



Global Re-introduction Perspectives: 2013

Further case-studies from around the globe
Edited by Pritpal S. Soorae



IUCN/SSC Re-introduction Specialist Group (RSG)





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Re-introduction of tule elk to Point Reyes National Seashore, California, USA

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Introduction

Tule elk (*Cervus elaphus nannodes*), a subspecies endemic to California, was historically found in large herds throughout much of central and coastal California. Market hunting during the California Gold Rush decimated these herds, and by 1895, only two to 10 elk remained. This remnant group was protected and served as the source for early relocation efforts (McCullough, 1971). Early efforts were generally unsuccessful but did establish a herd in California's Owens Valley, outside their historical range, in 1933. The herd grew rapidly and supported six controversial hunts between 1943 and 1969. In an effort to limit hunting, concerned preservationists formed the Committee for the Preservation of Tule Elk in 1960. Public pressure resulted in the California State Legislature passing a law in 1971 that halted hunting until either state-wide numbers reached 2,000, or no further unoccupied elk habitat existed. This law prompted the California

Department of Fish and Game to begin re-introducing tule elk throughout their former range. In 1976, the U.S. Congress passed a resolution that concurred with state law and directed federal agencies to make lands available for re-introductions within the subspecies' historical range. Point Reyes National Seashore was identified as a potential translocation site.



Male elk with Pacific Ocean in the background

© Jeff Wilson

Goals

- Goal 1: Establish and maintain viable populations of tule elk within the subspecies' native range at Point Reyes National Seashore, California.
- Goal 2: Manage tule elk using minimal intrusion to regulate population size, where possible, as part of natural ecosystem processes.
- Goal 3: Provide for a free-ranging tule elk herd at Point Reyes National Seashore.
- Goal 4: Research and monitor the elk populations and their habitat over time.
- Goal 5: Provide the public with interpretation and information on tule elk conservation biology and management.



Tomales Point from the air © Reg Barrett

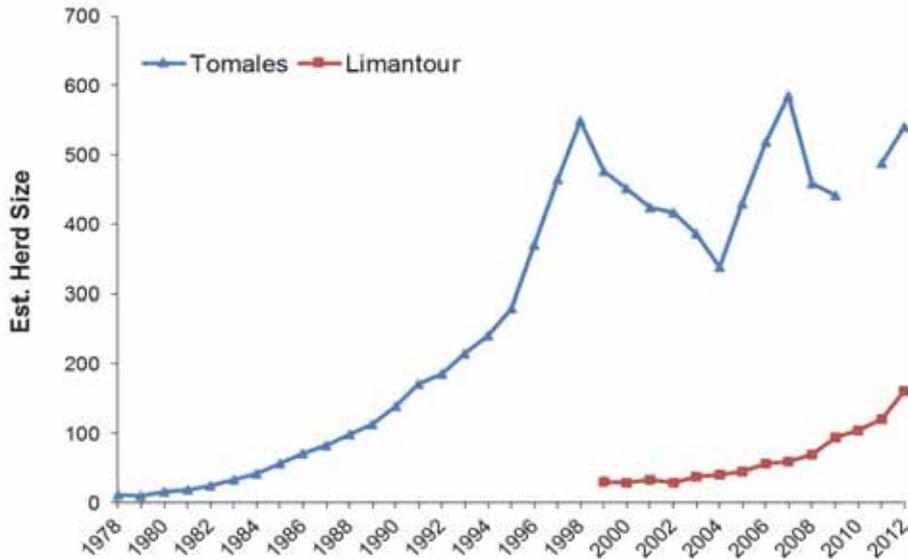
Success Indicators

- Indicator 1: Re-introduced tule elk do not experience extirpation or become exposed to the threat of extirpation.
- Indicator 2: Re-introduced tule elk are allowed to become self-regulating to the extent possible.
- Indicator 3: A tule elk herd not restricted in their movements by fencing is successfully established outside the original fenced release site.
- Indicator 4: Research and long-term monitoring of tule elk and their habitat at Point Reyes are incorporated in to an adaptive management program.
- Indicator 5: Tule elk are readily accessible to the public for viewing and information on their life cycle and conservation status is available to the public.

Project Summary

Feasibility: Point Reyes National Seashore (288 km²) historically supported more than 1,000 tule elk, as indicated by biological specimens and historical accounts (McCullough, 1971). By the mid-1800s, tule elk were extirpated from Point Reyes due to agriculture, logging and market-hunting. In 1976, Point Reyes was identified as a potential re-introduction site in state and federal conservation plans. It was decided that the ideal tule elk release site within Point Reyes needed to be a confined area separated from domestic cattle operations where the re-introduced elk could be held in a small acclimation pen prior to release (i.e., soft release). The northernmost 10.3 km² of the Point Reyes Peninsula (Tomales Point) met these criteria: a 5 km fence at the base of the Point could confine elk and the existing cattle grazing lease for the area had expired.

Fig. 1. Showing exponential growth of the population



Implementation: Ten tule elk (2 males:8 females) were translocated to a holding pen at Tomales Point in March, 1978. These 10 elk and seven additional calves born in the pen (4 males:3 females) were released in September 1978, and shared the range with cattle until the following year. The re-introduced elk seemingly flourished during the first few months following release. However, by mid-summer 1979, one adult male died and a second adult male was severely emaciated and was removed from the range. Both males had deformed antlers. The females and calves were provided supplemental feed from September 1979 to April 1980 to alleviate apparent malnutrition evident from emaciation and light-colored brittle pelage. Two female elk born in the pen in 1978 were culled in March 1980 after exhibiting emaciation and severe diarrhea. In an effort to supplement the genetic diversity of the original re-introduced herd, an additional three adult males were re-introduced to Tomales Point in December 1981, but these elk disappeared in early 1982.

Post-release monitoring: Tule elk at Point Reyes have been monitored closely since their re-introduction. The severe diarrhea observed in the herd shortly after their re-introduction was determined to be the result of Johne's disease (*Mycobacterium avium paratuberculosis*) (Jessup *et al.*, 1981), and the light colored pelage and antler deformities were attributed to trace element deficiency (Gogan *et al.*, 1989). Following an initial period of slow growth, the herd exhibited approximately 20 years of exponential growth (Cobb, 2010) (Figure 1). By 1998, the herd numbered approximately 450 animals (4 elk/ha).

The rapid herd growth at Tomales Point raised concerns over potential negative impacts that a high density elk herd may have on native flora and fauna. Additional concerns were raised over the potential for the expanding elk population to overshoot the area's ecological carrying capacity, leading to habitat degradation, and then crash to a lower abundance, resulting in a secondary genetic bottleneck. In response to these concerns, the National Park Service considered alternative measures that included no action and various combinations of actions including culling, contraception, translocations, and removal of the elk fence at Tomales Point (National Park Service, 1998). Ultimately, a decision was made to evaluate the effectiveness of translocation and artificial population control methods within the framework of adaptive management. Between 1997 and 2001, 30 to 50 elk cows at Tomales Point were contracepted annually with porcine zona pellucida (PZP), which effectively prevented pregnancy for one year. In 1998, biologists captured and translocated 45 elk cows and bulls from Tomales Point to an unrestricted region of Point Reyes (Limantour) following a test and cull screening program for Johne's disease, thereby establishing a free-ranging herd beyond Tomales Point.

Following this management intervention, elk at Tomales Point exhibited periodic swings in numbers from 1998 to 2012, suggesting that the herd may have reached a stochastic carrying capacity (Figure 1). Shortly after release at Limantour, two to three elk moved approximately 10 km from the release site and established a second free-ranging herd (D Ranch) on cattle ranchlands. The newly established herds initially exhibited a pattern of early population growth similar to that observed at Tomales Point, but then began to increase rapidly. With abundant forage resources, these newly established herds are predicted to increase exponentially (Cobb, 2010). Rapid growth of the D-Ranch herd combined with the elk's habitat preferences has caused concern among cattle ranchers within the Seashore over elk use of forage resources, which may escalate as elk numbers increase (Cobb, 2010).

Major difficulties faced

- Trace element deficiency and Johne's disease threatened the initial success of the Point Reyes tule elk re-introduction.
- Male tule elk introduced to Tomales Point to enhance the genetic diversity of the initial herd did not survive.
- Presence of Johne's disease made tule elk at Point Reyes



Ranger and female elk at Tomales Point

@ McCrea Cobb



Visitors viewing elk at Tomales Point © NPS

unsuitable as a source for future state-wide re-introductions, as dictated by state law, and required screening (test and cull) prior to establishing a new free-ranging herd within Point Reyes.

- The potential threat of disease transmission to the insular tule elk at Point Reyes, specifically Chronic Wasting Disease (CWD), made it difficult to supplement the herd to mitigate the potential for inbreeding depression.
- A lack of effective

population-limiting predators at Point Reyes allowed for rapid irruptive growth of the elk herds. The limited area available to elk at Tomales Point led to a short lived fertility control program and one time removal of elk for relocation. The expansion of the free-ranging Limantour herd has led to concerns among local cattle ranchers.

Major lessons learned

- Screen for nutritional conditions within domestic and wild species at release site prior to the re-introduction. Trace element deficiency in elk at Tomales Point was likely unavoidable due to naturally low levels of certain trace elements (copper and selenium) in the underlying soils and bedrock. Screening for diseases may not be practical as the presence of many diseases cannot be determined by screening.
- Identify potential population regulation factors prior to re-introduction. Knowledge of potential population limiting factors (or the lack thereof) may allow predicting population growth based upon outcomes elsewhere and thereby allow identification of potential future management actions.
- Address means of alleviating potential inbreeding depression.
- Recognize the likelihood of public involvement in future management actions and identify a socially acceptable means of any possible future population control prior to re-introduction.
- Quantify resource selection to predict areas of likely range expansion and potential conflicts with human activities prior to a re-introduction. This may allow for proactive human-wildlife conflict management.

Success of project

Highly Successful	Successful	Partially Successful	Failure
	√		

Reason(s) for success/failure:

- A self-sustaining herd of tule elk was established at the original release site at Point Reyes and a second free-ranging herd was established using progeny from the first re-introduction.
- Concerns over the potential transmission of diseases to and from tule elk at Point Reyes blocked plans to manage the herd as part of a meta-population.
- For the first 20 to 30 years post re-introduction, potential conflicts between tule elk and cattle ranching operations have been minimal, despite their close proximity.
- Tule elk at Point Reyes have displayed no outward signs of inbreeding depression, even though they have some of the lowest genetic diversity of any tule elk herd
- Ready opportunities for viewing of tule elk at Point Reyes enhance public understanding of the area's rich natural history.

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References

Cobb, M. A. (2010) Spatial ecology and population dynamics of tule elk at Point Reyes National Seashore, California. Dissertation, University of California, Berkeley, CA, USA.

Gogan, P. J. P., D. A. Jessup, & M. Akeson. (1989) Copper deficiency in tule elk at Point Reyes, California. *Journal of Range Management* 42:233-238.

Jessup, D. A., B. Abbas, D. Behymer, & P. Gogan. (1981) Paratuberculosis in tule elk in California. *Journal of the American Veterinary Medical Association* 179:1252-1254.

McCullough, D. R. (1971) *The tule elk: its history, behavior, and ecology.* University of California Press, Berkeley, CA, USA.

National Park Service. (1998) *Point Reyes National Seashore Tule Elk Management Plan and Environmental Assessment.* Point Reyes National Seashore, CA, USA.