

Plant Research at Haleakala



Endemic silversword is the "trademark" of Haleakala NP. About 40,000 of these remarkable plants persist, although their range has been reduced by goat browsing. Silverswords grow vegetatively for about 20 years, then flower and die. This one should be flowering within a few years.

By Lloyd L. Loope

Haleakala is not among the better known national parks to the general public, but ranks second to none in botanical riches. Located on the Hawaiian island of Maui, the park includes the erosional crater of a huge dormant volcano with elevations of 3800 - 10,023 feet and the adjacent Kipahulu Valley which descends to the coast. First established as the Haleakala Section of Hawaii National Park in 1916, it was given independent status in 1961.

Haleakala is probably best known for its famous silverswords, but this bizarre plant is only one of hundreds of Haleakala species confined to the Hawaiian Islands and dozens restricted to east Maui. Unfortunately, Haleakala has too often been treated as simply a grand geological phenomenon and the destruction of its biological riches accepted as an unavoidable evil. It has long been well known that feral goats and pigs are destroying the vegetation, but park managers have been largely frustrated in their efforts to confront the problem. Although a concerted effort at goat reduction by hunting has somewhat alleviated goat browsing pressure, hunting alone cannot control the large reservoirs of these animals that exist on adjacent State and privately-owned lands. Successful goat impact control and restoration efforts can be accomplished only by fencing out this external source. The magnitude of this task has intimidated park managers until recent years.

Over the past decade, fencing has proven itself an

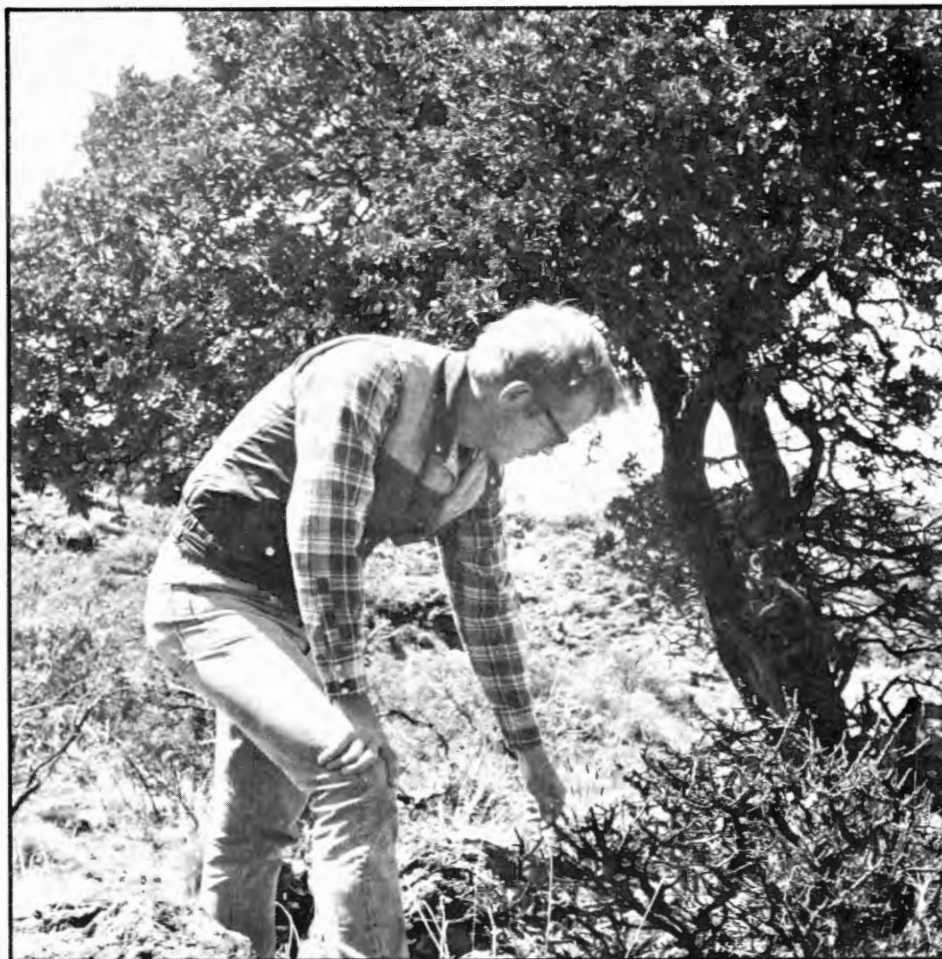
effective strategy for reducing goats in Hawaii Volcanoes NP. The current Haleakala administration recognized the need for a concerted resource management and research effort and began reorganizing priorities and shifting funds into these activities in 1975. The University of Hawaii CPSU became actively involved at Haleakala and superbly documented how much there is yet to lose. A research lab and quarters to support research and resource management projects were created from an old military barracks. Sierra Club volunteers beginning in 1978, have constructed 4.5 miles of fence. Full-time research and resource management positions were established in 1980. A major fencing program for Haleakala now ranks at the top of the NPS construction program for 1983.

I came to the scene at Haleakala last fall to fill the newly established research position. My research is designed to assist in restoring native vegetation and flora once the browsing pressure of goats is removed. Examples of the types of problems which exist include the following: Mamane, once a major

component of the high elevation vegetation, is a favorite food of feral goats and is "highlined," with no reproduction in most places where it occurs. Although it produces abundant seed, there is no indication that successful seedlings are being produced, even within goat exclosures. Yet healthy seedlings can be readily produced under greenhouse conditions. We will try to resolve the question of how to get successful mamane regeneration.

Haleakala sandalwood, a species endemic to the portion of Haleakala above 5000 ft., has been reduced to a few hundred individuals. Goats have "highlined" sandalwood virtually wherever it occurs. Rats are believed to eat sandalwood seeds, so that seedling establishment may not occur even in the absence of goat browsing. We are attempting to determine whether sandalwood can reproduce from seed when seeds are protected from rats by wire mesh exclosures.

Dry forest on the southern slope of Haleakala is composed of nearly 50 tree species, many of which have become very rare throughout their ranges in



Haleakala sandalwood occurs nowhere in the world except above 5000 feet on Haleakala. Goat browsing is a major factor contributing to its decline. The shrub in the foreground is kept in a

hedged condition by goats. The mature tree in the background exhibits the "highlined" form, so typical of the species under current conditions.

Hawaii. These have not been able to reproduce for many years because of browsing by cattle and goats. Even if browsing pressure is removed, severe competition from the exotic Kikuyu grass may suffice to prevent reproduction. Rat predation of seeds and/or other yet undiscovered factors may stand in the way of reproductive success for some species. We will attempt to find out the requirements for reproduction of dry forest species. We will also try to determine what losses and range reduction of dry forest species have occurred in the Kaupo Gap area of Haleakala, with the hope of eventual restoration.

Haleakala silversword once had a much more extensive range on Haleakala than now. Goats browse off these rare plants, so that they persist only in areas of very sparse vegetation on otherwise barren cinder cones which are seldom frequented by goats. With the drastic reduction in the goat population that fencing will afford, silversword may be enabled to occupy its former range. How precisely can we define its former range? How quickly can it be expected to reestablish in formerly occupied sites, following goat removal? Would careful artificial scattering of silversword seed in suitable habitats where it is believed to have once occurred be a desirable management practice? What is the status of silversword populations currently? Other rare species, many of them endemic to Haleakala, require answers to questions similar to those for the silversword. My research will build upon findings of investigators of the University of Hawaii CPSU and others, but will only represent a beginning at finding answers to crucial long-term problems involving preservation of the Hawaiian biota in national parks and elsewhere. These problems are difficult ones, but the rewards of success are great because of the outstanding significance of Hawaiian biota in illustrating evolutionary principles.

Lloyd Loope is research biologist at Haleakala NP, Box 537, Makawao, Maui, HI 96768.