# Mitigating conflict between Tule Elk conservation and Point Reyes ranching

Brice M. Hagan

## ABSTRACT

Point Reyes National Seashore in Marin County is home to a unique working landscape of historical family operated dairy and cattle ranches. However since the creation of free ranging tule elk herds, the elk have expanded onto pastoral lands. This is causing conflict with ranchers who operate under strict organic certifications. As cattle and elk compete for forage, the ranchers' certification and key to business is under threat. Along with this elk damage fences, irrigation systems, and cause injury to cattle. The settlement of a contentious lawsuit that was brought forth against ranching has forced the National Park Service to update their General Management Plan and consider a range of alternatives from reducing ranching and the management of free ranging tule elk. This process has incorporated a public comment forum which was released to the public. From this forum, an instrumental approach to stakeholder analysis was completed which identified and categorized four key stakeholder groups. These groups were ranchers as "key players", environmental groups as "context setters", local business and regional government as "subjects", and the general public as the "crowd". From this stakeholder analysis emerged unforeseen congruencies across the groups. This supportiveness for ranching and management was then extended to look at four management alternatives. These were relocation, contraception, lethal control, and fencing. Examining previous management studies in Point Reyes National Seashore and linking them to the public comments revealed that fencing is the most feasible and amicable current option.

## KEYWORDS

Human wildlife conflict, stakeholder analysis, working landscape, Marin county, national seashore

## INTRODUCTION

Working ranches within the Point Reyes National Seashore (PRNS) are a cultural resource that preserves a traditional dairy and beef cattle ranching culture that has been a historic component of Point Reyes, California since the early 1800's and continues to be important to the region's economy. When PRNS was established amidst fears of development in 1962, the National Park Service (NPS) directly acquired the seashore lands from the ranchers with a promise from Congress to preserve the ranches and the area as working landscape (Watt 2015, 2017). The ranches at PRNS account for 17% of the county of Marin's agricultural production and directly provide 65 jobs and support another 25 ranch family members (Rilla and Bush 2009). The presence of these ranches supports the area's rural school districts and businesses. Marin dairy and cattle ranches produce the area's most valuable agricultural commodities in the form of livestock products (County of Marin Department of Agriculture Weights and Measures 2017). Largely, it is artisan cheese producers in Marin and Sonoma rely on milk that is produced organically in PRNS (Rilla 2011). However, the reintroduction of tule elk (*Cervus canadensis nannodes*) to Point Reyes in 1978 has generated conflict with ranchers and poses a possible threat to ranching's continued feasibility in Point Reyes. Elk appear to prefer land that is managed for and with livestock, but livestock are often removed after land is given to elk (Krausman et al. 2011, Cobb, 2010, Gogan and Barrett 1987). Elk and cattle in PRNS have had conflicting negative interactions in areas where the two coexist, leading to a host of outcomes such as forage depletion, disease transmission, and death (Gogan and Barrett 1987, Cobb 2010).

Tule elk have caused damage to more than half of the PRNS ranches and there is fear among ranchers that competition for forage with cattle will drive ranches out of the area (Watt 2015, Spiegal 2014). As tule elk and cattle compete for forage, ranchers must begin to use feed supplements like hay for their cattle. Since many ranchers in PRNS operate under organic certification, there are limits to the amount of supplemental feed their herds can eat. To be certified as an organic dairy operation, pasture must provide at least thirty percent of dry matter intake over the course of a grazing season (Organic Production and Handling Standards 2011). Given the competition for forage posed by elk and the constraints of organic dairy ranching, tule elk may pose a direct threat to the long-term viability of ranching on the seashore suggesting that new forms of management are needed.

While the reintroduction of this locally-extinct large herbivore was a success, the tule elk population in PRNS has grown and spread. In 1998, a free ranging herd was established that has led to many issues with ranching. There are currently sixteen working ranches in PRNS operated by ten families. Most of the ranches are historically identified by a different letter of the alphabet from the first leasing system in the late 1800's. The ranches and families most heavily affected by a tule elk presence are those that surround the abandoned D-ranch in the southern tip of the seashore, where the free-ranging tule elk herds are located. After their establishment in the southern areas of PRNS, free ranging herds began to increase in numbers to around seventy individuals in each of the two herds in 2014. Current numbers in each free-ranging herd are 112 tule elk in the D-ranch herd and 145 elk in the Limantour herd (Bernot 2018). Population models from 2010 predicted this increase that will continue expanding onto neighboring private and leased lands (Cobb 2010). Tule elk in PRNS have an extremely high adult survivorship rate of 0.95 with no natural predators (Howell et al. 2002), allowing populations to expand without a check to their growth. With no natural check, it is imperative that managers begin to take active steps to manage the free-ranging tule elk herds in PRNS.

The NPS has had a largely hands-off approach to tule elk issues on private lands. There has been no real management intervention to date, only an agreement between the Point Reyes Seashore Ranchers Association (PRSRA) and the NPS to allow some hazing of elk off of grazing lands with an off-road vehicle (Watt 2015). This hazing is largely ineffective though, as elk return by the next day. The absence of management action is due in part to the settlement of a contentious lawsuit brought forth in February of 2016. When former Secretary of the Interior Ken Salazar proposed reinstating lease intervals of twenty years in a memorandum, the Center for Biological Diversity, Western Watersheds Project, and Resource Renewal Institute sued the National Park Service for not updating the 1980 General Management Plan in before announcing this extension of leases (Resource Renewal Institute et al. v. National Park Service et al.). The environmental plaintiffs claimed that ranching was having adverse detrimental effects on the landscape and they demanded for an updated management plan and an environmental impact assessment of ranching's effects (Resource Renewal Institute 2017). The lawsuit was settled in July of 2017 and requires the NPS to update the General Management Plan within the next four years while contemplating a full range of alternatives. Settlement mandated alternatives that must be evaluated include a no-ranching and limited management of tule elk alternative, a reduced

ranching and management of Drakes Beach tule elk herd alternative, and a no dairy ranching and management of Drakes Beach tule elk herd alternative. Two other alternatives being considered by the NPS are continued ranching and management of Drakes Beach tule elk alternative and continued ranching and removal of Drakes Beach tule elk herd (Macleod 2017). All ranches are now currently on interim leases until 2022 (Resource Renewal Institute Settlement 2017). In the wake of this uncertainty, ranchers are turning to creating lobbying groups and seeking legislation to instate lease intervals of a twenty-year period and allow diversification of their operations. (Guth 2018, H.R. 6687 2017). This is creating concerns of expanding privatization on the seashore.

Possible management methods considered in this study are relocation, contraception, lethal control, or fencing. However, all of these methods have associated costs and benefits that can preclude their use. Yet, as free-ranging tule elk herds are persistently expanding without a concerted effort to address this, a continued working landscape will be unattainable. In the wake of lawsuits and new grazing plans, it is important to examine management alternatives as stakeholders begin to play more active roles. My main research objective was to analyze the conflict between tule elk conservation and cattle ranching in Point Reyes National Seashore in an attempt to create management suggestions to mediate grazing conflicts and maintain a working landscape. To approach this, I asked the questions of:

What are stakeholder's views and how do they interact?

Given this, what are current feasible management options?

I hope to determine the potential for establishing an active tule elk management scheme that would maintain Point Reyes as a multi-use working landscape.

## EXTENDED INTRODUCTION

### History of Tule Elk at Point Reyes

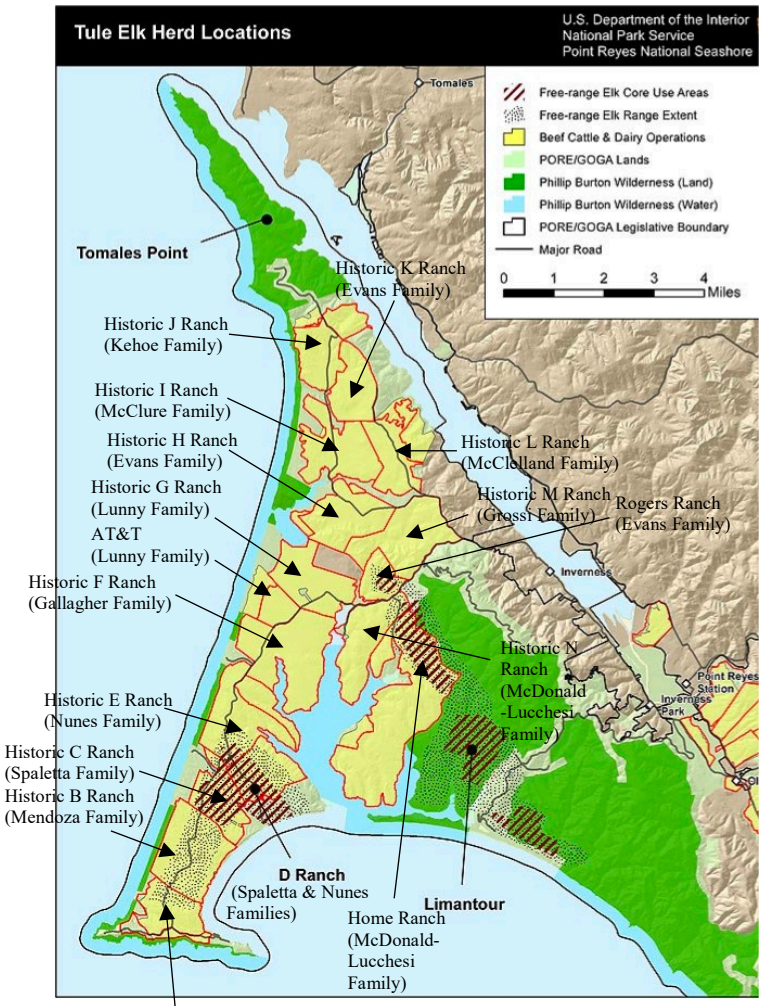
Tule elk, the only subspecies of elk native to California, were once the predominant herbivore of the state's Central Valley landscape. However, their numbers were reduced to near extinction in the late 1800's following market hunting during the gold rush era (McCullough 1971). The species' fate changed when a single breeding pair was found on the ranch of Henry Miller, a California cattle baron. Miller set aside 600 acres in Buttonwillow of his personal land to

assure the elk's survival. He continued to support the herd until 1914, when numbers had rose and the elk began costing him in damages to his operation. Miller called on aid from various government agencies and worked to relocate the herd. Early tule elk transplants failed until 1934, when a captive herd was established in the Owens Valley. This became the major tule elk population in California. Owens Valley tule elk quickly began to cause damages to fences and alfalfa fields, and ranchers begun to advocate for their control. Periodic hunts to control tule elk numbers occurred in the Owens Valley until 1960, when strong public opposition emerged (McCullough, 1996). Under a new policy, smaller hunts were continued until the passage of the Behr bill (Senate Bill 722) in 1971, which prohibited hunting until total tule elk population throughout the state had reached two thousand individuals (McCullough 1996). This required the re-introduction of tule elk in new habitats across the state. Since the 1870's, tule elk have been re-introduced in 22 locations across California (McCullough 1996). Several of these introductions have sparked conflict with agriculture and this conflict continues to the present day in the Point Reyes National Seashore (PRNS).

PRNS was suggested as a site for tule elk conservation due to its protected habitat and potential for increased tourism (Ciriacy-Wantrup and Phillips 1970). In 1978, tule elk were re-established in the PRNS in an enclosed 2,600-acre portion at the northernmost tip, Tomales Point. When discussion of reintroduction began, the biggest concern was disrupting the dairy and cattle industry. For this reason, the tule elk were put in an enclosed area because of issues tule elk had caused for agriculture in other areas (Sadin 2007). After years of fluctuating population size, El Nino years during 1995-1997 brought sizeable growth to the tule elk herd in Tomales point in the PNRS. Herd sizes reached 549 and a possible maximum carrying capacity level, prompting the creation of the 1998 Management Plan (Point Reyes National Seashore Tule Elk Management Plan and Environmental Assessment 1998). The Plan called for the creation of a free ranging herd by 2005. The Tomales point herd had previously been separated from neighboring dairy and cattle operations by a ten-foot-high fence, enclosing 2,600 acres exclusively for the elk (Watt 2015). In December 1998, 45 tule elk were helicoptered to the west side of Inverness ridge and quarantined for six months while some received immuno-contraceptives. On June 1, 1999, 23 tule elk were released into the Phillip Burton Wilderness Area near Limantour Estero (Watt 2015). The area was chosen because of the presence of perceived natural buffers to avoid conflict with ranches. Within a year however, several elk appeared on the recently abandoned D-ranch. (Watt 2015, Cobb 2010).

It is from these two herds that the conflict between tule elk conservation and Point Reyes ranching stems (see Figure 1).

Conflict with ranching soon arose, and by 2005 complaints were registered regarding elk eating forage on leased lands and damaging fencing and irrigation systems. One ranching family, family, the Spalettas, claimed that they had spent over $30,000 on tule elk-related damages, including forage replacement, fence and irrigation repairs, and even the cost of animals gored by the elk (Watt 2015). At this time, tule elk had caused damages to 6 dairy and 5 beef operations (Watt 2015). The 1998 Management Plan was meant to be adaptive and encapsulating of ranchers even stating, "The Park Service has a responsibility to be a good neighbor to adjacent and nearby landowners (1998 Management Plan)." However, in the wake of these damages, the NPS was only willing to work with ranchers individually and not as a collective (Watt 2015). The only intervention agreed upon was some light hazing of tule elk by ATV's. This inaction continued until 2013, when a series of meetings were held and the need to address extending ranch leases to 20 years forced the NPS to act. This generated a new Ranch Comprehensive Management Plan and led to the lawsuit put forth against the National Park Service (NPS) by environmental groups who claimed ranching was having detrimental effects on the landscape and that the proper environmental assessments were not taken before the consideration to extend leases. After the lawsuit was settled in 2017, three alternatives (reduced ranching, no dairy ranching, and no ranching) were left to be considered as the plan is updated over the next four years.




## History of ranching in Point Reyes

**Figure 1. Tule elk herds location and area of conflict with regards to ranching.** Adapted from < https://www.nps.gov/pore/learn/nature/tule_elk_tomales_point_faq.htm>

Cattle ranching was introduced to the Point Reyes peninsula in the early 1800's by Franciscan missionaries and Mexican land grantees. They brought longhorn cattle for beef operations initially and then expanded to dairying operations. After the brief stint of Mexican independent rule, transition to US jurisdiction brought with it a consolidation of vast acreages by the litigious Shafter brothers. The Shafter's created the historic system of tenant ranches which gave ranch tracts an alphabet letter designation stretching from A to Z. With a growing population in San Francisco, there was a high demand for fresh dairy products which Point Reyes ranches helped satisfy. The peninsula's isolated lands and moist climate provided abundant forage for livestock while remaining close to an urban center for rapid delivery. The heyday of dairy ranching

in Point Reyes was over by 1920, but it created a lasting legacy that has shaped the peninsula and to this day remains an important industry there (Sadin 2007).

Threats from commercial and residential development helped spur the creation of a national seashore in Point Reyes. Discussions began in the late 1950's and faced immediate opposition from ranching families. They opposed the proposed leaseback agreement and did not recognize the same recreation value in Point Reyes that the NPS did. Legislative approval for the creation of PRNS came from congress after a few years of debates surrounding funding and how to deal with inholdings. The "hole in the doughnut" strategy was used which sought to acquire bordering seashore lands and leave an interior pastoral zone. The congressional bill had built many protections of ranching into it. This was largely done as a means to cut costs of land acquisition, respect private land rights, and to maintain rural character outside of national seashore boundaries (Sadin 2007). Despite reservations for ranchers, by 1971 most ranches had been directly acquired by the NPS. Ranchers had been facing increasing taxes and inflated land values, all while under the specter of NPS's presence. This combination of factors caused the ranchers to approve the NPS's power to condemn and repeal the legislatively mandated pastoral zone so long as they were paid a fair price for their lands. After the purchase of their lands ranchers were given the option to retain a reservation of use and occupancy (RUO) for 25 years or the life of the owner or spouse. Congress has expressly stated its intent for cattle ranching and for dairy farming to continue at Point Reyes, through Public Law 87-657 (1962) and Public Law 95-625 (1978). Public Law 87-657 (1962) was the legislation that founded Point Reyes National Seashore and within section 4 the explicit intent for the continuation of cattle and dairy ranching is given. Section 4 of the law states that "No parcel of more than five hundred acres... shall be acquired without the consent of the owner so long as it remains in its natural state, or is used exclusively for ranching and dairying purposes…The term 'ranching and dairying purposes,' as used herein, means such ranching and dairying, primarily for the production of food… In acquiring access roads within the pastoral zone, the Secretary shall give due consideration to existing ranching and dairying uses and shall not unnecessarily interfere with or damage such use." This an example of explicit instructions from Congress to preserve and not to impede established ranching. Following this, in section 318(c) of Public Law 95-625 (1978) the term "agricultural property" specific to Point Reyes was defined and standardized legislative language was created for the leasing of land for agricultural purposes with PRNS that only authorizes leases/permits that ensure protection of cultural and natural

resources. Congress' promise made to ranchers to maintain dairy operations is echoed in a statement made by Senator Alan Bible in 1970 where he said regarding the above amendment and acquisition, "the federal government in effect made a promise to the ranchers in the pastoral zone that as long as they wanted to stay there, to make that use of it, they could do it… it is the firm intent of the committee [on Interior and Insular Affairs] that the amendment shall in no way operate to impair the integrity of the dairyman who wants to continue dairy farming" (112 Congr. Rec. S3823). As all but two of these RUOs expired in the 1990's they became leases of generally five to ten-year periods. This arrangement has placed ranchers in permittee relationship with the government thus limiting rancher ability to manage their operations and invest in long-term planning or upkeep (Watt 2017).

**Ranching as a cultural resource**

Working landscapes and other such ideals were not in the NPS's jargon in 1960's and it was not until the late 1980's that the NPS began to formally recognize cultural landscapes (Sadin 2007). Late recognition though does not discount the dramatic impact and longstanding history of ranching in Point Reyes. Working ranches in PRNS are important to the area's cultural landscape and maintain a traditional ranching culture that evokes themes of the American West (Brunson and Huntsinger 2008). Historic ranching is described as a "uniquely American cultural heritage" (Kirner 2015). The lifestyle is attractive and can be a draw for tourism, alongside scenes of nature. Point Reyes has the unique opportunity to, "reconnect people with their natural heritage through wilderness and recreational experiences as well as the food they eat, the beauty of the cultural landscapes where it is grown, and the honorable labor of producing it" (Diamant et al. 2007). This value has begun to become recognized to an extent in PRNS. As of October 2018, over 22,000 acres of the Point Reyes Peninsula Dairy Ranches Historic District was placed in the National Registrar of Historic Places (Gunn 2018).

**Resilient Agriculture Group (RAG)**

To protect their interests, some ranching families have joined to create an agricultural lobbying group called the Resilient Agriculture Group (RAG). As their lobbyist, the group has

hired former republican congressman John Doolittle. Their stated aim is to change founding legislation to guarantee rancher presence and provide for rancher security. However, the group is creating a concern that they may seek to ease limitations on land usage and expand privatization of the seashore. In response to this, other ranching families have chosen to distance themselves from the group. In a letter to the editor of Point Reyes Light, the Evans family were openly critical of RAG and described the group as "contentious" and "counter-productive" (Guth 2018). These sentiments were soon echoed as seven other ranching families (Niman, McClure, Evans, Rossotti, Nunes, Giacomini, and Kehoe) voiced their support of this letter against RAG emphasizing their "mutually respectful relations" with park staff. (Guth 2018).

**House Resolution 6687**

Introduced by Representative Jared Huffman [D-CA] House Resolution 6687 (H.R. 6687) sought to reinstate lease permits of twenty-year intervals and work to minimize tule elk conflicts by working with interested Indian Tribes on tule elk management schemes such as hunting and reestablishment in other lands (H.R. 6687 2018). The bill passed the House of Representatives in September of 2018 but soon thereafter died in the Senate. While this bill was not a success, its attempt at including native tribes is worth examining as a management alternative.

**Stakeholder analysis**

Stakeholder analysis is an "…approach for understanding a system, and changes in it, by identifying key actors or stakeholders and assessing their respective interests in that system" (Grimble and Wellard 1997). Originally outlined in a business setting (Freeman 1984), the analysis has found success in examining a variety of natural resource issues (Reed et al. 2009). The general purpose of stakeholder analysis is to provide a methodology that addresses differential consequences of actions for identified stakeholders (Grimble and Wellard 1996). Applying this to the tule elk and ranching issue, I used following definition generated in Colvin et al. (2016) who define stakeholders in environmental management, "…as formally affiliated groups with a collective interest and shared preferences for the environmental and natural resource issue in

question". In doing this I am using an instrumental definition of a stakeholder to examine those who are pragmatic for outcomes (Miles 2015, Colvin et al. 2016).

## METHODS

### Data collection

I used a non-participatory approach to data collection because tule elk are well researched and there is considerable documentary evidence in form of public comments to inform stakeholder opinions. As part of the first phase of the updating process for the General Management Plan, the NPS held an open public comment period with two public meetings over the course of thirty days that ended on November 15, 2017. These public comments heard opinions over the five alternatives (stated in the introduction) being considered for the General Management Plan Amendment (GMPA). These comments were then released and made available to the general public online. (Accessed 3/25/2018. General Management Plan Initial Public Comments. <https://www.nps.gov/pore/getinvolved/upload/planning_gmp_amendment _initial_public_comments.pdf>)

### Data analysis

Stakeholders were identified using a top-down analytical categorization and grouped according to their respective influence and interest level. Categorizations used were "key players", "context setters", "subjects" and "crowd" (Reed et al. 2009). "Key players" are the ranchers and NPS, they are categorized by having a high level of interest and influence. "Context setters" are environmental groups which can be classified as having high level of influence but low interest. "Subjects" have a low influence but high interest level and consist of local business and government. The "crowd" was identified as the general public who have little pragmatic interest or influence and thus need not be considered in detail. These differing levels of influence and interest correspond to how these groups should be considered and have their interests managed. The implications of their comments are considered in the context of this interaction.

## RESULTS

The general results of the analysis and strategies to management are summarized in the below figure and tables:

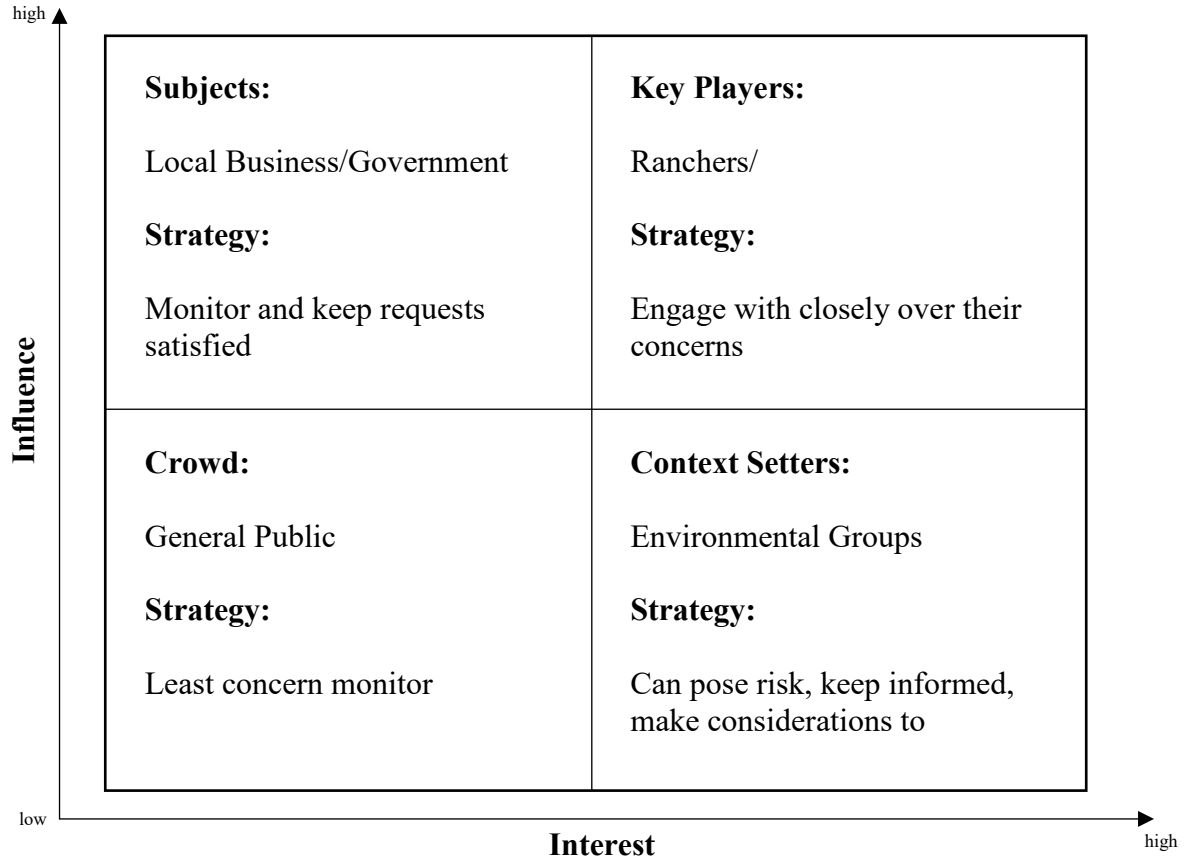



**Figure 2. Stakeholder analysis grid.**

**Table 1. Summarized support level of stakeholders**

| Stakeholder | Supportive of Management |
|---|---|
| Ranchers | Supportive |
| Environmental Groups | Not supportive or limited/non-lethal |
| National Park Service | - |
| Local Business/Government | Supportive |

**Table 2. Management option and feasibility of application in Point Reyes**

| **Management** | **Feasibility** |
|---|---|
| Relocation | Not an option due to prevalence of Johne's Disease |
| Contraception | High investment levels (money and animal handling) |
| Lethal Control | Ranchers have concerns over private hunting and culling will create major backlash |
| Fencing | Most amicable and recommended option |

## DISCUSSION

Comments from identified stakeholder groups were examined and are summarized below. Despite possible perceived incongruencies, there is wide range of support for ranching to continue and elk to receive some form of management. This form of management has yet to be defined by the NPS but from a preliminary analysis of select methods, fencing appears to have the most promise for alleviating conflict and appeasing the most stakeholders.

### Stakeholder Analysis

*Key players*

**Ranchers.** In general, Point Reyes seashore ranchers' concerns are leases of twenty-year intervals with a formal renewal and succession process, agricultural diversification, and operational flexibility (GMPA #2938, #2943, #2622, #2646). Ranchers in PRNS in effect facing what has been termed "impermanence syndrome" where uncertainty about the future limits investments and long-term planning that can be made for the benefit of the rancher and ecosystem (Parry and Skaggs 2014). Ranchers are open to management and the Point Reyes Seashore Ranchers Association (PRSRA) stated, "…the ranching community is prepared to step forward to assist with important environmental projects ranging from preserving threatened species to improving water quality…" (GMPA #2938). Ranchers consistently presented their willingness to work with the NPS on a

solution (GMPA #2943, #2907, #2646, #2910, #2938) and recognized the value of their cultural resource to the public (GMPA #2910, #2938, #2646, #2907).

With specific regards to tule elk, the PRSRA and affected ranchers support the continuation of manageable tule elk herds in the Tomales Point and Limantour Wilderness but seek the removal of tule elk from pastoral zones (GMPA #2943, #2660, #2907, #2910, #2940, #2941). The Spaletta family, who lease the area surrounding and including the D-ranch stated that, "We have tried every angle to keep viable, but we are getting close to the end if these elk are not relocated. These elk should be managed as a Natural Free-Range herd in a wilderness area where they are not hazed through fences and do not have to forage on ranches' hay and drink out of livestock watering areas…there is a place for both cattle and elk at Point Reyes National Seashore" (GMPA #2907). Even those ranchers most directly affected understand and are not hostile towards tule elk conservation but want the free-ranging tule elk off of lands designated as pastoral zone.

**National Park Service.** The NPS's highlighted initial proposal was the continued ranching and management of Drakes Beach's alternative. While the NPS has not provided comments on their stance this initial proposal can be suggestive. The NPS is a key player but at this current time is providing the platform to consider different stakeholder comments.

*Context Setters*

**Environmental groups.** Environmental groups from the previous lawsuit are vehemently against ranching and any management of free-ranging tule elk herds. The Western Watersheds Project (WWP) bluntly stated that, "Livestock ranching is no longer a legitimate use of Point Reyes National Seashore" and that they support the elimination of all fences and no use of culling or contraception (GMPA #2719). The Center for Biological Diversity followed a similar suit in stating, "We support allowing free-roaming tule elk herds to remain at Point Reyes National Seashore, and object to any fencing, removal, hazing, sterilization, or killing of elk in the park" (GMPA #2714). After the settlement, these groups are seeking the removal of all ranching and that the lands be turned over to tule elk with no active management or population control measures.

However, not all conservation and environmental groups are on the same side as those who pressed litigation. The National Parks Conservancy Association, who prefaced their statement that

they did not support the lawsuit, asserted that in terms of tule elk, "…the goal should be to minimize the impacts" and that they, "would agree that no management of the elk is inappropriate. Similarly, inappropriate would be concluding right now that there should be no elk in the pastoral zone as a matter of policy" (GMPA #2947). The Environmental Action Committee of West Marin (EAC) followed a similar supportive statement that pledged support for diverse management options besides culling and removal. In much the opposite direction of groups pressing litigation the EAC suggested that, "Long-term leases and overall agriculture management strategies may strive to reduce conflicts and find a way to balance and accommodate the presence of both cows and elk…" (GMPA #2960). This suggests that there is a compromise and support that can be drawn for ranching from certain environmental groups in the face of others.

*Subjects*

**Local business/government.** Local business and regional government support continued ranching on the seashore and also ask for the removal of free-ranging tule elk herds from the pastoral zone. The Marin County Board of Supervisors prefaced their statement by expressing their "full and unequivocal support for the continuation of viable livestock grazing, dairy production, and diversified agriculture…" and continued on to support the removal of tule elk in pastoral zones with management methods, "used to control their population and manage their impacts" (GMPA #2310). They also suggest recognizing the rancher's direct role in maintaining and enhancing the "pastoral cultural landscape" (GMPA #2310). Voicing support as well for the dairy ranches that help supply it, the Straus creamery vocalized support for the removal of tule elk herds from pastoral areas (GMPA #2683). With the support of regional institutions, management initiatives should be less hindered in their application.

*Implications*

From the above comments, it can be seen that the support for some form of management to lessen ranching conflict is tule elk is embraced across the array of stakeholders. While certain context setting environmental groups vehemently oppose ranching and any form of tule elk management, there are other similar groups which embrace ranching's place on the seashore and

instead seek to work towards an amicable partnership with ranching. Moving forward, rancher's need to be worked with directly while the considerations of environmental groups are heard. With the support of regional government and business, the economic niche that makes these ranches important is recognized. The risk to ranching comes from litigious environmental groups whose risk must be managed by incorporating their concerns to reasonable extents.

## Management

### *Relocation*

Relocation was suggested by many, even one of the affected families (GMPA #2910), in the comments as a management alternative. However, relocation outside of the seashore's boundary has issues. Prior to release as the original free-ranging herd, 45 tule elk in good physical condition were translocated and kept in a holding pen for six months within the park. Before release, a study was conducted that tested for presence of Johne's disease. Johne's disease was reported in the source population and thus warranted testing for the disease. The disease is a contagious chronic wasting disease that can spread from tule elk to cattle. Three different testing arrays were used and overall found ten tule elk with a positive trace present in tissue samples (Manning et al. 2003). In their comments, many ranchers expressed concern over the possible transmission of the disease to their ranch herds (GMPA #2941, #2940, #2938, #2910, #2907). Therefore, given the prevalence of contagious Johne's disease and transmission between cattle and other ruminants elsewhere, the elk cannot be relocated to borders outside of seashore.

### *Contraception*

Shunned by environmental groups but not specifically mentioned by other, contraceptives have been tested in Point Reyes on tule elk before with limited success. There was previous three-year study on the use of a contraceptive with tule elk living in Point Reyes. The results proved the effectiveness of porcine zona pellucida (PZP) as an immunocontraceptive, however despite the potential success, the contraceptives were expensive and had to administered annually by a dart gun to tranquilize females thus making them more difficult to approach (Shideler 2000). Given the

high investment levels, contraception is generally considered to not be a viable option for dealing with tule elk in Point Reyes.

*Lethal control*

Tule elk are controlled and managed throughout most of the state as a high value game species. They are no longer threatened nor endangered with stable overall numbers of around 4,000 (Cobb 2010). Tags are expensive and in high demand. In other areas, such as the Owens Valley, ranchers have embraced private hunting by allowing hunting outfitters to lead guided hunts on their property. This can be a lucrative solution. Despite this, ranchers in Point Reyes are wary of embracing such an option as they fear entering a different business that may detract or interfere with their ranching operations (Spiegal 2014).

In PRNS, culling has been used before to remove populations of exotic axis and fallow deer, with results more immediate and cost-effective than continuing other population control measure (Gogan et al. 2001). New Zealand hunting teams were contracted for the operation and local tribes participated in dressing the kills. The meat was used by the tribal groups and given to local food banks. Culling has recently been considered by the NPS as they have opened public comment on the use of park staff culling tule elk herds to keep the size of free-ranging herds between 100-160 individuals. However, given the intense backlash created when non-native deer were culled, the culling of tule elk is sure to create an even larger uproar and all environmental groups opposed culling measures as indicated in their comments (GMPA #2960, #2947, #2714, #2719). House Resolution 6687 introduced the concept of tribal hunting and meat use of tule elk however native groups would see culling as a last alternative as the elk are a culturally important species (C. Striplen, *personal communication*).

*Fencing*

Improving fencing is currently the most viable current option to mitigate conflict between tule elk and Point Reyes ranching. One of the impacted families on the Limantour wilderness side, the McDonald's, stated in their comment that, "The only way to manage elk is to build an elk fence" (GMPA #2941). They further even cede to, "recommend fencing out the actual sensitive areas. The fenced out sensitive areas would be removed from the leases and considered reduced

ranching" (GMPA #2940). Laura Watt who has been studying this issue closely even states in her comment that, "A separation fence may be necessary to prevent future spread of the elk onto pastoral lands" (GMPA #2966). It is also noted by ranchers that elk typically cross fences in the same area, so as a way to minimize damages to current fences there could be the implementation of highly visible elk crossings (Spiegal 2014). There are also elk excluding fence designs that could be employed which do not inhibit other wildlife species (VerCauteren et al. 2007). Fencing is one of the least contentious management proposals but is still disregarded by environmental groups who pushed litigation.

**Limitations**

Limitations of this study were that a non-participatory approach to stakeholders was employed. This non-active stakeholder analysis was able to carry out a preliminary identification and recommendation for management but could be bolstered by active stakeholder engagement. However, using the framework for stakeholder analysis as established here will provide meaningful in future examinations.

**Future directions**

Future directions of this work expand beyond considered amendments to the General Management Plan. One un-considered alternative is the implementation of a non-profit third party to manage compliance of lease terms and reduce the burden placed on the NPS. This approach has implemented with success in the Cuyahoga Valley in Ohio where the NPS has reinstated agricultural activities as a way to preserve the rural landscape. This is after previously expelling agriculturalists for their perceived detriment (NPS 2018). Also identified during this analysis process is the need for an economic review of individual ranches to determine if concerns over diversification and privatization are warranted, or of ranchers are just attempting to maintain the viability of their operations. Each operation is individual and therefore cannot be clustered and examined as a whole.

## Conclusions

Ranching on PRNS has legal precedence from Congress and maintains a historic landscape while operating as a cultural resource. There is a place for both tule elk and cattle at PRNS, however this place appears to be separated with fences from one another. Fencing pastoral areas to a larger extent and working to improve current fencing will work to ameliorate some the conflict during this interim period. Fencing is not a long-term solution though if free ranging herds are not actively managed. While environmental groups oppose population control measures, they must embrace management or face the same unforgiving natural population cycles as the Tomales Point herd. As this conflict moves forward and is resolved, it is important that considerations become oriented towards the long-term management of an unrelocatable free-ranging tule elk herd with no natural population control and the importance and maintenance of a historic and culturally significant working landscape.

## ACKNOWLEDGEMENTS

Thank you to Lynn Huntsinger for being my mentor and supporting me all throughout this project. It was her rangeland classes that got me inspired to do this topic. Also, thank you to Luke Macaulay for his guidance in the inception of this project. I also extend my gratitude towards Kurt Spreyer for his valuable feedback and edits in the formulation of my thesis. I also would like to thank James Bartolome and Chuck Striplen for speaking with me about this project.

## REFERENCES

Bernot, T. March 30, 2018. Winter Tule Elk census completed at Point Reyes. National Park Service. < https://www.nps.gov/articles/winter-tule-elk-census-completed-at-point-reyes.htm>

Brunson, M. W., Huntsinger, L. 2008. Ranching as a conservation strategy: can old ranches save the new West?. Rangeland Ecology and Management. 61(2): 137-147.

Cobb, M. A. 2010. Spatial ecology and population dynamics of tule elk (*Cervus Elaphus Nannodes*) at Point Reyes National Seashore, California." Ph.D. Dissertation. University of California, Berkeley.

Colvin, R.M., G. B. Witt, and J. Lacey. 2016. Approaches to identifying stakeholders in environmental management: insights from practitioners to go beyond 'usual suspects'. Land Use Policy 52:266-276.

County of Marin Department of Agriculture, Weights and Measures. 2017. Livestock and crop report. Novato, California.

Diamont, R., J. Roberts, J. Tuxill, N. Mitchell, D. Laven. 2007. Stewardship begins with people: an atlas of places, people, and handmade products. Conservation Study Institute. Woodstock, Vermont, USA.

Freeman, R. E. 1984. Strategic management: A stakeholder approach. Pitman Publishing. Boston, Massachusetts, USA.

Gogan, P. J. P. 1986. Ecology of the tule elk range, Point Reyes National Seashore. Ph.D. Dissertation. University of California, Berkeley. 441 p.

Gogan, P. J. P., and R. H. Barrett. 1987. Comparative dynamics of introduced tule elk populations. The Journal of Wildlife Management 51:20–27.

Gogan, P. J. P., R. H. Barrett, W. W. Shook, and T. E. Kucera. 2001. Control of ungulate numbers in a protected area. Wildlife Society Bulletin (1973-2006) 29:1075-1088.

Grimble, R., and K. Wellard. 1997. Stakeholder methodologies in natural resource management: a review of principles, contexts, experiences and opportunities. Agricultural Systems 55:173-193.

Gunn, M. "Historic Point Reyes Ranches Are Formally Recognized." National Park Service, U.S. Department of the Interior, 13 Nov. 2018.

Guth, A. May 3, 2018. House Committee hears Point Reyes woes. The Point Reyes Light. <https://www.ptreyeslight.com/article/house-committee-hears-point-reyes-woes>

Howell, J. A., G. C. Brooks, M. Semenoff-Irving, and C. Greene. 2002. Population Dynamics of Tule Elk at Point Reyes National Seashore, California. The Journal of Wildlife Management 66:478-490.

Kirner, K. D. 2015. The cultural heritage of family ranches. Rangelands. 37:85-89

Krausman, P. R., V. C. Bleich, W. M. Block, D. E. Naugle, and M. C. Wallace. 2011. An assessment of rangeland activities on wildlife populations and habitats. Pages 253–290 in D. D. Briske, editor. Conservation Benefits of Rangeland Practices: Assessment, Recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Conservation Service.

Macleod, C. 2017. Point Reyes National Seashore General Management Plan Amendment newsletter. National Park Service. <https://www.nps.gov/pore/getinvolved/upload/planninggmp amendment_newsletter_171016.pdf>

Manning, E. J., T. E. Kucera, N. B. Gates, L. M. Woods, and M. Fallon-McKnight. 2003. Testing for Mycobacterium avium subsp. paratuberculosis infection in asymptomatic free-ranging tule elk from an infected herd. Journal of Wildlife Diseases 39:323–328.

McCullough, D. R., J. K. Fischer, and J. D. Ballou. 1996. From bottleneck to metapopulation: recovery of the tule elk in California. Pages 375-403 in D.R. McCullough, ed. Metapopulations and Wildlife Conservation. Covelo, California: Island Press.

Miles, S. 2015. Stakeholder theory classification: A theoretical and empirical evaluation of definitions. Journal of Business Ethics. 142:437-459.

National Parks & Recreation Act of 1978, Pub. L. No. 95-625 § 318(c) (Nov. 10,1978).

NPS [National Park Service]. September 28, 2018. Countryside. <https://www.nps.gov/cuva /learn/historyculture/countryside.htm>

"Organic Production and Handling Standards." National Organic Program. USDA, 1 Oct. 2011.

Parry, S. F., and R. Skaggs. 2014. Uncertainty, impermanence syndrome, and public land ranching. Rangelands 36:20-24.

Point Reyes National Seashore. July, 1998. Tule Elk Management Plan and Environmental Assessment <https://www.nps.gov/pore/learn/management/upload/planning_tule_ elk_mp_ea_1998.pdf>

Reed, M. S., A. Graves, N. Dandy, H. Posthumus, K. Hubacek, J. Morris, C. Prell, C. H. Quinn, and L. C. Stringer. 2009. Who's in and why? A typology of stakeholder analysis methods for natural resource management. Journal of Environmental Management 90:1933-1949.

Resource Renewal Institute, Center for Biological Diversity, and Western Watersheds Project v. National Park Service and Cicely Muldoon, 3:16-cv-00688 F. Supp., 2 (N.D. Cal. 2017)

Resource Renewal Institute, Center for Biological Diversity, and Western Watersheds Project v. National Park Service and Cicely Muldoon Stipulated Settlement Agreement and Order, 4:16-cv-00688-SBA (KAW), 2 (N.D. Cal. 2017)

Rilla, E. 2011. Coming of age: the status of North Bay artisan cheese making. University of California Cooperative Extension. Novato, California.

Rilla, E., and L. Bush. 2009. The changing role of agriculture in the Point Reyes National Seashore. University of California Cooperative Extension.

Sadin, P. 2007. Managing a land in motion: an administrative history of Point Reyes National Seashore. National Park Service.

Shideler, S. E. 2000. Monitoring reproduction and contraception in free ranging wildlife: Tule Elk (*Cervus elaphus nannodes*) at Point Reyes National Seashore. USDA Forest Service Proceedings 3: 137-142.

Spiegal**,** S. 2014. Sharing the range: managing wildlife impacts to livestock production in California Coast Range working landscapes. Rancher, Manager, and Scientist Forum on Rangeland Conservation. Central Coast Rangeland Coalition.

The Point Reyes National Seashore Establishment Act, Pub. L. No. 87- 657, § 4 (Sept. 13, 1962).

To direct the Secretary of the Interior to manage the Point Reyes National Seashore in the State of California consistently with Congress' long-standing intent to continue to authorize working dairies and ranches on agricultural property as part of the seashore's unique historic, cultural, scenic and natural values, and for other purposes. H.R. 6687. 2018

VerCauteren, K. C., N. W. Seward, M. J. Lavelle, J. W. Fischer, and G. E. Phillips. 2007. A fence design for excluding elk without impeding other wildlife. Rangeland Ecology &Management 60:529-532.

Watt, L. A. 2015. The continuously managed wild: tule elk at Point Reyes National Seashore. Journal of International Wildlife Law & Policy 18:289-30.

Watt, L., and D. Lowenthal. 2017. Remaking the Landscape. Pages 123-154 *in* The Paradox of Preservation: Wilderness and Working Landscapes at Point Reyes National Seashore. University of California Press, Oakland, California, USA.