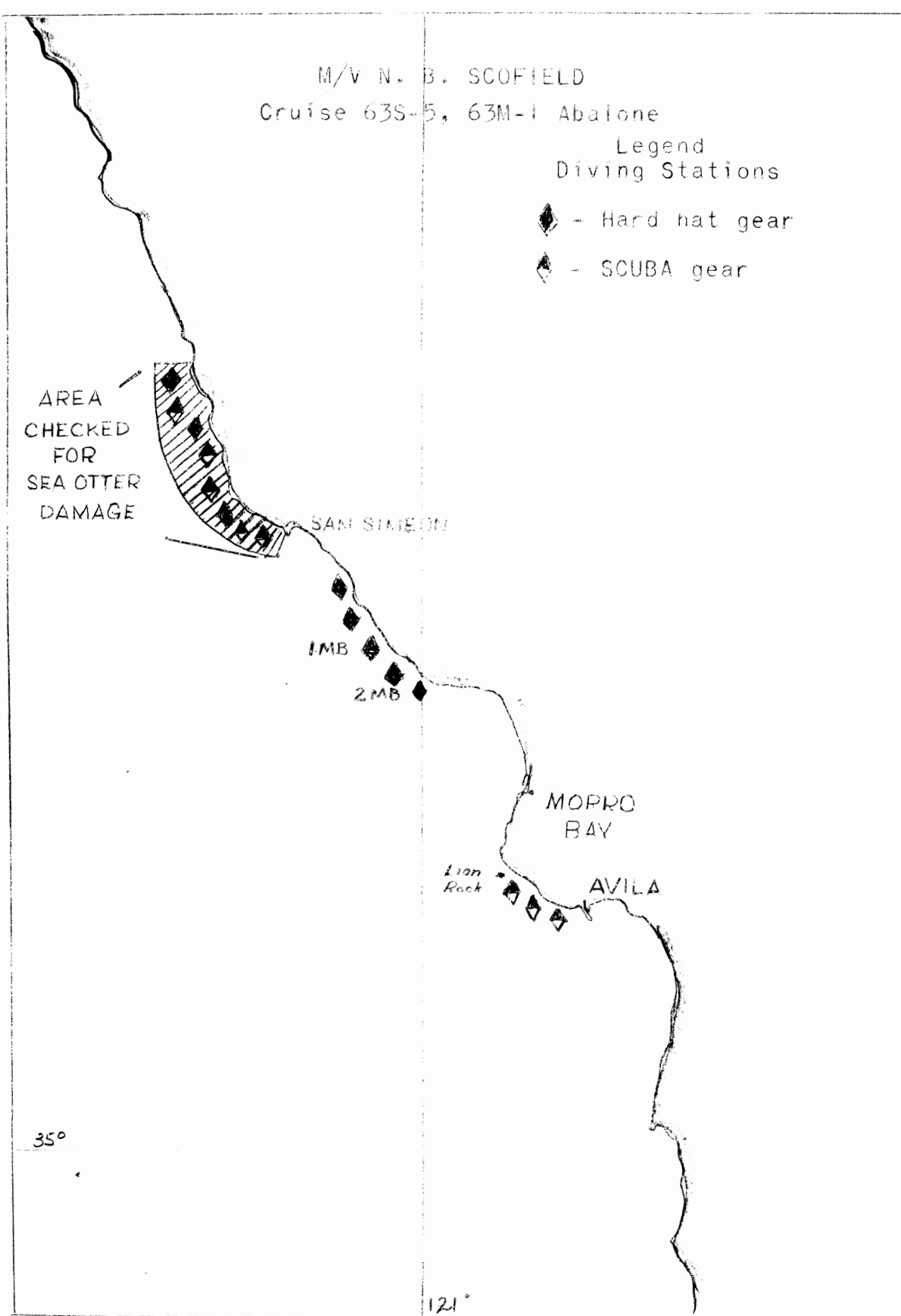


Figure 1.

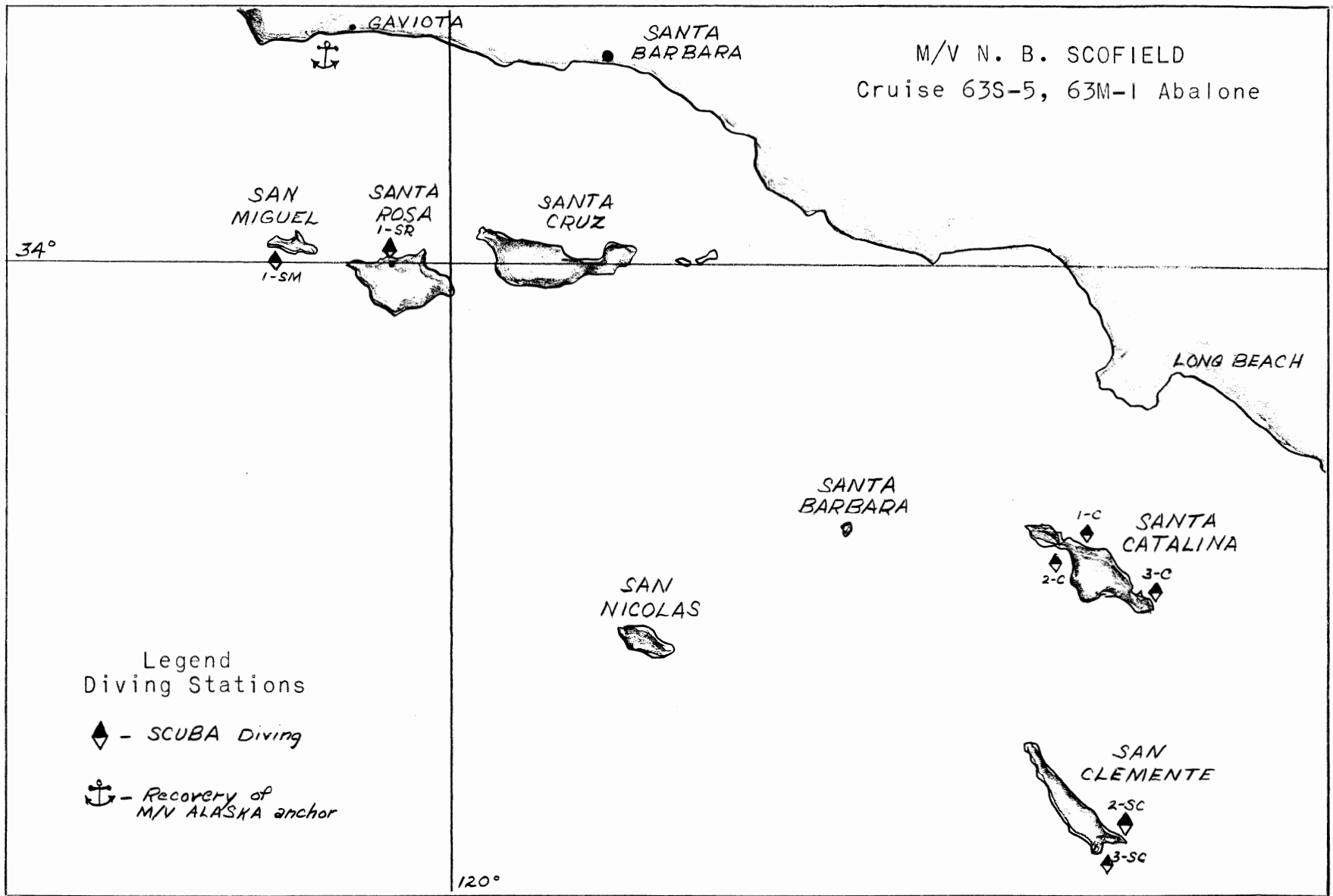


Figure 2.

