

# What happens to a grassland when you remove sheep grazing?

## Response of Grassland Vegetation on Santa Cruz Island to Removal of Feral Sheep

Authors: Dirk H. Van Vuren and Lizabeth Bowen

*Madroño* 59(4)190-195. 2012

BioOne Link: <http://www.bioone.org/doi/full/10.3120/0024-9637-59.4.190>

**Summary By: Elihu Gevirtz, Senior Ecologist. Channel Islands Restoration**

### Significance Statement

On the islands off the coast of California, sheep, goats and cattle were brought to graze, and remained there for more than 100 years. Over the past 30 years or so, these animals are being removed in order to restore the grasslands and other habitats that were there before the grazing animals. Islands present unique opportunities to restore ecosystems. Because they are isolated from the mainland and the non-native plants and animals that occur on the mainland, they often show dramatic responses to restoration efforts. This article is interesting to me because I am about to begin working on restoring native grassland for the sake of birds that nest on the ground and/or hunt in grasslands on two sites in the Santa Barbara area, and I am planning on using sheep to do the restoration.

### Introduction

Many grasses that are in California and certainly all of the sheep, goats and cattle did not occur in California before 1769. What happened during the past 150 years? People from Europe moved to California and brought with them their grazing animals in order to harvest wool, milk, meat, fat and leather. There were already millions of acres of grasslands in California. These native grasslands were full of native grasses (some annuals and some perennials), wildflowers, shrubs and some trees. When the sheep, goats and cattle were brought to California, they came with seeds of grasses and other weeds attached to their wool or fur. These seeds escaped into the wild California native grasslands where the animals were put out to graze. These seeds dropped onto the ground and grew, and took over the grasslands. Now only a small number of native grasslands remain in California. It is only a small fraction of what used to exist, and the animals that depend on these grasslands are fewer because their habitat has nearly disappeared. Scientists and land managers are working on restoring native grasslands trying different methods to figure out what will work to restore them.

Santa Cruz Island is a large island about 20 miles off the coast of Santa Barbara, California. Sheep were introduced to the island in the 1850s and by the

late 1800s there were 50,000 or more on the island. By the 1920s they had become feral (going all over the island, grazing wherever they wanted). This grazing was neither controlled nor managed. As a result, one grassland on the island had 40% of the soil and vegetation disappear. All of the sheep (47,000) were removed between 1981 and 2001.

Two scientists, Dirk Van Vuren and Lizabeth Bowen in Davis, California, were interested in the question: "How do island grasslands respond after sheep are removed?" To answer the question, they established a total of 50 monitoring plots in nine sites within a grassland and counted all of the plant species in the plots, and weighed the grasses in order to determine the species that were present in each plot and the biomass in each plot. They conducted their first measurements in April 1980 and their second measurements in April 1996.

They found that total biomass in their plots increased substantially after removal of the feral sheep, but there were differences among native and non-native plants. Biomass of non-native grasses (grasses from Europe) increased by 32 percent, but biomass of native grasses increased by 18 times. Some native forbs increased a little, but many decreased in biomass, frequency or both. Most non-native forbs decreased by 80 percent. Native grasses increased dramatically in biomass and in frequency.

Limitations of the study are several. Annual grasslands in California change a lot between years and seasons; therefore the measurements taken in a single year and a single season may not be representative. Also, the testing was done only at one site on the island. Other sites might have had different results due to differences in geology, soil, rainfall and climate.

## **Thoughts**

Why would I use sheep to restore native grassland when they were such a destructive force? Because grasslands evolved with animals that grazed them and humans that burned them. Although we usually can't burn grasslands because we want to keep people safe who live next to them, we can graze them. The thing that will be different is that I plan on having a large number of sheep in small pastures for a very short amount of time. The hypothesis is that the grazing will stimulate the grasses to grow more, minimize the buildup of thatch, and allow the birds to nest and raise their young, and hunt for food.