

The Battle for Santa Barbara!

—A case history of what happened when rabbits were introduced to an island having several unique species of plant and bird life—and the desperate fight to save them from extinction . . .

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A war to save certain unique species of plant and bird life from extinction has been raging off and on for the last four years close to the California mainland.

The unpublicized battles on Santa Barbara Island, one of two islands of the Channel Islands National Monument off the Ventura-Los Angeles coast, have been fought by biologists of the National Park Service and the U. S. Fish and Wildlife Service with assistance from the California Department of Fish and Game. These battles



No, this stark scene isn't the result of a forest fire—rabbits are to blame. They've girdled the trees and shrubs and eaten almost everything eatable on the island. The damage speaks for itself. (National Park Service photo.)



Santa Barbara Island's lush vegetation containing many rare species of plant life, as it appeared before advent of the rabbit. If sufficient rainfall occurs and if the number of rabbits remaining after concerted cleanup campaigns can be kept to a minimum, the island's native vegetation and birds eventually may be restored. (National Park Service photo.)

are a desperate, last-minute attempt to preserve a species of giant sunflower, a species of song sparrow, and other flowers and small animals found nowhere else.

The enemy? Rabbits, introduced to the island by early day farmers and again during World War II. The critters simply took over. The result was disastrous.

Isolation Saved Ancient Species

Looking backward a moment, Santa Barbara Island several million years ago was cut off from the mainland. Only because of this isolation was it able to develop and maintain its ancient species of plant and bird life. Time figuratively stood still—that is, until the arrival of the white man about 100 years ago (prehistoric man and Indians lived there, but they didn't materially disturb natural conditions).

Those early fishermen and ranchers brought over goats, sheep, nonnative weed seeds and the rabbits, all of which were to have important effects on the island's plant and bird life.



Setting out on one of their early rabbit cleanup drives, armed with guns which proved to be ineffective in getting the job done, are, left to right: Vernal A. Smith, Park Ranger, Cabrillo and Channel Islands National Monument; Grant Birmingham, U. S. Fish and Wildlife Service; Paul Schumacher, supervisory archaeologist, National Park Service; Bennett T. Gale, Regional Chief of Interpretation, National Park Service, and Eric Peacock, U. S. Fish and Wildlife Service. (National Park Service photo)

Grazing, Weeds Upset Balance

The goats and sheep over-grazed the island; farming disturbed the ground cover and introduced competing weed plants which tended to crowd out the native species. In those early years, probably because rainfall was more abundant then, the rabbits were only a minor threat to the giant sunflower, although they did nibble at the young plants and girdle some of the older plants so that they died. In the nick of time the sheep finally were removed in 1937.

The island passed from jurisdiction of the Federal Lighthouse Service to the National Park Service the following year. Now it is a national monument.

During the 12 years after 1937 the native plants made a spectacular comeback under complete protection. This largely was made possible by continuing abundant rainfall which enabled the plants to thrive and recover despite the man-caused competition. It was the golden age of recovery.

But during World War II, the New Zealand Red strain of rabbits was introduced and freed as a possible emergency source of food, leading to a drastic change in 1950.

Dry Cycle Begins

Coupled with the beginning of a period of less than normal rainfall, the rabbit population "exploded." Between 1950 and 1953, the jungle of giant sunflower, morning glory and other native plants—which sheltered the unique species of song sparrow—became barren wasteland. Rabbits

killed the "forest" understory, leaving only bare ground beneath the dying sunflower jungle on which not even a mouse could find a place to hide.

A former hayfield was reduced to stubble. The place looked as though a forest fire had burned it.

At that point the National Park Service asked the help of the Fish and Wildlife Service and the California Department of Fish and Game in undertaking a rabbit control program. This began in October, 1954, with DFG providing transportation to and from



Note how the rabbit has completely girdled the trunk of the giant sunflower, or *Coreopsis*, one of the rare species of plant life for which Santa Barbara Island is noted.

the island whenever possible but with the federal men carrying out the control work.

Shooting Was Ineffective

It was a discouraging task. Teams of men combed the island, shooting as many rabbits as they could find. It took four men six days to shoot 400 rabbits. Before the project began, mainlanders had shot about 100. That made 500 rabbits removed—but the control crew estimated at least 200 more remained and could not be completely tracked down because of the steep, inaccessible terrain bordering the ocean, which gave refuge to the animals.

Shooting had removed only 2.6 rabbits per man-hour of hunting, far too slow to accomplish the job.

The experimental use of poison, under safeguards to prevent harm to other wildlife, removed 12 more rabbits in that first intensive campaign before weather conditions and other factors forced a halt and the biologists had to leave the island.

Poison More Successful

Back they came the next year to renew the fight to exterminate the rabbits. Poison was used on a large scale and with that, augmented by some shooting, some 2,500 of the pests were killed. This figure indicated that probably many more than the estimated 200 had survived the previous year's roundup. Again, despite the men's best efforts, they estimated at least 150 of the animals still remained at the end of that year's campaign to produce more litters during the off-season.

When the rabbit control crew returned to the island in 1956, they found the animals for the first time in poor condition. The continuing dry cycle had resulted in less and less plant growth and poorer nutrition. The rabbits were literally eating themselves out of house and home.

But, despite having killed all but about 150 of the rabbits the previous year, some 600 more were killed during the 1956 control effort.

It was obvious that not much headway was being made, for enough survivors remained at the end of each cleanup effort to make it necessary to do the job all over again.

In the fall of 1957, plans were made for the work party to stay longer this time to mop up. Meanwhile, ice plant had spread so far and so thickly in

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No wonder they had a hard time controlling the pesky rabbits! In cliffside burrows some of them managed to stay out of reach from year to year. Grant Birmingham of the U. S. Fish and Wildlife Service maintains a precarious foothold while he pumps cyanide gas into a burrow. (National Park Service photo)

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place of the ravaged natural vegetation that the rabbits couldn't get through it.

The combination of unusually dry conditions, virtual elimination of the plants on which the animals long had fed, the relentless control program and the carpet of ice plant at last seemed to be accomplishing the job of removing the pesky rabbits. After poisoning and shooting 500 of them that fall, the scientists saw only two live rabbits—although by this time the likelihood that others remained in inaccessible places was taken for granted.

Rainfall Aids Recovery

Then, last spring, after the wettest winter since 1937, came signs of encouragement, accompanied by another setback. There was a slight revival of the giant sunflower, and the morning glory's recovery was marked. Other plants and wild flowers also were making a comeback.

By this time the ice plant had spread over one-half of the island's surface to a depth of 12 to 18 inches—difficult for humans to wade through and impenetrable for the rabbits. This forced most of the rabbits into three major

cleared areas, making it easier for the cleanup group to attack them.

On the other hand, the rabbits were once more in good condition, thanks to having more to eat, and apparently they were making the most of it by producing more litters than they could during the dry years.

Climate Plays Biggest Role

Meantime the National Park Service men had come to three conclusions: (1) climatic conditions, primarily rainfall, had more effect than direct controls on determining the ups and downs of rabbit population and vegetation growth, (2) only during wet cycles can the vegetation on Santa Barbara Island hold its own in the battle with the rabbits, and (3) absolute extermination of the rabbits was necessary during the fall of 1958 if the native bird life and vegetation ever was to be restored to its original condition.

In the 1958 fall rabbit control campaign 10 men from the same co-operating agencies spent 41 man-days in an all-out effort to end the rabbit menace once and for all. The results of the previous year's stepped up campaign

were reflected in the fact that fewer rabbits were seen at the commencement of control operations than in any previous year.

Variety of Methods Used

Eighteen man-days of shooting produced only 62 rabbits. Two hundred sixty rabbits were accounted for by poisoning operations which were repeated for all areas of infestation from four to six times. One rabbit was caught in steel traps, and one was taken alive. Poisoned carrots were tossed in large quantities over cliffs to areas that in previous years had been inaccessible to control by poisoned grain.

At the close of the operation no live rabbits could be found. However, this in itself is not entirely conclusive. It was the consensus of the field men that from 6 to 25 rabbits might still remain alive. A checkup next spring should reveal whether this was so. In any event, the reduction from an estimated peak population of 6,000 (in 1952-53) to two dozen animals or less in 1958 has been accomplished.

If there actually are any surviving rabbits, another winter favorable for vegetation like the last might permit the vegetation to stay ahead of the rabbits. At the worst, the vegetation definitely has been rescued for the time being.

Which Plants Will Win Victory

A new biological imponderable does loom, however: the nonnative ice plant which was released by the rabbits from competition with the native plants now covers more than 85 percent of the island. Whether the native plants can win back control over the aggressive ice plant will constitute the next chapter in the unfolding ecological history of Santa Barbara Island.

From the long battle certain principles known to every biologist and trained game manager emerge clearly:

1. Habitat is the key to wildlife abundance and when habitat is destroyed, there seldom is much that can be done to restore the situation without an expensive, time-consuming all-out effort. Even this sometimes is too little and too late.

Lack of Natural Controls Is Harmful

2. Many species, when unchecked by natural predators or other controls, can rather quickly cause almost irreparable damage to their own habitat

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and that of other wildlife sharing the same area.

(The National Park Service faces a parallel situation with respect to the nonnative wild burros of Death Valley National Monument, which in the last 50 years have multiplied and spread through much of the mountainous parts of that region with devastating effects upon native vegetation and upon the native desert bighorn sheep.)

3. No species of wildlife or plant ever should be introduced to an area without prior study to determine the possible effects on life already inhabiting that area. It's obvious that more harm than good often can and does occur when this precaution is not taken.

White pelicans are one of our largest American birds. Their wingspread reaches nine feet.

Most wild elk live to be about 10 years old, but captives have lived to be 25.



The 1958 Pismo clam census in the Pismo Beach area revealed that last year's crop is growing well but this year's clam set again was poor, which has been the case for all but one of the last 10 years. Marine Biologists J. L. Baxter, left, and John E. Fitch sift sand from the census trench to learn how the young clams are faring.