

8. GRAZING MANAGEMENT PLAN

8.1. INTRODUCTION

The Alaska Division of Agriculture requires a Grazing Management Plan (GMP) on state lands leased for grazing (pursuant to AS 38 and 11 AAC 58 and 60; see CRMP Section 5). The GMP runs with the grazing lease and can be amended as necessary with state approval. Methods for enforcing GMP requirements are set forth in the grazing lease and 11 AAC. This chapter constitutes the GMP for the Fox River grazing lease area, ADL 226513.

In addition to a GMP, a lessee of state grazing lands is required to submit separately and keep on file with the Division of Agriculture and the local Soil and Water Conservation District a Soil and Water Conservation Plan or, if one has been completed, a Coordinated Resource Management Plan. The lessee is required to use management practices reasonably designed to prevent pollution of water, to prevent soil erosion greater than applicable soil loss tolerances identified by NRCS guidelines, to minimize disturbance of or conflict with fish and wildlife habitats recognized during lease adjudication as being important and warranting special consideration, and to minimize conflict with other legitimate users of the grazing lease area. When possible, these practices will comply with appropriate practices and procedures identified in NRCS manuals.

The Division of Agriculture requires that the following information be provided in a GMP:

1. A physical resource map showing:
 - a. location, acreage, and configuration of the authorized area;
 - b. proposed range improvements, including corrals, feedlots, watering sites, fences, improved pasture, line sheds, etc.;
 - c. proposed headquarter site withdraw (if needed). (Not applicable on the Fox River grazing lease.)
 - d. existing facilities on private property or other state authorizations that are associated with the Grazing Lease (wintering feedlot, etc.)¹;
 - e. proposed access and existing physical features such as existing roads or trails and water bodies.
2. A written plan indicating:
 - a. the information identified in 1) above;
 - b. proposed timing for development and stocking;
 - c. initial stocking rate as determined in the conservation plan;
 - d. proposed stocking rates, proposed grazing management and conservation practices, and standards and procedures for meeting the proposed development (in compliance with NRCS manuals); and
 - e. specific plans for dealing with all concerns noted during adjudication of the lease that were included in the final decision as needing special attention.

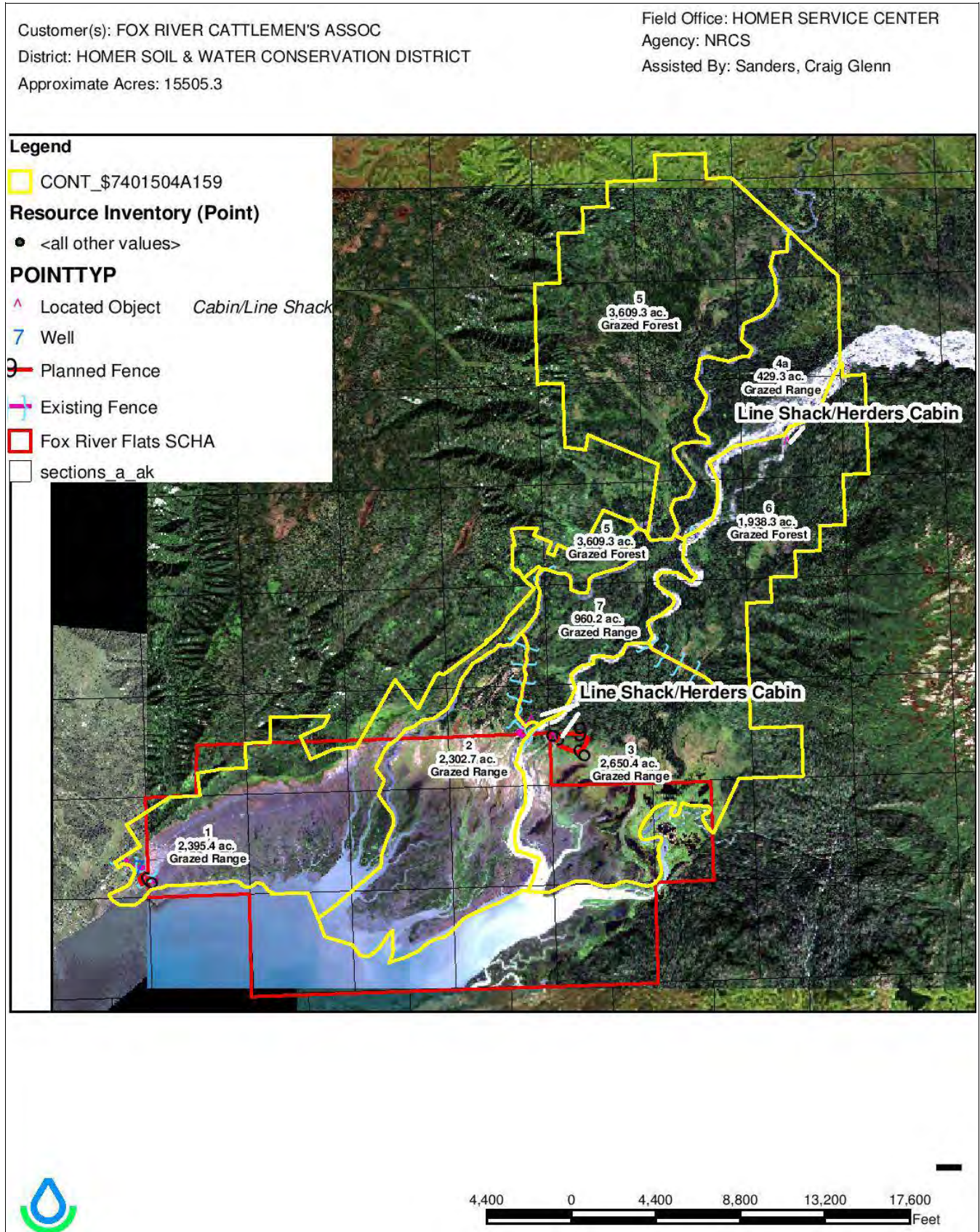
Each of these topics is covered below or the reader is directed to other sections of the Coordinated Resource Management Plan where relevant information can be found. The CRMP is available online at <http://www.homerswcd.org/projects/index.php>.

8.2. PHYSICAL RESOURCE MAP

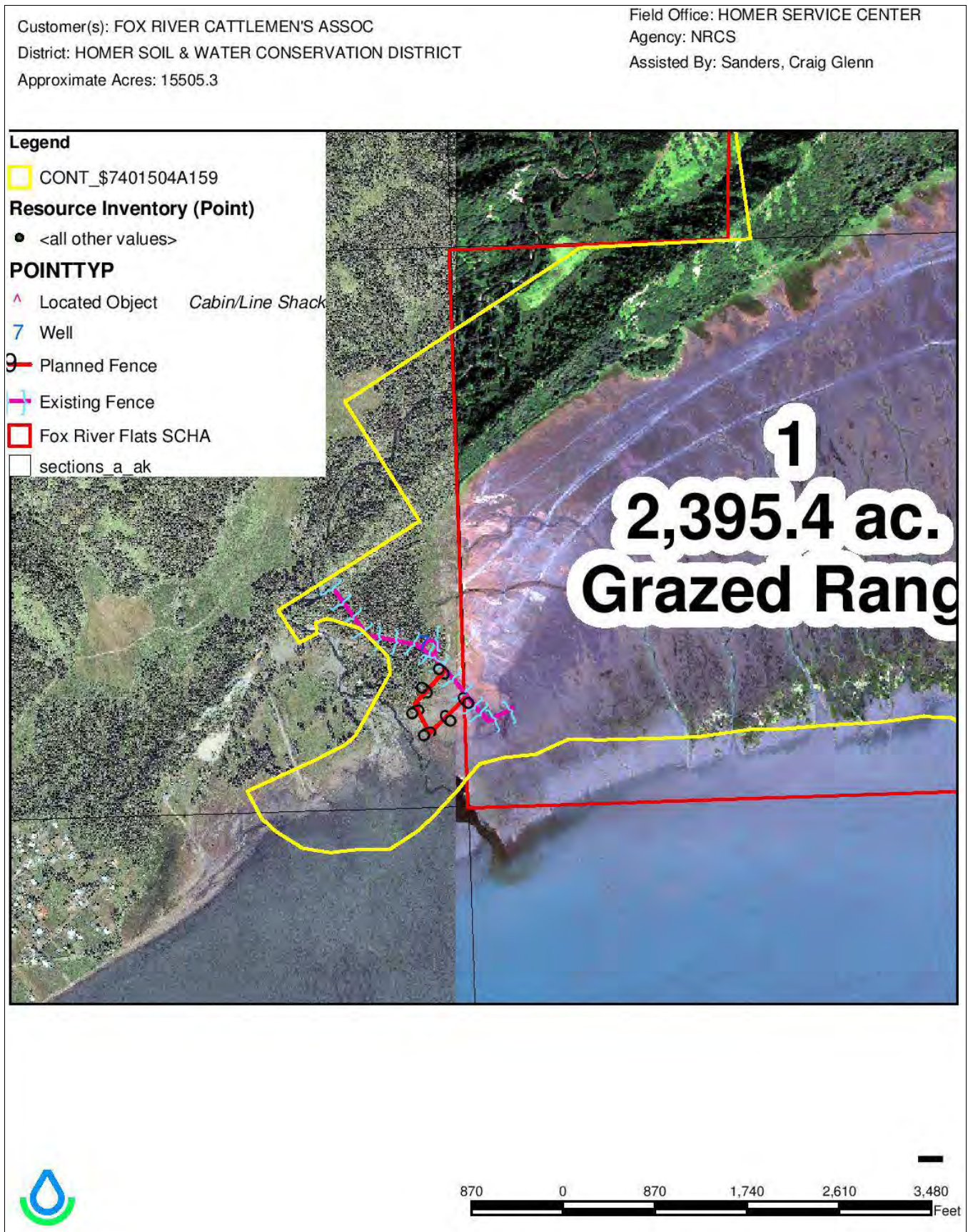
The GMP should include a physical resource map providing information listed above. Maps 8-1a and b provide physical resource maps for the GMP. They show grazing areas and their acreages, as well as existing and potential improvements.

¹ No “existing facilities on private property or other state authorizations... (wintering feedlots, etc.)” are associated with the Fox River Flats grazing lease. The Fox River cattlemen provide wintering feedlots on private parcels at some distance from the lease. Cattle are driven or hauled to these wintering areas in the fall—usually by the end of October. They are overwintered there, and returned to the grazing lease in the spring, after green-up (see discussion in text).

Map 8-1a. Fox River Flats Grazing Management Plan map.



Map 8-1b. Fox River Flats Grazing Management Plan—close up map of southwest corner.



8.3. “A WRITTEN PLAN...”

The Grazing Management Plan should include a written component that addresses the following topics:

- a. a written narrative explaining information identified on the physical resource map (Section 8.3.1);
- b. proposed timing for the development and stocking (Sections 8.3.2 and 8.3.3);
- c. initial stocking rate as determined in the NRCS conservation plan (Section 8.3.3);
- d. proposed stocking rates, proposed practices, and the standards and procedures for meeting the proposed development (in compliance with NRCS standards and practices) (Sections 8.3.3 to 8.3.5 and 8.3.8);
- e. specific plans for dealing with all concerns noted during adjudication of the lease that were included in the final decision as needing special attention (Section 8.3.5).

8.3.1. DISCUSSION OF GRAZING AREAS SHOWN ON THE GRAZING MANAGEMENT PLAN MAP

The Fox River Flats grazing lease is divided into eight areas for management purposes. Unless otherwise specified, all fences discussed or shown on the GMU map are 4-strand, barbed wire built to NRCS and ADF&G specifications.

Area 1 consists of 2,395.4 acres of grazed range. The most frequent interfaces with lease neighbors, as well as with visitors to the flats, occur in this area, at the entrance to the lease near Fox Creek. A “working corral” and “drift fence” are located near the entrance. The boundary fence has three openings to accommodate wildlife, equipment, and public access. The boundary fence was installed partly in response to conflicts with lease neighbors and partly to protect Fox Creek streambanks from damage being caused by unauthorized vehicles. The fence provides room for Fox Creek to meander. In addition to the barbed-wire fence, the cattlemen have installed an electric fence that extends into the tidelands and is intended to prevent ATVs from going around the end across the mudflats. FRCA hopes to have language incorporated in its next Special Area Permit from ADF&G allowing it to seasonally extend the electric fence further out into the CHA. FRCA also proposes to install a bear exclusion fence in this area in which to hold cattle when bears are active nearby.

Plans are to erect a line shack near the entrance for staging of equipment and materials; storage of gear, first aid, and veterinary supplies, etc.; and for sheltering herdsman and maintenance personnel who occasionally need to stay overnight. The “river-to-bluff” fence divides this area from Area 5 to the north, allowing cattle to be pushed into shrublands upvalley. Tidal fluctuations in this grazing area act as a moving fence, which promotes even grazing use across the CHA.

FRCA would like to be able to cross Fox Creek from time-to-time with equipment up to 1000 lb (and infrequently with vehicles over 1000 lbs) to work on corrals, perform seeding, etc., as well as to bring veterinarians into the lease to treat sick or injured cattle. The cattlemen hope to work with ADF&G, Habitat Division, to develop language for this use that could be incorporated into the next Special Area Permit issued by ADF&G for grazing in the Fox River Flats Critical Habitat Area. This would mean designating an appropriate motorized crossing on Fox Creek and obtaining an “871”² permit from ADF&G.

Area 2 consists of 2,302.7 acres of grazed range. A fence is located between Areas 2 and 7 to the northeast. (See aerial photo under Area 7.) As in Area 1, tidal fluctuations in this area act as a moving fence, which promotes even grazing use across the CHA.

² Permits granted under Alaska Statute 16.05.871 (Anadromous Fish Act) are sometimes called “871” permits for short. Alaska Statute 16.05.871 requires that an individual or government agency provide prior notification and obtain permit approval from the Habitat Division for “road crossings” or “use of vehicles or equipment” (among other activities) in anadromous waterways. (See Section 5.)

Area 3 consists of 2,650.4 acres of grazed range. A line shack was moved into this area and placed on the east side of Sheep Creek in summer 2009. It was subsequently enlarged to the pre-approved size of 12 ft by 20 ft. This shack was brought in when cattle poaching became a problem and when availability of a warming shelter became a safety concern for cattlemen after they crossed Sheep Creek during high tides, storms, or floods. A working corral approximately 5 acres in size is planned near the existing line shack (as drawn in red on Map 8-1a). This would allow horses to be penned while riders are dismounted and would allow cattle to be held when awaiting veterinarian visits or other kinds of handling. As in Areas 1 and 2, tidal fluctuations in this area act as a moving fence, which promotes even grazing use across the CHA.

Area 4a consists of 429.3 acres of grazed forest. The 177-ft choke-point fence is located between this area and Area 7, to the south.

Area 5 consists of 3,609.3 acres of grazed forest. The 172-ft river-to-bluff fence is located between this area and Area 1, to the south.

Area 6 consists of 1,938.3 acres of grazed forest, all of which lies east of Sheep Creek. A line shack is located in the northern half of this area. A fence approximately 3,200 feet long separates this area from Area 3, to the south.

Area 7 consists of 960.2 acres of grazed range and forest. The choke-point fence runs between this area and Area 4a, to the north. Pushing cattle north of the choke-point fence during early summer benefits brushline areas, which are otherwise heavily utilized by cattle for grazing, loafing, and staging. However, predators, both bears and wolves, are an issue north of the choke point fence. A range rider is often present to reduce predation on cattle moved to northern areas.

A 12-ft-by-20-ft line shack cabin (with a 4-ft-by-8-ft porch) is located in the southern edge of this area, on the west side of Sheep Creek (see photo below). This line shack cabin provides shelter for rest and safety of cattlemen monitoring and tending livestock, particularly after they have crossed Sheep Creek. A 6-ft-by-6-ft cache on legs is constructed just north of this cabin to provide a bear-proof place to store supplies.



Area 7b consists of a fenced paddock approximately 4 acres in size (this area was fenced before the Fox River Flats Critical Habitat Area was established). The paddock allows cattle and/or horses to be held temporarily during cattle drives, veterinary visits, range riding, or other activities. As needed and approved by the state, this paddock will be reseeded with pasture mix. The focus is on seeding bare areas. Bare areas will be mechanically tilled to assure good soil-seed contact and then seeded with a pasture mix recommended by the NRCS. Any tilling or seeding activities will be kept at least 25 ft back from the boundary of the Fox River Flats Critical Habitat Area and the banks of Sheep Creek (see photo below, from DNR, Division of Agriculture).



As discussed under Access (CRMP Section 2.3), a designated multi-use trail extends through the entire lease, beginning along the north shore of Kachemak Bay, crossing the edge of the tideflats, and running along the foot of the bluffs west of Fox River to the boundary of the Kenai National Wildlife Refuge. To access the various line shacks, corrals, and grazing areas, the cattlemen use several informal routes that take off from this trail but follow no specifically designated trails.

8.3.2. TIMING AND GRAZING USE

Timing of grazing is based on real-time assessments that reflect weather and on-the-ground conditions in spring and fall. As specified by the NRCS:

The date on which livestock grazing starts in the spring is determined yearly by representatives of the Cattlemen's Association, NRCS, ADF&G, and Alaska Division of Agriculture. Turnout dates are based on green-up of plants and on soil conditions. Range readiness is assessed and agreement on timing is reached by consensus. Range readiness (for the purposes of this plan) is a point in time when plants and soils can sustain grazing without reduction in acceptable ecosite conditions. Cessation of fall grazing is determined at the end of each grazing season and is based on weather and general forage conditions.

Cattle are moved onto the lease in late spring, after snowmelt is well underway. At first, cattle tend to graze on and along the base of the steep ridge that bisects the northwest corner of the CHA because forage plants green up earlier on these south-facing slopes than in other areas. Depending on snowmelt and weather conditions, cattle soon move onto the flats. Most of the cattle forage on the west side of the Fox River, with moderate numbers between Fox River and Sheep Creek, low to moderate numbers between Sheep Creek and Bradley River, and few or none east of Bradley River. Windy conditions drive the cattle off the flats and into the brushline for shelter. Hot weather and high insect counts drive the cattle out onto the flats for relief.

Cattleman Otto Kilcher describes how herds tend to distribute across the lease:

Earlier in the year, the individual herds tend to remain separate from each other, with the generalization that C. Rainwater's tend to favor Area 1, Willard's favor Area 2, and M. Kilcher's, O. Kilcher's, and M. Marette's favor Area 3. This is useful as it serves to help our specific individual breeding programs. However later in the season, we like to "mix it up" to spread the gene pool a bit, and we may gather anyone's animals from anywhere on the lease, including areas high upriver. We are installing cross fences (creating these "Areas" or "Fields") to help ensure uniform lease utilization, grazing management, herd management, and predation prevention.

8.3.3. STOCKING RATES

The current recommended stocking rate for the lease is 500 animal units per season³. Roughly 300 head have been grazed annually over the last several years. FRCA grazing goals are to increase herd numbers on the lease to 500 and manage the lease in a way that is ecologically sustainable. Herd numbers would be increased incrementally as approved by the Division of Agriculture and ADF&G. For example, herd numbers might be increased from 350 animals to 500 animals over 5 years, reviewing consequent range effects each fall. Such an incremental process allows any issues that arise from an increase in stocking to be identified and addressed quickly.

An outside factor that affects the numbers of animals stocked on the lease is the availability of winter feed (hay) from local and Alaskan sources. Stocking on the lease will not increase beyond animal numbers that can be fed affordably over winter. Currently, FRCA members cut hay from roughly 1,000 acres of their own haylands on the

³ **Animal unit (AU):** A 1,000-pound beef cow is the standard measure of an animal unit. The dry matter forage requirement of one animal unit is defined as 26 pounds per day. Animal unit equivalents (AUE) are calculated for various other animals. A 700-pound steer is 0.80 animal units. A 1,300 pound horse is 1.20 animal units. A 120-pound sheep is 0.20 animal units. An animal unit month (AUM) is a measure of the ability of rangeland to support grazing animals. **Example:** If in a particular area, 5 acres of rangeland are required to support 1 *animal unit* for 1 *month*, then 5 acres provides 1 AUM. That means that 60 acres of that rangeland would be required to feed 1 AU for 1 year.

Homer bench. One current member of the FRCA does haul in most of his winter hay from local sources and hay producers outside Homer.

An aside worth considering: With respect to Homer area hayfields, the support of local cattle operations provided by the Fox River lease benefits the wider community. The availability of the grazing lease makes local cattle operations possible; this in turn creates a demand for winter feed; and this in turn provides an incentive for the cattlemen to maintain their hayfields in production, thus protecting these lands from conversion to other uses (at least for the time being). Hayfields on the Homer bench are widely recognized by the community as an aesthetic amenity and a tie to local history.

8.3.4. AN OVERVIEW OF NRCS RANGELAND MONITORING IN THE GRAZING LEASE

[Most of this and the following section were based on annual range evaluation reports prepared by Karin Sonnen, NRCS Rangeland Specialist.]

Plant communities are dynamic and fluid, responding to changing environmental conditions, as well as to grazing and management (see Ecosite discussion in CRMP Section 7.3.4). NRCS has implemented an annual rangeland monitoring program to assist those making management decisions in the grazing lease. NRCS Range Conservationist Dave Swanson did the first rangeland inventory in 1992 to determine initial stocking rates and set up monitoring locations.

In 1994, NRCS began long-term monitoring to measure grazing pressure and impacts over time. Four permanent 8 ft x 8 ft exclosures or “cages” were installed in the western and central flats above the high tideline, where cattle have grazed seasonally for over 50 years. Exclosures were located in areas predicted to have the highest probability of grazing impacts. Some of these locations have proven to be among the most heavily utilized areas on the lease. Exclosures prevent cattle from grazing plants within the caged area. One cage was removed in 1998 by winter ice scour. In 1999, all four cages were replaced to ensure that cattle continued to be excluded. A fifth exclosure was constructed in 2003. These sites are evaluated annually. Map 8-2 shows the location of the five monitoring sites. Table 8-1 provides an overview of the history of each site.

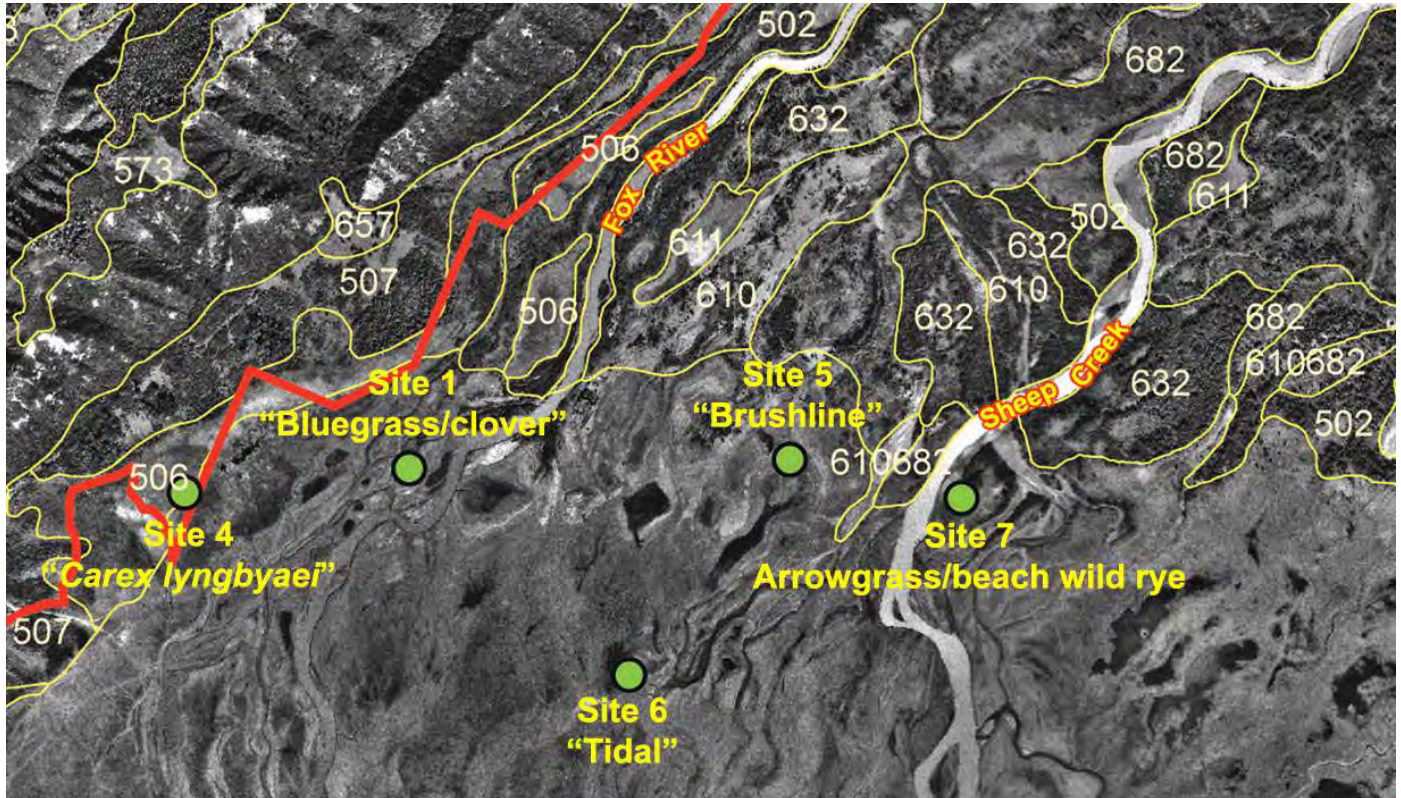
Three tools are used at each monitoring site to assist with evaluations: permanent exclosures (8 ft x 8 ft or 10 ft x 10 ft), 25-m transects (75 ft at Site 7), and portable exclusion cages, which can be relocated each fall. Movable cages allow comparisons of grazed and ungrazed plant heights from year-to-year; these can vary dramatically in response to summer temperatures, rainfall, etc. Transect corners are permanently marked, and transects are photographed each fall (see Figure 8.1). In 2004, key ungrazed plants were clipped and collected at three of the five sites to dry and weigh for a measure of biomass per species (Sites 1, 5, 7).

Each fall, NRCS assesses: current year Utilization, Trend, Similarity Index, and Rangeland Health at each monitoring site. (These terms are explained more fully in Section 8.3.6.) NRCS staff are often accompanied by cattlemen and/or state agency personnel on these evaluations. Annual reports entitled *Fox River Flats Range Evaluations* have been prepared by NRCS since 1999 (and occasionally before that since 1992). Monitoring data are kept in the Fox River Cattlemen's Association CRMP file and in the NRCS Homer field office.

Data collected indicate grazing use remains light and well distributed in all eight grazing areas. Grazing in the lease is managed at an intensity that maintains enough cover to protect soils from erosion and that maintains the quality and quantity of desirable vegetation. Efforts are made to prevent cattle from grazing key forage species beyond “proper grazing use” for the species (30-50% by weight) during the growing season, or 60% when dormant. Interestingly, NRCS has documented that many grazed plants remain greener and more nutritious later

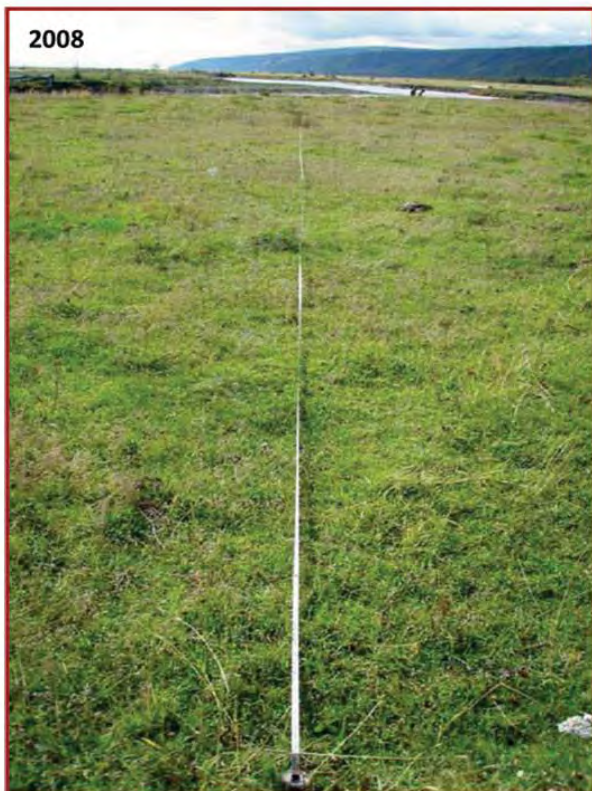
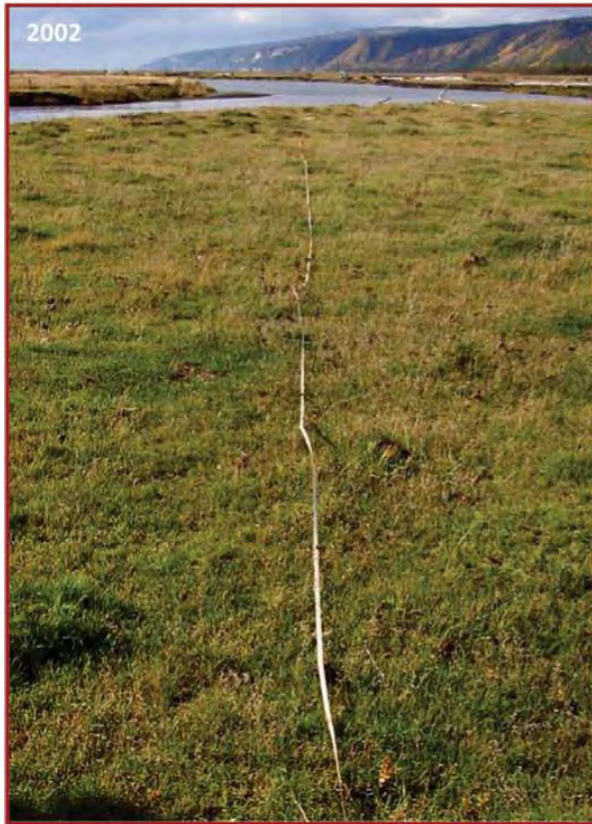
in the fall than ungrazed plants because grazing can stimulate regrowth. The following section provides a more detailed discussion of NRCS monitoring activities.

Map 8-2. NRCS rangeland monitoring sites within the Fox River flats grazing lease.



The following photos of each grazing site provide a visual comparison from multiple years. These photos are from *Fox River Flats Grazing Evaluation September 2010* by Karin Sonnen, NRCS Rangeland Management Specialist.

Site 1



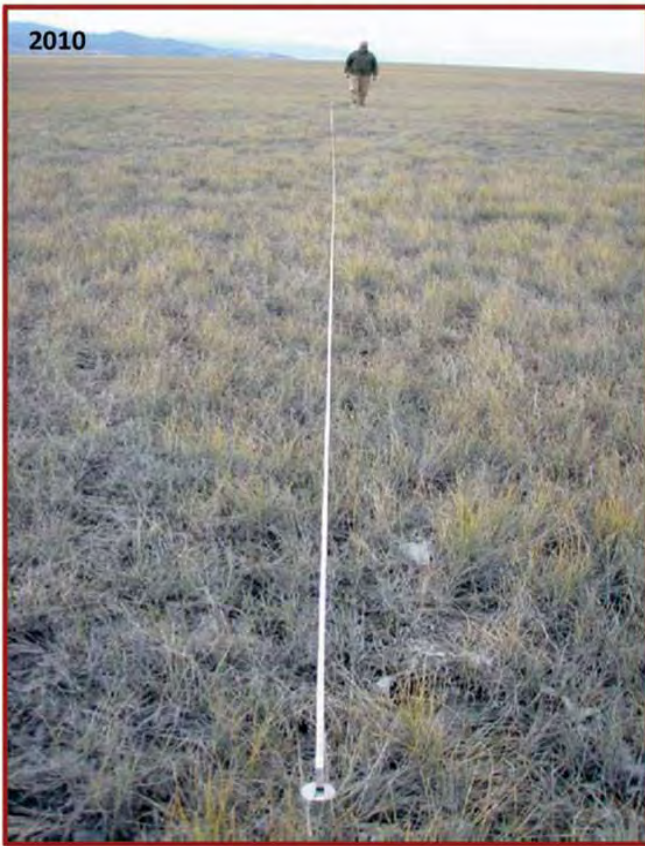
Site 4



Site 5



Site 6



Site 7

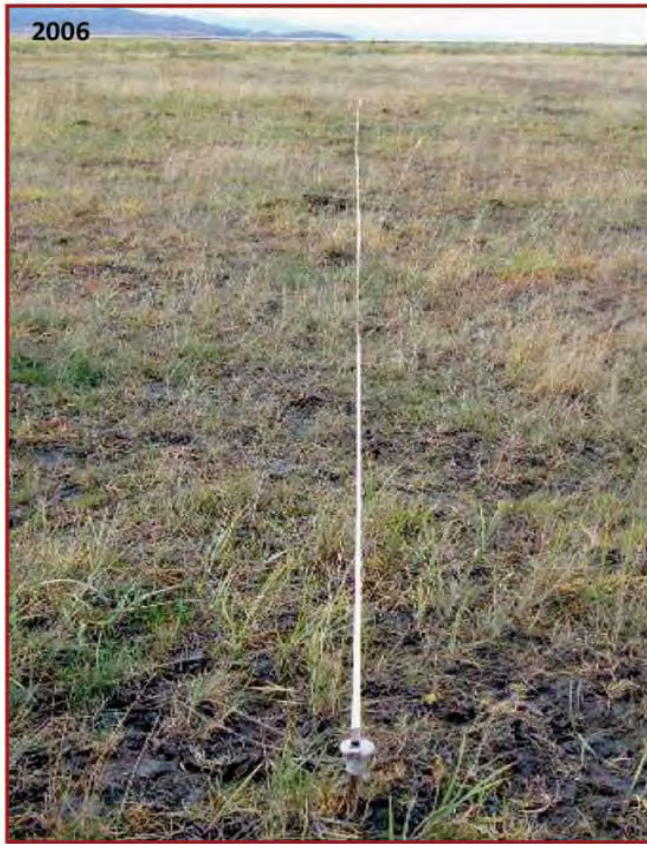


Table 8-1. Range site histories 1992-2009

Site	Permanent enclosure	Portable enclosure	Dominant plants inside permanent enclosure	Dominant plants outside permanent enclosure	Comments
1 bluegrass/ clover	Installed 1992 (8'x8')	Installed spring '03	Bluejoint (<i>Calamagrostis canadensis</i>) dominates HCPC (Historic Climax Plant Community).	Bluegrass (<i>Poa arctica</i>), clover (<i>Trifolium</i> spp.), yarrow (<i>Achillea millefolium</i>)	Plants outside enclosure are preferred by livestock and geese; they are adapted to heavy grazing and maintain nutritive value later in fall than native plants; forage production would increase with proper fertilization. Also preferred by migrating waterfowl because of greater site distance within low-growing plants.
4 <i>Carex lyngbyaei</i>	Installed 1999 (8'x8') replaced spring '08	Installed spring '03; cage flattened in '05, ungrazed height not measured; cage mangled in '06, ungrazed height not measured; new cage '07	<i>Carex lyngbyaei</i> (outside flood-deposited silt fan).	<i>Carex lyngbyaei</i> ; <i>Poa eminens</i> was observed beginning to invade 2004-2006, but few plants observed in 2007; in 2007, <i>Puccinillia</i> seen growing in patches among <i>C. lyngbyaei</i> . Plant community apparently changing in response to altered hydrology	October and November 2002 flooding deposited a silty fan roughly 1 ft thick on site. Flooding also re-routed a stream from the canyon just south of location, and stream now runs in a channel across transect. Minor changes made to transect location in '03 in response to flooding. Fall '06, ruts from 4-wheelers were cut in alongside transect line; by fall '08, these were largely healed over with sedge re-growth.
5 brushline <i>Carex subspath- acea</i> , <i>C. ramenskii</i>	Installed 1999 (8'x8'); rebuilt fall '05 (10' x10'), cow damage by fall '06 but still functional	Installed spring '03, replaced fall '07; cage also installed over invading hairgrass community	Large-flowered bluegrass (<i>Poa eminens</i>), Ramensk's sedge (<i>Carex ramenskii</i>) and Hopner's sedge (<i>C. subspatheca</i>)	Ramensk's sedge (<i>Carex ramenskii</i>), Bering's hairgrass (<i>Deschampsia behrengensis</i>) is increasing and spreading to southwest.	Most heavily utilized site; reflects some hoof damage; resulting bare ground may be promoting invasion of spruce seedlings (but see discussion of climate change in narrative).
6 tidal (<i>Carex ramenskii</i>)	Installed 1999 damaged 2000	Not applicable	Originally <i>Carex ramenskii</i> , <i>C. subspath-acea</i> ; plants slowly re-establishing since '02 flood.	Originally <i>Carex ramenskii</i> ; plants are slowly re-establishing since '02 flood.	Inundated at tides >17.5 ft; partly crushed by ice in 2000, then further damaged by cows; no plans to repair, used to find permanent transect.
7 brushline Arrow grass/ beach wild rye	Installed 2003	Installed spring '03; ice damage winter '03-04; replaced fall '07; found crushed in '08	Arrow grass (<i>Triglochin maritimum</i>), beach wildrye (<i>Elymus arenarius</i>), sedge (<i>Carex</i> spp.), Bering's hairgrass (<i>Deschampsia behrengensis</i>), <i>Puccinellia phryganodes</i> , <i>Hordeum brachyantherum</i> .	Currently the same as inside the permanent enclosure	Preferred by livestock; cattle stage here in fall before crossing Sheep Creek. Site has bare ground in natural state, but bare ground has increased due to hoof action. Plant community expected to shift towards more grazing-tolerant species.

When first installed, permanent exclosures are valid for comparing annual grazing utilization because plant communities within and outside exclosures are the same. As a result, ungrazed plant heights within the exclosure can be compared to grazed heights outside it. After 2 or 4 years of grazing, however, plant communities outside the exclosures often begin to change in response to grazing pressure. At that point, exclosures become unsuitable for annual utilization checks and instead become valuable for monitoring changes in plant community composition and structure (trends).

Table 8.2 summarizes rangeland evaluation data per site per year 2000-2009. Comparing these data with temperature and rainfall data could be revealing—annual forage production appears to decline during hot/dry summers (e.g., 2000, 2001, 2002, 2004). Production rises in response to adequate rainfall. These relationships should be observable using range data. Long-term trends overlie these shorter-term variations. The Kenai Peninsula (and other parts of the state) are experiencing a long-term warming and drying trend. A number of reports document this trend. Map 8.3 is a map from one such report: E. Berg, “Landscape drying, spruce bark beetles and fire regimes on the Kenai Peninsula, Alaska (2006, USFWS Kenai National Wildlife Refuge). See also Berg et. al., “Recent woody invasion of wetlands on the Kenai Peninsula Lowlands, south-central Alaska: a major regime shift after 18 000 years of wet Sphagnum-sedge peat recruitment” (2009, *Can J. For. Res.* 39: 2033-2046). As Map 8.3 shows, one effect of long-term warming and drying is that wetlands throughout the peninsula may be invaded by woody species, especially black spruce.

Map 8.3. Wetlands (orange) and black spruce forests (green). As wetlands dry with climate warming, they are believed to be converted to shrubs and black spruce forest
(from Berg 2006, Landscape drying, spruce bark beetles and fire regimes on the Kenai Peninsula, Alaska).

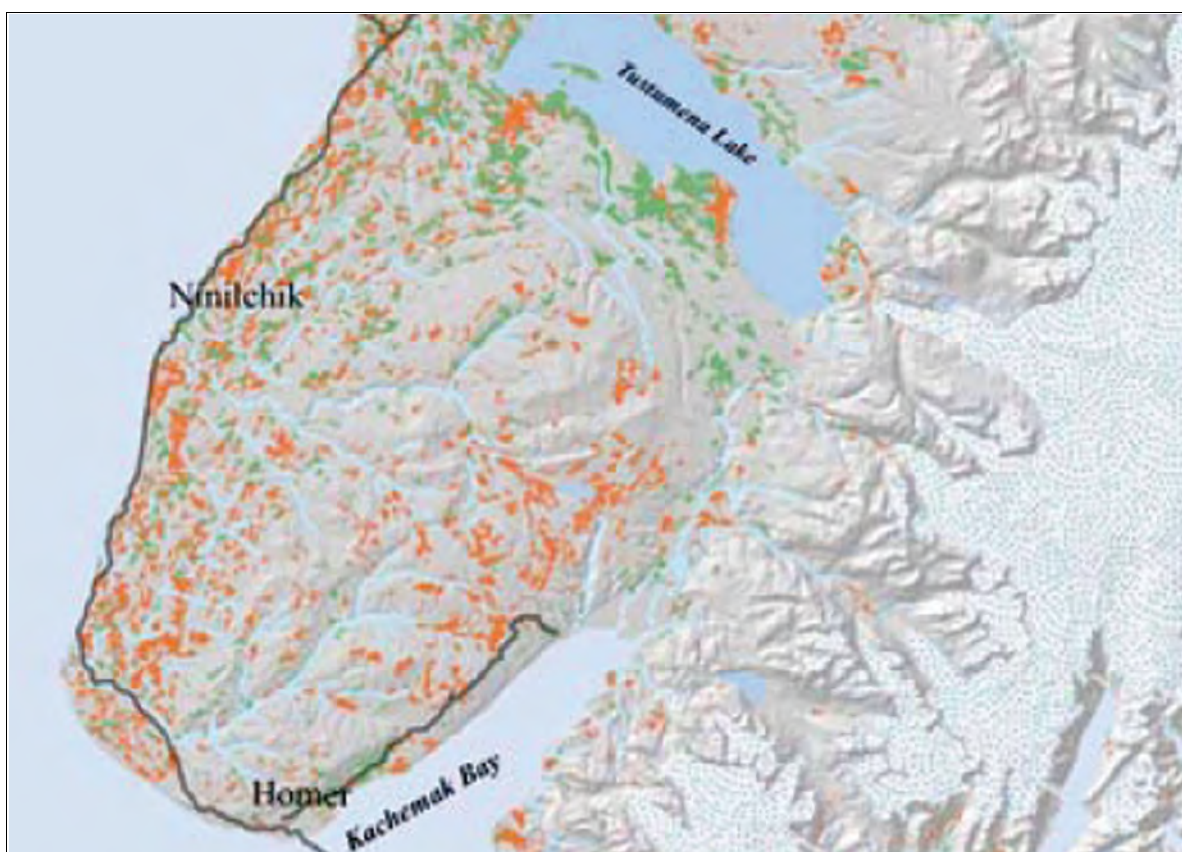


Table 8.2. Summary of rangeland monitoring results, per site and per year (2010 data have been added since the CRMP review draft).

Site #4, <i>Carex lyngbyaei</i> Site, 59 48.989 N, 150 59. 230 W								
year	Dominant species	Height (inches)		Utilization (%)	Apparent Trend	Similarity Index (%)	Rangeland health	Other Comments
		Ungrazed	Grazed					
2000	<i>Carex lyngbyaei</i>	9.8		15	Positive	90		
2001	<i>Carex lyngbyaei</i>	9.5		30	0	70		
2002	<i>Carex lyngbyaei</i>	9.3		25	Positive	90		
2003	<i>Carex lyngbyaei</i>	16	6.2	25	Positive	80	Healthy	
2004	<i>Carex lyngbyaei</i>	25.5	6.7	10	Positive	90	Healthy	
2005	<i>Carex lyngbyaei</i>	17	5.6	15	Positive	95	Healthy	
2006	<i>Carex lyngbyaei</i>	14.5	6.7	30	Positive	85	BI	
2007	<i>Carex lyngbyaei</i>	25	8.5	15	Positive	90	No deviation from healthy	
2008	<i>Carex lyngbyaei</i>	22.8	10	10	Positive	90	No deviation from healthy	Significant growth and healing is occurring
2009	<i>Carex lyngbyaei</i>	24	11.1	10	Positive	95	No deviation from healthy	Area has recovered from 2002 floods
2010	<i>Carex lyngbyaei</i>	41	--	<10	Positive	100	No deviation from healthy	No grazed plants found at site
Site #1, Island Site, 59 49.007 N 150 58.508 W								
2000	<i>Poa arctica</i>			35				
2001	<i>Poa arctica</i>			40				
2002	<i>Poa arctica</i>			40				
2003	<i>Poa arctica</i>	3.8	1.2	40	Positive	10	Healthy	
2004	<i>Poa arctica</i>	3.2	1.5	35	Positive	10	Healthy	
2005	<i>Poa arctica</i>		1.6	35	Positive	10	Healthy	
2006	<i>Poa arctica</i>	3.3	1.2	45	0	10	BI	
2007	<i>Poa arctica</i>	4.9	1.7	50	Positive	10	BI	
2008	<i>Poa arctica</i>	4.9	1.9	50	Positive	10	BI	HCPC is dominated by bluejoint; but replacement PC is highly nutritious, even into fall, for waterfowl & cattle
2009	<i>Poa arctica</i>	3	1.9	40	Positive	10	BI	
2010	<i>Poa arctica</i>	4.25	2.3	35	Positive	10	BI	Taller grasses and sedges are showing up, not all plants were grazed

Table 8.2. Summary of rangeland monitoring results, per site and per year (continued).

Site #5, Brushlin Site, 59 48.975 N 150 57.038 W								
year	Dominant species	Height (inches)		Utilization (%)	Apparent Trend	Similarity Index (%)	Rangeland health	Other Comments
		Ungrazed	Grazed					
2000	Carex ramenskii			30				
2001	Carex ramenskii			50				
2002	Carex ramenskii	7.4		40				
2003	Carex ramenskii	5.2	3.3	45	Negative	20	At Risk	
2004	Carex ramenskii	4.2	2.5	40	0	20	At Risk	
2005	Carex ramenskii	7.2	1.8	60	0	30	At Risk	
2006	Carex ramenskii	6.6	2.7	40	0	10	Soil, Hyd, BI	
2007	Carex ramenskii	8.5	2.5	40	Negative	10	Soil, Hyd, BI	
2008	Carex ramenskii	7	3.1	45	Negative	10	Soil, Hyd, BI	
2009	Carex ramenskii	6.6	4	40	0	10	Soil, Hyd, BI	
2010	Carex ramenskii	8.75	4.1	30	Positive	10	No deviation from healthy	Over the last 10 years, Bering's Hairgrass (<i>Deschampsia behrensis</i>) has been increasing in this area and moving south-west toward saltwater
Site #6, Tidal Site, 59 48.512 N 150 57.710 W								
2000	Carex ramenskii			10				
2001	Carex ramenskii			30				
2002	Carex ramenskii	9.1		20				
2003	Carex ramenskii	9	3.2	40	0	70	At Risk	
2004	Carex ramenskii	9.8	3.3	30	Positive	85	At Risk	
2005	Carex ramenskii	7.4	4.5	20	Positive	75	Healthy	
2006	Carex ramenskii	10.6	2.8	30	0	60	Soil	
2007	Carex ramenskii	7	2.6	35	0	70	No Deviation from healthy	
2008	Carex ramenskii	10.2	2.9	30	Positive	85	No Deviation from healthy	
2009	Carex ramenskii	9.5	4	35	Positive	90	No Deviation from healthy	
2010	Carex ramenskii	9.5	4	10 (for grazing) 15 (when hoof impacts also included)	Positive	90	No Deviation from healthy	This area receives less grazing pressure than more inland areas, and also is more susceptible to hoof impacts due to almost continuously wet soil.

Site #7, south of Sheep Creek, 59 48.679 N 150 56.284 W								
year	Dominant species	Height (inches)		Utilization (%)	Apparent Trend	Similarity Index (%)	Rangeland health	Other Comments
2003	Triglochin maritima			45	Negative	50	Unhealthy	Site established
2004	Triglochin maritima	4.8	1.7	45	0	50	Unhealthy	Bare ground approximately 45%
2005	Triglochin maritima	4.5	1.5	40	Negative	60	At Risk	Hooves contributing to Ut.
2006	Triglochin maritima	5.5	2.1	40	Negative	55	Soil, BI	
2007	Triglochin maritima	6.5	1.3	40	Negative	50	Soil, Hyd, BI	
2008	Triglochin maritima	4.75	2.4	45	Negative	50	Soil, Hyd, BI	
2009	Triglochin maritima	n/a	2	45	Negative	60	Soil, Hyd, BI	
2010	Plantago maritima	2.8	1.8	40	Undetermined	60	Slight to moderate deviation from healthy for Soil and Biotic Integrity	Popular for grazing, located at brushline; Arrow Grass (<i>Triglochin maritimum</i>), Goose Tongue (<i>Plantago maritima</i>), and Beach Wild Rye (<i>Elymus mollis</i>) are species highly preferred by cattle, and they are commonly found plants in the area.

North of Brushline (photo below)

The area inland of the brushline is composed of a mosaic of spruce trees, balsam poplar copses, and bluejoint-fireweed meadows. This vast area has been monitored by NRCS conservationists via helicopter, on horseback, and on foot. All of its plant communities are currently very lightly utilized by cattle. The Apparent Trend is positive, Similarity Index is rated at 100, and there are no deviations from “Healthy” in the Rangeland Health Indicator assessment.

Grazing areas north of brushline (source: NRCS).



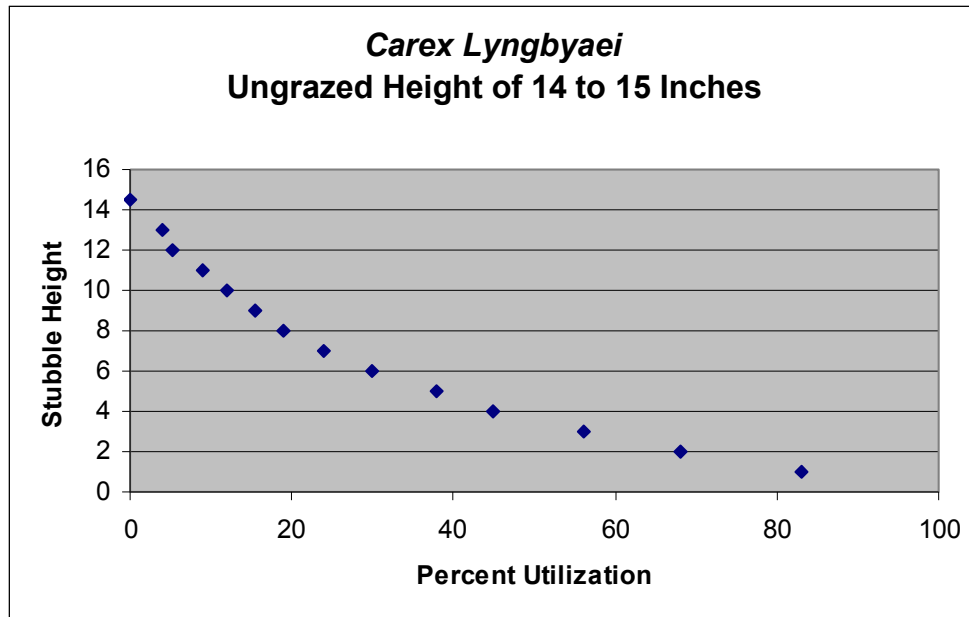
8.3.5. A MORE DETAILED DISCUSSION OF NRCS MONITORING METHODS IN THE FOX RIVER FLATS GRAZING LEASE AREA

The following discussion of NRCS sampling methods has been excerpted from *Fox River Flats Grazing Evaluations* prepared yearly since 1999 by Karin Sonnen, NRCS Range Specialist, Homer field office. See Section 8.3.6 for a fuller introduction of rangeland concepts.

(1) Utilization:

Utilization is a measure of how much of the plant's current year's growth has been removed by the grazing animal. This includes not only the amount consumed, but also damage to plants from trampling and hoof action. This is an ocular estimation made by an experienced range conservationist.

The following graph shows the utilization curve of *Carex lyngbyaei*, as sampled in the Fox River Flats. This shows that the utilization percentage is not a direct reflectance of stubble height of the remaining grass. Grasses have more of their biomass at the base of the plant than at the tips. Therefore, when a plant is grazed to 50% of its height, it does not equal 50% of the plant.



(2) Apparent Trend:

The apparent trend determination looks at the entire site as a whole and compares it to the ungrazed site, or the desired plant community. Plant decadence, soil condition, species composition of the plant community, and vigor of the plants are all considered. A rating is assigned of + for moving in a direction toward the desired plant community, - for moving away from the desired plant community, or a 0 for a trend which is not discernible.

(3) Similarity Index:

This is a rating of how similar the existing site is to what would be present without grazing. This takes into account not only the species present, but also the production by these species. For example, if the site without grazing would have the following:

Beach Wild Rye 4,000 #/ac
Beach Pea 500#/ac

But the plant community on the site actually had the following:

Beach Wild Rye 1,000 #/ac
Beach Pea 100 #/ac

The Similarity Index would be calculated as follows:

Species	#/Ac expected	#/ac actual
Wild Rye	4000	1000
Beach Pea	500	100
Sum	4,500	1,100

1,100 actual ÷ 4,500 expected = 0.24 or 24% Similarity Index

(4) Rangeland Health:

This rating takes into consideration 17 indicators, which fall into three difference categories: Soils, Hydrologic Function, and Biotic Integrity. The 17 indicators are shown below. Note that some indicators are used for more than one category. For example, “rills” and “gullies” are indicators for both Soil/Site Stability and Hydrologic Function. “Soil surface resistance to erosion” and “Compaction layer” are indicators for all three categories. “Annual production” is an indicator for only Biotic Integrity.

Soil/Site Stability	Hydrologic Function	Biotic Integrity
Rills		Functional/structural groups
Water flow patterns		Plant mortality/decadence
Pedestals and/or terracettes		Annual production
Bare ground		Invasive plants
Gullies		Reproductive capability of perennial plants
Wind-scoured, blowout and/or depositional areas	Plant community composition and distribution relative to infiltration and runoff	
Litter movement	Litter amount	
	Soil surface resistance to erosion	
	Soil surface loss or degradation	
	Compaction layer	

After considering all of these indicators, the three categories are given a rating. If there is no deviation from the health of all of these indicators, the Rangeland Health rating is “none.” If the Biotic Integrity deviates from a healthy rating, the area is given a “Bio” rating. If all three of the categories deviate from “healthy,” the area is given a rating of “Soil, Hydr, Bio,” which indicates that there is a deviation from healthy in all categories. The field data sheets can be reviewed with a range conservationist for further explanation.

Data for measured parameters, such as grazed and ungrazed height per species, can be summarized per site for all years evaluated. The following table summarizes grazed and ungrazed height data for *Carex*, *Poa*, and *Triglochin* (*Plantago* measured in 2010).

Site 4: <i>Carex lyngbyaei</i>	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ungrazed heights (inches)	9.3	16.0	25.5	17.0	14.5	25.0	22.8	24.0	41
Grazed heights (inches)		6.2	6.7	5.6	6	8.5	10	9.3	NG

Site 1: <i>Poa</i> (bluegrass)	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ungrazed heights (inches)	n/a	3.8	3.2	n/a	3.3	4.9	4.9	3.0	4.25
Grazed heights (inches)		1.2	1.5		1.2	1.7	1.85	1.0	2.3

Site 5: <i>Carex</i>	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ungrazed heights (inches)	7.4	5.2	4.2	7.2	6.6	8.5	7.0	6.6	8.75
Grazed heights (inches)		3.3	2.5	1.8	2.7	2.5	3.1	4.0	4.1

Site 6: <i>Carex</i>	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ungrazed heights (inches)	9.1	9.0	9.8	7.4	10.6	7.0	10.2	9.5	--
Grazed heights (inches)		3.2	3.3	4.5	2.8	2.6	2.85	4.0	NG

Site 7: <i>Triglochin</i> and <i>Plantago</i>	2002	2003	2004	2005	2006	2007	2008	2009	2010
Ungrazed heights (inches)	n/a	4.8	n/a	4.5	6.5	4.75	n/a		2.8
Grazed heights (inches)		1.7		2.1	1.3	2.4	2.0		1.8

NG = no grazing at site

8.3.6. FOR THOSE INTERESTED, A BRIEF INTRODUCTION TO RANGELAND CONCEPTS

What is rangeland? (from NRCS *Range and Pasture Handbook*, Section 600.0202(a) p. 2-2)

Rangeland is land on which the historic climax vegetation was predominantly grasses, grasslike plants, forbs, or shrubs. Rangeland includes land revegetated naturally or artificially to provide a plant cover that is managed like native vegetation. Rangelands include natural grasslands, tundra, alpine plant communities, coastal and freshwater marshes, and wet meadows.

What is an ecological site? (from NRCS *Range and Pasture Handbook*, Section 600.0300 (a) p. 3.1-1)

An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. Landscapes are divided into ecological sites for the purposes of inventory, evaluation, and management. An ecological site is the product of all the environmental factors responsible for its development, and it has a set of key characteristics that are included in the ecological site description. Ecological sites have characteristic soils and hydrology that have developed over time throughout the soil development process (see Section 7.3.4).

Most ecological sites evolved with a characteristic kind of herbivory (kinds and numbers of herbivores, seasons of use, and intensity of use). Herbivory directly influences vegetation and soil, both of which influence hydrology. Ecological sites also evolve with a characteristic fire regime. Fire frequency and intensity contribute to the characteristic plant community of the sites.

What is an ecological site description? (from NRCS *National Range and Pasture Handbook*, Exhibit 3.1-3 p. 3.1 ex-3)

An ecological site description is prepared for each ecological site. These descriptions contain information regarding the physiographic features, climate, soils, water features, and plant communities associated with each ecological site. Plant community dynamics, annual production estimates, growth curves, associated wildlife communities, and interpretations for use and management of the site are also included in each site description.

What is a historic climax plant community? (from NRCS *National Range and Pasture Handbook*, Section 600.0301 p. 3.1-2)

The historic climax plant community (HCPC) is the plant community that was best adapted to the unique combination of biotic, abiotic, and climatic factors associated with the ecological site. These include natural disturbances, such as drought and fire, as well as grazing by native fauna and insects. The HCPC was in a natural dynamic equilibrium with the environmental factors on its ecological site in North America at the time of European immigration and settlement.

The historic climax plant community of an ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Boundaries of plant communities can be recognized by characteristic patterns of species composition, association, and community structure.

What is a similarity index? (from NRCS *National Range and Pasture Handbook*, Section 600.0402(b) p. 4-17)

Similarity index is the comparison of the present plant community on an ecological site to any other plant communities that may exist on the site. The purpose for determining similarity index is to provide a benchmark for future comparisons evaluating the extent and direction of changes that have occurred in the plant community because of a specific treatment or management.

How is similarity index calculated? (from NRCS *National Range and Pasture Handbook*, Section 600.0402(b) (2) p. 4-17)

To determine the present plant community's similarity index to a specific plant community, the specific plant community must be adequately described in the ecological site description. The specific plant community must be described by species, and by the expected range of production by weight by species or by groups of species, as well as the expected normal total annual production. This range of production becomes the allowable production to be counted when determining similarity index.

The existing plant community must be inventoried by recording the actual weight, in pounds, of each species present. The annual production by species of the existing plant community is then compared to the production of individual species in the desired plant community. All allowable production is then totaled. It is important to remember that if the similarity index is calculated when plants are still growing, then the plant productions should be reconstructed to reflect the total production for the year.

The relative similarity index to the desired plant community is calculated by dividing this total weight of allowable production by the total annual production in the desired plant community. This evaluation expresses the percentage of the desired plant community present on the site. For example, if the current inventory reflects only 65% of the allowable plants compared to the desired plant community, then the current plant community has a 65% similarity index to the desired plant community.

What is succession and retrogression?

Succession is the process of soil and plant community development on an ecological site. Retrogression is the change in vegetation away from the historic climax plant community due to mismanagement or severe natural events, such as climatic events.

What is trend? (from NRCS *National Range and Pasture Handbook*, Section 600.0402(a) p. 4-14)

Trend is a rating of the direction of plant community changes that may be occurring on a site. The plant community and the associated components of the ecosystem may be moving either toward or away from the historic climax plant community or some other desired plant community. At times, it can be difficult to determine the direction of change. Usually trend is determined by two evaluations over time.

Trend provides information necessary for the operational level of management to ensure that the direction of change meets the objectives of the manager. The present plant community is a result of a sustained trend over a period of time. Trend is an important and required part of a rangeland resource inventory. It is significant when planning the use, management, and treatment needed to affect desired change in the rangeland resource.

How is range trend determined? (from NRCS *National Range and Pasture Handbook*, Section 600.0402(a) p. 4-14)

Trend is determined by evaluating changes in plant composition, abundance of seedlings and young plants, plant residue, plant vigor, and condition of the soil surface. First, the kind of trend (rangeland trend or planned trend) being evaluated must be determined.

Rangeland trend is defined as the direction of change in an existing plant community relative to the **historic climax plant community**. It is described as:

- Toward: Moving towards the historic climax plant community.
- Not apparent: No change detectable.
- Away from: Moving away from the historic climax plant community.

Planned trend is defined as the change in plant composition within an ecological site from one plant community type to the **desired plant community**. It is described as:

- Positive: Moving towards the desired plant community.
- Not apparent: No change detectable.
- Negative: Moving away from the desired plant community.

What is rangeland health? (from NRCS *National Range and Pasture Handbook*, Section 600.0402(c) p. 4-23)

The rangeland health assessment is an attempt to look at how the ecological processes on an ecological site are functioning. Ecological processes include the water cycle (capture, storage, and redistribution of precipitation), energy flow (conversion of sunlight to plant and animal matter), and nutrient cycling (the cycle of nutrients, such as nitrogen and phosphorus, through the physical and biotic components of the environment).

Qualitative assessments of rangeland health provide land managers with information that can be used to identify areas that are potentially at risk of degradation, and provide early warnings of resource problems on upland rangelands. This procedure has been developed for use by experienced, knowledgeable land managers. It is not intended that this assessment procedure be used by individuals who do not have experience or knowledge of the rangeland ecological sites they are evaluating. This approach requires a good understanding of ecological processes, vegetation, and soils for each of the ecological sites to which it is applied.

How is rangeland health evaluated? (from NRCS *National Range and Pasture Handbook*, Section 600.0402(c) (2) p. 4-24)

Ecological processes functioning within a normal range of variation support specific plant and animal communities. Direct measures of site integrity and status of ecological processes are difficult or expensive to measure because of the complexity of the processes and their interrelationships. Therefore, biological and physical attributes are often used as indicators of the functional status of ecological processes and site integrity.

Three closely interrelated attributes are evaluated:

- Soil/site stability: The capacity of the site to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.
- Hydrologic function: The capacity of the site to capture, store, and safely release water from rainfall, run-on, and snowmelt; to resist a reduction in this capacity, and to recover this capacity following degradation.
- Integrity of the biotic community: Capacity of a site to support characteristic functional and structural communities in the context of normal variability, to resist loss of this function and structure because of a disturbance, and to recover following such disturbance.

8.3.7. OTHER CONSIDERATIONS IN MANAGING THE FOX RIVER FLATS GRAZING LEASE

Dealing with trespass animals: FRCA has worked to limit the movement of their cattle off the lease by installing appropriate fencing. In 2009, cattlemen added on to the “drift fence” located at Fox Creek, and they plan to electrify it if necessary to help keep their animals on the lease. Prompt reporting by all parties, with help and response from Division of Agriculture, has been of considerable help. Residents of Kachemak Selo (the Russian Old Believer village between the switchback trail and the grazing lease) have recently upgraded their fences/cattle guards, and FRCA understands that other neighbors are upgrading as well. The presence during fall 2009 of a “range rider” on the lease proved very successful in monitoring animals straying onto and off of the lease and in minimizing cattle predation and poaching.

8.3.8. CONSERVATION PRACTICES STANDARDS AND SPECIFICATIONS

A variety of NRCS Conservation Practices have been installed or are recommended for the Fox River Flats grazing lease area. These are:

- Prescribed grazing (which includes Proper Grazing Use) (Practice Code 528A)
- Fence (Practice Code 382)
- Pasture and Hayland Planting (Practice Code 512)
- Critical Area Planting (Practice Code 342)
- Windbreak/Shelterbelt Establishment (Practice Code 380)
- Bear Exclusion Fencing (Practice Code 382)

Conservation Practices and their Standards and Specifications are tailored to NRCS field office areas. As with other states, Alaskan field office-applicable “practices and standards and specs” are available through an electronic Field Office Technical Guide (eFOTG). To review practices, standards and specs for the Kenai Area, go to: http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=AK, click on the map of Alaska, and then on the Kenai Peninsula after the map of Alaska has loaded.

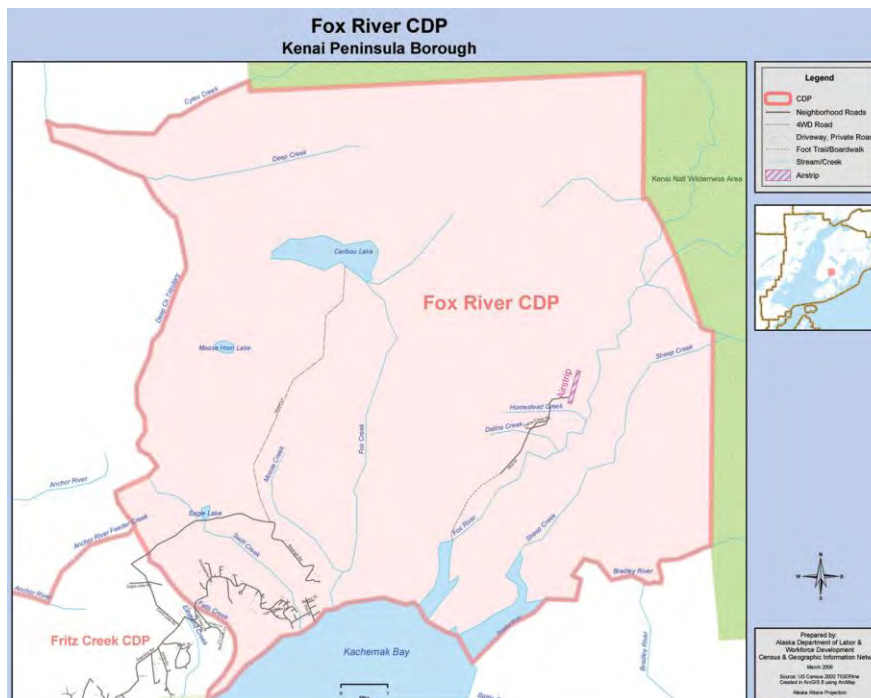
9. COMMUNITY CONTEXT

9.1. HOW THE GRAZING LEASE RELATES TO SURROUNDING COMMUNITIES

In addition to thinking about the Fox River Flats grazing lease area from its boundaries inward, lease users and managers often find themselves faced with issues that originate outside lease boundaries. It is therefore important to remember that the grazing lease exists in relationship to communities beyond its boundaries, particularly Homer, Kachemak City, the areas out East End Road and near Fritz Creek, and the three Russian “Old Believer” villages of Kachemak Selo, Razdolna, and Voznesenka. These surrounding communities impact the grazing lease area, and the lease area in turn affects them.

9.1.2. FOX RIVER CDP

The Fox River CDP (census-designated place) encompasses population centers closest to the Fox River Flats grazing lease area. Map 9-1 shows the Fox River CDP boundaries. The Russian “Old Believer” villages of Kachemak Selo, Razdolna, and Voznesenka represent the main year-round population centers in the Fox River CDP. Locations of these villages are shown on Map 9-2. In 2007, the population of the Fox River CDP was 660 (www.city-data.com/city/Fox-River-Alaska.html). More recent estimates put the CDP population at 606 (http://labor.alaska.gov/research/alari/2_12_76.htm).



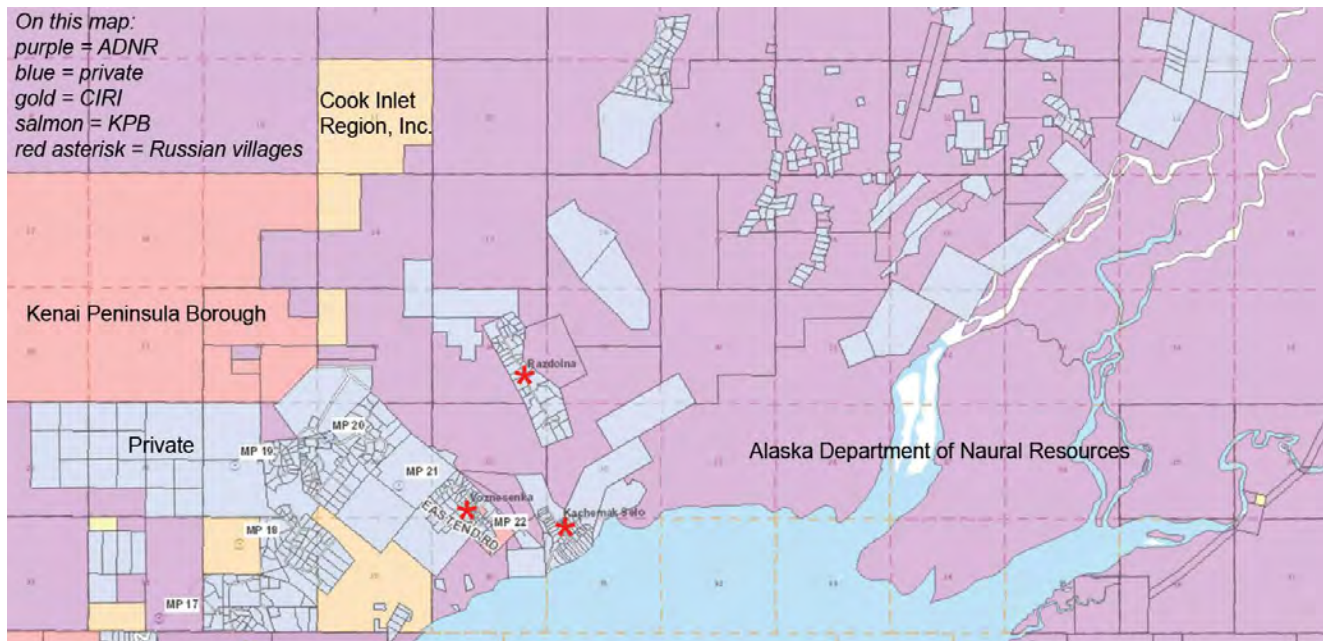
Map 9-1. Fox River CDP (census designated place) area.

Information at www.city-data.com/city/Fox-River-Alaska.html shows the population of the Fox River CDP to be relatively young (median resident age is 14.8 years compared to the statewide median of 32.4 years), more male than female (53.7% male, 46.3% female), primarily of Russian ancestry (79.2% Russian, 2.9% English, and 2.3% Irish), and likely to leave school relatively early (for residents 25 years and over, 24.6% have a high school degree or higher; 4.8% have a Bachelor's degree or higher; and 1.8% have a Graduate or professional degree). For

residents 15 years and over 19.6% have never married; 75.4% are now married; 0% are separated; 2.5% are widowed; and 2.5% are divorced. Most men are involved with fishing (“agriculture, forestry, fishing and hunting,” 48%) or construction (33%), with 6% in educational services, 4% in food and beverage stores, 4% in “other transportation, and support activities, and couriers,” and 4% in “real estate and rental and leasing.” Among women, the dominant employment is in educational services (43%), social assistance (29%), and health care (19%). Many villagers, particularly females, are employed in Homer and surrounding communities; so the “mean travel time to work” is 66.1 minutes. (To compare these data with, for example, Homer, go to <http://www.city-data.com/city/Homer-Alaska.html>.) As part of

HSWCD/NRCS outreach efforts, printed copies of this CRMP will be provided to schools in the three Russian villages.

Map 9-2. Location of Russian “Old Believer” villages (red asterisks) near the CRMP area.



9.1.3. LOCAL, SUSTAINABLE FOOD PRODUCTION

The fact that livestock grazing is possible on a large expanse of state land near a local population of over 13,500⁴ represents a significant opportunity for sustainable local food production. The significance of this is worth considering.

In recent years, cultural preferences about where food comes from have been changing. One example of this has been the growth in Community Supported Agriculture⁵ (CSA) throughout both the Lower 48 and Alaska. The growth in CSAs has been fueled by consumer concerns about the quality of their food and the environmental impacts of food production. The Website of the Alaskan group *Last Frontier Locavores* (<http://alaskalocavores.wetpaint.com>) lists sixteen CSAs in Alaska, including operations in Bethel, Fairbanks, Palmer, Homer, and Skagway. Educational institutes are also getting involved in this approach: Alaska Pacific University operates a CSA in Palmer (www.springcreekfarmak.org) as part of its outdoor and environmental education programs.

Meat CSAs are now also appearing. These are generally small-to-medium sized, pasture-based ranches that offer regular delivery of mixed meat, poultry, and eggs in exchange for a seasonal or multi-month commitment from subscribers who buy “shares” in the operation. Seafood is now being added to the CSA approach—the Sixth Street Community CSA in New York City has joined with Prime Select

⁴ 2009 population estimates from the Alaska Department of Labor and Workforce Development for communities on the southern Kenai Peninsula from Ninilchik south (including communities on the south side of Kachemak Bay); see http://labor.alaska.gov/research/alari/2_12_76.htm.

⁵ CSAs are programs whereby consumers generally buy subscriptions or “shares” in local farms and then receive regular deliveries of vegetables and other products from the farm during the growing season (or in some cases, year-round). Some CSAs also sell boxes to the general public rather than only to subscribers.

Seafoods in Cordova to become the first CSA in the country offering wild Alaskan salmon, halibut, cod, and rockfish to its members (<http://sixthstreetcenter.org>).

Similarly, a growing concern for the welfare of animals raised for food has led to growing consumer interest in free-range livestock (and fowl) as an alternative to buying animals produced under confinement in “factory farms.” Again, this reflects concern for the quality of food and for food production methods that are environmentally sustainable, as well as humane.

Such ideas are also reflected in concepts like “the 100-mile diet,” which promotes the use and purchase of food produced within 100 miles of the consumer. This results in both fresher quality food and reduced transportation-related costs and environmental impacts. A number of Websites now connect individuals to sustainably produced food sources near them. An example is Eatwild's Directory of Farms (www.eatwild.com), which lists more than 1,100 pasture-based farms that meet their “...exacting criteria (www.eatwild.com/criteria.html), assuring that their animals and land are well-treated...” The Eat Well Guide (www.eatwellguide.org) is an online directory for consumers looking for locally grown and sustainably produced food in the US and Canada, including family farms, restaurants, farmers’ markets, grocery stores, Community Supported Agriculture programs, and U-pick orchards. Local Harvest (www.localharvest.org) provides similar information. In Homer, the Website maintained by the organization “Sustainable Homer” has a “Local Food” link that puts visitors in touch with food producers in the Homer area. The Website also connects visitors to statewide and national resources through links such as these, copied from the site:

- Glacier Valley CSA (www.glaciervalleycsa.com) is run out of Palmer and is the only year-round CSA box around. Some of their produce is shipped up from the Lower 48, but they fill it with as much local produce as they can. If you sign up for a box, the drop off is at the Ring of Fire Meadery.
- The AK Root Cellar Blog (<http://community.adn.com/adn/blog/69017>) is for those who would like to add more local foods to their diet, meet local farmers, learn new recipes based on seasonal eating and preserving the summer harvest.
- Global Food Collaborative (www.globalfoodcollaborative.com): Working in Alaska to connect businesses to each other and to other strategic companies and technologies --all for the purposes of a world-class industry with optimal supply chains.
- Edible Communities (www.ediblecommunities.com): Cultivating Community Through Food
- Read about what the Upbeet Gardener, Marion Owen of Kodiak, proposes for sustainable food policy for Alaska
- Alaska Permaculture Blog (<http://akpermaculture.ning.com>) is a great way to share ideas and questions with others around the state on what works in Alaska for permaculture.

The Fox River Flats grazing lease represents an opportunity to produce meat in ways that are consistent with these kinds of approaches and trends. Long-term, such trends are likely to strengthen as concerns about environmental processes such as climate change and ocean acidification provide arguments for environmentally responsible, sustainable local food production. Numerous groups in Homer, including the Homer Soil and Water Conservation District and the NRCS field office, have programs in place to promote sustainable local food production.

9.1.4. Emergency Food Source (Food Security)

Cattle raised because of the availability of summer grazing in the Fox River Flats ensure that a significant supply of fresh meat is maintained “on-the-hoof” in the Homer area. This meat supply could become significant to local communities during an emergency that disrupts food deliveries to the southern peninsula—such as an earthquake or flood. Having a plan in place to use this potential food source efficiently and fairly could be of significant benefit to local communities.

9.2. OTHER LAND USES IN THE CRMP AREA

Other land uses in the CRMP area include

- research (e.g., by the Kachemak Bay Research Reserve and the NRCS),
- recreation (including guided tours by both horseback and ATVs, as well as appreciation of local history available through visits to the “Bearfooter’s property,” owned and managed by the Kachemak Heritage Land Trust),
- hunting (e.g., for moose, black bear, Dall sheep, and waterfowl),
- trapping (for a variety of furbearers), and
- fishing (for salmon, Dolly Varden, hooligan, etc.).

Currently these uses of the Fox River Flats grazing lease area are generally of low intensity, dispersed, and seasonal. Specific information on levels of use is not generally available because these activities are poorly tracked by local land managers. This reflects existing agency priorities, budget constraints, and the difficulties inherent in accessing and monitoring this relatively large and remote expanse of land.

Some conflicts among uses and users have at times surfaced. Dominant concerns appear to center around:

- incidents of illegal hunting and fishing,
- occasional unauthorized taking of cattle,
- cattle trespass on adjacent private properties (improved fencing—both of grazing areas and of private properties—appears to be reducing this problem; see Section 8, above),
- control of brown bears that are preying on cattle,
- unauthorized ATV and ORV travel across sensitive habitats, particularly in the Fox River Flats CHA; this can lead to degradation and alteration of drainage systems and other habitat features, and
- unauthorized grazing of unmonitored livestock (e.g., horses released to graze without authorization or oversight).

A first step in addressing all of these concerns is to take better advantage of “eyes on the ground” in the grazing lease area. A key component of such an effort would be to improve communication between those who are actively using the area and those who are offsite but responsible for management. A dedicated and well-publicized contact number for reporting unauthorized uses or other situations warranting management concern would contribute to more effective communication between these two groups. (The Homer area Marine Mammal Stranding Network “hotline” provides an example of this kind of program: in addition to centralizing contact, it provides a mechanism for distributing photos of the situation, in the case of MMSN, photos of stranded animals.) Cattlemen are often onsite checking cattle and fences and could act as onsite “eyes on the ground,” as could recreational guides and their clients (e.g., from Trails End Horse Adventures).

A second step in addressing all user/use conflicts and concerns is outreach and education. The ADF&G has increased signage at the boundary of the Fox River Flats CHA to promote education about the area. Signs are often vandalized, and so should be manufactured of relatively inexpensive and easily replaced

materials. Outreach to the local Russian communities of Kachemak Selo, Voznesenka, and Razdolna is also important. As noted above, printed copies of this CRMP will be provided to village schools.



Fox River and young spruce, June 2010 (Devony Lehner, HSWCD)

10. OTHER GRAZING TOOLS AND APPROACHES

Livestock grazing as a science and land use activity is neither static nor uniform. The science of livestock grazing and management continues to evolve with the collection of new data on livestock species behavior, forage plant chemistry, livestock metabolism, pasture and rangeland ecosystems, and other related topics. Practices used by ranchers evolve as new tools, techniques, and kinds of livestock become available and as environmental, political, cultural, and economic conditions and goals change. Predicting with any certainty the long-term potential value to the state and local communities of the Fox River Flats grazing lease area is, therefore, difficult. But recognizing that the potential may be very great, and thinking about different ways to optimize this potential, are useful exercises. The discussions above suggested some possible directions to consider. Below are introduced a few emerging (or re-emerging) approaches to grazing management that may help shape how this potential is realized. At the moment, what may be most important is that landowners, managers, and users of this area recognize, respect, and protect the potential represented by the Fox River Flats grazing lease area.

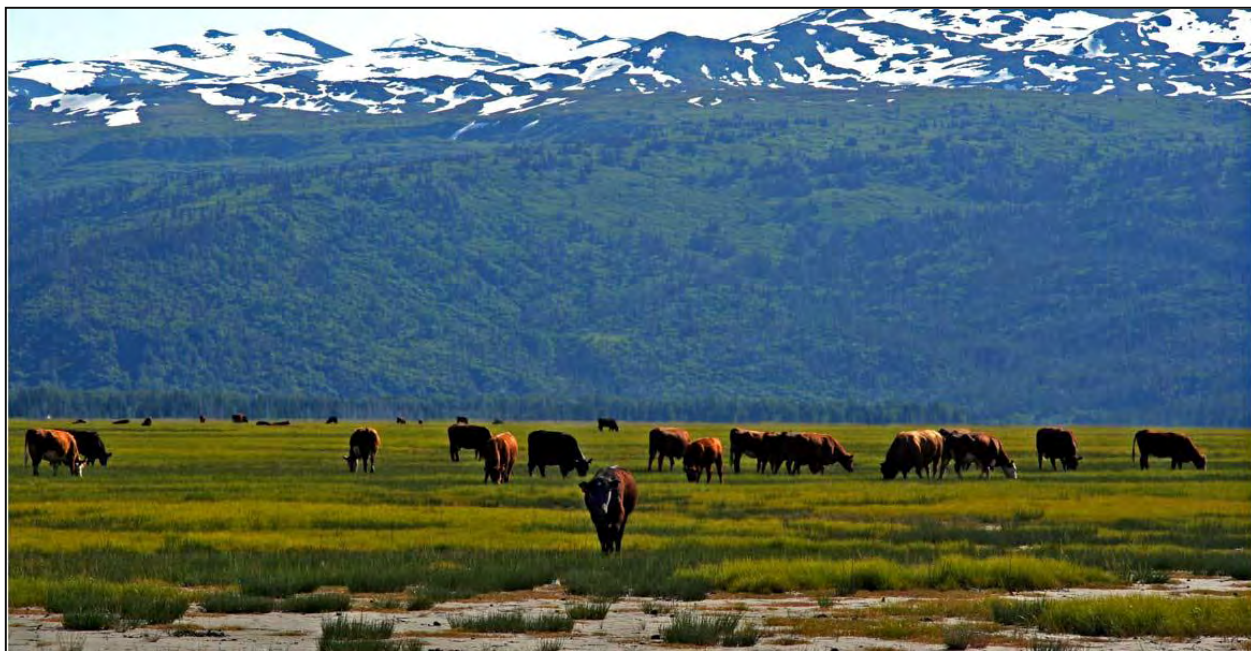
10.1. STOCKMANSHIP

Steve Cote, with the NRCS in Boise, Idaho, makes a strong case for the benefits that properly trained range riders (stockmen) and properly “trained” and moved herds can bring to rangeland grazing operations. He outlines recommended techniques for handling cattle on the range in *Stockmanship, a powerful tool for grazing lands management* (S. Cote 2004). The techniques he describes are based on the work of Bud Williams and his “low stress livestock handling” or “Bud Williams stockmanship.”

Cote begins by asserting that “under sound (holistic) management with animals that are well handled, the effects of grazing on the health of rangelands can be outstanding—well beyond the realm of what was formerly considered possible. The results that planned grazing can achieve cannot be duplicated by rest, fire, or technology... Highly controlled livestock can be used to reduce brush, keep forage productive, create more plant diversity, and reduce fires—all of which create better conditions for many wildlife species.” He then notes that “the time plants are exposed to animals, not how many animals graze the area, is what determines if an area is overgrazed... The key is to move the herd before the grazed plants send up enough growth to entice an animal to graze it again. This sounds simple enough until we consider that on most ranges, cattle are scattered over +/-10,000 acres of range with few or no cross fences. Many of the cattle don’t want riders to find them, and they don’t want to be in a herd. They want to stay in their favorite hideouts... To avoid over-grazing and over-resting, riders must know how to handle even large herds so they want to stay together, graze where they are placed, and can be readily moved to a new grazing area. Well-handled livestock will go places that were formerly impossible to get them to. Their tendency for hiding out in favorite places will be changed.”

Cote then describes in step-by-step detail how to handle stock to achieve these results, noting along the way that “ranchers in Arizona [using these techniques] report they have quit building fences to protect the creeks. They don’t have to because they are handling stock so much better.” He also warns, “you aren’t going to get to do it the way you want! Reducing stress and getting outstanding control of your animals requires that you give up reacting to your instincts and respond totally to what the animals show you they need and on their timetable... The cow is seeking comfort and security. She associates it with both the place and the situation where she last experienced it... My general goal with my cattle—or anybody else’s that I’m working—is to eventually have the complete but calm attention of every animal in the bunch, 100 percent of the time... Calmness starts in the handler and ends up in the animal... A knowledgeable rider can dominate horses and cattle far more than a rough rider can.”

Figures 10-1 and 10-2 are illustrations from Cote's stockmanship manual and illustrate some of the techniques used in low stress livestock handling. For more information, the manual can be downloaded at www.grandin.com/behaviour/principles/SteveCote.book.html. (This is a Website maintained by Temple Grandin, a PhD in animal science, a pioneer in humane livestock handling, and a best-selling author: e.g., *Animals in Translation*, *Animals Make Us Human*, etc.)

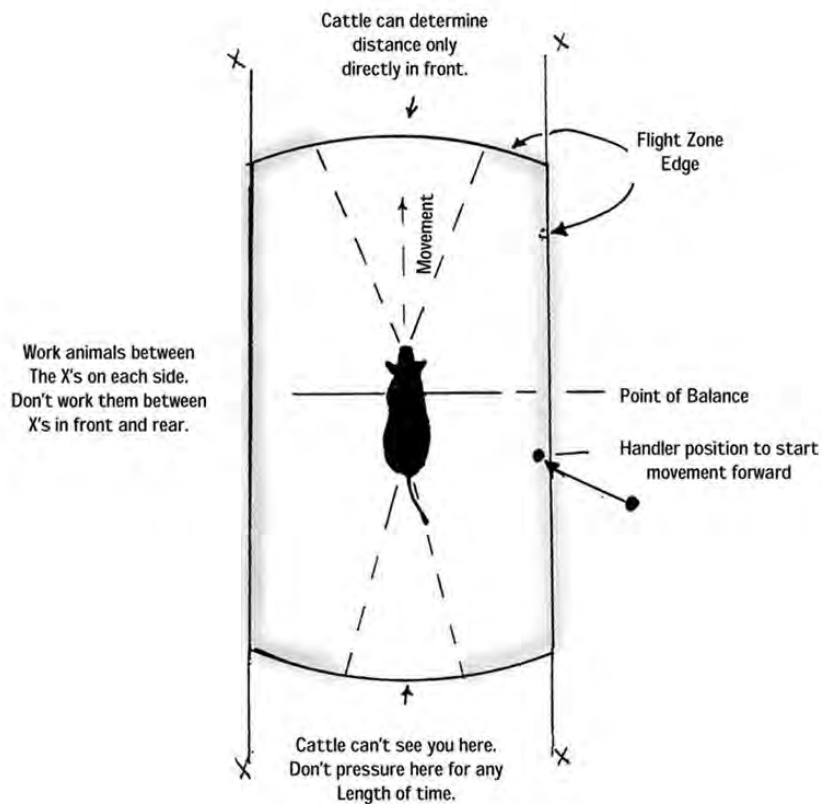


June on the Flats (Devony Lehner HSWCD)

CATTLE FLIGHT ZONES

The flight zone is not a circle around the animal. It tends to be closer at the sides and farther out in front and back. It might be somewhat larger in the back. It changes with the situation and with time.

DIAGRAM 1



TRAINING STOCK TO TAKE PRESSURE FROM THE SIDES AND THE BACK

OBJECTIVE — To move the animal forward and be comfortable with pressure applied to the side from different handler angles of approach.

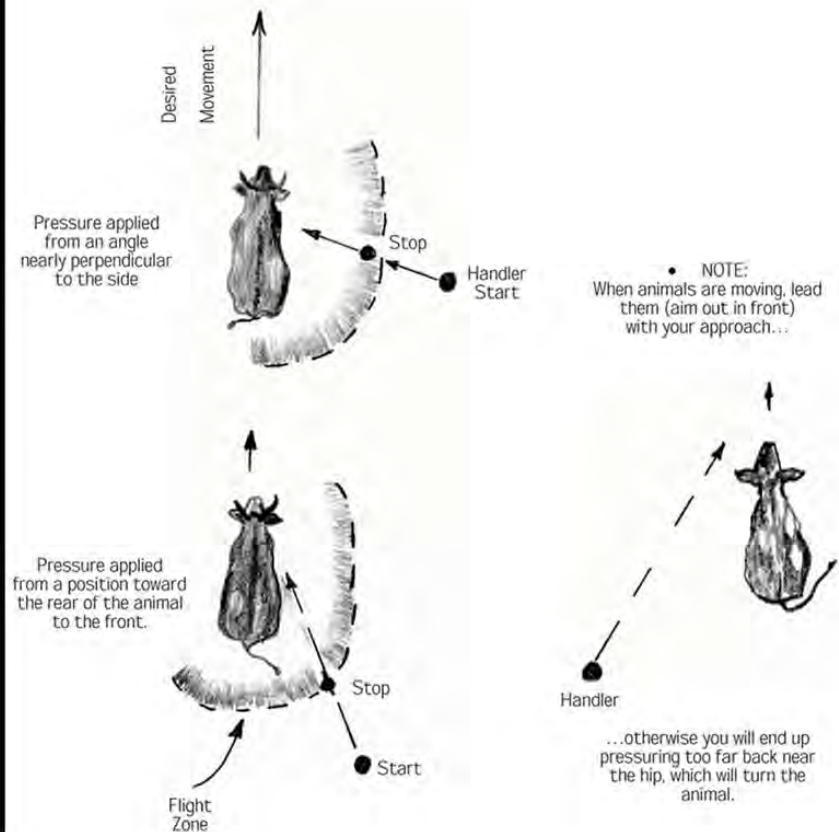
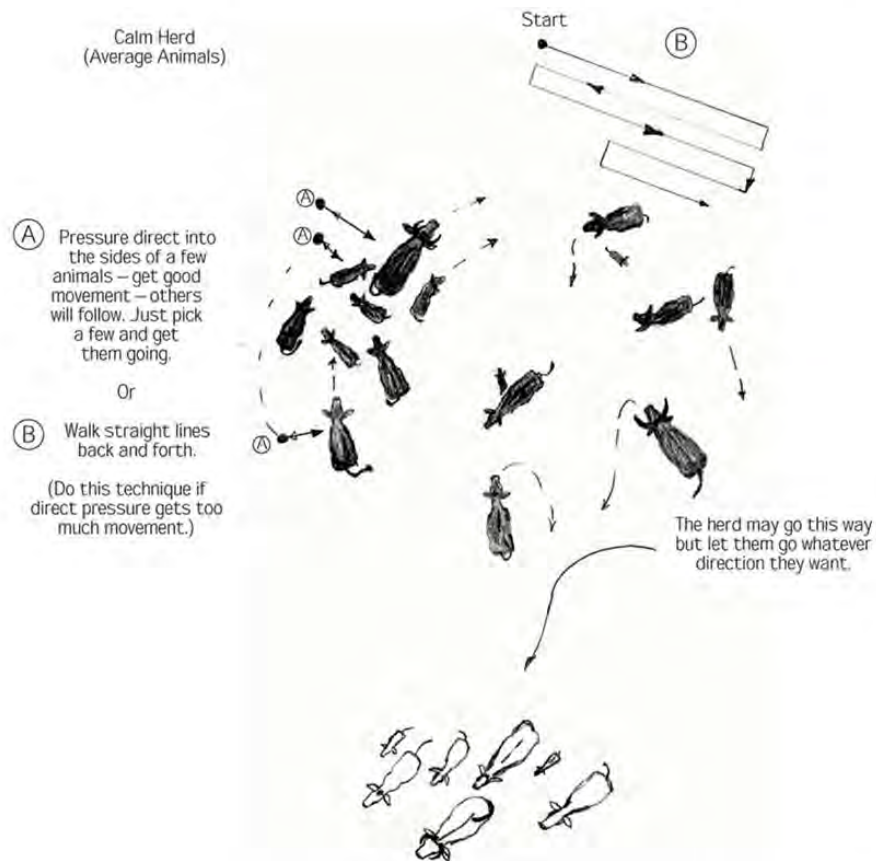


Figure 10-1. Two illustrations from *Stockmanship, a powerful tool for grazing lands management* (S. Cote 2004).

STARTING A HERD — TRAINING A HERD OUT ON PASTURE OR RANGE TO:

- Pick Up Movement
- Start Moving as a Herd

On a Herd that is Mothered Up (if they are pairs) and Grouped



DRIVING A CALMER HERD

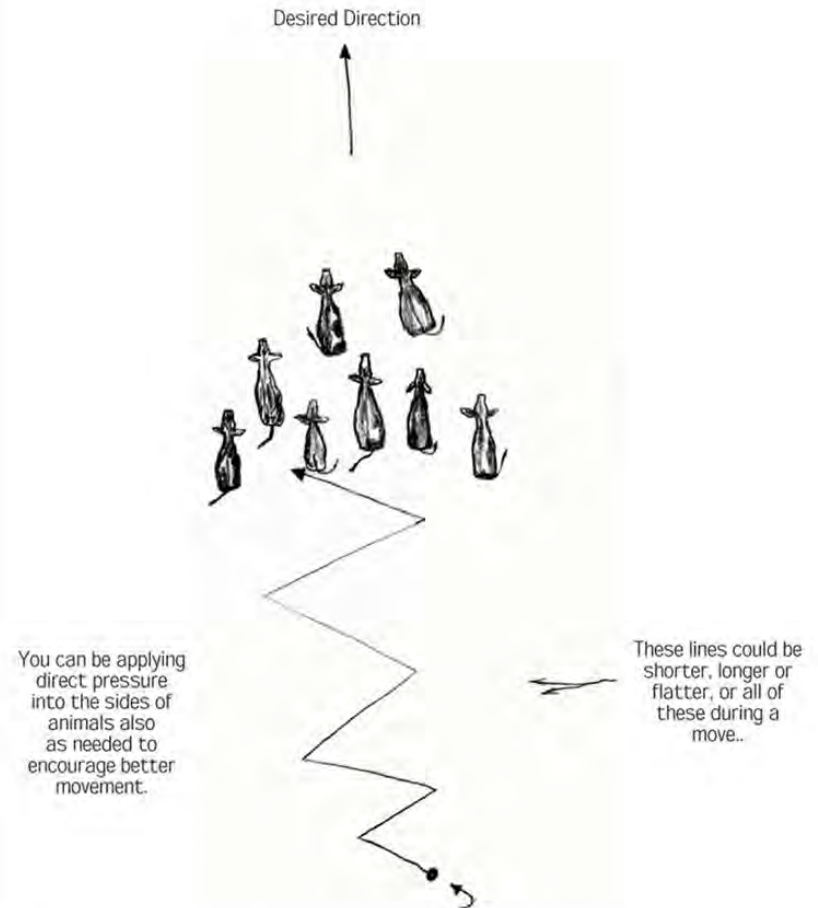


Figure 10-2. Two illustrations from *Stockmanship, a powerful tool for grazing lands management* (S. Cote 2004).

10.2. CONSERVATION GRAZING

Conservation grazing is the use of grazing and browsing livestock—semi-feral or domesticated—to maintain and increase the biodiversity of natural or semi-natural grasslands, heathlands, woodland pastures, wetlands, and many other habitats. (This definition is from Peninsula Open Space Trust, see below.) This approach to grazing, where livestock production goals become secondary to the use of livestock in ecosystem management, is a relatively new approach in this country. It has a more established history overseas, particularly in the United Kingdom and parts of the European continent. Several excerpts from organizations that promote and implement conservation grazing suggest some of its varied applications.

- **Peninsula Open Space Trust (POST), headquartered in Palo Alto, California**
(from: www.openspacetrust.org/lands/stewardship_conservation.html)

The mission of the *Peninsula Open Space Trust (POST)* is to give permanent protection to the beauty, character and diversity of the San Francisco Peninsula and Santa Cruz Mountain range. POST encourages the use of these lands for natural resource protection, wildlife habitat, low-intensity public recreation and agriculture for people here now and for future generations.

Conservation grazing is an innovative tool that POST has implemented on several properties, including Driscoll Ranch, in La Honda, and Cloverdale Coastal Ranches, near Pescadero. Used effectively, conservation grazing can go a long way in conserving natural resources on fragile habitat while supporting traditional agricultural land use.

The goal of conservation grazing is to enhance grassland biodiversity through the careful and well-timed placement of cattle on the land. A herd of cattle rotate through various segments of pasture for part of the year, eating away at the dense thatch of dead annual grasses covering hillsides. As the cattle feed, they make room for young native perennial grasses to poke through the thatch and establish themselves on the land, thereby enabling a more natural landscape to flourish.

On Driscoll Ranch, POST implemented a long-term resource management program for conservation grazing to preserve remnants of coastal terrace prairie as well as expanses of native California rye grass and purple needle grass. Such high-impact grazing keeps grass growth at the correct level and rejuvenates the native grasses while controlling invasive species. It also helps control erosion by compacting soils in emerging gullies.

- **Sheep used for conservation grazing in southern Oregon**

Below is an example of the use of Lilliputian Soay sheep for conservation grazing in southern Oregon. This write-up was obtained from www.soayfarms.com/conservation.html.

The Lilliputian Soay is utilized for conservation grazing in both Great Britain and the United States. Lands that are ideally suited for wildlife habitat, for some agricultural purposes or for reforestation projects are being reclaimed from overgrowth without pesticides or bulldozers as a result of the use of sheep. Because it can thrive on marginal browse and can adjust to an assortment of challenging conditions, the Soay adapts to a wide range of environments where more domesticated breeds would fail. Additionally its small size and light weight make it appropriate for sensitive sites where heavier animals such as Highland Cattle or Exmoor Ponies could trample or foul fragile plants and soils. Rookeries and even butterfly habitats can benefit from foraging Soay. In the US this concept is just being introduced, but in the UK heritage breeds are being used increasingly for a variety of schemes. Soay sheep are found in such historic locations as Cheddar Gorge (home of Cheddar Cheese) in Somerset, England to keep scrub in and around the Gorge and its caves from taking over. Even on St. Kilda concern about excessive

growth of ungrazed sward prompted the Marquess of Bute to bring the sheep from Soay to Hirta when he purchased the islands back in the 1930's.



In the spring the sheep were turned into a small wooded area to eradicate the virulent poison oak that so often takes over in parts of southern Oregon. Several weeks later “Chivo”, a Maremma Livestock Guarding Dog that lives with the Soay, surveys their work upon its completion.

Forest Fuel Reduction

In the drier parts of the western United States, where forest fires are an increasing threat to man and beast alike, the Soay can likewise be used for fuel reduction. Many of the shrubs that grow under the canopy here and compete with trees for water (manzanita, ceanothus, and scotchbroom) are extremely flammable. Because of an eighty-plus year policy of fire suppression, they have grown to staggering levels. We are now learning that small and frequent fires have historically been an important part of the forest's ecology. What we have done in quelling them for so long has been to allow combustibles to build up, creating a potential for conflagration. By thinning to reduce overcrowding and using livestock as one means of eliminating these ladder fuels the forest becomes safer, the trees become healthier and are thus better able to withstand blazes when they do come.

- **Conservation grazing in the UK**

Conservation grazing has been actively supported in the UK for many years. The “Grazing Animals Project,” formed in 1997, provided advice to landowners grazing animals on conservation sites. More recently, this partnership has been restructured as the “Grazing Advice Partnership.” The following information about their organization and some of the information they have available was compiled from their Website: www.grazingadvicepartnership.org.uk

The [Grazing Advice Partnership](http://www.grazingadvicepartnership.org.uk) exists to encourage grazing that benefits wildlife, landscape, and cultural heritage. **Conservation grazing is livestock grazing that meets nature conservation objectives.** It includes everything from extensive, low-intervention grazing schemes that meet livestock welfare needs while allowing natural processes to occur to grazing on improved grassland managed to optimize sward structure for invertebrates, small mammals, and birds.

What does GAP do?

- GAP exists to provide a first point of contact for information, advice and networking support to anyone with an interest in grazing with our natural environment and our cultural heritage in mind.
- GAP does not duplicate work undertaken by the many individuals and organisations involved in farming, conservation, and land-management. Instead GAP provides the means by which that knowledge, experience, and good practice can be easily sign-posted, accessed, and made available to as many people as possible.

The original GAP, “Grazing Animals Project,” was formed in 1997—an advice network for grazing on conservation sites.

- By 2005 GAP supported a network of 1000 members.
- By 2008 GAP membership had risen to 1600 and a strong sister partnership network (PONT) was operating in Wales.
- The focus of land management in England has changed radically since GAP was first formed, with more changes ahead.
- With the majority of farmers signed up to agri-environment schemes, there is a demand for advice on grazing that achieves conservation objectives from the majority of land managers.
- Government policy in England is now committed to an integrated approach to land management advice.

The GAP new partnership:

- On August the 4th, 2008, Defence Estates, the National Trust, Natural England and the Rare Breeds Survival Trust formed a new investing partnership.
- The new partnership designed a new advice partnership to start functioning in Spring 2009—the Grazing Advice Partnership.
- An official launch of the new partnership was held at the Grazing Advice Partnership and Devon Wildlife Trust Conference in September 2009 in Exeter.

Benefits of the Grazing Advice Partnership

- All the best bits of the old Grazing Animals Project service.
- One-stop shop for Grazing Advice—sign posting to complimentary sources of advice.
- Shared ownership of advice by the majority of land managers and advisers engaged with grazing to meet conservation objectives in England.
- Federal link with similar Grazing Networks elsewhere in the UK.
- A business model that will mean the Grazing Advice Partnership is financially secure for the long term.
- Continued buy-in to the network from a broad range of specialists involved with different aspects of grazing management.
- A balanced operations group with no single organisation dictating how the Grazing Advice Partnership is operated.

Why graze?

In the UK almost all areas we value for their conservation interest form part of cultural landscapes created by humans, often as a side product of subsistence agriculture. Grazing livestock and associated activities played a key role in the formation and maintenance of many semi-natural habitats including grassland, heathland, and pasture-woodland, through slowing or altering the successional trajectory of these habitats towards increased woodland cover. In addition to maintaining or restoring such habitats, grazing is also an essential component of many habitat (re)creation projects, for example managed reversion from arable fields to species-rich grassland or the recreation of heathland.

Publications

The Grazing Advice Partnership and its predecessor, the Grazing Animals Project, have a number of publications available on their Websites. Three interesting examples are listed below. Descriptions are from the Websites cited.

The Breed Profiles Handbook: A Guide to the Selection of Livestock Breeds for Grazing Wildlife Sites (www.grazinganimalsproject.org.uk/breed_profiles_handbook.html).

This handbook is a useful reference guide for managers and advisers involved in determining and implementing grazing prescriptions on sites being managed for wildlife. It is the first succinct reference document assisting the identification and selection of grazing animals appropriate for use in nature conservation situations in the British Isles, particularly on the more challenging habitats. It includes two-page summaries of the attributes and impacts of the grazing and browsing abilities of over 50 breeds of cattle, ponies, sheep, goats and pigs.

Individual profiles should be read in conjunction with the relevant sections on issues that may affect the choice of stock - species, breed, background, husbandry, age and sex, conformation, and habitat/vegetation type. The Handbook also contains a glossary, references, and bibliography.

Pulborough Brooks Report. Managing wet grasslands for birds (download under “Publications” tab at www.grazinganimalsproject.org.uk)

Report from a workshop organised by GAP and the RSPB at Pulborough Brooks in Feb 2006. Contains information on managing wet grassland for birds, dealing with grazing and other forms of land management.

The GAP also provides case studies of grazing projects ongoing in the UK; these can be accessed from site locations shown on a grazing map at

www.grazingadvicepartnership.org.uk/conservation_grazing_map.html.

Welcome to the GAP grazing map, providing information and case studies on a wide range of conservation grazing schemes around the British Isles. Please click on the [Visual Map Tool](#) link on this page to access the map and explore the grazing scheme information in our database. Alternatively, you can access a text-based version of the map by clicking the [Text Map Tool](#) link instead.

10.3. TARGETED GRAZING

Similar to conservation grazing, but with a more “targeted” goal, targeted grazing is the carefully controlled grazing of livestock to accomplish specific vegetation management objectives. Unlike conventional grazing management, **livestock are used as a management tool—often briefly and intensively and often with the goal of reducing invasive plants**. Again, goals include improving land health by performing weed control, reducing wildland fire, and aiding in restoration projects” (www.cnr.uidaho.edu/rx-grazing/). Specific livestock species (generally breeds of cattle, goats, or sheep) are grazed at controlled intensities and durations to achieve desired goals, whether to reduce weeds, alter plant community composition, reduce fire fuels, create firebreaks or other clearings, or for other purposes. Often a herder oversees the livestock to closely manage animals and monitor effects.

As more land managers look at ways to use livestock in their management programs, more information about targeted grazing becomes available. Two examples of useful online references are: *Livestock Grazing Guidelines for Controlling Noxious Weeds in the Western United States* (Davison, Smith, and Wilson 2007), available online, and *Targeted Grazing: A Natural Approach to Vegetation Management*

and Landscape Enhancement—A handbook on grazing as a new ecological service (Peischel and Henry 2006), available online at www.sheepusa.org/get_page/pageID/249. A brochure about targeted grazing referenced on the latter website provides a number of examples of targeted grazing activities nationwide, among them:

- In New Hampshire, sheep graze under power lines to prevent trees from reaching the lines and cutting service.
- Sheep in North Dakota reduce leafy spurge concentrations by 90 percent so the grass can grow for the cattle that follow.
- In the Pacific Northwest, sheep and goats have controlled invasive shrubs like gorse and multiflora rose.
- In Oregon forest plantations, sheep grazed down shrubs and grass with virtually no damage to adjacent Douglas firs.
- In California vineyards, sheep have grazed down competing vegetation on the vineyard floors.
- Sheep are maintaining a firebreak three miles long and 200 feet wide between luxury homes in Carson City, Nevada, and the Toiyabe National Forest.

The following example of a prescription for targeted grazing to reduce Canada thistle is among a number of prescriptions available online from the University of Idaho (www.cnr.uidaho.edu/rx-grazing/).

Targeted Grazing to reduce Canada thistle:

Type and Class of Livestock: All classes of sheep, goats, and cattle.

Grazing Objective: Begin grazing when rosettes are green and begin to sprout. Remove animals when grazing shifts to desirable species and then regraze new sprouts.

Growth Stage for Treatment: Graze during the seedling through late vegetative stage, with regular removal of top growth throughout the season. Graze often enough to prevent flowering. Grazing treatment will need to be repeated at least three years. Goats will graze older plants.

Potential Effectiveness: Goats, sheep, and cattle can damage Canada thistle with repeated grazing to prevent flowering. Goats are the preferred grazing animal, followed by sheep and cattle. Sheep and cattle prefer to graze this plant when it is young before spines develop. Grazing is most effective when repeated during the season and for multiple seasons to prevent seed production and to deplete root reserves. Plants are smaller and weaker in successive years after repeated grazing. Most information suggests best results are achieved when grazing is combined with herbicide treatments.

References:

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Donald, W.W. 1990. Management and control of Canada thistle (*Cirsium arvense*). *Review of Weed Science* 5:193-250.

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The Fox River Flats grazing lease area provides opportunities to explore, test, and refine such approaches to better fit local conditions and to implement such practices to meet identified management goals.