KERN HIGH SCHOOL DISTRICT

Ridgeview High School

We are Bring Salty Back: The Effect Animal Grazing has on the Restoration of Atriplex Canescens at the Wind Wolves Preserve, CA.

An Experimental Report Presented By:

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Abstract

This project observes the reintroduction of saltbushes, Atriplex canescens, through animal grazing in the Wind Wolves Preserve. We examined three different sites: one had been grazed on by sheep and humans had planted and scattered seeds from saltbushes, one had been grazed on by sheep, and the third one had not been grazed on and humans had not gone back to plant or scatter seeds. After identifying the three sites we would be using we marked them off using marking line tape and marker flags creating a square of 65 meters by 65 meters. Within the three sites we marked off we randomly selected four random plots in each site of 9 meters by 9 meters. Then, we counted each individual saltbush that was above 12 cm in height. The site that sheep had grazed on and humans had scattered seeds in had an abundance of saltbushes. The other two sites, however, did not have a single saltbush. The grazing of the sheep broke down and prepared the soil to the point that allowed the seeds planted by humans to flourish. This analysis of data can serve as an example to other preserves or conservancies that are trying to reintroduce native species. They can protect their livestock from predators and prepare the soil to reintegrate species at the same time. This project serves as a reminder that in order to reintegrate native species we cannot rely solely on nature and are going to have to put some effort.

Chapter One: Introduction

The Wind Wolves Preserve is in the process of restoring a once native plant, Saltbush (Atriplex canescens), into their managed lands with the aid of animal grazing. In this project three sites were observed, two where grazing species (sheep) have been kept at night in concentrated area to avoid predation. One of the experimental sites had been grazed by sheep and then seeded with Saltbush. The experiment aims to address three different site types and their corresponding saltbush population; a site (site 1) where sheep were heavily grazed on and seeded by humans, a field that had been grazed on by sheep but had not been seeded by humans (site 2), and a field that had neither grazing nor human interaction (site 3). Site 3 will act as our control population of saltbush. A field collection procedure was followed in which each site had saltbush populations measured. We will be testing the effect these sheep had on the soil and see in what ways it affects the Salt Bushes' propagation.

Chapter Two: Review of Literature

The WindWolves preserve is a 97,00 acre ranch that spread from Kern county to Ventura. The ranch dates back to spanish colonist who immigrated sheep, cattle, horses, and among non-native plants and animals with them. Since the species they brought with them were not native to California, these species are now referred to as an invasive species. Invasive species are species that are not native to the ecosystem under examination and are often likely to harm it, by creating competition with native species in specific niches of the ecosystem.

Atriplex Canescens (saltbush) is one of the native species that suffered the consequences of invasive species in the Wind Wolves Preserve. Consequently it has been in the Wind Wolves Preserve Plant List as of March 13, 2004. Saltbush are native to California and typically have a lifespan of two or more years. They play a key role in the environment they are part of for, for they are a browse plant for wildlife. In Wind Wolves, elks, birds, and rabbits are among the animals that benefit most from the nutrient rich plant.

In order for the reintegration of the seed to be prosperous, the seedbed in which it is planted in must be weed free and firm. Currently, the most successful method of planting saltbush is through drilling. Drilling is a process in which seeds are scattered onto the ground. The seeds should not be covered for anything exceeding 2.54cm. Late Spring and early summer are the best times to plant the seeds.

Animal/ livestock exclusion grazing has become a popular method in the restoration of native plants. As stated by the University of Oregon, there are two general types of grazing methods, continuous and rotational. When animals have unrestricted and uninterrupted access to the land this is considered continuous grazing which sometimes may invasive species by

transporting seeds in fur, feet, or digestive tracts, Rotational grazing is a more controlled method of grazing where animals are rotated from one padlock[1] to another in a timely manner.

Within rotational grazing there is intensive rotational grazing. Intensive rotational grazing involves more padlocks and shorter grazing periods. This type of grazing involves more management but produces better results. This type is also referred to as Management Intensive Grazing (MIG) and provides more stable production during poor growing conditions (drought), higher quality, less weed and erosion, and uniform soil fertility levels.

Animal grazing has multiple benefits not only for the production of livestock but also for land management. Grazing a grassland harder is recommended to help to reduce scrub encroachment, create small areas of bare ground to help seeds germinate and take the grassland back to an earlier stage of ecological succession. Without any sort of natural disturbances, like animal grazing, lands begin accumulating large amounts of dead plant which lead into the introduction of invasive plants. What grazing does is, through physical impact like hoof action and pawing[2], and consumption, trample plants, break up soil surfaces, incorporate seed into the soil, and compact soil making the soil viable for new plants to thrive. By destroying most of the invasive plants by eating and trampling down them down grazing reduces the competition from invasive plants and allows native plants to nourish. Grazing controls the succession of invasive vegetation which is essential in the maintenance/restoration of native plants.

There are 3 main livestock used for grazing, cattle, horses, and sheep. Cattle are preferred over sheep at creating and maintaining structurally diverse grassland. Their large size and heavy weight breaks up the ground easier and are particularly good at knocking down and

[1] Padlock is a small enclosure of animal with fences.
[2] Pawing is the scrape or feel of an animal's paw or hoof.

creating gaps in tall, coarse vegetation such as bracken and scrub. However, they do require more water and therefore, must be graze in an area where water is easily accessible. Horses and ponies have forward facing teeth which allow them to graze very low to the ground however, they have a picky diet. They preferably eat sweet grasses and avoid flowers but are ideal for maintaining the mosaic habitat perfect for insects. Sheep have very thin lips and move slowly when nibbling on grass. Along with grass and herbs they will eat low shrubs. Sheep are light and much more easily transported than cattle and are better suited for steep slopey lands. They can cause trampling and poaching on wet soils but they do not as heavy of an impact as bigger graziers.

Chapter Three: Methodology

In February of 2016 the Wind Wolves Preserve allowed sheep to graze in the same site of land and were put in one condensed location for predation purposes. While the sheep were condensed in a single location at night, the sheep would graze on the plants there, nourish the soil through their manure, and breakthrough the soil with their hooves. This also helped remove any invasive species that might have been in the plot of land.

SITE 1: Human Intervention and Sheep intervention

Identify sites that have been grazed on by sheep and in which humans have gone in to scatter seeds for saltbushes. We were able to distinguish what sites we would need by talking to the rangers from the preserve. Section a portion of the site with the parameters of sixty-five meters by sixty-five meters using marking line tape and marker flags to section that piece of the land off. Within that same site of land we created three plots in the shape of a square using marking line tape and marker flags in random locations. In order to receive unbiased information. Count each individual saltbush within the three squares that was above 12 cm tall. (In some plots it would have had been nearly impossible to count each and every single saltbush.) Write down the amount of saltbushes that was collected in square

SITE 2: Sheep Intervention

Find a site that has been grazed on by sheep and humans have not planted or scattered seeds on. The rest of the protocol the same in SITE 2 than in SITE 1 repeat the rest of the procedure.

SITE 3: No Sheep or Human Intervention

Find a site that sheep have not grazed on and in which humans have not planted or scattered seeds on. The rest of the protocol the same in SITE 2 than in SITE 1 repeat the rest of the procedure.

Chapter Four: Results

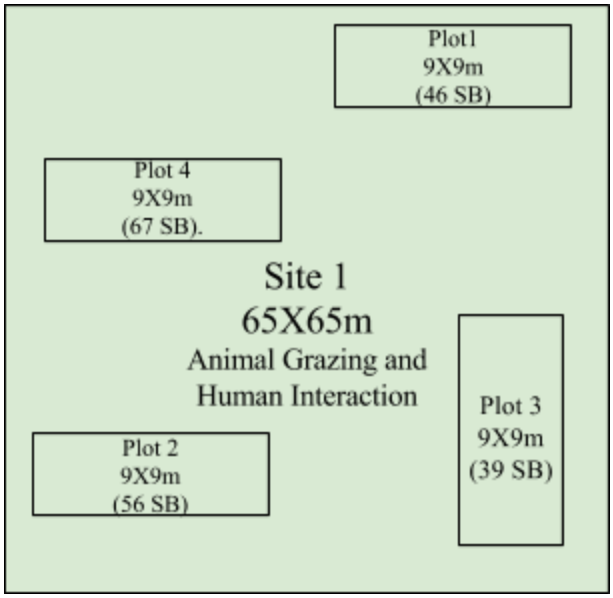

Figure 1

NOTES: In spot 2 there were several baby Salt bushes however, those were not counted.

Average: 52 Saltbush per 15 ft perimeter.

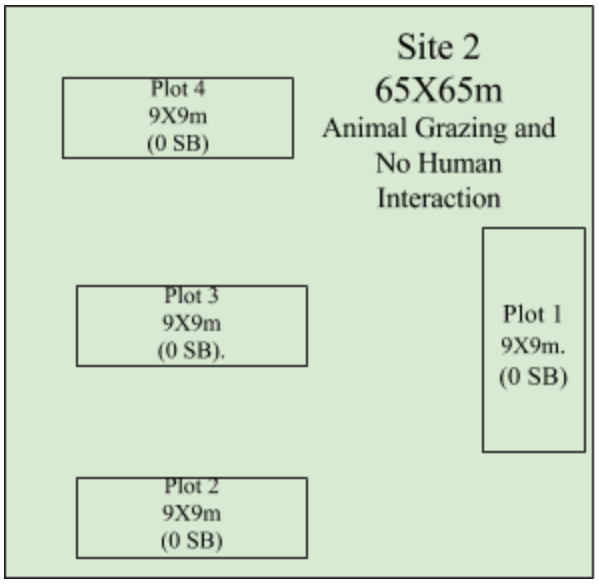

Figure 2

NOTES:

Average: 0 Saltbush

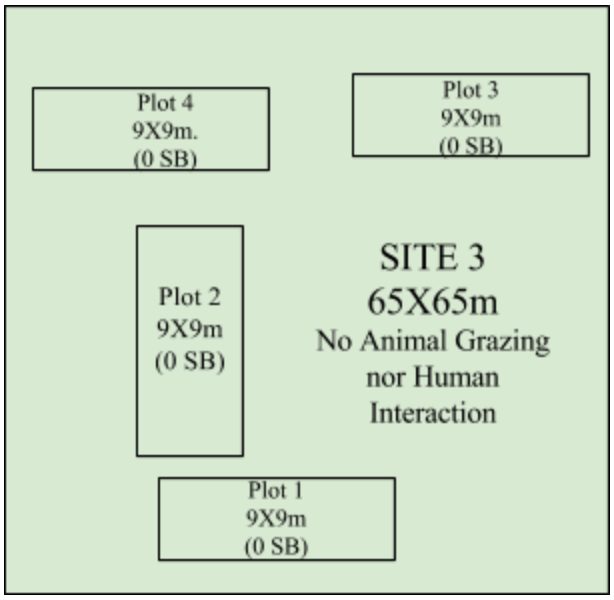

Figure 3

NOTES: There were many bushes of weeds and plants of oats, almost completely covering the plot.

Average: 0 Saltbush per 15 feet perimeter.

Table 4.1 Average Success Rate of the Bakersfield Cactus Population

Site	# of Saltbushes
Human Intervention and Sheep Grazing	208
Only Sheep Grazing	0
No Intervention	0

Data obtained from We are bringing Salty Back (2016)

Chapter Five: Discussion/conclusion w/Further Research

As seen in figure one of Site 1 , which had human intervention and was grazed by sheep, it was the only site that had saltbushes within it. While the other two sites (figure 2 and 3) did not have a single saltbush, a plant that is native to the area. It was expected that sites two and three would have a significantly lower number of saltbushes than site one; both site two and three did not have the right combination of human interaction and animal grazing, site 2 had only grazing while site 3 was the control and had neither grazing nor human interaction. However, the zero saltbushes should not be the norm in this scenario. We cannot rely on nature alone to take its course after invasive species have been introduced to an area. The grazing of the sheep broke down and prepared the soil to the point that allowed the seeds planted by humans to flourish. This analysis of data can serve as an example to other preserves or conservancies that are trying to reintroduce native species.

In order to be more certain and be able to draw a more accurate conclusion, we will have to survey more sites. It's important to note that we are limited to the amount of sites that the Wind Wolves Preserve has with the characteristics that we are looking for. Nevertheless, the data we gathered and analyzed demonstrates that a combination of a natural grazing and having humans aid with planting and scattering seeds can help bring forth some of the best effects in the reintroduction of saltbushes.

This project, however, is only the beginning. From this project we can use the data collected to try this method with other plants that need to be reintegrated. We should not limit this methodology of reintegration to saltbushes alone. In order to increase biodiversity and

combat invasive species we have to check what other species could also be reintegrated in this manner.

References

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