Chirikof Island Rangeland Assessment

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Introduction

On July 17-18, 2014, a research team from multidisciplinary backgrounds and agencies assessed the environmental status of Chirikof Island, Alaska. The purpose of this assessment was to collect and report baseline field data and photos of Chirikof Island's current environmental condition. The data collected will be utilized by the United States Fish & Wildlife Service (USFWS) to complete an Environmental Impact Statement (EIS). The Chirikof Island research team included Agronomist Casey L. Dinkel of the Alaska Plant Materials Center, Rangeland Manger Karen Sonnen, seasonal intern Katie Schmidt from Natural Resource Conservation Service's (NRCS), and regional USFWS managers Nora Rojek and Jeff Williams. Agronomist Dinkel conducted a complete rangeland assessment of the island, while also documenting the existing impacts by cattle. Dinkel also assisted NRCS's Sonnen and Schmidt with rangeland surveys throughout the Island. USFWS regional managers Rojek and Williams surveyed sea bird populations and existing or potential sea bird habitat.

Background

The Island of Chirikof is located in the Gulf of Alaska approximately 80 miles southwest of Kodiak Island and 80 miles east of the Alaska Peninsula. A detailed image of Chirikof Island can be seen in **Figure 1**. Chirikof Island is 11 miles long north to south and 7.5 miles wide east to west, consisting of approximately 29,000 acres. On the Northern half of Chirikof Island the terrain is rolling to flat. The Southern portion of the island consists of significantly steeper terrain, ranging from hills to small mountains. Chirikof Island is void of trees and is comprised of a diverse community of vascular plants, including forbs, grasses, sedges, and shrubs. A general list of documented vascular plants can be seen in **Table 1**.

Currently, Chirikof Island is home to a variety of seabirds, small rodents, fox, and cattle. The cattle were first introduced to the island in the late 1880's and utilized as a food source for fox hunters and whalers. Since their introduction, cattle populations have greatly fluctuated and hundreds of cattle have been introduced for ranching and other various business opportunities. A historical timeline of Chirikof Island and its cattle is outlined in **Figure 2**. Several different breeds have been introduced to the island such as: Angus, Hereford, Long Horn, and Short Horns. Despite the harsh winters and isolated existence, cattle populations have increased during recent years. While collecting field data on Chirikof Island individual groups of cattle were counted and recorded. The cattle population of Chirikof was estimated to be between 1,000 and 1,200 individuals. However, since there was not ample time to survey the entire island, some cattle numbers may differ from what was originally estimated. An aerial survey conducted by the USFWS in the fall of 2014 estimated 2,024 cattle to inhabit Chirikof Island. Presently, these animals are unmanaged. Due to their isolation and lack of human contact, the cattle of Chirikof Island behave skittish, and sometimes aggressive.

FIGURE 1

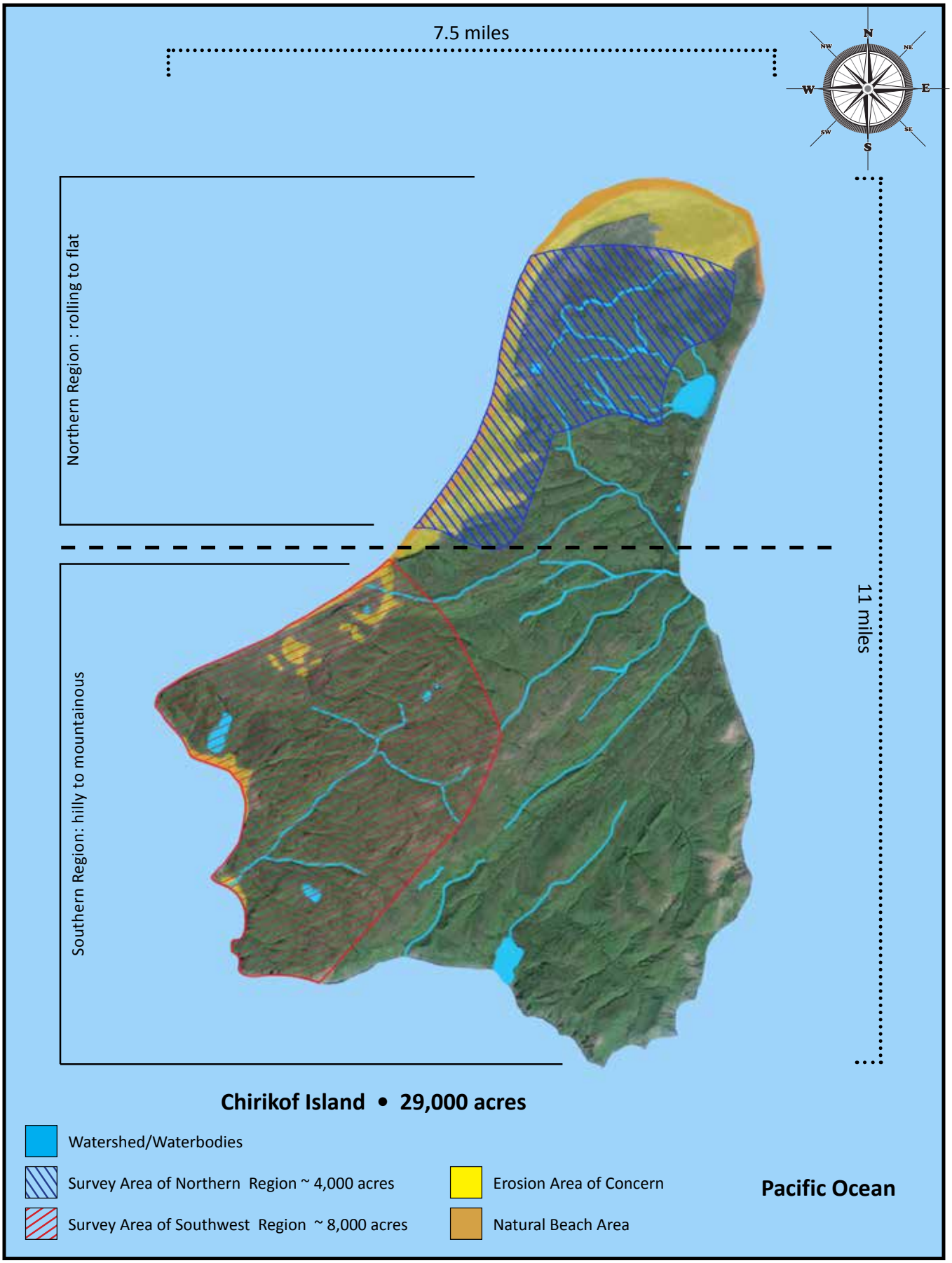
7.5 miles
N
NW
NE
W
E
SW
SE
S
Northern Region : rolling to flat
Southern Region: hilly to mountainous
11 miles
Chirikof Island • 29,000 acres
Watershed/Waterbodies
Survey Area of Northern Region ~ 4,000 acres
Survey Area of Southwest Region ~ 8,000 acres
Erosion Area of Concern
Natural Beach Area
Pacific Ocean

TABLE 1

General list of vascular plants found on Chirikof Island - Talbot & Talbot 2014

Agrostis alaskana
Agrostis exarata
Artemisia tilesii
Angelica lucida
Andromeda polifolia
Antennaria monocephala
Arctostphylos alpine
Arnica chamissonis
Aster sibiricus
Athyrium filix-femina
Barbarea orthceras
Betula nana
Bromus sitchensis
Cakile edentula
Calmagrostis canadensis
Calamagrostis inexpansa
Callitriche sp.
Caltha palustris
Campanula latisepala
Cardamine pratensis
Cardamine umbellata
Carex canescens
Carex cicinata
Carex lyngbyei
Carex macrocephala
Carex macrochaeta
Carex pluriflora
Carex sitchensis
Castilleja unalaschcensis
Cerastium fontanum
Cicuta virosa
Claytonia chamissoi
Claytonia sibirica
Cochlearia sp.
Coeloglossum sp.
Conioselinum gmelinii
Cornus suecica
Cyrpripedium sp.
Cystopteris fragilis
Deschampsia beringensis
Dodecatheon pulchellum var. *macrocarpum*
Drosera rotundifolia
Dryopteris expansa
Eleocharis uniglumis
Empetrum nigum
Epilobium ciliatum subsp. *glandulosum*
Epilobium honemannii subsp. *behringianum*
Epilobium latifolium
Equisetum arvense
Equisetum scirpoides
Equisetum variegatum
Erigeron pererinus
Eriophorum angustifolium
Eriophorum chamissonis
Festuca rubra
Galium sp.
Gentianella amarella
Geum macrophyllum
Glyceria pauciflora
Gymnocarpium dryopteris
Heracleum maximum
Hippuris vulgaris
Honckenya peploides
Hordeum brachyantherum
Huperzia selago
Hypochaeris radicata
Iris setosa
Juncus alpinus
Juncus bufonius
Juncus falcatus
Juncus ranarius
Juncus triglumis subsp. *albescens*
Koenigia islandica
Lathyrus japonicas
Ledum decumbens
Leymus mollis
Ligusticum scoticum
Limosella aquatic
Lolium perenne
Lupinus nootkatensis
Luzula multiflora subsp. *kobayasii*
Luzula parviflora
Lysimachia thyrslflora
Maianthemum dilatatum
Malaxia monophylla
Menyanthes trifoliata
Mertensia maritima
Mimulus guttatus
Moehringia lateriflora
Myriophyllum sp.
Oxycoccus microcarpus
Parnassia kotzebuei
Pedicularis verticillata
Phleum sp.
Plantago maritima
Platanthera sp.
Poa annua
Poa eminens
Poa pratensis subsp. *irrigata*
Polemonium acutiflorum
Potamogeton richardsonii
Potentilla anserina subsp. *pacifica*
Potentilla palustris
Prenanthes alata
Pyrola asarifolia
Ranunculus bongardii
Ranunculus hyperboreus
Rhinanthus minor
Rhodiola rosea
Rhododendron camschaticum
Rubus chamaemoris
Rubus spectabilis
Rubus stellatus
Rumex acetosella
Rumex fenestratus
Rumex transitorius
Sagina procumbens
Salix alexensis
Salix arctica
Salix barclayi
Salix glauca var. *stipulata*
Salix ovalifolia var. *ovalifolia*
Salix rotundifolia
Salix pulchra
Senecio peudoarnica
Sibbaldia procumbens
Solidago lepida
Sanguisorba canadensis
Spiranthes romanzoffiana
Stellaria media
Stuckenia filiformis
Swertia perennis
Taraxacum certophorum
Thelypteris connectilis
Tofieldia coccifera
Triglochin palustre
Trisetum spicatum
Veronica sp.
Viola langsdorffii
Vaccinium vitis-idaea

FIGURE 2

Timeline (1867-2014)

Chirikof- There is a long history of cattle grazing on Chirikof Island. Cattle are believed to have been first introduced in the mid to late 1880's as a source of food for fox hunters and whalers. In the years since many different ranchers have attempted to establish a successful ranching practice on Chirikof, bring in new cattle and subsequently new genes. However the remote location, bad weather, and difficulty of transportation of cattle off the island has made it an expensive and often unsuccessful venture. The history of Chirikof has had its hardships including boat wrecks, plan crashes, man stranded, and lawsuits. Below is a rough time line of the history of cattle on Chirikof.

1867- The US purchased the territory of Alaska from Russia.

1886- Semidi Propagation Company of San Francisco leases Chirikof from the US government and brings in a few pair of blue foxes to Chirikof from St. Paul Island. (foxes still roam the island today)

1887- Semidi Propagation Company of San Francisco placed a small herd of Siberian Cattle and short-horned bull on Chirikof as a source of food for whalers and blue fox hunters.

1890's- Semidi Propagation Company is sold to Alaska Commercial company.

1892- Axel Olson transported three longhorned cows and one bull to Chirikof.

1899- Alaska Commercial Company reported 20 head of cattle on Chirikof. In the same report the Alaska Commercial Company states that that they are not feeding cattle over winter and that Chirikof cattle are surviving with no outside food source.

1907-400 cattle

1912- Department of Ag. Experimental Station added new bulls on Chirikof.

1920- Axel Olson returned to Chirikof. He counted 200 head of cattle.

1925-Jack McCord first visited Chirikof. He was intrigued with the cattle on Chirikof islands and bought the abandoned cattle from Alaska Commercial Company. No legislation existed which allowed for private use of public lands in Alaska. McCord started lobbying in DC and eventually worked to help create the Alaska Grazing bill.

1927- Alaska Grazing bill Act passed in Congress. This allowed the Secretary of Agriculture to establish grazing districts and leases on public lands outside of other established reserves or national forests.

1928- Jake McCord formed Chirikof Cattle Company applied for Grazing lease on Chirikof.

1936- Start date for McCord's Grazing lease.

1941- America becomes involved with World War II residents of Alaska in the Gulf of Alaska and Aleutian chain were evacuated during the war, McCord only could only return to Chirikof when he had contracts to supply Beef.

McCord started a commercial operation selling beef to Armed forces during World War II.

1942-Military commissioned a radio station and weather observatory in Chirikof.

1943-Navy bought $23,000 worth of beef from McCord

1945- End of WWII.

1947- Jake McCord introduced Hereford Bulls on Island. (1,500 cattle)

1949- U.S. Navy went to Chirikof to salvage abandoned radio range equipment.

1950- Jack McCord sold Chirikof Cattle Company to Ryan and Cooper owners of Palmer cold storage who partnered w/ wholesale meat packaging company from Washington. (1,000 cattle) Ryan sold much of the original animals bringing in Angus, Whiteface, and Hereford bulls for breading stock.

1955- Don Wright bought reaming interest in Chirikof Cattle Company. After many hardship left Chirikof in 1963.

1959- Alaska became a state.

196?-Woodworth became next owner of Chirikof Cattles .

1966- Chirikof Cattle Company (Woodworth) purchased four bulls.

1982- The major corporate interest was transferred from Woodworth to Wilfred Stache

1979-1983 *No one managed cattle on Chirikof.*

1980- Chirikof became part of the Maritime Wildlife Refuge with the passage of the Alaska National Interest Land Conversion Act. (ANILCA)

1983- Len and Marsha Milton became owners of the lease on Chirikof. The Milton's borrowed $875,000 from Alaska Agriculture Loan Board. They used this money to buy 600 cattle and transported them in to the Island, Cattle were not equipped to deal with Chirikof harsh weather and most died that winter. During this time 78 cattle were barged of the island.

1990-Wayne McCrarys becomes the next owner the cattle and lease on Chirikof.

????-Tim Jacobson becomes next rancher to take ownership of Chirikof cattle.

Early 2000's -Fish and Wildlife express their desire to remove Cattle of Chirikof. They believe that having cattle on Chirikof clashes with the mission of the Maritime Wildlife Refuge that was created to conserve marine mammals, seabirds and other migratory birds, and the marine resources.

2001- Grazing lease Expired in 2001 but was extended to 2003.

2004- 2005 Tim Jacobson barged out about 40 head of cattle from Chirikof. He does not pay for important services involved in the transportation of the cattle. A civil lawsuit is filed against him.

2006- The USDA, ARS and Montana Agricultural Experiment Station teamed up together to do a genetic test on Chirikof cattle. The test involved comparing genetics of cattle isolated on Chirikof Island to the genetics of cattle commonly used for commercial production in North America. The results stated that Chirikof Island population of cattle is distinctive form other commercial breads.

2013-2014 The Fish and wildlife started beginning an Environmental Impact Statements in compliance with NEPA.

2014- As part of the Environmental Impact statement Fish and Wildlife do a "scoping" process were they asked community members, stakeholders, and local, state, and federal agency for ideas and opinions on the cattle of Chirikof and Wosnesenski. There are public meeting in Kodiak and Homer. Public Comment closed in Feb of 2014.

2014- There is an estimated 800-1,000 cattle on Chirikof.

Observations

Assessment of SW Region – Chirikof Island (July 17, 2014)

During the first day of the Chirikof Island environmental assessment, the Southwest portion of the island was studied. This area consisted mostly of hilly terrain with some small mountains. The majority of the day was spent collecting plant utilization heights, taking photos, observing erosion patterns, and collecting plant specimens. During this assessment, it was observed that the cattle frequented the coastal bluffs and low lying sedge meadows. Portions of the coastal bluffs and inner island sedge meadows displayed significant utilization of 50% or greater (see photos **1a** & **1b**). The majority of the Southwest region had little to no visible grazing (see photos **2a** & **2b**). When grazing was visible the cattle specifically targeted several plant species such as Beach Wildrye (*Leymus mollis*), Beach Fleabane (*Senecio peudoarnica*), Common Cow Parsnip (*Heracleum maximu*m), Lyngbyes Sedge (*Carex lyngbyei*), and Large Head Sedge (*Carex macrocephala*) as their first choice of fodder. Due to its high palatability, areas containing Beach Wildrye (*Leymus mollis*) had moderate to heavy utilization. This resulted in increased erosion rates due to more hoof activity and lack of vegetation. Some Interior portions of the island display evidence of ecological plant community succession due to selective grazing. This type of succession is known as secondary secession and usually occurs after some type of disturbance, such as heavy grazing. On Chirikof Island, this is evident in areas where forb species such as Lupine (*Lupinus nootkatensis*) and Common Yarrow (*Achillea millefolium*) make up a large percentage of the existing plant community. As the cattle selectively graze Beach Wildrye (*Leymus mollis*) and other graminoids, the ungrazed and less palatable plants such as Lupine and Common Yarrow have less competition from surrounding plants for scarce resources (see photo **3a**). This succession is also apparent in areas where less palatable grass species such as Bering Hairgrass (*Deschampsia beringensis*) and Meadow Barley (*Hordeum brachyantherum*) make up the majority of existing vegetation (see photo **3b**). It is important to recognize that rangeland ecosystems are very dynamic and constantly changing, with grazing being only one of many factors that can cause secondary secession. Natural erosion and fire should also be accounted for when determining the current ecological state of a rangeland.

Photo 1a Shows significant utilization of Large Head Sedge (*Carex macrocephala*) on coastal Bluffs of Chirikof Island.

Photo 1b Shows significant utilization of Beach Fleabane (*Senecio peudoarnica*) on coastal Bluffs of Chirikof Island.

Photo 2a Shows rangeland with little to no utilization.

Photo 2b Shows rangeland with little to no utilization.

Photo 3a Displays native rangeland in an ecological transition with a Lupine dominate community

Photo 3b Shows a large area mostly dominated by native Bering Hairgrass (*Deschampsia beringensis*) and Meadow Barley (*Hordeum brachyantherum*), due to grazing pressure and natural ecological transition.

Observations

Assessment of Northern Region – Chirikof Island (July 18, 2014)

The second day of the Chirikof Island environmental assessment was conducted on the Northern portion of the island. This section of the island consists of mostly flat to rolling terrain with some coastal bluffs, and inter-island sedge meadows. Sampling procedures were kept consistent between both days on Chirikof Island. The majority of the day was spent collecting plant utilization heights, taking site photos, observing erosion patterns and collecting plant specimens. During this assessment, greater cattle numbers were observed on the Northern portion of the island. This was primarily due to flatter terrain and a higher abundance of water sources including small lakes and creeks (see photo **4a**). This contributed to heavier range utilization and increased erosion. Similar to the Southwest region of Chirikof Island, cattle frequent the coastal bluffs more than the Interior portions of the island and beach plant communities displayed significant grazing damage. Additional damage to the coastal bluffs was caused by hoof action from cattle (see photo **4b**). This damage was further amplified by the natural process of wind and water erosion. Similar to the southwest region, cattle seemed to target Beach wildrye (*Leymus mollis*), Beach Fleabane (*Senecio peudoarnic*a), and Common Cow Parsnip (*Heracleum maximum*) as their first choice of fodder when grazing coastal bluffs. The Interior of the Northern region consisted of two major plant communities. The first plant community occurred on sandy, well drained, rolling hills to flat meadows consisting of a variety of grasses and forbs, including but not limited to, Red Fescue (*Festuca rubra*), Bering Hairgrass (*Deschampsia beringensis*), Beach Wildrye (*Leymus mollis*), Spike Trisetum (*Trisetum spicatum*), Meadow Barley (*Hordeum brachyantherum*), Fireweed (*Epilobium spp.*), Common Yarrow (*Achillea millefolium*), Seacoast Angelica (*Angelica lucida*) and Canada Goldenrod (*Solidago lepida*) (see photo **5a**). Additionally, this plant community displayed an abundance of Bering Hairgrass (*Deschampsia beringensi*s) and Meadow Barley (*Hordeum brachyantherum*) suggesting ecological transition due to grazing (see photo **5b**). The second plant community occurred in low lying areas with poor drainage consisting of a variety of sedges, including but not limited to Silvery Sedge (*Carex canescens*), Lyngbyes Sedge (*Carex lyngbyei*), Sitka Sedge (*Carex sitchensis*), and Mayflower Sedge (*Carex plurifora*) (see photo **6a**). In contrast to the Southwest region, the Northern region consists of a higher percentage of undesirable grasses. This is due to grazing selection and pressure from cattle. As discussed previously, it is important to recognize that rangeland ecosystems are very dynamic and constantly changing, with grazing being only one of many factors that can cause secondary secession. Natural erosion and fire should also be accounted for when determining the current ecological state of a rangeland.

Photo 4a Shows rolling to flat terrain, with multiple groups of cattle drinking at a nearby creek drainage.

Photo 4b Shows the effects heavy grazing and hoof action, amplified by wind and water erosion on sandy coastal bluffs of Chirikof Island.

Photo 5a Shows a typical grass/forb plant community common to the Northern region of Chirikof Island.

Photo 5b Shows an abundance of Bering Hairgrass (*Deschampsia beringensis*), suggesting plant ecological transition due to grazing.

Photo 6a Shows a typical wet sedge meadow plant community common to the Northern region of Chirikof Island.

Observations

Erosion Assessment - North and Southwest Regions

The North and Southwest regions of Chirikof Island contain coastal bluffs showing significant erosion. From the site visits, it was determined that the processes of natural erosion (wind and water) and impacts from cattle (hoof action and grazing pressure) is accelerating the erosion process in these regions (see photo **7a**). The soils within these areas are comprised mostly of fine unconsolidated sand, making them highly erodible. When these fine sands are disturbed, erosional rates are accelerated; resulting in soil transport and vegetation loss. In order to get a better understanding of the depositional history of the area and the driving forces of erosion on the island, soil profile data was collected from coastal bluffs in both regions. The general soil profile or diagnostic horizons of these soils consisted of a thin 0-2" organic layer, also known as an O horizon. The O horizon was succeeded by a 2-6" B horizon comprised mostly of sand with very little soil structure and some translocated minerals. The B horizon was followed by a thicker 6-36" C horizon of unconsolidated sand. Since the terrain in the Southwest region is relatively steep, cattle did not readily utilize this region as much as other areas. Instead, the majority of cattle on the island congregate on flatter areas such as riparian meadows where they are closer to water and forage. With fewer cattle utilizing the Southwest region there is a significant reduction in grazing and hoof impact; thus reducing erosion potential. In contrast, the Northern region displays areas of natural erosion that are being accelerated by the impacts of hoof action and grazing. These areas are much larger and more extensive than eroded areas in the Southwest region. Some areas in both regions display signs of revegetation by the natural reinvasion of native species. This is evident in areas that have newly established stands of Horsetail (*Equisetum spp.*) and Beach Wildrye (*Leymus mollis*) (see photo 7b).

Photo 7a Shows accelerated erosion from cattle hoof action and heavy grazing.

Photo 7b Shows the primary succession of (*Equisetum spp.*) after a recent disturbance.

Summary

Chirikof Island is home to an estimated 2,024 head of cattle that utilize the island's 29,000 acres. Based on the given acreage and herd size, there are approximately 14.3 acres available per animal unit on Chirikof Island. Since these cattle are unmanaged and free grazing they are able to move throughout the island as they choose, concentrating in areas where forage, water, and flat terrain are closest to one another. In the absence of management the high population of cattle has altered the ecological succession of plant communities away from a climax community. A climax community is determined by the presumed potential of a rangeland, which is generally predictable under specific management or disturbance. For the purpose of this summary, a climax community is defined as a plant community at the end of its successional series. It is self perpetuating and is in equilibrium with the physical and biotic environment. There are four range condition classes that are used to reflect the percentage of plants found in a given area, which describe rangeland over all health. These classes are expressed as; Excellent 76-100%, Good 51-75%, Fair 26-50%, and Poor 0-25%. For example, a range condition class recorded as poor (0-25%) usually displays many erosional characteristics and is comprised of early seral plant species that are low in cover and diversity. As a rangeland site transitions towards a climax community, coverage and diversity will begin to improve with overall rangeland health. The disturbance of the current plant communities on Chirikof Island has caused succession that is common in rangelands impacted by grazing and hoof action. This succession, away from a climax community, can be reversed if cattle stocking rates are reduced and a grazing management plan is implemented. The cattle population on Chirikof Island is considerably high at the present time; and a 50% herd reduction is advisable. This recommendation was determined by noting the current grazing damage, stocking density, and existing erosion directly or indirectly caused by cattle; as it relates to overall rangeland health. It would also be advisable to conduct a study to determine an average yield production of various rangeland plant communities throughout Chirikof Island. Obtaining rangeland yield production on a per acre basis would allow for a more defined grazing management plan, an accurate stocking rate, and reduce the risk of rangeland damage in the future. If grazing is allowed to continue, Chirikof Island offers adequate high quality forage to sustain a healthy cattle population. The recommendations listed above should allow severely impacted areas to naturally revegetate and transition to a desired climax community with time. If you have any questions or concerns pertaining to this report, please contact Casey L. Dinkel at the Alaska Plant Materials Center (PMC), 907-745-4469 or via email at casey.dinkel@alaska.gov.


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