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Authors

Black, Randi A.
Larson, Stephanie

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Pests and Politics: Managing Free-Ranging Tule Elk in Point Reyes National Seashore

Randi A. Black and Stephanie Larson

University of California, Agriculture & Natural Resources, Sonoma County, Santa Rosa, California

ABSTRACT: In 1978, Point Reyes National Seashore (PRNS) reintroduced Tule elk, which is the only National Park unit where Tule elk can be found. The State of California provided the initial elk Tomales Point in PRNS. State wildlife biologists were members of the team that managed the re-introduction and subsequent monitoring. Tomales Point is a fenced area; however, one goal of the 1998 Tule Elk Management Plan was to establish a free-ranging Tule elk herd to the seashore. That plan stated the forage is unaffected by the number of elk occupying the range and elk do not have a strictly negative effect on vegetation. However, in 1999, PRNS moved a free-range herd of 28 elk from Tomales Point to the wilderness area near Limantour Beach. Within weeks, a few elk unexpectedly migrated to ranches in the designated pastoral zone. Currently, Drakes Beach (D Ranch) herd includes approximately 150 Tule elk. Designated pastoral zone, where livestock and dairy producer operations may be permitted, are charged an annual lease based on the lands' carrying capacity. In 2004, beef and dairy producers began to express concerns about the impacts elk were having on forage, organic certifications, and overall economic viability. In 2014, PRNS initiated the Ranch Comprehensive Management Plan to assess growing concerns of beef and dairy producers related to the free-ranging elk impacts to the pastoral zone. PRNS staff have not implemented any of their 1998 control methods, and are currently only hazing elk away from permitted operations. The efficacy of hazing elk away from the pastoral zone is in question; and PRNS has stated an inability to do more control due to recent litigation. Efforts should focus on non-lethal effective elk management options, such as contraception, which abide by current litigation constraints while mitigating producer burden and concern. The objective of this paper is to develop a case for potential multi-species management (i.e., elk plus cattle) at PRNS while protecting its historical, biodiversity, and economic value.

KEY WORDS: cattle, *Cervus canadensis nannodes*, organic, Point Reyes National Seashore, Tule elk

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INTRODUCTION

Point Reyes National Seashore (PRNS) is home to 20,000 acres of coastal grasslands made up of native and non-native species. Agriculture has always been an integral part of the PRNS landscape; Native Americans managed these lands for the production of food, fiber, and other vital resources (Anderson 2005). Ranching began at Point Reyes when Mexican land grantees introduced the first cattle to the area in the mid-1800s. Dairying soon became a dominant agricultural land use in Point Reyes and Marin County (Livingston 1994).

Through the 1980s and 1990s and into the early 2000s, efforts to conserve threatened and endangered (aka special status) species on western rangelands often led to the removal of livestock. However, research findings, demonstration results, and failed conservation efforts in recent years found that grazing removal led to unintended consequences of non-native species dominance or succession patterns that resulted in degraded habitat for many species, not improved habitat. Research into endangered species (e.g., fairy shrimp, California tiger salamander, kit fox, Bay Checkerspot butterfly, and California red-legged frog) has led to reversal of recommendations about grazing, where grazing is now recommended for the species' management (USFWS 2002). To conserve some of the most productive and biodiverse rangeland landscapes, ranching must not just be tolerated as a means to an environmental end, but valued and planned for, ecologically, socially and economically (Huntsinger and Hopkins 1996).

In 1978, PRNS reintroduced Tule elk (*Cervus canadensis nannodes*), the only National Park unit where

Tule elk can be found. In 1999, PRNS moved a free-range herd of 28 elk from Tomales Point to the wilderness area near Limantour Beach. Within weeks, a few elk unexpectedly migrated to ranches in the designated pastoral zone. The objective of this paper is to develop a case for potential multi-species management (i.e., elk plus cattle) at PRNS.

PASTORAL ZONE

The open, working landscape, where beef and dairy cattle graze, is the pastoral zone (Figure 1). The pastoral zone is both a historic cultural and working agricultural landscape that today includes 18,000 acres (20%) of the PRNS and 10,000 acres of the North District of the Golden Gate National Recreation Area (GGNRA). Twenty-four families hold lease/special use permits for cattle and dairy operations. The designated pastoral zone, where livestock and dairy producers' permitted operations preside, is charged an annual lease based on the lands' carrying capacity. In 2004, beef and dairy producers began to express concerns about the impacts elk were having on forage, organic certifications, and overall economic viability. In 2014, PRNS initiated the Ranch Comprehensive Management Plan (RCMP) to assess growing concerns of beef and dairy producers. It related to growing concerns of beef and dairy producers' impacts on the natural resources along with the free-ranging Tule elk impacts to the pastoral zone. However, due to a lawsuit brought against the NPS, efforts toward the RCMP Plan ceased and the park began development of an updated General Management Plan, per the settlement agreement, focusing on ranch management.

Figure 1. Historic alphabet ranches operating in Point Reyes National Seashore.

ELK MANAGEMENT

Tule elk were extirpated from PRNS by the 1860s and were not present when Congress entrusted the National Park Service (NPS) to protect the seashore, ranches, farms, ranchers, and farmers. In 1998, NPS decided to reintroduce Tule elk to the 18,000-acre designated elk range located entirely within the Limantour Wilderness Area. At the time of reintroduction, it was expected that Tule elk populations in an area would rapidly increase.

Prior to the reintroduction of free-range elk, PRNS created an elk management plan, which sought to direct management, monitoring, and research of Tule elk, focusing on a free-range herd. This plan described elk control methods that were deemed appropriate for managing populations and locations of elk including immunocontraception, relocation, and culling, though culling received public criticism (Bayless 1998). PRNS staff have not implemented any of the 1998 control methods, and are currently only hazing elk away from permitted operations. PRNS conducts elk hazing on a daily basis but they have habituated to certain locations, returning after the hazer leaves. The efficacy of hazing elk

away from the pastoral zone is in question; and PRNS has stated an inability to do more control due to recent litigation.

In late 1999, the D Ranch permittee expired and the beef cattle grazing lease was not renewed; cattle grazing was removed from D Ranch. The D Ranch remains part of the pastoral zone, which is considered a historical piece of the agricultural land of the park, but without management, is losing historic and ecological value. With the removal of livestock grazing, plant and animal species assemblages apparently changed, and the elk that migrated from the wilderness reintroduction in 1998 took residence (Figure 2).

The current elk management plan reassured seashore ranchers at the time that the ranch lands would be protected because the plan states, "elk would not negatively affect any other permitted use (long-standing ranch special use permit)" and the plan included tools to manage elk overpopulation, including contraception, relocation and culling (Bayless 1998). The Seashore's 2001 "Year in Review" acknowledged the need to "carefully monitor" and keep the elk outside the pastoral zone, to prevent interference with the cattle ranches and to ensure that the elk "are not shedding the organism that causes Johne's disease." Perhaps efforts to encourage better elk distribution in their designated areas could not only benefit them, but also the livestock and dairy producers and sensitive natural resources areas at PRNS.

BRUSH CONTROL

In addition to the increasing elk population, the lack of burning, grazing, and mechanical control of brush species has resulted in increased brush lands at PRNS, primarily coyotebrush (*Baccharis pilularis*). This species can be a problem in range or pastures due to 1) high levels of seed production, 2) persistent seed or seed bank, 3) effective seed dispersal, 4) tolerance to water or nutrient stress, 5) chemical or physical deterrents to browsing, 6) ability for vegetative regeneration after top removal, and 7) extended longevity (Robbins et al. 1970). It may become invasive in some regions or habitats, partly due to the prevalence of the wind dispersed seeds, and may displace desirable vegetation if not properly managed.

Coyotebrush's successional status varies with habitat type (Williams and Hobbs 1989). It invades and colonizes grassland, replacing annual grasses with shrub (da Silva and Bartolome 1984, Steinberg 2002). This is correlated with the absence of fire or grazing and the rate of invasion increases with precipitation, because wet springs maximize early root growth. Range management practices are known to be effective for improving forage quality and quantity; management using tools including fire, mowing, grazing and planting rangeland forages have resulted in preserving productive and biodiverse grasslands. Both native and non-native brush species will expand and change the habitat and character of coastal prairie grasslands without some form of disturbance or management.

Figure 2. Free Range Tule Elk her locations, with the Drake's beach herd indicated with a circle and the Limantour-Estero herd indicated with a square.

For hundreds of years, or perhaps millennia, humans have facilitated the persistence of this important ecosystem, through fire and grazing. At PRNS, coyotebrush encroachment, which is overtaking good pasture, is an issue for ranchers on California coastal rangeland. Consideration is needed on when and where to remove the brush as it is vitally important to acknowledge

the ecosystem services provided given that they are tremendous habitat for coastal rangeland birds and other animals. Livestock grazing is being increasingly used to promote native species diversity at both the pasture and landscape scales (Bartolome et al. 2014). A balanced habitat positively contributes to ranching practices while promoting local biological diversity.

THREATS TO BIODIVERSITY

Without managed livestock grazing (i.e., with removal or decrease of grazing and active rangeland management that livestock producers provide), threats to native biodiversity may increase. Proper grazing management can maintain habitat for some special-status species on PRNS lands, while they have been inconclusive for others (USFWS 2002). Apparently, grazing has proven compatible with preservation of the special-status species found at PRNS.

The endemic Sonoma spineflower (*Chorizanthe valida*) is found solely in managed (grazed) pasture at PRNS. A master's thesis completed in 1992 on the ecology of Sonoma spineflower concluded that grazing of competitive, non-native plants had a positive influence on Sonoma spineflower survival (Davis 1992, Davis and Sherman 1992, USFWS 1998). Tiburon paintbrush and Marin dwarf flax occur on serpentine grasslands, with six occurrences of Marin dwarf flax on GGNRA grazing lands. PRNS staff concluded "Marin dwarf flax may benefit from a moderate level of cattle grazing through the reduction of taller competing vegetation as the flax is subject to shading by competing grasses or may be suppressed by buildup of thatch from previous year's herbage if left ungrazed." (USNPS 2001). Beach layia and Tidestrom's lupine are found in dune habitats and do not appear to be Point Reyes *horkelia* and Point Reyes meadowfoam are also found primarily within grazed areas (Bob Soost 2004, pers. comm.).

University of California Cooperative Extension highlighted the relationship of grazing to some threatened and endangered species (Rilla and Bush 2009). Most of the Myrtle's silverspot butterflies documented at PRNS have been found in areas that are grazed by either cattle or Tule elk. Butterfly surveys done by PRNS staff in 2003 showed occurrences of Myrtle's silverspot on 13 ranches, all of which support livestock operations (Adams 2004).

At time of listing, the USFWS believed that cattle grazing significantly decreased the habitat quality of the Myrtle's silverspot butterfly (*Speyeria zerene myrtleae*). However, a five-year status review by USFWS found that the moderate cattle grazing regime currently used at the PRNS did not significantly affect the distribution of Myrtle's silverspot butterfly at that site (USFWS 2009).

ANIMAL BEHAVIOR

One objective of this study is to answer the question: What if beef cattle and elk were trained to actively graze coyotebrush? A potential solution to the management of coyotebrush and the coexistence of livestock and elk could be the training of animals to eat coyotebrush with the hopes of removing them from the pastoral zone. Efforts that could train both cattle and elk to eat brush will reduce the current producer burden and concerns while addressing the concerns of brush encroachment to natural resources at PRNS. Elk migration and feeding behaviors have been studied extensively in Idaho (Dalke et al. 1965, Unsworth et al. 1998), Washington (Schwartz and Mitchell 1945, McCorquodale 1993), Montana (Edge et al. 1987), Yellowstone National Park (Boyce et al. 2003, Mao et al. 2005), and Rocky Mountain National Park (Green and Bear 1990). Elk feeding behavior is largely

influenced by forage quality, where low quality reduces daily feeding time and high quality increases feeding time (Green and Bear 1990). PRNS experiences seasonal variations in forage quality due to a rainy winter and spring seasons and drier summer season, producing higher quality forages during spring. The winter and spring period also accounts for the time dairymen pasture their cows to meet the 120 day, 30% dry matter intake requirement from pasture for organic certification (Rinehart and Baier 2011).

Increased elk grazing during the same period that cattle are expected to graze does present management concerns *vis a vis* forage competition. Elk and beef cattle summer diets overlapped by 42% in Colorado (Hansen and Reid 1975) and 46% in Nevada (Beck and Peek 2005). They have also been reported as socially compatible (Wallace and Krausman 1987), potentially influencing the amount of time elk spend grazing cattle pasture. Elk habitat selection was primarily driven by cattle use, distance from the nearest visible road, forage biomass, and distance to cover (Grover and Thompson 1986). Cattle use and the greater available biomass on cattle pasture likely increase use of the pastoral zone by elk. The roads and tourism should decrease pastoral zone use, but, as PRNS is a public destination, familiarization with park guests and ranch activity may reduce the behavioral necessity for elk to avoid trafficked areas. Increased habituation may result from food conditioning, natural tolerance, predator refuge, and habitat occupancy by humans (Found and St. Clair 2016). Habituation of wildlife to people, while a benefit for wildlife viewing in tourist trafficked areas, can lead to ecosystem damage, result in human-wildlife conflict (Walter et al. 2010), and increase elk habitation on ranching lands. Increased use of ranching lands may also be encouraged by preference of elk to graze and rest on open meadow compared with forest (Collins and Urness 1983), improvements to forage quality on lands grazed by cattle (Anderson and Richard 1975, Grover and Thompson 1986), and the increased forage management on intensively managed cattle pasture. Elimination of potential benefits of co-grazing for ranchers creates a need to improve elk habitat outside of cattle pastures.

Previous work has indicated the capacity to train beef cattle to eat "weeds" and brush for pasture management. These may supply similar nutritional benefits to common feedstuffs; however, cattle (and other animals) are habituated to eating what their mother eats and continually choosing the same feedstuffs out of habit. Cattle are generalists, though, or they might select and adapt their diets with a variety of forages varying in quality and nutritional value to meet their nutritional requirements and should be able to better utilize the full variety of plants available at PRNS. Within PRNS, coyotebrush has invaded much of the grassland area, making its management an important goal for both ranchers and park staff. Previous brush control has included mowing and goat introduction, but has been unsuccessful due to cost, time, and goat health. The potential to train cattle to consume the brush would improve grasslands in an economical and resourceful way. Elk are also generalists and, while training has never occurred with wildlife species in the past, feeding behavior similarities between elk and cattle support a similar training design. Altering

elk diet preferences may reduce co-grazing of elk and cattle, as elk may choose to remain in areas with higher brush populations, easing tensions and conflicts associated with elk within the pastoral zone.

CONCLUSION

Organic food markets have shown considerable economic value within the U.S., accounting for an estimated \$28.4 billion in 2012 (Greene 2017). While produce accounted for 43% of the organic food market value, dairy products ranked second, consisting of 15% of the total (Greene 2017). Increased demand for organic fluid milk caused organic milk volume sales to increase from 1.9% in 2006 to 4.4% in 2013 of total fluid milk volume sales (USDA-ERS 2014) and supported the growth of organic dairy farms throughout the US (1.7 vs. 7.4% of total dairy operations from 2007 to 2013, respectively; USDA 2007, 2016). This growth has been particularly pronounced in small and medium sized herds with fewer than 500 cows (USDA 2007, 2016). While organic producers typically earn more money per hundredweight of milk, the cost of sourcing organic feeds and resources meant a cost of \$7.65 per hundredweight higher than conventional farms, or nearly \$1 more than the average price premium for organic milk (McBride and Greene 2009). This higher cost may influence producers to use grazing more, as pasture for feed costs less than other high-energy sources (McBride and Greene 2009).

Currently, the pasture rule requires dairy cattle to graze a minimum of 120 days per year and obtain, on average, at least 30% of their dry matter intake by grazing (Rinehart and Baier 2011). When managed effectively, this allows organic dairies to utilize pasture for a low-input management system, by grazing at or above the required minimum. However, the organic regulations also emphasize the importance of maintaining or improving the natural resources of the operation, defined as “physical, hydrological, and biological features of a production operation, including soil, water, wetlands, woodlands, and wildlife” (National Organic Program, 7 CFR § 205.200). While much of wildlife does not likely negatively affect the management of organic dairy production, co-existence with large herbivores, such as elk, does represent a challenge due to the likely competition for forages on grazing lands. Management of livestock, wildlife, and natural resources is needed to maintain the historical heritage of Point Reyes National Seashore in order to ensure long-term stability of agriculture and wildlife at PRNS.

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