State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

November 17, 2009

Dear Interested Parties:

This Final Environmental Impact Statement (FEIS) describes the effects of implementing or eliminating livestock grazing on Washington Department of Fish and Wildlife (WDFW) managed lands as it relates to the Wild Horse Coordinated Resource Management planning process and area. The project area is located approximately 10 miles east of Ellensburg, Washington, in eastern Kittitas County and encompasses approximately 62,000 acres.

The State Environmental Policy Act (SEPA) provides an exemption to grazing when issuance of new grazing leases covering a section of land or less; and issuance of all grazing leases for land that has been subject to a grazing lease within the previous ten years [WAC 197-11-800(2)(24)(a)]. Because some of the lands (i.e., the WDFW Whiskey Dick Wildlife Area) involved in the planning process have not been grazed in the past ten years and amount to more than a section of land, they are now subject to a SEPA review. Because of strong public interest, both support and controversy, WDFW has chosen to develop this FEIS to ensure the full extent of the public review process has been implemented.

Livestock grazing is being proposed that allows for viable livestock grazing, and is compatible with the goals and objectives of improving range conditions and enhancing wildlife habitat – consistent with existing state rules and WDFW policy on livestock grazing. Alternative 1 [No Action (Current Management)] would continue current grazing management on up to 22,554 acres within the Quilomene and Whiskey Dick Wildlife Area. Alternative 2 [Proposed Action (CRM Grazing Plan)] would allow livestock grazing on approximately 62,000 acres within the CRM area. Alternative 3 [No Grazing] would eliminate livestock grazing on WDFW managed lands within the CRM area. One additional alternative was considered but eliminated from detailed study.

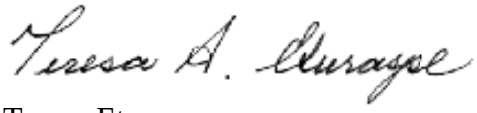
Issues were identified during the comment period for the Draft EIS. These issues included the following:

- Water quality impacts
- Protection of stream corridors (including riparian areas)
- Spread of noxious weeds
- Impacts to fish and wildlife (i.e., sage grouse, elk, mule deer, steelhead, etc.)

- Impacts to vegetation and habitat
- Impacts to recreation
- Impacts to cultural resources
- Impacts to socioeconomics
- Soil displacement and compaction
- Habitat monitoring

WDFW has prepared and is distributing this final environmental impact statement. Comments received from agencies and interested parties during public review of the draft document have been considered and where possible incorporated into this final document. WDFW believes this final environmental impact statement will assist decision makers to identify the key environmental issues and options associated with this action.

Sincerely,



Teresa Eturaspe
SEPA Responsible Official
(360) 902-2575

Final Environmental Impact Statement
for
Livestock Grazing Management on the Washington Department of Fish and Wildlife's Quilomene and Whiskey Dick Wildlife Areas in Kittitas County, Washington

As part of the Greater Wild Horse Coordinated Resource Management Planning Process

November 17th, 2009

Prepared by:

Washington Department of Fish and Wildlife
Lands Division, Wildlife Program
600 Capitol Way North
Olympia, Washington 98501

&

Ecology and Environment, Inc.
720 3rd Avenue
Seattle, Washington 98104

Fact Sheet
Final Environmental Impact Statement (FEIS)

LIVESTOCK GRAZING MANAGEMENT OF THE QUILOMENE AND WHISKEY DICK WILDFIFE AREA OF THE L.T. MURRAY WILDLIFE AREA COMPLEX, WASHINGTON

Description
The Washington Department of Fish and Wildlife (WDFW) proposes implementation of a grazing management plan within the Quilomene and Whiskey Dick Wildlife Areas (WA) of the L.T. Murray Wildlife Area Complex located in Kittitas County. The proposed grazing is part of the greater Wild Horse Coordinated Resource Management Planning process made up of other public and private owners. This FEIS addresses only those lands owned and/or managed by WDFW. The proposed action would rotate livestock grazing across Lone Star, Rocky Coulee, East Whiskey Dick, West Whiskey Dick, Wild Horse North, Wild Horse South, Wild Horse Crossing, Vantage Hwy, Whiskey Jim, Lower Parke Creek, and Upper Parke Creek pastures within the wildlife area. The FEIS evaluates the environmental impacts of the Proposed Action, a "No Grazing" alternative, and an alternative that would continue the grazing plan implemented in 2008 (the "No Action" alternative).

Project Proponent
Washington Department of Fish and Wildlife (WDFW)

Tentative Date for Implementation
The date of implementation corresponds to the Fish and Wildlife Commission's review and approval of a grazing permit after issuance of this Final Environmental Impact Statement (FEIS).

Lead Agency, Responsible Official, and Contact Person:
Washington Department of Fish and Wildlife, 600 Capitol Way North,
Olympia, Washington 98501-1091

WDFW Responsible Official:
Teresa Eturaspe, SEPA/NEPA Coordinator
Regulatory Services Section, Habitat Division
Washington Department of Fish and Wildlife

Contact Person:
Jennifer Quan
Lands Division Manager
Washington Department of Fish and Wildlife
Lands Division, Wildlife Program

Permits and Licenses Required
Per WAC 232-12-181, the Washington Department of Fish and Wildlife will issue a grazing permit for any grazing that occurs on department lands. The director is authorized to enter into grazing permits when the director determines that a grazing permit will be consistent with the desired ecological condition for those lands or the department's strategic plan. Except for temporary permits, or permits that are being renewed or renegotiated with existing permittees, grazing permits shall first be submitted to the commission, which may review the permit to

ensure it conforms to commission policy. If, within thirty days, the commission has not disapproved the permit, the director shall be deemed authorized to enter into that permit.

Authors and Principal Contributors

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Date of Issuance of Draft EIS
January 22, 2009

Draft EIS Comment Period Closed
February 27, 2009

Date of Issuance of Final EIS
November 17, 2009

Date of Next Actions and Subsequent Environmental Reviews
Upon issuance of this FEIS, and review and approval of a final grazing plan by the Fish and Wildlife Director, subsequent implementation of management strategies will occur.

Location of Copies of this FEIS and Supporting Documents

Washington Department of Fish and Wildlife
Lands Division, Wildlife Program
1111 Washington Street SE
Olympia, Washington 98501-1091

Cost/Availability

Copies of the Final Environmental Impact Statement are available for downloading at no charge from http://wdfw.wa.gov/hab/sepa/sepa.htm .

By phone or written request a limited number of hardcopies and CD copies are available at no charge by contacting the Wildlife Program at 360-902-2515. After these copies are distributed additional copies will be available by downloading from the website.

Distribution List

Notice of the availability of this FEIS is posted on the WDFW website: http://wdfw.wa.gov/hab/sepa/sepa.htm. Notification has been sent to all local government planning departments (city and county); affected Tribes within the area of project jurisdiction; all state and federal agencies with jurisdiction; selected environmental organizations; and interested parties.

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List of Abbreviations and Acronyms

asl	Above Sea Level
AUMs	Animal Unit Months
AU	Animal Unit
BEA	Bureau of Economic Analysis
BLM	Bureau of Land Management
BMP	Best Management Practices
CFR	Code of Federal Regulations
CRM	Coordinated Resources Management
CWA	Clean Water Act
DAHP	Department of Archeology and Historic Preservation
DEIS	Draft Environmental Impact Statement
Ecology	Washington State Department of Ecology
EIS	Environmental Impact Statement
EPA	(U.S.) Environmental Protection Agency
ESA	Endangered Species Act
ESAC	Ecosystem Standards Advisory Committee
ESUs	Evolutionarily Significant Units
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FT	Federal Threatened
GHG	Greenhouse Gas
gpm	Gallons Per Minute
HB	House Bill
HUC	Hydrologic Unit Code
IAC	Office of the Interagency Committee
LGP	Livestock Grazing Plan
mm	Millimeter
NAAQS	National Ambient Air Quality Standards
NRCS	(U.S.) Natural Resource Conservation Service
NRHP	National Historic Register of Places
NPS	National Parks Services
ODW	(Department of Health) Office of Drinking Water
OFM	Office of Financial Management
OHV	Off-highway Vehicle
PA	Proposed Action
PFC	Proper Functioning Condition
PHS	Priority Habitats and Species
PM_{10}	Particulate Matter for Fugitive Dust Emissions
PSE	Puget Sound Energy
PUD	Public Utility Department
RCO	Recreation and Conservation Office
RCW	Revised Code of Washington
RMAs	Road Management Areas
SC	State Candidate
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SGRP	Sage Grouse Recovery Plan
SOC	Species of Concern

STM	State-and-Transition Model
SWAP	Source Water Assessment Programs
TCPs	Traditional Cultural Properties
TMDL	Total Maximum Daily Load
USBPA	United States Bonneville Power Administration
USGS	United States Geological Service
USFWS	United States Fish and Wildlife Services
USFWS-PR	United States Fish and Wildlife Services Pittman Robertson
USNPS-LWCF	United States National Parks Service – Land and Water Conservation Fund
WA	Wildlife Area
WA-APPROP	Washington Appropriation
WA RCO-Bonds	Washington Recreation and Conservation Office-Bonds
WA RCO-WWRP	Washington Recreation and Conservation Office – Washington Wildlife and Recreation Program
WAC	Washington Administrative Code
WAUs	Watershed Administrative Units
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WRIAs	Water Resource Inventory Areas

Common and Scientific Names for Fish and Wildlife Species

Common Name	Scientific Name
sage sparrow	*Amphispiza belli*
Pallid bat	*Antorzous pallidus*
golden eagle	*Aquila chrysaetos*
burrowing owl	*Athene cunicularia*
pygmy rabbit	*Brachylagus idahoensis*
ferruginous hawk	*Buteo regalis*
Beaver	*Castor canadensis*
mountain sucker	*Catostomus platyrhynchus*
sage-grouse	*Centrocercus urophasianus*
Elk	*Cervus elaphus nelsoni*
yellow-bellied racer	*Colubor constrictor mormon*
Townsend's big-eared bat	*Corynorhinus townsendii*
Rattlesnake	*Crotalus* spp.
Big-brown bat	*Eptesicus fuscus*
prairie falcon	*Falco mexicanus*
peregrine falcon	*Falco peregrinus*
bald eagle	*Haliaeetus leucocephalus*
Pacific lamprey	*Lampetra tridentata*
loggerhead shrike	*Lanius ludovicianus*
black-tailed jackrabbit	*Lepus californicus*
white-tailed jackrabbit	*Lepus townsendi*
striped whipsnake	*Masticophis taeniatus*
brown-headed cowbird	*Molothrus ater*
Myotis bats	*Myotis* spp
mule deer	*Odocoileus hemionus*
westslope cutthroat	*Oncorhynchus clarki lewisi*
rainbow trout	*Oncorhynchus mykiss*
Steelhead	*Oncorhynchus mykiss*
inland redband trout	*Oncorhynchus mykiss gairdneri*
Chinook salmon	*Oncorhynchus tshawytscha*
sage thrasher	*Oreoscoptes montanus*
California bighorn sheep	*Ovis canadensis californiana*
short-horned lizard	*Phrynosoma douglassi*
Columbia spotted frog	*Rana luteiventris*
speckled dace	*Rhinichthys osculus*
bull trout	*Salvelinus confluentus*
Townsend's ground squirrel	*Spermophilus townsendii*
ground squirrels	*Spermophilus* spp.
Merriam's shrew	*Sorex merriami*
Preble's shrew	*Sorex preblei*

Common and Scientific Names for Plant Species

Common Name	Scientific Name
Thurber's needlegrass	*Achnatherum thurberianum*
Russian knapweed	*Acroptilon repens*
scilla-like onion	*Allium scilloides*
wild onion	*Allium* spp.
alder	*Alnus* spp.
serviceberry	*Amelanchier alnifolia*
low sagebrush	*Artemisia arbuscula*
stiff sagebrush	*Artemisia rigida*
big sagebrush	*Artemisia tridentata*
Wyoming big sagebrush	*Artemisia tridentata* ssp. *wyomingensis*
threetip sagebrush	*Artemisia tripartita*
Pauper milk-vetch	*Astragalus misellus* var. *pauper*
Carey's balsamroot	*Balsamorhiza careyana*
Hooker's balsamroot	*Balsamorhiza hookeri*
balsamroot	*Balsamorhiza* spp.
cheatgrass	*Bromus tectorum*
mariposa lily	*Calachortus macrocarpus*
whitetop	*Cardaria pubescens*
musk thistle	*Carduus nutans*
sedges	*Carex* spp.
Indian paintbrush	*Castilleja* spp.
diffuse knapweed	*Centaurea diffusa*
Canada thistle	*Cirsium arvense*
red-osier dogwood	*Cornus sericea*
black hawthorn	*Crataegus douglasii*
western hawksbeard	*Crepis occidentalis*
smooth scouring rush	*Equisetum laevigatum*
rabbitbrush	*Ericameria nauseosa*
line-leaf fleabane	*Erigeron linearis*
cushion fleabane	*Erigeron poliospermus*
rock buckwheat	*Eriogonum sphaerocephalum*
buckwheat	*Eriogonum* spp.
thyme-leaf wild buckwheat	*Eriogonum thymoides*
Idaho fescue	*Festuca idahoensis*
yellow bells	*Fritallaria pudica*
needle-and-thread grass	*Hesperostipa comata*
foxtail barley	*Hordeum jubatum*
rushes	*Juncus* spp.
kochia	*Kochia scoparia*
perennial pepperweed	*Lepidium latifolium*
bitterroot	*Lewisia rediviva*
basin wildrye	*Leymus cinereus*
Dalmatian toadflax	*Linaria dalmatica ssp.dalmatica*
Canby's lomatium	*Lomatium canbyi*
large seeded biscuitroot	*Lomatium macrocarpum*
biscuit root	*Lomatium* spp.
purple loosestrife	*Lythrum salicaria*
mock goldenweed	*Nestotus stenophyllus*
hedgehog cactus	*Pediocactus simpsonii* var. *robustior*
rock penstemon	*Penstemon gairdneri*
reed canarygrass	*Phalaris arundinacea*

Common Name	Scientific Name
mockorange	*Philadelphus lewisii*
Hood's phlox	*Phlox hoodii*
longleaf phlox	*Phlox longifolia*
common reed	*Phragmites australis*
ponderosa pine	*Pinus ponderosa*
bulbous bluegrass	*Poa bulbosa*
Cusick's bluegrass	*Poa cusickii*
Kentucky bluegrass	*Poa pratensis*
Sandberg'sbluegrass	*Poa secunda*
black cottonwood	*Populus balsamifera* ssp. *trichocarpa*
aspen	*Populus tremuloides*
chokecherry	*Prunus virginiana*
bluebunch wheatgrass	*Pseudoroegneria spicata*
bitterbrush	*Purshia tridentata*
wax currant	*Ribes cereum*
watercress	*Rorippa nasturtium-aquaticus*
Wood's rose	*Rosa woodsii*
coyote willow	*Salix exigua*
Russian thistle	*Salsola iberica*
elderberry	*Sambucus nigra*
Ute's ladies tresses	*Spiranthes diluvialis*
western needlegrass	*Stipa occidentalis*
spinescent fameflower	*Talinum spinescens*
Hoover's tauschia	*Tauschia hooveri*
thick-leaved thelypody	*Thelypodium laciniatum*
poison ivy	*Toxicodendron rydbergii*
brodiaea	*Triteleia grandiflora*
cattail	*Typha latifolia*
ventenata	*Ventenata dubia*
sagebrush violet	*Viola trinervata*

Executive Summary

Background

The Washington Department of Fish and Wildlife (WDFW) and interested partners in Kittitas County set up the collaborative Wild Horse Coordinated Resources Management (CRM) group in January 2006 to facilitate resource planning across numerous ownership and management boundaries. The CRM area comprises approximately 62,000 acres in northeastern Kittitas County. Within the CRM boundaries, WDFW owns approximately 35,423 acres, Washington Department of Natural Resources (DNR) owns 15,142 acres, Puget Sound Energy (PSE) owns 7,943 acres, and the Bureau of Land Management (BLM) owns 2,869 acres. The CRM allows for resource planning across ownership and management boundaries to meet multiple goals, including needs of fish and wildlife as well as those of local farmers and ranchers. This process has brought together WDFW, BLM, Puget Sound Energy, DNR, the Natural Resources Conservation Service (NRCS), livestock operators, and other groups and individuals to collaboratively plan to improve management of the Wild Horse CRM area to ensure healthy wildlife and plant communities across the landscape.

WDFW owns or manages nearly one million acres of land across the state, and is aggressively pursuing additional acquisitions in an effort to protect lands critical to fish and wildlife conservation. In Kittitas County, this effort has recently resulted in three important acquisitions protecting over 20,000 acres that had been threatened by development. Kittitas County is one of the fastest growing counties in Washington, and the acquisition and protection of threatened wildlife habitat in this county is dependent on strong local support and partnerships. Participation in the Wild Horse CRM process allows WDFW to maintain strong ties with the local agricultural community, and is supported by all three local legislators, as well as four of the largest land conservation organizations in Washington.

Purpose and Need

WDFW proposes to permit livestock grazing on portions of the Quilomene WA and the Whiskey Dick WA to facilitate implementation of the Wild Horse CRM goals.

WDFW is a significant landowner in Kittitas County and strives to support local economies and values where compatible with its mandate to protect, restore, and enhance fish and wildlife and their habitats. Livestock grazing is an integral part of Kittitas County culture, and when WDFW acquired the Skookumchuck unit, agriculture constituents made clear the need for those lands to continue to support livestock grazing.

Portions of the Skookumchuck unit were annually leased for livestock grazing up until 2008, but the Whiskey Dick WA, which has not been grazed in the past ten years, is subject to a State Environmental Policy Act (SEPA) review prior to implementing a grazing strategy. Due to strong public sentiment related to grazing, WDFW has chosen to develop an EIS to ensure the full extent of the public review process has been implemented, and involve all interested stakeholders in the planning process.

Overview

WDFW is proposing to authorize a 5-year grazing permit on WDFW-managed lands within the CRM area. Three alternatives were analyzed and represent varying levels of grazing intensity and acreages. The proposed grazing system has been developed to benefit big game species such

as mule deer and elk and minimize effects to other species, including shrub-steppe obligates (i.e., sage-grouse).

Ownership in the Wild Horse CRM project area is a mixture of public and private landowners, including WDFW, DNR, BLM, and PSE. By spreading grazing across a larger landscape, the Proposed Action allows for a reduction in overall grazing intensity and potential recovery in areas that have been heavily grazed in the past.

The beneficial and/or deleterious effects of livestock grazing on fish and wildlife habitat are an area of controversy, and identified in this FEIS. Timing, intensity, and duration of livestock grazing, as well as the plant community in which it occurs, all play a role in determining the magnitude of impacts to wildlife habitat. To best control livestock grazing effects, the proposed grazing system would implement range improvement projects, forage utilization standards, and a rotational pasture system, and utilize adaptive management practices.

The Proposed Action would be implemented in phases. Inclusion of pastures will be dependent on securing sufficient funding to complete mitigation measures such as fencing and water developments, and hiring a new position to perform required monitoring.

Alternative 1 – No Action (Current Management)

Under Alternative 1, livestock grazing would continue on pastures that have been grazed in the recent past (i.e., within the last 10 years). Implementation of this alternative would include a 5-year grazing permit, and would allow grazing on seven pastures: five WDFW-managed pastures, as well as two PSE-managed pastures.

- *Acres:* 22,554 total – WDFW-managed (16,748 acres) & PSE-managed (5,806 acres)
- *AUMs:* An average of 500 AUMs annually
- *Fencing:* Construct 4.2 miles & maintain up to 57.4 miles of boundary fence.
    - Construct 1 mile, and maintain up to 21 miles of pasture fence.
    - Install and remove up to 5.5 miles of temporary fence.
- *Water sources:* Priority redevelopment and maintenance of up to six springs.

Affected Environment and Environmental Consequences

Earth Resources

Grazing would be implemented at reduced AUMs compared to levels prior to WDFW ownership. The light grazing intensity is expected to let vegetation recover between rotations and is unlikely to increase soil erosion. No additional biological soil crust loss is anticipated, and overall effects are expected to be minor to moderate. Construction of fencing would cause minimal short-term soil disturbance to soils.

Water Resources

Alternative 1 is expected to have minor effects on water quality due to use of temporary fencing to exclude livestock from all fish-bearing waters, and use of water developments and salt placement to draw livestock out of riparian areas. In addition, spring and early summer grazing will improve cattle distribution and minimize livestock use of riparian areas. Browse utilization triggers would protect unfenced riparian areas from excessive livestock use. Water quality effects due to spring redevelopment are expected to be minor.

Vegetation

Effects of livestock grazing throughout the majority of the area will be minor. No changes in plant species composition, structure, and density are expected. Areas within 100 meters of developed stock water are currently dominated by weedy and early seral plant species and are not expected to either improve or decline.

Trenching associated with six spring redevelopments is expected to result in short-term effects to vegetation associated with springs. Spring redevelopment would result in decreased grazing pressure along creeks, thereby decreasing adverse effects from trampling and grazing. Riparian vegetation is expected to continue increasing, particularly in fenced areas, and fire return intervals are expected to be unaffected.

Wildlife

The level of grazing proposed under this alternative would have minor, short-term effects on forage quantity for mule deer and elk. Slight improvement of big game forage quality could also occur, but might be inconsequential under the Proposed Grazing System. Adverse effects to big game winter range are not expected. The majority of riparian and wetland areas will be fenced to exclude livestock, therefore, effects to sage-grouse nesting and brood rearing habitat will be minor. Winter forage for sage-grouse is almost exclusively sagebrush, which is only a minor component of cattle diets in the spring and early summer. Therefore, negligible effects to winter forage are expected.

Under this alternative, fencing effects on wildlife would be minor. The 5.2 miles of new fence would be constructed to wildlife-friendly specifications, and existing fences are already in good repair.

Fish

Fish-bearing stream reaches will be fenced to exclude livestock, and effects to unfenced stream reaches are expected to be minor to moderate. Under Alternative 1, fenced riparian vegetation is expected to recover rapidly, improving fish habitat. Unfenced riparian vegetation is expected to gradually recover, reducing sediment delivery to fish-bearing stream reaches. Shade would also increase as riparian vegetation recovers.

Cultural and Historical Resources

Under Alternative 1, livestock would continue to graze in the Western Pastures and no new springs would be developed. Gradual improvement of vegetative cover is expected, which should help stabilize soils and thereby protect cultural resources. In instances where proposed range improvements under this alternative could potentially affect cultural properties, site-specific plans will be developed in consultation with DAHP and interested tribes to ensure protection of cultural resources.

Socioeconomic Conditions

This alternative would have a negligible effect on the socio-economic structure of the county. Population, employment, and income are unlikely to be affected as a result of this alternative.

Alternative 2 – Proposed Action

Alternative 2 is the Preferred Alternative as it more fully addresses the purpose and need as described above, and still allows for viable livestock grazing compatible with the goals and

objectives of improving range conditions and enhancing wildlife habitat. The WDFW habitat acquisition and conservation program relies on strong partnerships and support within local communities. Full participation in the Wild Horse CRM is critical for the maintenance of such support in Kittitas County.

This alternative incorporates the livestock grazing management strategy developed in the CRM Grazing Plan (CRM 2008), and would allow livestock grazing on nine WDFW-managed pastures under a 5-year grazing permit, as well as two PSE-managed pastures. Alternative 2 would allow livestock grazing on four WDFW pastures (which have not been grazed in the recent past) in addition to the seven pastures that would be grazed under Alternative 1. By spreading grazing across a larger landscape, Alternative 2 reduces overall grazing intensity and increases the potential for recovery. Of the 62,000 acres within the CRM area, grazing would be allowed on approximately 51,104.

- *Acres:* 51,104 total – WDFW-managed (45,298 acres) & PSE-managed (5,806 acres)
- *AUMs:* An average of 550 AUMs annually
- *Fencing:* Construct 4.2 miles & maintain up to 57.4 miles of boundary fence.
    - Construct 1 mile, and maintain up to 41.6 miles of pasture fence.
    - Construct and maintain 3.2 miles of permanent fencing around springs and wetlands.
    - Install and remove up to 10.3 miles of temporary fence.
- *Water Sources:* Priority redevelopment and maintenance of up to 12 springs

Affected Environment and Environmental Consequences

Earth Resources

Alternative 2 effects to soil resources would be reduced as effects would be spread over a larger landscape. Effects to "Eastern Pastures" are expected to differ from effects to "Western Pastures", since the Eastern Pastures have not been grazed in the recent past. Western Pastures are expected to recover faster, as they would be used less frequently over a 5-year period. Minor to moderate loss of biological soil crust is anticipated in the Eastern Pastures, and construction of fencing would cause minimal impact to soils. Though more spring redevelopment would occur under Alternative 2, effects would be similar to those described under Alternative 1.

Water Resources

Although the types of effects are similar in Alternatives 1 and 2, the extent of the effects will differ over the Eastern and Western pastures. Direct effects on water quality would be reduced in the Western Pastures, which would be used less frequently over a 5-year period and allow faster recovery of vegetation and soils. Direct effects to Eastern Pastures would be increased, as there are an additional 51.2 miles of stream corridors included. Temporary fencing would be use to minimize riparian effects.

Indirect effects to Eastern Pastures would also be increased relative to Alternative 1, as the Eastern Pastures have not been grazed in the recent past. Former livestock trails have re-vegetated, and a number of these trails will be re-opened by livestock, potentially increasing sedimentation and reducing water quality. Due to the Proposed Grazing System and BMPs, this effect is expected to be minor to moderate.

Alternative 2 would require the redevelopment of up to six additional springs, the installation and removal of up to 2.8 more miles of temporary fence, the construction of 3.2 miles of permanent fence around springs and wetlands, and the maintenance of 20.6 additional miles of pasture fence. These effects are expected to be short-term and minor.

Vegetation

Both direct and indirect effects will be reduced in the Western Pastures, but these effects would be increased in the Eastern Pastures. No changes in plant species composition, structure, and density are expected in either Eastern or Western pastures, and areas within 100 meters of developed stock water, which are currently dominated by weedy plant species, are not expected to either improve or decline.

Trenching associated with six spring redevelopments is expected to result in short-term effects to vegetation. However, spring redevelopment would result in decreased grazing pressure along creeks, thereby decreasing adverse effects from trampling and grazing. Due to the presence of endangered steelhead in Whiskey Dick Creek, temporary fencing will be used to exclude livestock. Therefore, grazing effects to riparian vegetation are expected to be minimal. All other streams in the Eastern Pastures are intermittent and effects would likely be minor to moderate due to the lack of surface water.

Wildlife

Alternative 2 will reduce the potential for forage competition between livestock, mule deer, and elk in the Western Pastures, as these pastures would be grazed less frequently than under Alternative 1. However, increased competition could result in the Eastern Pastures, as livestock grazing would be introduced into previously ungrazed areas. As with Alternative 1, adverse effects to big game winter range are not expected.

Of the 20 miles of pasture fences in the Eastern Pastures, approximately 13 miles are anticipated to require significant repairs. Overall, effects from fencing under this alternative would be moderate as existing fences will need significant repair. Effects to sage-grouse are expected to be similar to those described under Alternative 1, although the Eastern Pastures are relatively rugged and less unsuitable for sage-grouse. Overall, a very slight increase in fence-related conflicts or predation for shrub-steppe associates could occur due to new fencing.

Fish

Effects to fish habitat would be similar to those described under Alternative 1. Riparian vegetation could recover more rapidly on the Western Pastures under Alternative 2, as these areas would be grazed less frequently than under Alternative 1. However, Alternative 2 includes more short-term effects to unfenced riparian vegetation in the Eastern Pastures.

Cultural and Historical Resources

Under Alternative 2, livestock would continue to graze the Western Pastures, and would be reintroduced into the Eastern Pastures. As with Alternative 1, no new springs would be developed. Seven of the 12 proposed spring redevelopments have identified cultural resources, and a site-specific plan will be developed, to ensure protection of these sites.

Socioeconomic Conditions

Although Alternative 2 represents a 170 percent increase in acreage, it represents only a 10 percent increase in AUMs. Therefore, effects will be similar to Alternative 1.

Alternative 3 – No Grazing

Alternative 3 is the “No Grazing” alternative, and no livestock grazing would be permitted on the WDFW-ownership within the CRM area. Grazing could still occur on non-WDFW ownership,

which includes BLM, DNR, and PSE land. While Alternative 3 does not meet the purpose and need, WDFW has not eliminated Alternative 3 from analysis. Withdrawing from participation in the Wild Horse CRM would be likely to significantly impact partnerships, support and funding for acquiring lands critical for fish and wildlife conservation.

Under Alternative 3, existing boundary fences would be maintained and those fences separating PSE and WDFW ownerships would be maintained to exclude livestock from WDFW ownership. In addition, 3.6 miles of new fencing would be constructed to exclude the WDFW parcel within the South Wild Horse pasture, and Section 23, which is currently included in the Wild Horse North pasture. Approximately 0.78 miles of temporary fence would be installed and removed each year that the Wild Horse Crossing pasture is grazed, in order to exclude the WDFW parcel in Section 15. Existing water developments would remain in place for wildlife but would not be maintained in support of livestock management. Dilapidated fences and non-functioning springs may be removed over time as funding and staff becomes available.

- *Acres:* N/A – no grazing would occur on WDFW-owned lands
- *AUMs:* N/A – no grazing would occur on WDFW-owned lands
- *Fencing:* Construct 4.2 miles & maintain up to 45 miles of boundary fence.
    - Construct 4.6 miles, and maintain up to 11.4 miles of pasture fence.
    - Install and remove up to 0.78 miles of temporary fence.
- *Water Sources:* No spring redevelopment would occur

Affected Environment and Environmental Consequences

Earth Resources

Effects of livestock grazing activities on soil function would be eliminated under Alternative 3. Biological crust recovery would occur more quickly, and any soil crust loss would be associated with wildlife or human activities.

Water Resources

There will be no direct and indirect effects to the water resources from livestock grazing if Alternative 3 is implemented.

Vegetation

Under this alternative, livestock grazing would not occur. Recovery of vegetation in the Western Pastures is expected to be more rapid, particularly in riparian areas associated with non-fish bearing streams. In addition, the potential for increased invasive weed establishment within 100 meters of developed stock water would no longer be expected. Spring redevelopments and any effects associated with trenching would not occur.

Wildlife

Under this alternative, livestock grazing would not occur. Overall, recovery of shrub-steppe and riparian habitat in the Western Pastures is expected to be more rapid than under Alternatives 1 or 2. However, potential improvements to elk forage would not occur. Pasture fence maintenance would not occur, which could benefit sage-grouse over the long-term.

Fish

Alternative 3 would eliminate all effects of livestock grazing to aquatic habitat on WDFW managed land in the CRM area. The elimination of livestock grazing could accelerate recovery of woody and herbaceous riparian vegetation.

Cultural and Historical Resources

Alternative 3 would have no direct and indirect effects to cultural resources because grazing would be eliminated under this alternative. Identified cultural resources that are expected to be affected by recreational users will be protected.

Socioeconomic Conditions

Effects to employment and income in Kittitas County would be realized in three ways: (1) direct effects attributable to employment associated with the ranches; (2) indirect effects attributable to industries that supply materials, equipment, and services to the ranches; and (3) induced effects attributable to personal spending by the ranch owners, employees, families, and related industries. Given the small proportion of the economy derived by ranching, effects are expected to be minimal.

Mitigation Measures

- The Upper Skookumchuck and Skookumchuck pastures, along with the WDFW parcel within the Wild Horse Crossing pasture, will be rested indefinitely, in order to protect critical fish habitat in Skookumchuck Creek and cultural resources along Columbia River. This will protect approximately 20.4 stream miles and 10,000 acres of habitat.
- Construct and maintain temporary fencing to protect select streams and riparian areas. All fish-bearing stream reaches would be protected with fencing. Temporary fences will be installed in each pasture prior to cattle turnout.
- Redevelopment and protection of springs on WDFW land within the project area, to reduce effects to water quality and riparian areas. Stock fence will be constructed to protect these spring sites, as necessary. Springs will be redeveloped for each pasture before grazing is allowed.
- Permanent fences with high bottom wires and low top wires and temporary electric fences will be used to minimize wildlife effects and facilitate movements of large ungulates, such as deer and elk. Fence markers will be placed on new permanent fence wires to reduce collision risk for birds. As funding allows, fence markers will be incrementally installed on existing permanent fences.
- Cultural resource assessments will be conducted as necessary, prior to excavation or ground disturbance, to comply with Executive Order 05-05.
- WDFW, through consultations with DAHP and pertinent tribes, will develop site-specific mitigation plans for affected archaeological sites.
- During spring redevelopment, dust abatement will be implemented where necessary.

1 Introduction

1.1 Document Structure

The Washington Department of Fish and Wildlife (WDFW) has prepared this Final Environmental Impact Statement (FEIS) in compliance with the State Environmental Policy Act (SEPA) and other relevant state laws and regulations. This FEIS identifies the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives. The document is organized into four chapters, plus appendices.

Chapter 1 - Introduction: Provides the project's background and history, describes the proposed action, purpose, need, public involvement and relationship to SEPA.

Chapter 2 - Alternatives Including the Proposed Action: Describes the Proposed Action and alternatives in more detail. This chapter also provides a table of the alternatives to allow comparisons among key elements and impacts, and the Preferred Alternative.

Chapter 3 - Affected Environment and Environmental Consequences: Summarizes the physical, biological, social, and economic characteristics of the project area and analyzes potential effects of implementing the preferred alternative and other alternatives. The chapter is organized by resource area. Each section includes a discussion of the affected environment, environmental consequences and cumulative effects. This chapter also provides mitigation measures where appropriate.

Chapter 4 - Consultation and Coordination: Provides a list of preparers and agencies consulted during development of the FEIS.

Appendices: Provides more detailed information to support the analyses presented in the FEIS.

1.2 Background and History

WDFW first acquired land (11,180 acres) that would become the Quilomene Wildlife Area (WA) in 1962. In 1966, 17,027 acres (located south of the Quilomene WA) were acquired to establish what is now referred to as the Whiskey Dick WA. In 1974, an additional 343 acres were purchased and added to the Quilomene WA.

Funding for both areas was provided by the Interagency Committee for Outdoor Recreation (IAC Grant Program, now known as the Recreation Conservation Office (RCO)), U.S. Fish and Wildlife Service (USFWS) and National Park Service (NPS) to expand the winter range for the Colockum deer and elk herds, to perpetuate and improve upland game bird habitat, and to provide recreational opportunities.

Between 2004 and 2007, a total of 17,382-acres of what is referred to as the Skookumchuck property was acquired in four phases. These properties include lands in the Skookumchuck and Parke Creek drainages and Vantage Highway area, which are now managed as part of the Quilomene WA. The property was acquired to connect the Whiskey Dick and Quilomene WAs, as well as to provide habitat for sage-grouse and wintering big game. Funding for the

Skookumchuck property was provided by the legislature, Hanford mitigation funds, Grant County Public Utility District (PUD) and the RCO (formerly IAC) and supported by the local community.

In addition, the Washington Department of Natural Resources (WDNR) owns 23,085 acres and Bureau of Land Management (BLM) owns 3,479 acres within the boundaries of the WA. All further references of the Quilomene WA in this document refer to the new acquisitions portions of the Quilomene (i.e., Skookumchuck & Parke Creek). Portions of the Quilomene WA acquired prior to 2004 are outside of the proposed action and are not proposed for grazing.

Coordinated Resource Management Process

Coordinated Resource Management (CRM) is a procedure designed to: 1) achieve compatibility between the uses being made of natural resources, which include agriculture, fish and wildlife habitat, forage production and use, forest products, recreation, land development and others; and 2) improve land and water resources and their perpetuation in high quality condition. A Coordinated Resource Management plan covers all ownerships of the planned area. All major uses of the area are considered in an effort to coordinate activities and maximize resource management opportunities. WDFW is party to a Memorandum of Understanding signed by major state and federal regulatory and resource management agencies and an active partner in many CRMs across the state.

WDFW and interested partners in Kittitas County specifically set up the collaborative Wild Horse CRM planning process beginning in January 2006; the project area comprises approximately 62,000 acres in northeastern Kittitas County. The CRM allows for resource planning across ownership and management boundaries to meet multiple needs, including needs of fish and wildlife as well as those of local farmers and ranchers. This process has brought together WDFW, BLM, Puget Sound Energy (PSE), WDNR, the Natural Resources Conservation Service (NRCS), livestock operators and other groups and individuals to collaboratively plan to improve management of the Wild Horse CRM area to ensure healthy plant communities across the landscape.

WDFW owns or manages nearly one million acres of land across the state, and is aggressively pursuing additional acquisitions in an effort to protect lands critical to fish and wildlife conservation. In Kittitas County, this effort has recently resulted in three important acquisitions protecting over 20,000 acres that had been threatened by development. Kittitas County is one of the fastest growing counties in Washington, and the acquisition and protection of threatened wildlife habitat in this county is dependent on strong local support and partnerships. Participation in the Wild Horse CRM process allows WDFW to maintain strong ties with the local agricultural community, and is supported by all three local legislators, as well as four of the largest land conservation organizations in Washington.

Ownership in the Wild Horse CRM project area is a mixture of public and private landowners, including WDFW, WDNR, BLM, and PSE. By spreading the grazing across a larger landscape, the Wild Horse CRM process allows for a reduction in the overall grazing intensity and the potential for recovery and restoration in the areas of the landscape that have been grazed in the recent past.

In 2006, the Wild Horse CRM group developed a consensus goal statement for the entire CRM planning area that addresses social, economic, and ecological needs of stakeholders. The goal statement incorporates a description of the desired landscape that includes: 1) healthy watersheds that support a variety of native plant communities with few invasive/undesirable species, 2) enhanced habitat for wildlife that use the area, 3) improvements to water sources that improve availability across the area for wildlife and livestock, and 4) properly managed and sustainable grazing practices that balance wildlife and livestock use and result in an upward trend in ecological condition for both uplands and riparian areas.

In 2007, legislative support for the Wild Horse CRM resulted in a proviso appropriation of $490,000 in WDFW 2007-2009 biennium for implementation of the CRM (note: in October 2008, $128,000 of these funds were cut from the WDFW's budget).

Please note that unless otherwise identified, any further reference to CRM is referring specifically to the Wild Horse CRM.

1.3 CRM Area

The Wild Horse CRM Area is approximately 10 miles east of Ellensburg, Washington, in eastern Kittitas County. The western boundary of the area is the Parke Creek drainage, and the eastern boundary is the Columbia River and Ginkgo Petrified Forest State Park (Figure 1-1). Within the CRM area, WDFW owns approximately 35,423 acres, the WDNR owns 15,142 acres, PSE owns 7,943 acres, and the BLM owns 2,869 acres (Figure 1-2).

The CRM area is divided into 13 pastures: Lone Star, Rocky Coulee, East Whiskey Dick, West Whiskey Dick, Skookumchuck, Upper Skookumchuck, Wild Horse North, Wild Horse South, Wild Horse Crossing, Vantage Highway, Whiskey Jim, Lower Parke, and Upper Parke (Figure 1-3). In addition, livestock are grazed on privately owned rangeland and irrigated pasture adjacent to the CRM area.

1.4 Purpose and Need for Action

Purpose:
The WDFW proposes to permit livestock grazing on portions of the Quilomene WA and the Whiskey Dick WA that will facilitate implementation of the greater Wild Horse CRM.

Need:
In Kittitas County, agriculture, including livestock grazing, has a long history and is both economically and culturally a valuable part of the community. WDFW is a significant landowner in Kittitas County.

As a landowner, WDFW strives to be a responsible neighbor and community member supporting the community's economies and values where compatible with its mandates and obligations to the greater public it serves.

Between 2004 and 2007, as WDFW acquired the 17,382 acres (Skookumchuck acquisition) of land adjacent to the Quilomene WA, the agriculture constituents in the community made clear the need for those lands to continue to support livestock grazing.

To blend the needs of the local community with the WDFW statewide mandates, in 2006 WDFW engaged in the Wild Horse CRM process. These partnerships are supported by the WDFW's Domestic Livestock Grazing on Department Lands Policy #C-6003 that specifically identifies CRM participation as an appropriate purpose for grazing on WDFW lands, where ecological integrity is maintained.

SEPA provides an exemption to grazing when issuance of new grazing leases covering a section of land or less; and issuance of all grazing leases for land that has been subject to a grazing lease within the previous ten years (WAC 197-11-800(2)(25)(b)). Because some of the lands (Whiskey Dick WA) involved in the planning process have not been grazed in the past ten years and amount to more than a section of land, they are now subject to a SEPA review. Because of strong public interest, both support and controversy, WDFW has chosen to develop this DEIS to ensure the full extent of the public review process has been implemented.

1.5 Proposed Action

WDFW is proposing to authorize grazing for 5-years on WDFW managed lands within the CRM area. The Proposed Action (PA) would involve managed livestock grazing on 9 of 13 pastures (excluded are two PSE pastures and the WDFW Skookumchuck and Upper Skookumchuck pastures, which are being deferred for fish protection and cultural resource issues) within the boundaries of the Wild Horse CRM Area (Figure 1-2). The terms and conditions of grazing use would include a forage utilization standard, a rotational system, and selected range improvements and maintenance projects. The proposed grazing system is expected to benefit big game species such as mule deer and elk and minimize effects to other species, including shrub-steppe obligates (i.e., sage-grouse). The action would also implement adaptive management utilizing objectives as identified in the livestock-grazing plan for the Wild Horse CRM area. The PA was developed in partnership through the CRM process. This is discussed further in Chapter 2 of this document.

Implementation of the proposed action would be phased, and dependent on funding for mitigation measures and monitoring. Pastures would be phased in individually, or in aggregate, starting with the Western Pastures (Vantage Highway, Lower Parke, Upper Parke, South Wild Horse, and Whiskey Jim), and continuing with the Eastern Pastures (Lone Star, Rocky Coulee, East Whiskey Dick, and West Whiskey Dick). Implementation would require completion of the mitigation measures described in Section 3.12 within each pasture prior to it being added to the grazing rotation. In addition, funding for a new position to accomplish the required monitoring would be necessary to fully implement the proposed action (i.e., all 9 pastures).

1.6 Areas of Controversy

The beneficial and/or deleterious effects of livestock grazing on wildlife habitat are an area of controversy identified in this DEIS. Moderate grazing has been shown to maintain healthy and diverse plant communities (Lyon and Christensen 2002, Hayes and Holl 2003), and allow recovery from historical overgrazing (Courtois et al. 2004). Several additional studies have

shown that moderate livestock grazing increases plant diversity (Rambo and Faeth 1999, Vavra 2005, Holechek et al. 1999). However, there is also evidence that livestock grazing can cause decreased plant diversity (Olff and Ritchie 1998), and in some cases can be identified as the primary cause of plant community decline (Kauffman and Krueger 1984, Belsky 1992, Fleischner 1994). The timing, intensity, and duration of livestock grazing, as well as the plant community in which it occurs, all play a role in determining the magnitude of impacts to wildlife habitat.

The effects of livestock grazing on riparian areas and water quality are also an area of controversy. It has been demonstrated that livestock grazing can reduce or eliminate vegetation in riparian areas (Platts and Nelson 1985, Platts 1991). Furthermore, it has been shown that livestock grazing can impact water quantity and quality (Fleischner 1994, Belsky et al. 1999). However, it has also been shown that light rest-rotation grazing in riparian areas has limited effects on vegetation (Platts 1991, Kauffman et al. 1997). Again, the timing, intensity, and duration of livestock grazing play a critical role in determining effects to riparian areas and water quality.

1.7 Public Involvement and Issues

Scoping initiates public involvement in the SEPA process. It has three purposes: (1) to narrow the focus of the DEIS to significant environmental issues; (2) to eliminate issues that would have insignificant impacts or that are not directly related to the proposal; and 3) to help identify reasonable alternatives, consistent with the purpose and need of the proposed action, to be analyzed in the DEIS. The scoping process alerts the public, the project proponent, and the lead agency to areas of concern and potential controversy early in the process. For this DEIS, WDFW is both the project proponent and the lead agency.

WDFW initiated SEPA public scoping for this DEIS on July 14, 2008 and the period extended through August 5, 2008. A public scoping meeting was held in Ellensburg, Washington, on July 15, 2008. Oral comments were provided to WDFW during the public scoping meeting. In addition, many interested stakeholders and individuals provided written comments. The issues raised by these comments are addressed in this FEIS.

The public scoping comments have been categorized according to topic area. The comments generally fall into the categories of Water Resources, Vegetation/Habitat, Fish, Wildlife, Cultural Resources, Socioeconomics, and Alternatives. A summary of the primary issues raised in the oral and written scoping comments is provided below.

1.7.1 Water Resources

- Inventory and maps of all springs and surface water features should be included in the DEIS.
- Methods to limit livestock in streams should be included.
- Impact analysis for water resources should consider:
  - Water quality effects from livestock use of surface water and grazing in proximity to streams, including sedimentation, temperature, nutrients, and fecal coliform.
  - Water quality effects from construction/maintenance of range improvements.
  - Water developments and return-flows to streams.

- Water availability for wildlife and riparian vegetation.

1.7.2 Vegetation/Habitat

- Inventory and maps of native plant species should be included.
- Impact analysis for vegetation and habitat should consider:
  - Effects on native riparian and upland vegetation cover.
  - Effects on the spread of noxious weeds.
  - Effects on microbiotic crusts.
  - Vegetation monitoring and restoration plan.

1.7.3 Land Use/Recreation

- Effects to recreation, including hunting and bird watching

1.7.4 Fish

- Inventory of fish species should be included.
- Impact analysis for fish should consider:
  - Water quality effects on fish habitat.

1.7.5 Wildlife

- Inventory of wildlife species should be included.
- Impact analysis for wildlife should consider:
  - Effects on wildlife forage.
  - Effects on wildlife breeding, rearing, and movement.
  - Emphasis on sage-grouse and other state and federal listed species.
  - Effects of water developments on wildlife.
  - Effects of fences on wildlife.

1.7.6 Cultural Resources

- Impact analysis for cultural resources should consider:
  - Effects to potential cultural resources.

1.7.7 Socioeconomics

- Impact analysis for socioeconomics should consider:
  - Economic effects of grazing vs. no grazing

1.7.8 Alternatives

- The EIS should include a “no grazing” alternative.
- The EIS should include habitat monitoring in the alternatives.
- The EIS should include a “no action” alternative that includes no grazing where cattle have not been grazed recently.

1.8 Relationship to SEPA

The WDFW recognizes the importance of SEPA as part of its land and resource management decisions. The Environmental Impact Statement (EIS) process under SEPA provides opportunities for other agencies, stakeholders, the Tribes, and the public to participate in

developing and analyzing information related to WDFW decisions. This process, as detailed in Chapter 197-11 of the Washington Administrative Code (WAC), ensures that the environmental consequences of decisions are documented, and that appropriate mitigation is considered. The EIS process includes:

- Scoping;
- Preparing a DEIS, which analyzes the probable effects of a proposal and reasonable alternatives;
- Issuing the DEIS for review and public comment;
- Preparing a Final Environmental Impact Statement (FEIS), which includes analyzing and responding to comments on the DEIS;
- Issuing the FEIS; and
- Using the FEIS in decision-making.

2 Description of the Alternatives

2.1 Introduction

This chapter describes and compares the alternatives. It includes a description of each alternative considered. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public.

This chapter describes the following:

- Brief Summary of Alternatives
- Actions Common to All Alternatives
- Actions Common to Alternatives 1 and 2
- Alternatives Considered in Detail
- Alternatives Considered But Eliminated From Detailed Analysis
- Comparison of Alternatives
- Preferred Alternative

2.1.1 Alternatives

The alternatives presented represent different grazing options. All alternatives except Alternative 3 are consistent with the purpose and need (see Section 1.4). They include:

Alternative 1-No Action (Current Management): Livestock grazing would continue on pastures that have been grazed in the recent past (less than 10 years).

Alternative 2-Proposed Action (CRM Livestock Grazing Plan): Livestock grazing would continue on pastures that have been grazed in the recent past (less than 10 years). In addition, grazing would be allowed on several pastures on the Whiskey Dick WA, which have not been grazed within the recent past.

Alternative 3-No Grazing: No livestock grazing would occur. While Alternative 3 does not meet the purpose and need, based on the public scoping comments WDFW has not eliminated Alternative 3 from analysis.

2.2 Actions Common to All Alternatives

Actions common to all alternatives are discussed in section 2.2.1. For the sake of simplicity, pastures with full or partial WDFW ownership will be referred as "WDFW managed pastures," even though many of these pastures also include DNR and BLM parcels. The checkerboard ownership pattern of these pastures necessitates a comprehensive planning effort. Accordingly, acreage and proposed livestock numbers given for each pasture reflect all ownerships.

For the purposes of this EIS, the following pastures are considered WDFW-managed: Lone Star, Rocky Coulee, West Whiskey Dick, East Whiskey Dick, Skookumchuck, Upper Skookumchuck, South Wild Horse, Vantage Highway, Whiskey Jim, Lower Parke, and Upper Parke. The following pastures are considered PSE-managed: North Wild Horse and Wild Horse Crossing. See Figure 2-1. Although the South Wild Horse pasture is predominantly owned and managed by PSE, a small WDFW parcel occurs in the northeast corner. This pasture will be analyzed along with other WDFW-managed pastures, but will be administered along with other PSE-managed pastures (North Wild Horse and Wild Horse Crossing).

WDFW has elected to indefinitely remove the Skookumchuck, Upper Skookumchuck, and WDFW parcels within the Wild Horse Crossing Pasture from the grazing rotation, in order to protect endangered steelhead in Skookumchuck Creek and cultural resources along the Columbia River.

Cumulative effects from actions on non-WDFW owned land within WDFW-managed pastures are addressed in the Direct and Indirect Effects sections, with the exception of spring redevelopment. Cumulative effects from spring redevelopment and actions on PSE-managed pastures are addressed in the Cumulative Effects sections of the document.

2.2.1 Wildlife Area Management Goals and Objectives

Under all alternatives, WDFW would manage the Quilomene and Whisky Dick WAs in accordance with the agency goals and objectives outlined in the Draft L.T. Murray/Whiskey Dick/Quilomene WA Management Plan (WDFW 2006a). These specific goals and objectives include:

Goal: Healthy and diverse fish and wildlife populations and habitats

- Objective: Protect, restore and enhance fish and wildlife populations and their habitats.
- Objective: Ensure that WDFW activities, programs, facilities, and lands are consistent with local, state, and federal regulations that protect fish, wildlife, and their habitats and contribute to their recovery.

Goal: Sustainable fish and wildlife-related opportunities

- Objective: Provide sustainable fish and wildlife-related recreational and commercial opportunities compatible with maintaining healthy fish and wildlife populations and habitats.
- Objective: Improve the economic well-being of Washington communities by providing diverse, high quality recreational and commercial opportunities.

Goal: Operational Excellence and Professional Service

- Objective: Provide sound operational management of WDFW lands, facilities, and access sites.

2.3 Actions Common to Alternatives 1 and 2

The following actions are part of Alternatives 1 and 2 and are listed here to avoid repeating them in the description of each alternative. Actions listed below are specific to range improvements and maintenance and do not apply to Alternative 3.

2.3.1 Goals and Objectives

The objectives common to both Alternatives are listed below. Both Alternatives will include implementation of the Adaptive Management Process, which requires monitoring and evaluation of grazing strategies and incorporation of new knowledge into management approaches.

Goals and Objectives for the entire CRM area include:

- Meet NRCS Prescribed Grazing Standards for native bunchgrasses (see Appendix B) and HB 1309 Ecosystem Standards.
- Meet guidelines from the Washington State Recovery Plan for the Greater Sage-Grouse (Stinson et al. 2004):
  - A maximum of 35 percent forage utilization.
  - Where site potential allows, maintain at least 7 inches (15-18 cm) of grass/forb height for breeding (March to mid-April) and brood-rearing periods (April through July).
  - Livestock are seasonally rotated through pastures.
  - Use is periodically deferred during the growing season.
- Improve rangeland health and initiate changes in rangeland trends such that ecological sites more closely resemble the historical plant communities that occurred in this area.
  - Rangeland Health and trend will be measured by the following indicators:
    - Cover of native perennial bunchgrass “decreaser” species, i.e., bluebunch wheatgrass, Idaho fescue, and Cusick’s bluegrass.
    - Amount of bare ground.
    - Cover of lichen and mosses.
    - Native plant species richness.
- Increase bluebunch wheatgrass palatability for the Colockum elk herd.
- Increase forb cover and/or diversity.
- Maintain sensitive plant populations.
- Promote stable or declining weed populations.
- Maintain or improve health of riparian plant communities.

Additional Goals and Objectives specific to WDFW-managed pastures include:

- Protect existing riparian and wetland vegetation.
  - Where possible, this will be accomplished through temporary fencing, along with the timing and monitoring of livestock use.
  - Where fencing is not feasible and timing and monitoring livestock use does not sufficiently protect riparian and wetland vegetation, grazing will be deferred until a solution is found.

- Fish-bearing stream reaches will be protected by temporary fencing.

2.3.2 Grazing System

Prescribed livestock grazing is objective-driven; management objectives determine the number of livestock grazed, the duration of grazing, as well as whether a pasture is grazed, deferred or rested in a given year. If management objectives are not being met, the strategy is adapted to meet the objectives defined for the area. Flexibility is maintained to meet resource needs, as well as social and economic demands.

Both grazing alternatives will include a rotational and time-controlled grazing system. Rotational grazing involves moving livestock from one pasture to another, the timing and sequence of which is based on the rotation schedule, utilization triggers and plant phenology. Pastures will be systematically deferred or rested, according to NRCS Prescribed Grazing Standards.

Grazing systems will differ based on majority ownership within a given pasture. Within WDFW-managed pastures, the **Proposed Grazing System** will include light-intensity grazing (less than 35 percent forage utilization), a spring and early summer grazing period, and a rest-rotation scheme. Within PSE-managed pastures, the grazing system will also include light-intensity grazing, but use may occur from April through August with a deferred-rotation scheme.

NRCS Prescribed Grazing Standards provide the following guidance for livestock grazing on rangeland dominated by the jointed, cool-season bunchgrasses native to eastern Washington (Guinn 1994, Rouse et al. 1994).

- Defer each pasture one out of every three years. Deferment refers to the delaying of livestock grazing until after the growing season. Dormant season use is acceptable in a deferred year.
- Graze each pasture no more than once out of three years during the critical period (boot stage through seed formation stage). NRCS defines “boot stage” as the growth stage when a grass seed head is enclosed by the sheath of the uppermost (flag) leaf (USDA/NRCS 2003).
- Graze no pasture more than half the growing season (generally March to early July).

Grazing periods are defined by elevation and ownership, as described below:

- Low elevation WDFW-managed pastures (Rocky Coulee, Lone Star, East Whiskey Dick), will not be grazed beyond June 1; mid elevation WDFW-managed pastures (West Whiskey Dick, Vantage Highway, Whiskey Jim, Lower Parke) will not be grazed beyond June 15; upper elevation WDFW-managed pastures (Upper Parke) will not be grazed beyond June 30. This will allow for re-growth before the end of the growing season. If no natural water is available, the permittee may be allowed to supply water from off-site, provided that established stock tanks are utilized.
- Although classified as a WDFW-managed pasture for the purposes of this review, the South Wild Horse pasture is predominantly owned and managed by PSE. The WDFW parcel within this pasture is relatively small and located greater than ½ mile from stock water (approximately half of the parcel is more than 1 mile from water). This pasture will be managed with other PSE-managed pastures (North Wild Horse and Wild Horse Crossing), which may include grazing during the dormant season.

Best Management Practices (BMPs) would be implemented under both Alternatives 1 and 2. See Section 3.12 for details.

2.3.3 Grazing Use and Stocking Capacity

The term "Animal Unit Month" (AUM) measures livestock grazing use. The NRCS defines an AUM as the amount of forage required by one animal unit per month, which equates to 900 pounds of air-dried forage. An animal unit (AU) is defined as a 1,000-pound cow with a calf under weaning age (approximately six months) (USDA/NRCS 2003).

Forage production estimates for the various pastures were developed using data from a draft soil survey for Kittitas County provided by the local NRCS office. During 2006, 2007 and 2008, range specialists from WDFW, WDNR, NRCS, and BLM conducted a range inventory on almost 62,000 acres of the CRM project area, including the pastures in both grazing alternatives, to verify the forage production, condition and areal extent of various ecological sites in the grazing area. (An ecological site is a kind of land with specific physical characteristics, which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation and in its response to management.) Information gathered during this effort and field inspections of various ecological sites were used to assess rangeland health and to develop an estimate of forage production for the grazing area. The methods utilized during this inventory, and results summarized by pasture, are presented in Appendix B.

The total available production of palatable species was calculated for each pasture, and available production for livestock was calculated using the following allocations: 35 percent of grass forage, 10 percent for forbs, 5 percent for palatable shrubs such as currant and snowberry, and 0 percent for sagebrush and bitterbrush. Available production was then converted into AUMs. An accessibility factor was then applied to the available AUMs to calculate Allowable AUMs. Livestock accessibility calculations were based on Table 2-1. Available AUMs are presented in Table 2-2.

Table 2-1 Forage Accessibility Based on Slope and Distance from Water

Distance from Water (m)	**Percent Slope**				
	0 - 5	**6 - 15**	**16 - 45**	**46 - 60**	**60+**
	Percent Accessibility				
0 - 200	100	100	90	60	0
201 - 400	100	100	80	50	0
401- 600	100	90	70	50	0
601 - 1500	90	80	70	40	0
1500+	0	0	0	0	0
Source: WDFW 2008a					

Table 2-2 Production and AUM Calculations by Pasture

Pasture	**Acreage**	**Total Production (lbs)**	**Production of Palatable Species** (lbs)[1,4]	**Available Production** (lbs)[2]	**Annual Available AUMs**[4]	**Accessibility**[3] (percent)	**Allowable AUMs**	**Stocking Rate** (acres[5]/AUM)
East Whiskey Dick	10,225	3,741,157	2,774,041	811,400	902	59	532	11
Lone Star	5,378	1,758,269	1,212,040	359,547	399	41	164	13
Lower Parke	1,752	846,949	432,880	128,648	143	78	111	12
North Wild Horse	4,202	2,687,365	1,774,234	350,498	389	81	315	11
Rocky Coulee	3,049	1,415,516	1,035,623	310,951	346	42	145	9
South Wild Horse	3,837	1,668,302	955,236	269,111	299	39	117	13
Upper Parke	1,894	1,032,540	605,122	174,683	194	66	128	10
Vantage Highway	5,988	1,032,540	1,252,924	349,628	388	59	229	15
West Whiskey Dick	9,898	3,973,826	2,798,169	832,780	925	45	416	11
Whiskey Jim	3,277	1,624,860	1,034,138	298,568	332	70	232	10
Wild Horse Crossing	1,064	592,766	374,186	105,067	117	62	72	9
Source: WDFW 2008a								

[1]Palatable species include forbs, grasses, and palatable shrubs.
[2]Available production was calculated by applying proper use factors to the palatable forage production: use of grasses is 35 percent; use of forbs is 10 percent; use of palatable shrubs is 5 percent (excludes sagebrush and bitterbrush).
[3]Percentage of forage that would be available to livestock due to slope and distance from water.
[4]Production based on average year.
[5]Acres are adjusted for Accessibility.

2.3.4 Utilization Levels

Forage utilization, or consumption of the current year's growth, is one way to gauge the intensity of livestock grazing. Forage utilization is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management area can be assessed.

Use of a pasture before the end of the growing season is "seasonal utilization." Under both grazing alternatives, pasture moves will be determined by the measures of seasonal utilization listed in Table 2-3.

Table 2-3 Utilization Measurements

Area/ Vegetation Type	Key Species	Stubble Ht / Percent Use	Monitoring Method
Riparian	Key graminoids[1]	4 inches	Stubble Height Method[2]
Riparian	Browse species	35 percent	Landscape Appearance[2]
Uplands; within the area accessible to livestock	Bluebunch wheatgrass, Idaho fescue	35 percent	Landscape Appearance, Key Species Method[2], Grazed-Class Method
Uplands; within 100 yards of developed stock water	Bluebunch wheatgrass, Idaho fescue	60 percent	Key Species Method, Grazed-Class Method[2]

[1] Key species will vary by site, but are typically dominant and/or the most palatable. Potential key species include sedges, fowl mannagrass, and basin wildrye.
[2] Coulloudon et al. 1999.

2.3.5 Guidelines

2.3.5.1 HB 1309 Ecosystem Standards

Passed by the state legislature in 1993, House Bill (HB) 1309 maintains that WDFW (state agencies) "shall implement practices to meet the standards on agency-owned and managed agricultural and grazing lands." The 26 Ecosystem Standards created by the Ecosystem Standards Advisory Committee (ESAC) are intended to maintain and restore fish and wildlife habitat by improving ecosystem health. These standards include noxious weed control, stream temperature, fish passage, soil stability and watershed function, plant community status/condition, and stream channel width to depth ratios, among others. The intent of each Ecosystem Standard is achieved by implementing practices that maintain or make measurable progress towards achieving the desired ecological conditions. Listed below is a selection of "desired ecological conditions" that apply to grazing alternatives (ESAC 1994):

- Land managers must comply with state and local weed control laws.
- Land managers must meet state water temperature requirements, based on classes defined in the regulations.

- Mass soil movement, e.g., mudslides, slumps, debris torrents, does not occur.
- Native plant species dominate uplands and riparian areas. Non-native plant species, not classed as noxious weeds, which provide habitat benefits to fish and wildlife comparable to native plant species are acceptable.
- Limited areas, (e.g., oak woodlands, prairies, wetlands, natural seepages), and structural features (e.g., cliffs, caves, and snags) that provide benefits to fish and wildlife are preserved and increased (where feasible).
- Stream bank erosion dynamics approximate natural/geologic rates.
- Plant community structural complexity, vegetative cover and plant species diversity approximates site potential for native species, in both uplands and the riparian management zone. Non-native plants can be used if they provide equivalent habitat benefits to fish and wildlife.
- Active gully erosion does not occur.
- Soil erosion beyond natural geological rates is not discernible.
- Width to depth ratio of streams is 12 to 1 or less to the extent possible given site and stream potential.

2.3.6 Adaptive Grazing Management

Adaptive grazing management involves monitoring and evaluating livestock grazing activities, and incorporating new scientific research into future grazing management. As needed, monitoring results are used to modify the timing, intensity and duration of livestock grazing. Both grazing alternatives will utilize an adaptive grazing approach to ensure management goals are achieved.

2.3.7 Livestock Grazing Permit

Domestic livestock grazing on WDFW managed lands may be permitted if determined to be consistent with desired ecological conditions for those lands (WAC 232-12-181). Grazing permits are of agency-wide interest. WDFW has procedures that include a cross-program review to ensure all grazing permits are subject to the best available science. In addition, new grazing permits are made available for the Fish and Wildlife Commission review before being forwarded to the WDFW director for approval. All grazing permits, excluding temporary permits lasting less than two weeks, must include a domestic livestock grazing management plan that includes a description of ecological effects, fish and wildlife benefits, a monitoring and evaluation schedule, and a description of the desired ecological conditions.

Roles and Responsibilities

The WDFW has several roles and responsibilities as part of implementing the grazing permit. The WA Manager determines the “on” and “off” dates and any necessary alterations in AUMs for the WDFW managed pastures based on weather conditions, seasonal vegetation growth, the needs of the permittee, and other circumstances. A minimum of one week’s notice would be given to the permittee for the dates. WDFW would repair and maintain the boundary fence, may provide all construction and repair materials for pasture fences, and will install temporary electric fencing to protect riparian habitat and minimize sedimentation to creeks, prior to livestock turn-out.

The permittee also has multiple grazing permit responsibilities. The permittee is required to pay annual grazing fees to WDFW; gather stray cattle immediately upon notification; and keep livestock well distributed across the pastures using riders, salt, protein blocks, or other means.

The permittee would also keep livestock as far away as practical from watering points to minimize overuse of the area and may be required to repair and maintain all perimeter and boundary pasture fences to contain cattle in designated areas; all repairs and improvements would be pre-approved by the WA manager.

Multiple Ownerships
When a grazing plan involves multiple ownerships, each landowner involved in the CRM process is responsible for issuing a permit or lease for their land; the permittee assumes the responsibility of obtaining permits or leases from each landowner.

2.3.8 Range Improvements and Maintenance

Existing boundary fences (approximately 45 miles) that extend around the exterior of the CRM area would be maintained to prevent livestock trespass. Pasture fences (approximately 20 miles for Alternative #1 and 40.6 miles for Alternative #2) that extend along pasture boundaries will be maintained for livestock management).

Approximately 4.2 miles of new boundary fence will be constructed. Roughly 3.6 miles of new boundary fences would be installed along the northern boundary of the Upper Parke pasture, and approximately 0.6 miles would be installed along the southeast boundary of Vantage Highway pasture. An additional 1 mile of new pasture fence would be constructed to delineate the Wild Horse North and West Whiskey Dick pastures. The location of all current and proposed fences is provided in Figure 2-2.

In addition, a sufficient number of springs will be redeveloped to maintain cattle distribution and to limit effects to riparian and wetland habitat. The following springs are considered high-priority for re-development under Alternatives 1 and 2: Vantage Spring #2 and #3, Vantage Trough #1, Parke Creek #1 and #2, and Little Parke Artesian. Additional springs considered a high priority for redevelopment under Alternative 2 include Hell's Kitchen, Section 15 Spring, Cayuse, Section 3 Spring, Patte Spring, Rollinger Spring, and Section 12 Spring. Figure 2-3 shows the location of the springs. Should redevelopment be precluded due to resource concerns at any of these priority springs, an alternate spring may be chosen as necessary. NRCS construction standards will be followed for range improvements and spring redevelopments. Spring redevelopment would only occur at sites that have been previously developed in the past. Past development at these springs typically involved site excavation and the installation of a spring collection box, pipelines, and stock tanks. Proposed redevelopment could include site hardening and replacement of collection box, pipes, and/or water troughs, depending on the current condition of the water development. See Section 3.1 for descriptions of existing springs and proposed redevelopment. The permittee may also haul water from off-site, provided that existing stock tanks are used.

This project will also necessitate the use of temporary fencing. The length of temporary fences will vary depending on which pastures are being utilized each year. Under Alternative 1, up to 5.5 miles of temporary fence will be installed; under Alternative 2, up to 10.3 miles of temporary fence will be installed (see Figure 2-2).

Range maintenance would include upkeep of all boundary and pasture fences, installation and removal of temporary fencing, and maintenance of springs for livestock and/or wildlife use.

Range improvements and maintenance on WDFW managed land, with the exception of spring redevelopment, are addressed in the Direct and Indirect Effects sections. Spring redevelopment on DNR, BLM, and PSE ownership, as well as range maintenance on PSE-managed pastures are addressed in the Cumulative Effects section of the document. Range improvements on BLM, DNR, and PSE land may only be authorized by the respective landowner.

In addition to the improvements and maintenance common to Alternative 1 and 2, Alternative 2 would require increased infrastructure in East Whiskey Dick, West Whiskey Dick, Rocky Coulee, and Lone Star pastures.

2.3.9 Rangeland Vegetation Monitoring

Both short-term and long-term monitoring will be employed to determine whether objectives are being met. Short-term monitoring will include utilization (measuring the amount of plant biomass remaining after grazing) and cover monitoring. Long-term monitoring will include photo-monitoring, line-point intercept (for species cover, species composition, and key ecosystem attributes including soil and site stability, hydrologic function, and biotic integrity), belt transect (for measuring perennial invasive plants), species richness macroplots, forage palatability, and grass phenology monitoring. Other monitoring techniques could also be used. In addition, eight Land EKG (Orchard and Mehus 2001) monitoring sites have been established on PSE ownership within the CRM area (WDFW 2008a). The monitoring plan is described in more detail in Appendix C.

2.3.10 Weed Management

The goal of weed control on WDFW lands is to maintain and improve habitat for wildlife, meet legal obligations, provide good stewardship and protect adjacent private lands. Importantly, WDFW will continue to be a good neighbor and partner regarding weed control issues on adjacent lands. Weeds do not respect property boundaries. The agency believes the best way to gain long-term control is to work cooperatively on a regional scale. As funding allows and management objectives dictate, WDFW will find solutions to collective weed control problems.

Weed Management Approach

State law (RCW 17.15) requires that WDFW use integrated pest management (IPM), defined as a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency pest management objectives, to accomplish weed control.

Invasion of non-native species is a major concern on the Quilomene and Whiskey Dick WAs within the CRM area; weed control consumes a large portion of the WA budget each year. Therefore, it is important to minimize ground disturbance that could facilitate invasion by non-native plants. WDFW will continue to control weeds in accordance with the L.T. Murray/Quilomene/Whiskey Dick WA, Weed Management Plan. In addition, the monitoring of weeds would be a component of the rangeland vegetation monitoring as described in Section 2.3.9.

2.3.11 Fire Management

While periodic wildfires are normal processes in shrub-steppe ecosystems, the Quilomene and Whiskey Dick WAs are priority wildfire suppression areas due to fire sensitive habitats that are

critical to the survival of shrub-steppe obligate (dependent) wildlife species. If a fire occurred on the livestock-grazed portions of the WA within the CRM area, grazing would be deferred on all or portions of the pastures for up to three years at the discretion of the WA manager to allow adequate recovery of the vegetation. WDFW would continue to suppress fires in accordance with the L.T. Murray/Quilomene/Whiskey Dick WA Management Plan.

Fire Restrictions
Fire restrictions put in effect on WDFW lands shall be consistent with fire restrictions set by the Washington State Department of Natural Resources, which evaluates fire risk for much of the state's public lands.

2.4 Alternatives Considered in Detail

2.4.1 Alternative 1: No Action

Alternative 1 is the No Action (Current Management) strategy. Under Alternative 1, livestock grazing would continue on pastures that have been grazed in the recent past (i.e., grazed within the last 10 years). Livestock grazing would occur on seven pastures, of which five are WDFW-managed pastures. Two additional pastures which may also be considered part of the rotation schedule are predominantly owned by PSE, from whom the permittee would obtain approval prior to turnout.

Alternative 1 now includes the WDFW-managed Vantage Highway, Whiskey Jim, Lower Parke, Wild Horse South and Upper Parke pastures as well as the PSE-managed Wild Horse North and Wild Horse Crossing pastures. Figure 2-1 illustrates pastures included in each alternative, within the Quilomene and Whiskey Dick WA. The 2008 grazing plan was intended to be an interim short-term plan. However, implementation of this alternative would include a 5-year grazing permit.

2.4.1.1 Grazing Rotation

The grazing rotation proposed under the Alternative 1 would allow cattle grazing on approximately 22,554 acres, including five WDFW managed pastures (16,748 acres) and two PSE managed pastures (5,806 acres). Livestock use will generally occur from April through August. Livestock grazing will be consistent with NRCS Prescribed Grazing standards for native bunchgrasses (Appendix D) and the Sage-Grouse Recovery Plan (Stinson et al. 2004). Accordingly, a given pasture would be grazed no more than one year out of three during the critical growth period, or two years out of three during the growing season. An individual pasture would be grazed for no more than 50 percent of the growing season, which generally extends from March to early July, depending on elevation. WDFW-managed pastures will be grazed with a rest-rotation strategy, while PSE-managed pastures will be grazed with either a rest or deferred rotation strategy. Given these caveats, average AUMs for the Alternative 1 area will be 500 AUMs.

2.4.1.2 Range Improvements and Maintenance

Additional range improvements and maintenance under Alternative 1 include the priority redevelopment of six springs and the installation and removal of up to 5.5 miles of temporary fence. The length of temporary fences will vary depending on which pastures are utilized each year. Figure 2-3 shows the location of the springs. Figure 2-2 shows the location of fences that

would be improved and maintained. In addition, fencing will be installed to protect springs. Site-specific plans will be developed for each spring site prior to implementation.

2.4.1.3 Current Grazing Permit

Under Alternative 1, a 5-year grazing permit would be issued with an average of 500 AUMs available annually on five WDFW-managed pastures. Puget Sound Energy would issue a separate agreement for two additional pastures. A total of seven pastures would be available for grazing.

WDFW would work in conjunction with Puget Sound Energy, BLM, and DNR to schedule "on" and "off" dates and any necessary alterations in AUMs for pastures within the No Action Alternative area, based on weather conditions, vegetation growth and monitoring data.

2.4.2 Alternative 2: Proposed Action

This alternative incorporates the livestock grazing management strategy developed in the CRM Grazing Plan (WDFW 2008a). The CRM committee seeks to collaboratively manage up to 62,000 acres across multiple land ownerships. This alternative would allow livestock grazing on nine WDFW managed pastures under a 5-year grazing permit, as well as two PSE managed pastures.

The proposed action would implement more management objectives, allow slightly more AUMs, and require more rangeland infrastructure improvements and maintenance than Alternative 1. Alternative 2 would allow livestock grazing on West Whiskey Dick, East Whiskey Dick, Rocky Coulee, and Lone Star pastures in addition to the pastures that would be grazed under Alternative 1. Figure 2-1 delineates the pastures that would be grazed under each alternative. Alternative 2 includes all pastures except Upper Skookumchuck, Skookumchuck, and the eastern 1/3 of Wild Horse Crossing. Of the 62,000 acres within the CRM area, grazing would be allowed on approximately 51,104.

2.4.2.2 Grazing Rotation

The projected rotation would allow grazing on approximately 51,104 acres, including nine WDFW managed pastures (45,298 acres) and two PSE managed pastures (5,806 acres). Livestock grazing will be consistent with NRCS Prescribed Grazing standards for native bunchgrasses (Appendix D) and the Sage-Grouse Recovery Plan (Stinson et al. 2004). Accordingly, a given pasture would be grazed no more than one year out of three during the critical growth period, or two years out of three during the growing season. An individual pasture would be grazed for no more than 50 percent of the growing season, which generally extends from March to early July, depending on elevation. WDFW pastures will be grazed with a rest-rotation strategy, while PSE-managed pastures will be grazed with either a rest- or deferred rotation strategy. Given these caveats, annual AUMs for Alternative 2 will average 550.

2.4.2.3 Range Improvements and Maintenance

In addition to the range improvements and maintenance (Section 2.3.7) common to both Alternatives 1 and 2, Alternative 2 would require additional improvements to and maintenance of four pastures (West Whiskey Dick, East Whiskey Dick, Rocky Coulee, and Lone Star pastures). This alternative would also necessitate the maintenance of up to 20.6 additional miles of pasture fences, the installation and removal of up to 4.8 additional miles of temporary fences (Figure 2-

2), the construction and maintenance of 3.2 miles of fences around springs and wetlands, and the priority re-development of up to six additional springs (Figure 2-3). In addition, fencing will be installed to protect springs. Site-specific plans will be developed for each spring site prior to implementation.

2.4.2.4 Grazing Permit

A 5-year grazing permit with an average of 550 AUMs would be available for WDFW-managed pastures under Alternative 2. Additional AUMs would be available for two PSE-managed pastures. Given that the CRM grazing plan involves multiple ownerships, each landowner involved in the CRM process will issue a permit or lease for their land; it's the responsibility of the permittee to get authorization from each landowner before turnout.

WDFW will work in conjunction with Puget Sound Energy, BLM, and DNR to schedule "on" and "off" dates and any necessary alterations in AUMs for pastures within the Proposed Action Alternative area. The CRM grazing committee will assist landowners in the these decisions, which will include assessment of weather conditions, vegetation growth and monitoring data.

2.4.3 Alternative 3: No Grazing

Alternative 3 is the "No Grazing" alternative, and no livestock grazing would be permitted on the Quilomene and Whiskey Dick WAs, within the CRM area. No term grazing permits would be issued. No new actions would be proposed. Grazing could still occur on non-WDFW ownership, which includes BLM, DNR, and PSE land.

Structural improvements to water developments would not occur. Existing boundary fences would be maintained (45 miles), and approximately 4.2 miles of new boundary fence would be constructed. Fences separating PSE and WDFW ownerships within the CRM area are considered pasture fences. These fences would be maintained under the No Grazing Alternative in order to exclude livestock from WDFW ownership. Approximately, 11.4 miles of existing fence that separates PSE from WDFW ownership (i.e., along the eastern boundaries of Upper Parke, Vantage Highway, and Whiskey Jim and along the western boundary of Rocky Coulee, West Whiskey Dick, and Upper Skookumchuck pastures) would be maintained. In addition, 3.6 miles of new fencing would be constructed to exclude the WDFW parcel (Section 3) within the South Wild Horse pasture, and Section 23, which is currently included in the Wild Horse North pasture. Approximately 0.78 miles of temporary fence would be installed and removed each year that the Wild Horse Crossing pasture is grazed, in order to exclude the WDFW parcel in Section 15. Existing water developments would remain in place for wildlife but would not be maintained in support of livestock management. Dilapidated fences and non-functioning springs may be removed over time as funding and staff becomes available. Other authorized activities and administration including, but not limited to, fire protection, recreation, weed management, and road management would continue.

2.5 Alternatives Eliminated from Detailed Analysis

An alternative involving overall forage utilization of up to 50 percent on each pasture in the Quilomene and Whiskey Dick WA within the CRM area was considered for inclusion in this EIS. This alternative was eliminated from detailed analysis because it was determined not to be "reasonable" due to possible adverse effects of forage utilization on sage-grouse habitat and native perennial grasses. Livestock forage utilization in shrub-steppe ecosystems exceeding 35

percent would likely result in adverse effects to sage-grouse habitat, and would not be consistent with WDFW's Greater Sage-Grouse Recovery Plan (Stinson et al. 2004). Native perennial grass utilization levels of 25–35 percent are recommended to maintain healthy plants in arid landscapes (Holecheck et al. 1999, Galt et al. 2000, Mueggler 1975).

2.6 Comparison of Alternatives

This section provides a summary of the alternatives and effects of implementing each alternative. Information in Table 2-4 is focused on activities proposed within each alternative.

Table 2-4 Comparison of Alternatives

Key Elements	Alternative 1: No Action	Alternative 2: Proposed Action	[1]Alternative 3: No Grazing
Management Objectives	Current Management and Draft L.T. Murray/Whiskey Dick/Quilomene WA Management Plan	CRM Grazing Plan and Draft L.T. Murray/Whiskey Dick/Quilomene WA Management Plan	Draft L.T. Murray/Whiskey Dick/Quilomene WA Management Plan
Grazing Rotation	-Allow grazing on 5 WDFW managed pastures (16,748 acres) & 2 PSE owned pastures (5,806 acres). - An average of 500 AUMs annually (WDFW managed pastures only).	-Allow grazing on 9 WDFW managed pastures (45,298 acres) & 2 PSE owned pastures (5,806 acres) -An average of 550 AUMs annually (WDFW managed pastures only).	-Not Applicable
Range Improvements & Maintenance	-Construct 4.2 miles & maintain up to 49.2 miles (includes the 4.2 miles) of boundary fence. -Construct 1 mile and maintain up to 21 miles of pasture fence (includes the 1 new mile). -Install and remove up to 5.5 miles of temporary fences. -Priority redevelopment and maintenance of up to 6 springs.	-Construct 4.2 miles & maintain up to 49.2 miles (includes the 4.2 miles) of boundary fence. -Construct 1 mile and maintain up to 41.6 miles of pasture fence (includes the 1 new mile). -Construct and maintain 3.2 miles of fencing around springs and wetlands. -Install and remove up to 10.3 miles of temporary fences -Priority redevelopment and maintenance of up to 12 springs.	- Construct 4.2 miles & maintain up to 49.2 miles (includes the 4.2 miles) of boundary fence. -Construct 4.6 miles & maintain up to 16 miles (includes the 4.6 miles) of pasture fence. -Install and remove up to 0.78 miles of temporary fence.
Grazing Permits	-5-year permit	-5-year permit	-Not Applicable
Forage Utilization Levels	-Overall forage utilization will not exceed 35 percent.	-Overall forage utilization will not exceed 35 percent.	-Not Applicable
Vegetation Monitoring	-Short-term and long-term monitoring.	-Short-term and long-term monitoring.	-Per the L.T. Murray/Quilomene/Whiskey Dick Wildlife Area Management Plan.

2.7 Preferred Alternative

Alternative 2 is the Preferred Alternative as it more fully addresses the purpose and need as described in section 2.4 and still allows for viable livestock grazing that is compatible with the goals and objectives of improving rangeland conditions and enhancing wildlife habitat. The WDFW habitat acquisition and conservation program relies on strong partnerships and support within local communities. Full participation in the Wild Horse CRM is critical for the maintenance of such partnerships in Kittitas County.

3 Affected Environment and Environmental Consequences

Introduction

This chapter summarizes the physical, biological, social, and economic environments of the project area. In conjunction with the description of Alternatives 1 No Action (Current Management)] and 2 (Proposed Action) in Chapter 2 and with the predicted effects of the no grazing alternative, this chapter establishes the baseline against which the decision makers and public can compare the effects of all action alternatives.

This chapter also describes the direct, indirect, and cumulative effects of implementing each alternative on the physical, biological, social, and economic environments in the project area. It also presents the scientific and analytical basis for the comparison of the alternatives presented in Chapter 2.

This chapter describes the following:

- Cultural components, including prehistoric and historic sites and artifacts.
- Biotic components, including vegetation, soil, water, air, wildlife, and fish.
- Social and economic components, including recreational uses, social values and economic influence.
- Direct and indirect effects for each resource area by alternative.
- Cumulative effects for each resource area.

3.1 Earth Resources

3.1.1 Affected Environment

Topography

The CRM area is located on the Columbia Plateau, a broad lowland area at the eastern base of the Cascade Range and at the western edge of the Columbia Intermountain physiographic province (Figure 1-1). Prominent geographic features in the vicinity include the Yakima River and the Kittitas Valley to the west and southwest, the Wenatchee Mountains to the northwest and north, the Columbia River to the east, and the Boylston and Saddle mountains to the south (Jones and Stokes 2004). The site is characterized by steep rocky slopes, rolling hills, ridges, and a series of canyons that generally drain toward the east (WDFW 2006a, WDFW 2008a). Slopes within the CRM area range from less than eight percent on flat plateaus and ridgelines to over 50 percent on Whiskey Dick Mountain and incised side drainages (Jones and Stokes 2004).

Beacon Ridge forms a north-south topographic divide through the CRM area with streams west of the divide flowing to the Yakima River and streams east of the divide flowing to the Columbia

River. Numerous benches and incised stream valleys occur throughout the area. The benches tend to coincide with the locations of seeps and springs, which are generally clustered in the Vantage Highway pasture, Wild Horse North, and along Skookumchuck Ridge between West Whiskey Dick and East Whiskey Dick pastures. The locations of these benches probably coincide with an interbedded aquifer within the basalt bedrock that has weathered at the ground surface more readily than the surrounding basalts have (Jones and Stokes 2004).

Geology

The parent bedrock material of the CRM area consists of the Miocene-age Columbia River Basalt Group consisting of Grande Ronde Basalt and overlying Wanapum Basalt, as well as fractured and folded lava flows and a variety of interbedded sedimentary units of varying thickness (USGS 2005b). In addition to the Grande Ronde Basalt and Wanapum Basalt (Frenchman Springs Member), mapped geologic units in the area include the Ellensburg Formation, Ellensburg Formation Vantage Member, Alluvium, and landslide deposits (Jones and Stokes 2004). The parent basalt rock has weathered into the coarse gravels, cobbles, and boulders, along with fine silts and clays that are currently in the CRM area. The overlying soil is composed of fine-grained loess, deposits of volcanic ash, sandy loams and silt loams (WDFW 2008a).

The CRM area has a "low" seismic hazard (earthquake frequency) and there were no recorded earthquakes in the area from 1568 to 2004 (USGS 2005a). Two east-west-trending Quaternary faults pass through the CRM area, roughly parallel to the Whiskey Dick Anticline (USGS 2006b, Jones and Stokes 2004).

The CRM area has a "low" risk of landslides and the area is ranked by the Washington Department of Natural Resources as "low" for slope instability (Godt 2001, WDNR 2007). Coarse-grained mass wasting deposits provide evidence of historic and/or slow-moving landslide activity in the CRM Area.

Soils

A variety of soil types and depths occur within the CRM Area. The NRCS database identifies 106 mapped soil units in the CRM area (USDA/NRCS 2008a). General characteristics of the dominant soil types are shown in Table 3-1. "Rubble land" refers to areas of cobbles, stones, and boulders. The most common soil series/complexes include the Nevo-Fortyday complex, the Drino-Sohappy-Fortyday complex, the Argabak-Vantage complex, the Rubble land-Fortyday-Rock outcrop complex, the Camaspatch-Whiskey Dick complex, Argabak very cobbly loam, and the Vantage-Clerf complex, which together cover approximately 31 percent of the area (USDA/NRCS 2008a).

Four soils are identified as "partially hydric" in the CRM area: Nitzel-Weirman complex (2 to 5 percent slopes), Haploxerolls-Weirman-Aquolls complex (0 to 5 percent slopes), Esquatzel silt loam (0 to 2 percent slopes), and Esquatzel-Weirman complex (0 to 2 percent slopes) (USDA/NRCS 2008b). Hydric soils support elevated water tables and are saturated, frequently ponded, and/or frequently flooded during the growing season. The presence of hydric soils can indicate sensitive areas and habitats, such as wetlands. Hydric soils are susceptible to compaction and rutting.

Table 3-1 Major Characteristics of Dominant Soils in the CRM Area

Soil	Description	Thickness	Drainage Class	Hydrologic Group
Nevo	Very cobbly loam	Very shallow to bedrock	Well-drained; medium to very rapid runoff; moderately slow permeability	D
Fortyday	Very gravelly silt loam	Shallow	Well drained; runoff is medium; permeability is moderate	B
Drino	Very stony loam	Moderately deep	Well-drained; runoff is medium to very rapid; moderate permeability	B
Sohappy	Coarse-loamy	Deep	Well drained; medium to rapid runoff; moderate permeability	B
Argabak	Very cobbly loam	Very shallow to bedrock	Well drained; slow to very rapid runoff; slow permeability	D
Vantage	Very cobbly loam	Shallow	Well drained; slow to rapid runoff; slow permeability	D
Camaspatch	Very cobbly silt loam	Shallow	Well drained; slow to rapid runoff; moderate permeability	D
Whiskey Dick	Very cobbly loam	Moderately deep	Well drained; slow to very rapid runoff; slow permeability	D
Clerf	Very cobbly clay loam	Moderately deep	Well drained; slow to very rapid runoff; slow permeability	D

Hydrologic Soil Group Codes: Source: USDA/NRCS 2008
(A) Soils with low runoff potential; these soils have a high infiltration rate, even when thoroughly wetted.
(B) Soils with moderate infiltration rate when wetted.
(C) Soils with low infiltration rate when wetted.
(D) Soils with a high runoff potential; these soils have a very slow infiltration rate when thoroughly wetted.

Existing Conditions

Surface geology is dominated by a combination of rocky lithosols (i.e. soils that are shallow to bedrock and consist of mostly weathered basalt fragments) on shallow ridge tops and deeper stony loams on the slopes. Within the CRM area there are no soil types known to be of unique value or identified as priorities for conservation.

Predominant ecological sites in the CRM area per pasture are provided in Table 3-2. All the pastures are characterized by a mosaic of shallow soils with stony soil texture and loamy soils, which have a mixture of particle size including very fine particles (WDFW 2008a).

Table 3-2 Predominant Ecological Sites

Pasture	Characteristics Ecological Sites
East Whiskey Dick	Very Shallow, Dry Stony, Cool Stony, Loamy, Rock
Lone Star	Very Shallow, Cool Stony, Dry Stony
Lower Parke Creek	Very Shallow, Stony, Loamy, Dry Stony
Rocky Coulee	Very Shallow, Loamy, Dry Stony, Stony
Upper Parke Creek	Very Shallow, Stony, Cool Stony, Loamy
Upper Skookumchuck	Very Shallow, Rock Rubble, Stony, Loamy
Vantage Highway	Very Shallow, Dry Stony, Loamy, Stony
West Whiskey Dick	Very Shallow, Dry Stony, Cool Stony, Loamy
Whiskey Jim	Very Shallow, Cool Stony, Stony
Wild Horse Crossing	Very Shallow, Dry Stony, Loamy, Cool Stony

[1]Predominant Ecological Sites are sites that cover more than five percent of the pasture.
Source: WDFW 2008a

In semi-arid landscapes, biological crusts can occupy up to 70 percent of the surface area of un-cultivated dry lands (Belknap et al. 2001). The soil surface in the CRM area supports biological crusts composed of mosses, lichens, and a variety of soil algae and bacteria (WDFW 2008a). Biological crusts serve several functions in rangelands; they help to retain soil moisture, discourage annual weed growth, reduce wind and water erosion, fix atmospheric nitrogen, and contribute to soil organic matter (Belknap et al. 2001). A recent study of biological crust communities on a rested livestock grazing area in the Columbia Basin in Washington found biological crust species richness and cover to be positively correlated with the cover of native bunchgrasses and inversely related to the cover of invasive annual cheatgrass (Ponzetti et al. 2007).

Rangeland Health is defined as the "degree to which the integrity of the soil and ecological processes of rangeland ecosystems are sustained (Pellant et al. 2005)." Rangeland health was assessed on 42,813 acres of the CRM area in 2006, 2007 and 2008 by a team of rangeland specialists from BLM, DNR, WDFW, and NRCS (see Appendix B for methods). Sites not assessed include rocky outcrops, riparian areas, and seven ecological sites from the Lone Star and East Whiskey Dick Pastures, were data was incomplete. Two of the three attributes of this assessment, soil/site stability and hydrologic function, pertain to Earth Resources. Soil/site stability is defined as the capacity of a given site to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water. Hydrologic function is defined as the capacity of a given site to capture, store, and safely release water from rainfall, run-off, and snowmelt, as well as the sites ability to resist soil loss and recover after degradation (Pellant et al. 2005).

The following indicators were evaluated to determine soil/site stability and hydrologic function: rills, water flow patterns, pedestals and terracettes, bare ground, gullies, wind scoured sites or blowouts, litter movement, soil surface resistance to erosion, soil surface loss or degradation, plant community composition, litter amount, and compaction layers. These indicators were compared to reference conditions described in NRCS Ecological Site Descriptions (Rouse 2004), and rated on the degree of departure from reference conditions. Results summarized by pasture can be found in Table B-9.

For approximately 95 percent of the CRM area, the degree of departure from reference conditions for soil/site stability was rated as either "none to slight" or "slight to moderate" (Table B-7). About five percent of the CRM area was rates as having "moderate" departure from reference conditions (Table B-7). Sites with "moderate" departure from reference conditions are considered "at risk", indicating a reversible loss in productive capability and increased vulnerability to potentially irreversible degradation (Pellant et al. 2005). Hydrologic function was rated as either "none to slight" or "slight to moderate" for 93 percent of the CRM area, indicating a high degree of similarity with reference conditions. Approximately seven percent of the area was rated as having "moderate" departure from reference conditions for hydrologic function; no sites were rated as having "moderate to extreme" or "extreme" departure from reference conditions (Table B-7). Sites with "moderate" ratings for soil/site stability and hydrologic function tended to be relatively level and close to water, where livestock historically gathered in large numbers.

3.1.2 Environmental Consequences

Livestock grazing has the potential to affect soil structure and composition by compacting soil, decreasing vegetative cover and changing vegetative composition. The risk of soil compaction from grazing is greatest in areas where large numbers of livestock or wildlife (deer, elk) are concentrated for long periods on areas such as trails, watering areas, bedding grounds, salt locations, and isolated areas with canopy cover. Rotating livestock between pastures, limiting grazing duration and number of livestock per pasture, and optimizing the distance between shade, water, and mineral supplements may minimize the extent of livestock-related soil compaction over the landscape by influencing cattle distribution (Bailey 2005).

Livestock trails on steep slopes are the most susceptible to soil erosion (Clarke 2008), and may channel run-off. Within the CRM area, livestock use on steep slopes (i.e., 45-60 percent) is expected to be significantly lower than on shallower slopes, and negligible on slopes over 60 percent (see Table 2-1), thereby minimizing the risk of erosion associated with cattle trails.

Effects to biological soil crusts by livestock trampling are proportional to the timing and intensity of impact, as well as stocking rate and distance to water (Warren and Eldridge 2001; Anderson 1994; Jeffries and Klopateck 1987; Belknap et al. 2001). Biological soil crusts on clay or loamy soils, such as those found in the CRM area, are less susceptible to disturbance when the soil is wet or frozen (Belknap et al. 2001).

Belknap (2001) recommends the following strategies be used to minimize disturbance to crusts: 1) livestock grazing should occur during wet season, to allow re-growth of damaged crusts before summer droughts, 2) a rest-rotation grazing system should be used to allow for periods of recovery, 3) livestock should be well dispersed throughout a given pasture, to limit localized, heavy disturbance.

Erosion is largely influenced by slope and soil texture. Well-drained and course-textured soils, such as those that occur in the CRM area, are relatively resilient to erosion. Slopes can exceed a 60 percent gradient in some areas. Heavy grazing (greater than 50 percent forage utilization) can contribute to erosion by wind and water runoff through reduction of vegetative cover and soil litter (Fleischner 1994). However, light to moderate grazing and rest periods between rotations would likely allow vegetative cover to be maintained, thereby protecting the soil from erosion (Holechek et al. 1999).

3.1.2.1 Alternative 1: No Action

Direct and Indirect Effects

Grazing would be implemented at reduced AUMs compared to levels prior to WDFW ownership. The overall light grazing intensity (less than 35 percent forage utilization), is unlikely to increase soil erosion in the coarse-grained shallow soils in these pastures. Reduced grazing intensity should allow vegetation recovery and minimize bare ground and soil erosion. Furthermore, the density of livestock grazing in steeper areas with high potential for soil erosion is expected to be low. On average, four out of the five WDFW-managed pastures will be grazed each year.

Hydrologic function assessments across the Alternative 1 area indicate that approximately 87 percent of the assessed acres are similar to reference sites using the indicators discussed above

(departure from reference conditions was “none to slight” on 20 percent of the area and “slight to moderate” on 67 percent of the area). Approximately 13 percent of the assessed area was rated as having “moderate” departure from reference conditions. Changes to hydrologic function ratings would be similar to soil/site stability ratings, described above.

As with soil compaction, no additional biological soil crust loss is expected under the proposed grazing system. Rather, the grazing system proposed in Alternative 1 could affect the recovery of soil crust communities. This effect is expected to be minor to moderate due to low stocking rates and the rotational grazing strategy. However, areas within 100 meters of stock water (redeveloped springs, impoundments, and hardened watering sites) will likely have moderate to extreme effects to biological crust recovery (approximately 1.4 percent of the Alternative 1 area). Effects to biological soil crust recovery due to grazing during a portion of the dry season are expected to be partially mitigated by the rest-rotation grazing strategy.

Construction of fencing under Alternative 1 would have a minimal impact to soil conditions. There will be some ground disturbance from construction activities, (including compaction from driving onsite) however it will be a short-term effect. Existing fences would be maintained within the original footprint resulting in negligible effects. In addition, maintaining springs would help disperse livestock and minimize trampling (Figure 2-3). Spring redevelopment would occur as close to the original footprint as possible, while protecting sensitive areas around springs. In addition, neither spring redevelopment nor salting will occur on steep slopes, minimizing the risk of “trail collapse” (trail use and erosion on steep slopes). Soil disturbance associated with spring infrastructure redevelopment would be moderate but short-term and localized, including ground clearing and compaction by construction equipment/trucks. Structural improvements, as proposed, will improve livestock management by influencing livestock distribution.

3.1.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Direct and indirect effects on soil resources resulting from livestock grazing would be reduced from Alternative 1, as effects would be spread over a larger landscape. For Alternative 1, an average of 500 AUMs would be allowed annually over 16,748 acres. For Alternative 2, an average of 550 AUMs would be allowed annually over 45,298 acres. Alternative 2 represents a 10 percent increase in AUMs over Alternative 1, but includes 170 percent more acreage. The overall light grazing intensity (less than 35 percent forage utilization) is unlikely to cause soil erosion. Reduced grazing intensity should allow vegetation recovery and minimize bare ground and soil erosion. Furthermore, the density of livestock grazing in steeper areas with high potential for soil erosion is expected to be low.

Effects to “Eastern Pastures” (Rocky Coulee, Lone Star, West Whiskey Dick, and East Whiskey Dick) are expected to differ from effects to “Western Pastures” (Vantage Highway, Whiskey Jim, Lower Parke, Upper Parke, and South Wild Horse). Effects to Western Pastures will be similar as described under Alternative 1, except that recovery of sites rated with “slight to moderate” and “moderate” departure from reference conditions would be faster, as these pastures would be used less frequently over a 5-year period.

Soil/site stability assessments across the Eastern Pastures indicate that approximately 99 percent of the assessed area is similar to reference sites using the indicators discussed above (departure from reference conditions was “none to slight” for 50 percent of the area and “slight to moderate” for 49 percent of the area). Approximately one percent of the assessed area was rated with “moderate” departure from reference conditions. Sites rated as having “none to slight” and “slight to moderate” departure from reference conditions are expected to remain stable.

High utilization (up to 60 percent) will be allowed on 0.5 percent of the Eastern Pastures. High use sites are expected to continue with a “moderate” departure from reference conditions.

Hydrologic function assessments across Eastern Pastures indicate that approximately 97 percent of the assessed area is similar to reference sites using the indicators discussed above (departure from reference conditions was “none to slight” for 49 percent of the area and “slight to moderate” for 48 percent of the area). Approximately three percent of the assessed area was rated with “moderate” departure from reference conditions. Changes to hydrologic function ratings would be similar to soil/site stability ratings, described above.

Under Alternative 2, some loss of biological soil crust is anticipated in the Eastern Pastures. Biological crust loss is expected to be minor to moderate due to the grazing strategy, which provides more recovery time between grazing periods. Effects will be greater in areas within 100 meters of stock water (redeveloped springs, impoundments, and hardened watering sites, which accounts for approximately 0.5 percent of the Eastern Pastures. Effects to biological soil crust recovery due to grazing during a portion of the dry season are expected to be partially mitigated by the rest-rotation grazing strategy.

Construction of fencing under Alternative 2 would have a minimal impact to soil conditions. There will be some ground disturbance from construction activities (including compaction from vehicle traffic onsite) however it will be a short-term effect. Existing fences would be maintained within the original footprint resulting in negligible effects. In addition, maintaining springs would help disperse livestock and minimize trampling (Figure 2-3). Spring redevelopment would occur as close to the original footprint as possible, while protecting sensitive areas around springs. In addition, neither spring redevelopment nor salting will occur on steep slopes, minimizing the risk of “trail collapse” (trail use and erosion on steep slopes). Soil disturbance associated with spring infrastructure redevelopment would be moderate but short-term and localized, including ground clearing and compaction by construction equipment/trucks. Structural improvements, as proposed, will improve livestock management by influencing livestock distribution.

Due to the low forage utilization, maintenance of vegetative cover, and the coarse-grained soils, overall soil compaction under Alternative 2 would be minor to moderate. Overall effects to biological soil crusts are expected to be minor to moderate due to light intensity use and rotational grazing strategy (Belknap et al. 2001), with increased crust loss in the Eastern Pastures and faster crust recovery in the Western Pastures. Greater effects to Earth Resources are expected in areas where livestock concentrate (approximately 0.8 percent of the Alternative 2 area). Though more spring redevelopment would occur under Alternative 2, effects would be similar to those described under Alternative 1.

3.1.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Effects of livestock grazing, spring redevelopment, and pasture fence maintenance on soil compaction, soil/site stability, hydrologic function, and biological soil crusts would be eliminated under Alternative 3. Sites rated with "slight to moderate" or "moderate" departure from reference conditions for either soil/site stability or hydrologic function would be expected to recover faster than under Alternatives 1 and 2. Biological soil crust recovery would occur more quickly, and any crust loss would be associated with wildlife or human activities. Erosion may continue to occur on some of the major stock trails due to use by wildlife.

3.1.2.4 Cumulative Effects

Historical grazing resulted in compaction and loss of ground cover in some areas. However, livestock grazing has been greatly reduced since the early 1900s. In addition, cattle numbers have been further reduced since recent WDFW and PSE acquisitions, and horse and sheep grazing have been eliminated. Areas where livestock congregated around water sources (ponds, troughs, and springs), bedding areas, salting areas, trails along fences, and pasture corners are less productive due to compaction, displacement, and trampling. In addition, past activities such as road construction have resulted in soil compaction and erosion. Currently, soil-disturbing activities (i.e., camping, administrative and recreational road use, and illegal off-road vehicle use) occur within the area. Soil disturbance from current and historic land uses continues to contribute to the overall cumulative effects of the project.

Alternative 1

Over all ownerships within the CRM area, cumulative effects from livestock grazing, spring redevelopment, and pasture fence maintenance on soil compaction, soil/site stability, hydrologic function, and biological soil crusts are expected to be minor. Sites rated with "slight to moderate" or "moderate" departure from reference conditions for either soil/site stability or hydrologic function would be expected to continue recovery.

Additional spring redevelopments could occur on DNR ownerships within WDFW-managed pastures, and on PSE ownership. All spring redevelopments within the CRM area will meet NRCS specifications. Up to two miles of pasture fencing would also be constructed on PSE land to exclude livestock from their mitigation parcel. Livestock grazing on PSE-managed pastures would likely include dormant season grazing, which would likely decelerate or preclude the recovery of biological soil crust.

Alternative 2

Cumulative effects under Alternative 2 would be slightly reduced compared to Alternative 1, as effects would be spread over a larger landscape.

Alternative 3

With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE ownership. In addition, DNR and BLM would have the option to pursue grazing leases on their ownerships within the CRM area. Most of these parcels are inholdings within the Quilomene and Whiskey Dick WAs, and additional fencing would be required to exclude trespass livestock on WDFW ownership.

3.2 Water Resources

3.2.1 Affected Environment

Water resources in the CRM area include creeks, seeps, springs, wetlands and ponds. Infrequent small palustrine wetlands are located throughout the CRM area, primarily associated with riparian areas and springs but occasionally occurring around man-made stock ponds (WDFW 2008a). Wetland features are described in Section 3.4.1 of this DEIS.

The primary beneficial use of surface water and groundwater within the CRM area is to provide water for fish, wildlife and livestock.

Watersheds

The CRM area is comprised of six sub-watersheds: Rocky Coulee, Spring/Cayuse Creek, Whiskey Dick Creek, and Skookumchuck Creek, which are tributary to the Columbia River, and the Upper Parke Creek sub-watershed, which is tributary to the Yakima River (WDOE 2008b). The conditions of the watersheds within the CRM area are satisfactory based on Washington Department of Ecology's 2004 Clean Water Act Water Quality 303(d) list.

Surface Water

Numerous streams originate within the CRM area (Figure 2-3). These streams are divided into two principal drainage systems, streams flowing southwest into Parke Creek to the Yakima River and those flowing east and southeast to the Columbia River. CRM area streams tend to be steep, narrow, incised, and intermittent or ephemeral. They typically originate at headwalls, seeps, and springs. Some of the larger tributaries transition to perennial flow in their lower reaches, or are perennial for a short reach due to spring influence. Whiskey Dick Creek is perennial from its confluence with North Fork of Whiskey Dick and for a short reach around the confluence with Bryant Creek; Parke Creek is perennial from its confluence with Black Rock Canyon; Skookumchuck Creek is perennial downstream from the Section 9 spring (Skookumchuck pasture). The principal drainages in the CRM area are listed in Table 3-3.

Table 3-3 Streams in the Whiskey Dick and Quilomene WA

Stream	Stream Type	Pasture Location	GIS Miles
Rocky Coulee	Ephemeral	Rocky Coulee & Lone Star	10.5
Schnebly Coulee	Ephemeral	Wild Horse South, Rocky Coulee, & Lone Star	3.1
Cayuse Creek	Intermittent	East Whiskey Dick	4.0
Whiskey Dick Creek	Perennial[1]	West Whiskey Dick & East Whiskey Dick	13.0
Skookumchuck Creek	Perennial[1]	Skookumchuck[2], Upper Skookumchuck[2] & Wild Horse Crossing[3]	10.1
Jackknife Creek	Intermittent	Upper Skookumchuck[2] & East Whiskey Dick	5.3
North Fork Whiskey Dick Creek	Intermittent	East Whiskey Dick	7.3
North Fork Skookumchuck Creek	Intermittent	Upper Skookumchuck[2]	2.8
Upper North Fork Skookumchuck Creek	Intermittent	Upper Skookumchuck[2]	2.8
Rollinger Creek	Intermittent	West Whiskey Dick	4.1

Stream	Stream Type	Pasture Location	GIS Miles
Hartman Creek	Intermittent	West Whiskey Dick	4.1
Bryant Creek	Intermittent	West Whiskey Dick & East Whiskey Dick	5.1
Little Bohinkleman Creek	Intermittent	Upper Skookumchuck[2]	3.0
Black Rock Canyon	Intermittent	Whiskey Jim	2.4
Whiskey Jim Creek	Intermittent	Whiskey Jim	4.1
Parke Creek	Perennial[1]	Upper Parke Creek, Whiskey Jim, & Lower Parke Creek	5.4
		Total	87.1

[1]Intermittent in portions.
[2]These pastures are not proposed for grazing under any of the Alternatives.
[3]The WDFW parcel within this pasture is not proposed for grazing under any of the Alternatives.

None of the stream segments within these watersheds are on Ecology's 2004 Clean Water Act Water Quality 303(d) list for exceeding state water quality standards (WDOE 2007). However, the Columbia River, downstream of the CRM area, is listed for exceeding state temperature standards (Wanapum Lake) (WDOE 2008b, PSMFC 2007). None of the CRM area water bodies are proposed for listing in the 2008 assessment (WDOE 2008b).

Groundwater

The CRM area is underlain by the Columbia Plateau Regional Aquifer System. Most of the system is composed of the Grande Ronde Basalt and the overlying Wanapum and Saddle Mountains Basalt, which together form the Columbia River Basalt Group. The basaltic-rock aquifers are as much as 15,000 feet thick in places and are overlain by unconsolidated-deposit aquifers that also are part of the aquifer system. Near the CRM area, these unconsolidated-deposit aquifers are relatively thin, 50 feet thick or less, and generally unsaturated. The general movement of water in the aquifer system is from recharge areas near the edges of the plateau toward the Columbia River (Whitehead 1994).

Ground-water levels in the Columbia Plateau, including the CRM, area have been altered by irrigation practices. Water diverted or pumped from streams or reservoirs can cause water levels to rise whereas irrigation from groundwater can cause groundwater levels to decline. In Washington water levels have risen as much as 300 feet in some areas and lowered by 150 feet in other locations (Whitehead 1994). It is unknown if agricultural practices in the vicinity of the CRM area have altered the water table.

Springs

Based on soil survey data, 94 percent of the soils covering the CRM area support a seasonal elevated water table less than five feet deep near topographic benches and stream valleys (NRCS 2008). Numerous springs throughout the CRM area have been developed for stock watering and typically are associated with these benches and valleys (Figure 2-3). In May 2003, the flow was approximated for a sample of developed springs in the CRM area. The observed flow rates ranged from one to five gallons per minute (gpm) (Jones and Stokes 2004). Current, estimated flow rates for selected springs in the CRM area range from 0.05 to 2.8 gpm (Table 3-4).

Table 3-4 Flow Rates for Select Springs in the CRM Area

Site	Pasture	Flow (gpm)
Hell's Kitchen Spring	Lone Star	2.8
Section 15 Spring	Lone Star	0.4
Cayuse Spring	East Whiskey Dick	0.8
Rollinger Spring	West Whiskey Dick	2.8
South Wild Horse #1	South Wild Horse	0.22
Government	North Wild Horse	1.5
Pine	North Wild Horse	0.1
Section 28 #1	North Wild Horse	0.07
Section 4	North Wild Horse	0.2
Skookumchuck Heights	North Wild Horse	1.4
Thorn	North Wild Horse	0.05
Wild Horse #1	North Wild Horse	1.0
Parke Creek #2	Whiskey Jim	1.5
Parke Creek #1	Upper Parke Creek	2.0

Before WDFW began purchasing land in the CRM area in the 1960s, the area had a long history of use for livestock grazing. During that time, many springs located on private, state (WDNR) and federal (BLM) ownership were developed to provide water for livestock and wildlife. Spring development typically involved excavating in the area of the spring and installing a spring box to collect flow from the spring. A pipeline was buried several feet deep to deliver water from the spring box to a level spot where a trough for use by livestock and wildlife was installed. A float valve in the trough regulated the flow of water to the trough. In some cases the spring site was fenced to prevent heavy use from compacting the soil around the spring. Plant cover at spring sites is highly variable depending on the amount of flow from the spring. In many cases shrubs such as black hawthorn, elderberry, mockorange, and chokecherry occur along with typical upland shrubs like big sagebrush, bitterbrush, wax currant and rabbitbrush. In areas where the soil remains moist cattail, sedges, rushes and Kentucky bluegrass may occur. Drier areas with a long history of disturbance typically are dominated by cheatgrass and introduced annual forbs. Pictures of representative springs from both the Quilomene and Whiskey Dick WAs are presented in Figures 3-1a.

Figure 3-1a. Sample of Proposed Spring Redevelopment Sites. Upper left - Hell's Kitchen (Lone Star Pasture), upper right - Parke Creek #1 (Upper Parke Pasture); lower left - Section 15 (Lone Star Pasture); lower right - Vantage Spring #3 (Vantage Highway Pasture).

Figure 3-1b. Thorn Spring before (left) and after (right) redevelopment (PSE ownership). Native grasses and forbs will be seeded to disturbed areas in Fall 2009.

Most of the developed springs are currently in disrepair. The proposed redevelopment projects will involve inspecting each springbox and completing any necessary maintenance such as removing obstructions (e.g., rocks, sediment) to the flow of water. Subsurface outlet pipes from the springbox to the trough may need to be replaced; excavation for pipeline maintenance will be

limited to a 2-ft wide by 2-ft deep trench. Stock fence will be constructed to protect these spring sites. Most sites will require installation of a new water trough. Troughs will be located on level areas away from springs and stream channels; troughs will be placed on a gravel pad that will extend out in a six-foot radius from the trough to provide drainage and to protect the ground surface from cattle hooves where this concentrated use will occur. Troughs will be fitted with a wildlife escape mechanism. Overflow from the trough will be directed to the natural drainage channel or stream course. Appropriate native seed mixes for dry upland areas and moist spring sites will be used to re-vegetate spring redevelopment sites. Sites will be checked routinely for presence of noxious weeds, and control measures will be used when necessary. Figure 3-1b illustrates a spring on PSE ownership before and after redevelopment.

Floodplains

Streams in the CRM area generally do not support well-developed floodplains; however, the lower reaches of Whiskey Dick Creek and Skookumchuck Creek are designated by Federal Emergency Management Agency (FEMA) as "Special Flood Hazard Areas." These areas have a one percent annual chance of flooding to base flood elevations (the elevation to which floodwater is anticipated to rise during a 100-year flood) (WDOE 2007, FEMA 2007). According to FEMA Flood Zone Overlay maps, the nearest 100-year flood zone occurs along Parke Creek, well downstream of the CRM area (Jones and Stokes 2004).

3.2.2 Environmental Consequences

Livestock have the potential to affect water quality by increasing sedimentation in streams and by direct contamination. Livestock are expected to utilize riparian areas for water, shade and forage. Trailing through streams may occur as livestock access riparian areas. The proportion of time livestock spend near streams would increase as summer temperatures rise and upland vegetation becomes dry. Restricting livestock access to surface water can greatly reduce the risk of direct contamination.

Livestock grazing has the potential to indirectly affect water quality and stream channel conditions by removing riparian and upland vegetation. Overland flow and erosion are rare within the CRM area. Physical indicators of erosion, such as flow patterns, rills, gullies, wind scour, and deposition of sediment and litter, were not observed on upland areas during the assessment of rangeland health (Appendix B). In addition, rest-rotation grazing systems favor riparian recovery over deferred-rotation or season-long grazing systems by allowing time for vegetation to recover between grazing periods, decreasing soil compaction, improving infiltration, and decreasing sediment production (Bohn and Buckhouse 1985).

3.2.2.1 Alternative 1: No Action

Direct and Indirect Effects

Direct effects on water quality under Alternative 1 would be greatest where livestock can directly access stream channels. There are 11.9 stream miles within the Alternative 1 area; all streams, with the exception of a 0.75-mile reach of Parke Creek, are intermittent or ephemeral. Fish-bearing reaches of streams would be protected with temporary fencing. This would prevent direct effects to the perennial reach of Parke Creek on WDFW ownership, as well as a 2 mile intermittent reach upstream (Figure 2-2). In addition, pasture fencing would keep livestock within assigned pastures and ensure no direct effects to stream corridors from unauthorized grazing. Water developments and salt or protein supplements would be used to draw livestock

out of riparian areas onto adjacent uplands (WDFW 2008a). Therefore, implementation of Alternative 1 would have minor effects on water quality.

Indirect effects to water quality from Alternative 1 will be reduced by the use of the Proposed Grazing System (Section 2.3.1). Spring and early summer grazing will improve cattle distribution and minimize livestock use of riparian areas, as compared to grazing in mid to late summer (dormant season). This is due in part to the high water content of upland grasses and forbs during the growing season, as compared to the dormant season. Off-creek water developments will draw cattle away from riparian areas, decreasing potential damage to riparian vegetation and stream banks. Browse and herbaceous utilization triggers would also protect unfenced riparian areas from excessive livestock use (Table 2-3). Collectively, these measures would reduce the disturbance to vegetation that provides shade to streams. Sediment delivery from uplands would be minimized in Alternative 1 through the implementation of the Proposed Grazing System, rest-rotation grazing. Overall, indirect effects to water quality are expected to be minor.

Water quality could be affected over the short-term by surface disturbances associated with fence construction to protect springs and six spring redevelopments. This effect is expected to be minor.

Beef cow-calf pairs typically consume 12 to 35 gallons of water per day, depending on consumption of dry matter and ambient temperature (Winchester and Morris, 1956; ISU Extension, 1995). Early in the growing season, when percent moisture of forage is high and ambient temperatures are low, water use will likely be at the low end of this range. The reverse is expected at the end of the summer when forage has cured. Use on WDFW-managed pastures (with the exception of South Wild Horse) will occur between April 1st and June 30th, during the growing season, when forage moisture is high and temperatures are relatively moderate. Based on seasonal elevated water tables and numerous springs in the Alternative 1 area, the overall impact on water quantity is likely to be minor.

3.2.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Alternative 2 represents a 10 percent increase in AUMs over Alternative 1, but includes a 170 percent increase in acreage by the addition of the Eastern Pastures. Although the types of effects are similar in Alternatives 1 and 2, the extent of effects will differ.

Direct and indirect effects on water quality/quantity resulting from livestock grazing would be reduced in the Western Pastures, as effects would be spread over a larger landscape that includes the Eastern Pastures. Western Pastures would be used less frequently over a 5-year period, which would reduce the frequency of cattle access to stream channels, and allow faster recovery of vegetation and soils.

Direct effects to Eastern Pastures would be increased compared to Alternative 1. As with Alternative 1, direct effects on water quality would be greatest where livestock can directly access stream channels. Under Alternative 2, there are an additional 51.2 stream miles. The streams in the Eastern Pastures are predominantly intermittent, with the exception of 2.75 perennial miles of Whiskey Dick Creek. Similar to Alternative 1, temporary fencing would be

used to protect fish-bearing stream reaches, as well as other reaches as necessary to avoid or minimize effects to riparian areas and streams. Pasture fencing would keep livestock within assigned pastures to minimize direct effects to stream corridors in unauthorized areas.

Indirect effects to Eastern Pastures would also be increased relative to Alternative 1. The Eastern Pastures have not been grazed in at least 20 years (30 years for the East and West Whiskey Dick pastures; 20 years for the Lone Star and Rocky Coulee pastures), with the exception of occasional trespass. Photo-monitoring indicates that the abundance and cover of both riparian and adjacent upland vegetation has increased substantially since livestock exclusion (see Appendix D). Former livestock trails into incised stream channels have re-vegetated, with the exception of game trails. A number of these trails will be re-opened by livestock, potentially increasing sedimentation and reducing water quality. Due to the Proposed Grazing System and BMPs, this effect is expected to be minor to moderate.

As with Alternative 1, spring and early summer grazing will be implemented along with off-creek supplement placement and utilization triggers to reduce the disturbance to vegetation that provides shade to streams. Sediment delivery from uplands would be minimized through the implementation of light intensity, rest-rotation grazing. Overall, indirect effects to water quality are expected to be minor.

Alternative 2 would require the redevelopment of up to 6 additional springs, the installation and removal of up to 2.8 more miles of temporary fence (depending on the pastures used each year), and the maintenance of 20.6 additional miles of pasture fence. These effects are expected to be short-term and minor.

As Alternative 2 includes only a 10 percent increase in AUMs relative to Alternative 1, the difference in water consumption by livestock will be negligible. As in Alternative 1, the overall impact on water quantity is likely to be minor.

3.2.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

There will be no direct and indirect effects to the water resources from livestock grazing if Alternative 3 is implemented.

3.2.2.4 Cumulative Effects

Past activities such as homesteading, beaver removal, domestic livestock grazing, fire suppression, timber harvest, road construction and recreation have influenced current hydrologic conditions. Current conditions include reduced riparian plant diversity, composition, and vigor; down cut and degraded stream channels; changes in upland vegetation; and altered stream flows. Although many of the historical practices have been halted or modified, stream banks still show evidence of these practices. Activities that are currently ongoing and expected to continue into the future include road maintenance, weed control, and recreational use.

Alternative 1

Spring redevelopments could occur on DNR ownerships within WDFW-managed pastures, and on PSE-managed pastures. All spring redevelopments within the CRM area will meet NRCS specifications. Up to two miles of pasture fencing would also be constructed on PSE land to

exclude livestock from their mitigation parcel. Skookumchuck Creek on non-WDFW ownership within the Wild Horse Crossing Pasture is expected to be accessible to livestock. This could result in sediment delivery into Skookumchuck Creek, potentially affecting water quality. Livestock will consume additional water on PSE-managed pastures.

Alternative 2

Cumulative effects from Alternative 1 will also occur under Alternative 2. However, additional spring redevelopments could occur on DNR and BLM land under Alternative 2, as compared to Alternative 1.

Alternative 3

With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE-managed pastures. Spring redevelopment would be expected to continue on PSE-managed pastures. Skookumchuck Creek on non-WDFW ownership within the Wild Horse Crossing Pasture will continue to be accessible to livestock under Alternative 3. This could result in sediment delivery into Skookumchuck Creek, potentially affecting water quality. Livestock will continue to consume water on PSE-managed pastures. In addition, DNR and BLM would have the option to pursue grazing leases on their ownerships within the CRM area. Most of these parcels are inholdings within the Quilomene and Whiskey Dick WAs, and additional fencing would be required to exclude trespass livestock on WDFW ownership.

3.3 Air Quality and Noise

3.3.1 Affected Environment

Air quality in the geographic area is good, with prevailing westerly winds. The National Ambient Air Quality Standards have not been exceeded, meaning there are no non-attainment or maintenance areas. However, smoke from wildfires occasionally impact air quality in the geographic area.

Existing noise levels in the CRM area are generally low, as the primary noise sources are recreational uses (vehicles, hunting) and ambient noise from the wind turbines on Wild Horse North and South, as well as distant sounds such as roads, highways, and noise from the Yakima Training Center. There are no sensitive noise receptors within the CRM area. Sensitive noise receptors are generally where there is human habitation or substantial use and the intrusion of noise could adversely affect use or enjoyment of the area.

3.3.2 Environmental Consequences

Livestock grazing can directly impact air quality primarily through the generation of fugitive dust emissions (PM_{10}). Soil disturbance from the trampling action of livestock can increase PM_{10} emissions. Indirectly air quality would be impacted from vehicles/equipment used to implement structural improvements, routine operation and maintenance for administrative purposes and recreation activities.

The production of methane, a greenhouse gas, which is released from cattle, is not being assessed in this EIS because methane gas would be expected to be released from cattle grazing on land whether in the CRM area, on WDFW managed lands or private adjacent lands. Livestock grazing can directly impact ambient noise levels primarily through cattle bellowing.

3.3.2.1 Alternative 1: No Action

Direct and Indirect Effects

Direct effects to air quality and noise could result from Alternative 1. Minor adverse effects to air quality could result from fugitive dust released from cattle herding and vehicle/machinery used to implement range improvements and maintenance activities. However, these emissions would be negligible and would fall far below regulatory standards for particulate matter. In addition to fugitive dust emissions, minor adverse effects to air quality would result from vehicle exhaust from those vehicles used to undertake range improvement and management activities throughout the CRM. Vehicle exhaust would be short-term and localized in geographical extent.

The primary noise effects would be minor effects from cattle bellowing, recreation (hunting, wildlife viewing, etc), and vehicles/machinery. Construction-related effects such as motors and the sounds of fence construction and spring redevelopment would also be direct but would be localized and would be short term in duration. Noise increases from bellows and construction activities would be negligible.

3.3.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Effects on air quality and noise under Alternative 2 would be the same as those for Alternative 1 (dust emissions, vehicle exhaust, and cattle bellowing and construction noise), except that grazing would occur across a greater area (up to 51,104 acres).

3.3.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Since grazing would be eliminated under this alternative, there would be no direct or indirect to air and noise if Alternative 3 is implemented.

3.3.2.4 Cumulative Effects

Alternative 1

The potential effects to air and noise are minimal and of very short duration. There are no effects to accumulate if Alternative 1 is implemented.

Alternative 2

Cumulative effects for Alternative 2 would be the same as those discussed for Alternative 1, except that grazing would occur across a greater area.

Alternative 3

Since grazing would be eliminated under this alternative, there would be no cumulative effects to air and noise.

3.4 Vegetation

3.4.1 Affected Environment

The CRM area is located along the Columbia River northeast of Ellensburg. Annual precipitation ranges from seven inches along the Columbia River, to greater than 20 inches in the northwest corner; average annual temperature ranges from 47 to 53ºF (USDA/NRCS 2006). Precipitation at Ellensburg, approximately 10 miles west of the CRM area, averages 8.9 inches annually. Most

precipitation occurs in late autumn, winter, and early spring (Kittitas County Conservation District 2001). Elevation ranges from 700 to 3300 feet and topography ranges from relatively flat to 60 percent slopes.

Upland Vegetation

The CRM area lies within the Columbia Plateau ecoregion (WDFW 2005). The characteristic vegetation of this ecoregion includes a variety of bunchgrasses, forbs, shrubs typical of sagebrush steppe and steppe plant communities (Daubenmire 1988). Differences in soils, elevation, and aspect creates slight differences in plant associations. In areas with deeper soils (loams), big sagebrush/bluebunch wheatgrass is the dominant vegetation type. Big sagebrush/Idaho fescue and threetip sagebrush/Idaho fescue dominate northerly aspects in the 9-15 inch and 15+ inch precipitation zone, respectively. Bitterbrush is found throughout the CRM area in association with big sagebrush communities. Sandy soils, which occur predominantly at lower elevations, support needle-and-thread grass and bitterbrush associations. Common wildflowers include Carey's balsamroot, mariposa lily, longleaf phlox, brodiaea, yellow bells, bitterroot, wild onions, and large seeded biscuitroot. See Figure 3-2 for a map of major plant communities.

Shallow rocky soils (lithosols) are underlain by basalt. Shrub-steppe plant communities on these shallow soils are commonly referred to as lithosols communities. At low elevations in the CRM area, the lithosols are dominated by rock, stiff sagebrush, buckwheat, and Sandberg's bluegrass. At higher elevations, stiff sagebrush is often replaced by low sagebrush. Common wildflowers of the lithosolic habitats include mock goldenweed, Hood's phlox, and rock penstemon. South-facing hillslopes are generally an intricate mosaic of rock, lithosol, and sagebrush-steppe vegetation. Ridgelines and benches are usually dominated by lithosols.

Rocky outcrops and talus slopes are common on the shoulders of drainages and the breaks of ridges within the CRM area. Plants found along the margins of these sites include serviceberry, thick-leaved thelypody, and wax currant. Due to inaccessibility and the lack of forage, potential effects to outcrops and talus slopes will not be addressed in the FEIS.

Ponderosa pine occur on less than 80 acres within the CRM area, primarily at higher elevations in the Upper Parke, Wild Horse North, and Wild Horse Crossing Pastures. Dominant understory plants include big sagebrush, bitterbrush, Idaho fescue, western needlegrass, buckwheats and bluebunch wheatgrass. Due to the similarity of plant species in shrub-steppe and Ponderosa Pine understory, effects to the Ponderosa Pine vegetation type will be included with shrub-steppe for this FEIS.

A noxious weed is a plant that has been introduced to Washington State that is difficult to control and damaging to the economy and/or natural resources. Noxious weeds can invade natural areas and out compete native plants, thereby reducing biodiversity, threatening rare plants, and altering wildlife habitat. Noxious weeds and invasive species are a major concern within the CRM. The goal of weed control on WDFW lands is to maintain and improve the habitat for wildlife, meet legal obligations, provide good stewardship and minimize encroachment onto adjacent private lands.

Roads, trails, and parking areas are major pathways for the spread of noxious weeds and other invasive plants on the Quilomene and Whiskey Dick WAs. Weeds of concern that occur within the CRM Area include Dalmatian toadflax, diffuse knapweed, Russian knapweed, whitetop, perennial pepperweed, kochia, musk thistle, purple loosestrife, Canada thistle, Russian thistle, ventenata, and cheatgrass.

Most of the aforementioned weeds are found along roadsides, in and around agricultural fields or old homestead areas, and within degraded rangelands. Ongoing control efforts through the implementation of the L.T. Murray/Quilomene/Whiskey Dick WA weed management plan (WDFW 2006a) has reduced the overall population size and density of weeds as well as minimizing new occurrences. However, control of some aggressive species has been complicated due to their remote locations, proximity to high value riparian areas, and high annual seed production. Infestations are expected to continue for the foreseeable future despite control efforts.

Prior to European settlement, fire return intervals likely ranged from 30 to 70 years, depending on elevation and plant community type. At the turn of the 20th century, the level of livestock use in this area likely precluded wildfires from carrying across the landscape, thereby increasing fire return intervals. Currently, fires are primarily human-caused, occur primarily adjacent to open roads and the Columbia River, and are actively suppressed. Fires are suppressed to protect sagebrush, reduce the risk of cheatgrass infestations that frequently occur after intense wildfires, and to protect adjacent land ownerships. The CRM area has experienced several recent fires. In 2001 and 2003, two fires burned approximately 100 acres in the Whiskey Dick along Vantage Highway (WDFW 2006a).

Riparian Vegetation

Perennial stream reaches support narrow bands of hydrophytic riparian-wetland vegetation. Approximately seven of the 87.1 stream miles (eight percent) within the CRM have perennial flow. Small to medium-sized trees dominate the overstory in these areas, including black cottonwood, black hawthorn, aspen, and alder. Shrubs and graminoids within and near the streambeds include coyote willow, Wood's rose, mock orange, sedges, rushes, basin wildrye, and non-natives such as reed canarygrass, foxtail barley and bulbous bluegrass. Perennial stream reaches occur for short lengths downstream of springs, at the lower ends of Skookumchuck and Whiskey Dick Creeks, and along portions of Parke Creek (Lower Parke and Whiskey Jim pastures).

Draws and intermittent stream reaches support facultative riparian-wetland vegetation such as mock orange, Wood's rose, black hawthorn, and basin wildrye. Rocky Coulee and Schnebly Coulee, along with other smaller draws, support this type of plant community.

Palustrine wetlands are found sporadically within the CRM Area. They are primarily associated with riparian areas and springs, but are also found around man-made stock ponds. There are approximately 2.2 acres of palustrine wetlands found in the Lower Parke Creek pasture. This includes a 0.5-acre man-made stock pond that was developed within the Little Parke Creek drainage and a 1.7-acre wetland adjacent to Parke Creek (WDFW 2008b).

Although riparian areas and wetlands cover less than 0.5 percent of the CRM area, their ecological significance far exceeds their limited physical area. Riparian and wetland areas are major contributors to ecosystem productivity and structural and biological diversity, particularly in drier climates (Elmore and Beschta 1987).

Sensitive Plant Species

There are no known federally listed plant species within the CRM area. Ute's ladies tresses has been documented along the shoreline of the Columbia River in Washington, but not in or near the CRM area.

Three state-listed sensitive or special status plant species occur within the CRM Area (Table 3-5). Hoover's tauschia is listed as a threatened species by Washington State and as a species of concern by the USFWS. This species occurs on shallow, rocky soils (lithosols) along ridge tops and is often associated with Sandberg bluegrass, stiff sagebrush, spinescent fameflower, scilla-like onion, sagebrush violet, bitterroot, Canby's lomatium, and cushion fleabane (WNHP 1999). Hoover's tauschia was observed on the Whiskey Dick and Quilomene WAs, within the CRM area, during plant surveys conducted in May 2007 and 2008 by the Washington Native Plant Society (WNPS 2008, Marsh 2008). Additional populations have been documented within the CRM area on BLM land in the Rocky Coulee and Vantage Highway Pastures (WNHP 2008).

Table 3-5 Washington Natural Heritage Sensitive Species that are Known in the Area

Common Name	Scientific Name	State Status
Hoover's tauschia	*Tauschia hooveri*	Threatened
Pauper milk-vetch	*Astragalus misellus* var. *pauper*	Sensitive
Hedgehog cactus	*Pediocactus simpsonii* var. *robustior*	State Review Group 1

Source: WNHP 2008; WDFW 2008

Pauper milk-vetch is listed as a sensitive species by Washington State and occurs primarily on ridge tops. This species is often associated with stiff sagebrush, rock buckwheat, bluebunch wheatgrass, Sandberg's bluegrass, line-leaf fleabane, longleaf phlox, large seeded biscuitroot, and western hawksbeard (WNHP 1999). Pauper's milkvetch has been documented within the CRM area on the Whiskey Dick WA (WNHP 2008).

Hedgehog cactus, a State Review Group 1 species, primarily occurs on shallow, rocky soils along ridge tops, but has also been found on dry, rocky, south-facing hillsides. This species is often associated with stiff sagebrush, thyme-leaf buckwheat, Sandberg's blue grass, Hooker's balsamroot, wild onions, biscuitroots, line-leaf fleabane, mock goldenweed, Hood's phlox, and brodiaea (WNHP 2005). Hedgehog cactus was observed on the Whiskey Dick and Quilomene WAs during plants surveys conducted in May 2007 and 2008 by the WNPS (Marsh 2008). This species was also frequently encountered during the Wild Horse CRM rangeland inventory (2006 – 2008), and has been documented across the CRM area by WNHP (2008).

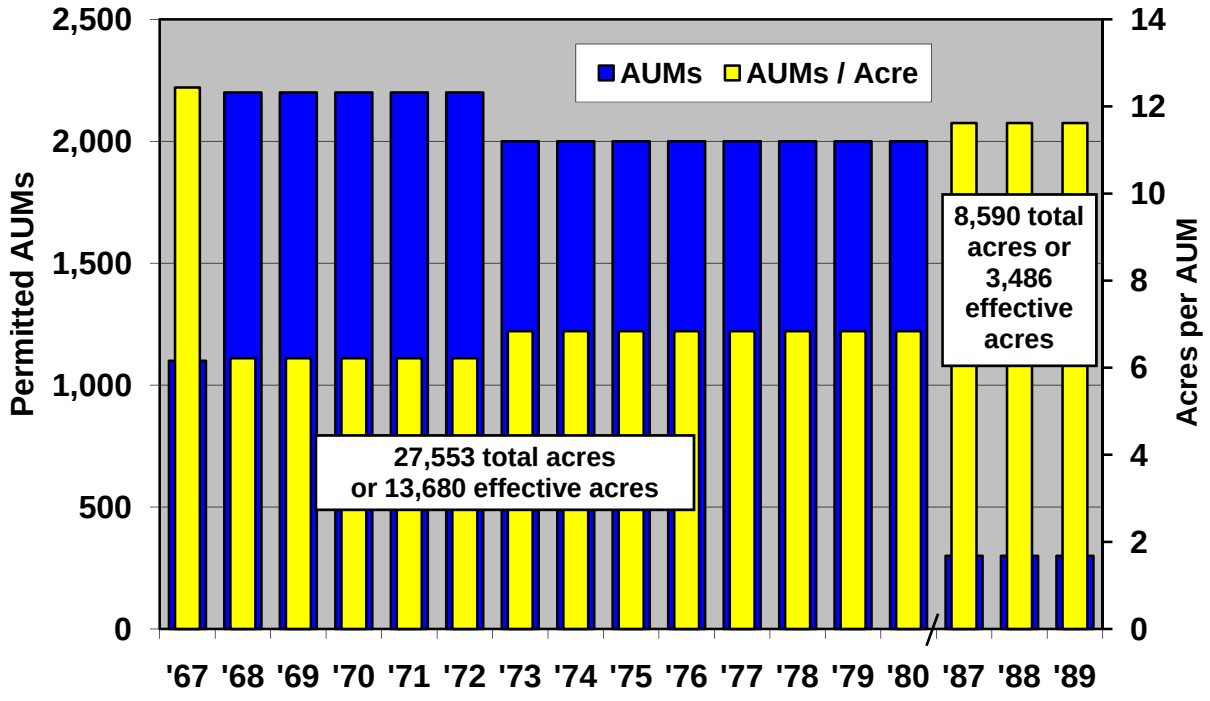
A population of the native common reed biotype has been documented within the Whiskey Dick drainage in the CRM Area. Stands of native common reed are relatively rare statewide due to the invasion of a more virulent biotype from Eurasia.

Rangeland Health

Current rangeland health in the CRM area reflects historical grazing practices and other vegetation management, including fire and agriculture. Grazing practices have changed over time and stocking rates have generally decreased. On the recently acquired portions of the Quilomene WA, grazing management has gone from season-long grazing to deferred or rest-rotation grazing. In the recent past, use was rotated across pastures, but pastures were infrequently rested during the critical period of bunchgrass growth. On the Whiskey Dick WA, livestock numbers and the amount of use decreased from an average stocking rate of around seven effective acres per AUM from 1967 to 1980, to around 12 effective acres per AUM in 1987 to 1989 (Figure 3-3). No livestock grazing has occurred in the East and West Whiskey Dick Pastures since 1981, and since 1989 in the Rocky Coulee and Lone Star Pastures. Forty photo-monitoring sites were established in 1981 to track changes in vegetation following the removal of livestock. Photo-monitoring has been repeated at regular intervals from 1981 to present. Appendix D contains a photo progression from 7 of these sites, spanning from 1981 to 2003.

Rangeland health was assessed across the CRM Area by a group of rangeland specialists from NRCS, BLM, DNR, and WDFW. Methods and a full analysis of these assessments are presented in Appendix B. Rangeland Health was assessed on 42,813 acres of the CRM area. Sites not assessed include rocky outcrops, riparian areas, and seven ecological sites from the Lone Star and East Whiskey Dick Pastures, where data collection was incomplete. There are three attributes of Rangeland Health, two of which, soil/site stability and hydrologic function, were discussed in the Soil Resources Section. This section includes an analysis of the effects of livestock grazing on the remaining attribute, biotic integrity. Indicators for biotic integrity include the following: soil surface resistance to erosion, soil surface loss or degradation, compaction layer, functional/structural groups, plant mortality/decadence, litter amount, annual production, invasive species, and reproductive capability of perennials. These indicators were compared to references described in ecological site descriptions (Rouse 2004), and rated by the degree of departure from reference conditions. Results summarized by pasture can be found in Table B-9

Figure 3-3. Whiskey Dick Wildlife Area Permitted Livestock Grazing 1967-2009.



Range Condition and State and Transition Models

Plant production was estimated across the CRM area, concurrently with rangeland health assessments. Percent composition of each species, by weight, was then used to determine current range condition and ecological status, based on a State and Transition Model (Rouse 2004). Range condition compares the plant species composition of the current plant community to the historic climax plant community, and is expressed as percent similarity. Excellent condition rangeland is defined as 75-100 percent similarity to the ecological site reference, good condition is 50-75 percent similarity, fair condition is 25-50 percent similarity, and poor condition is 0-25 percent similarity. Range condition is based on traditional Clementsian succession, whereby a linear sequence of species replacements occurs through time based on disturbance or release from disturbance. Prior to the late 1980s, this was the accepted theory for secondary succession in arid and semi-arid rangelands. Since the late 1980s however, range condition has largely been replaced by the State and Transition Model (STM). The vegetation types in this model are called “states” and the processes that cause states to change from one to another are called “transitions”. Plant community change within a state is generally reversible, but transitions between states cross an ecological threshold, and are generally irreversible. Within the CRM area, an alternative stable state exists on sites dominated by cheatgrass. It is generally accepted that such sites will not return to the historic climax plant community with passive restoration alone, within a meaningful timeframe. For sites where the historic climax plant community was predicted to be a big sagebrush/bluebunch wheatgrass plant association (31,993 acres), vegetation types described according to STMs will be used in the effects analysis. An STM has not been developed for lithosol plant communities, therefore, vegetation types described according to the range condition model will be used in the effects analysis for these communities (20,791 acres). Remaining acres (rocky outcrops, riparian, and forested areas) were not assessed by either model.

Appendix B contains a diagram depicting the current STM for Wyoming big sagebrush/bluebunch wheatgrass sagebrush-steppe (adapted from Rouse 2004). This STM has three separate stable States, and two to three plant communities within each State; State 1A is typified by perennial bunchgrasses with sparse sagebrush, State 1B is typified by perennial bunchgrasses, State 1C is typified by depauperate sagebrush-steppe, State 2A is typified by the dominance of annual grasses, State 2B includes an understory dominated by annual grasses with a sagebrush overstory, State 3A is typified by introduced grasses, and State 3B is typified by introduced grasses with a shrub overstory.

Riparian Proper Functioning Condition

Proper Functioning Condition (PFC) assessments were conducted along seven stream miles within the CRM area. PFC assessments rate the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of a riparian-wetland area.

3.4.2 Environmental Consequences

The effects of overgrazing are well documented (Belsky 1992, Fleischner 1994, Donahue 1999, Vavra et al. 2007, as cited in WDFW 2008). However, light to moderate livestock grazing often allows the maintenance of plant diversity, and in some cases, increases diversity as compared to un-grazed areas (Olff and Ritchie 1998, Rambo and Faeth 1999, Manier and Hobbs 2006). Long-term exclosure studies indicate that recovery following historical overgrazing is similar between ungrazed and moderately grazed areas (Holechek 1983, Curtois et al. 2004).

Livestock grazing in spring (during seedhead formation) removes live green forage as well as standing dead plant material and forces bunchgrasses to re-initiate efforts to produce seed. When timed properly, sufficient soil moisture remains so that the plants are able to re-grow nutritious new foliage, but they enter summer dormancy before they are able to produce new seed heads. The nutritious new growth provides more palatable forage for wildlife that use these areas the following fall and winter (Clark et al. 1998, Clark et al. 2000, Ganskopp et al. 2007). A similar management strategy, involving periodic deferment and rest, has been effective to ensure bunchgrasses remain healthy and productive and complete their life cycle (Evans 1986 in Vavra 2005, Frisina and Morin 1991, Frisina 1992, Grover et al. 1986, Vavra and Sheehy 1996, Yeo et al. 1993).

However, moderate to heavy livestock grazing during the critical growth period for native bunchgrasses (i.e., boot stage to seed ripe phenological stages) could result in reduced vigor, as evidenced by fewer seed stalks, lower vegetative production, and smaller crown size (Blaisdell and Pehanec 1949, Mueggler 1972, Clark et al. 1998). Heavy grazing during the critical growth period for several years can completely deplete plant reserves, eventually killing key species and allowing a corresponding increase in less palatable plants (Wilson et al. 1966). The Proposed Grazing System for Alternatives 1 and 2 allows grazing during the critical growth period only one out of three years, and limits utilization to 35 percent of current biomass, with the exception of sites within 100 meters of water.

Grazing during the critical flowering and seed set period for native forbs may alter plant species composition and density, including a potential increase in sagebrush density. The flowering and

seed set period varies by species and site; this period occurs from late March to mid-April in lithosol communities, and from April through June on deeper soil sites.

It is generally accepted that unmanaged, heavy grazing adversely affects riparian vegetation growth and stream bank stability. However, rest-rotation grazing systems and/or specialized grazing schemes in which riparian zones are treated as special use pastures may minimize adverse effects to riparian vegetation (Kauffman and Krueger 1984). The timing of livestock grazing is also important. Spring and early summer grazing typically results in more uniform cattle distribution than mid to late summer grazing, as forage quality is similar between upland and riparian areas during the upland growing season (Bailey 2005). Clary (1999) found improvements in stream channel configuration (width to depth ratio) and riparian plant diversity after implementing a light or moderate late spring grazing regime on heavily grazed pastures.

3.4.2.1 Alternative 1: No Action

Direct and Indirect Effects

Grazing would be implemented at reduced AUMs compared to levels prior to WDFW ownership. Grazing would occur on up to 16,748 acres (WDFW-managed pastures) with 500 average annual AUMs. Overall forage utilization would be light, with 35 percent of annual forage consumed. Grazing during the critical growth period for bunchgrasses would be limited to one out of every three years, and the grazing period would be limited to spring and early summer. On average, four out of the five WDFW-managed pastures will be grazed each year.

Upland Vegetation

Through implementation of the Proposed Grazing System and BMPs, effects of livestock grazing throughout the majority of the area will be minor. No changes in plant species composition, structure, and density are expected. Areas within 100 meters of developed stock water, where 60 percent utilization is allowed, are currently dominated by weedy and early seral plant species. These sites are not expected to either improve or decline. Additional site-specific information and analyses are presented below, based on the rangeland inventory data collected across the CRM area (Rangeland Health, range condition, and vegetation state based on STM).

Of the acres assessed for biotic integrity in the Alternative 1 area, approximately 79 percent are similar to reference sites using the indicators discussed in Section 3.4.1 (degree of departure from reference conditions was rated as “none to slight” for 11 percent of the area and “slight to moderate” for 68 percent of the area). Sites rated as having a “none to slight” departure from reference conditions are located far away from water or on steep slopes, and are expected to remain stable. Sites currently rated with “slight to moderate” departure from reference conditions are expected to remain stable or gradually improve. Approximately 18 percent of assessed sites were rated with “moderate” departure from reference conditions, and 3 percent of assessed sites were rated as “moderate to extreme”, which indicates significant departure from the ecological site reference. High utilization (up to 60 percent utilization) will be allowed on 1.4 percent of the Alternative 1 area (areas within 100 meters of developed stock water). Sites where high utilization will be allowed generally had either a “moderate” or “moderate to extreme” departure from the ecological site reference. No further departure from the ecological site reference is expected where high utilization is allowed, however, little or no recovery is expected either. Beyond 100 meters from developed stock water, sites currently rated with “moderate” departures

are expected to gradually improve, but sites with a “moderate to extreme” departure from ecological site reference are not expected to recover, without active restoration.

Of the acres assessed for vegetation state in the Alternative 1 area, approximately 34 percent are in State 1A, 1 percent are in State 1B, 42 percent are in State 1C, 19 percent are in State 2A, and 4 percent are in State 2B. Sites close to water and/or on gentle slopes are predominantly in State 2 (A or B). Sites within 100 meters of water where 60 percent utilization will be allowed are predominantly in State 2A or 2B. No recovery is expected on these sites without active restoration, with or without livestock grazing. Sites in State 1C are expected to slowly recover (this would be indicated by increases in perennial bunchgrass and native forb cover).

Range condition status of lithosol plant communities in the Alternative 1 area indicate that approximately 2 percent are in excellent condition and 98 percent are in good condition (Tables B-14, B-15, B-16, B-17, and B-20). Sites in good or excellent condition are expected to remain stable. Lithosol plant communities were not generally found within 100 meters of water.

With implementation of the Proposed Grazing System and current rangeland conditions, overall direct and indirect effects from livestock grazing are expected to be minor. However, moderate effects such as increased invasive plant establishment could occur within 100 meters of stock water, where higher utilization (60 percent) would be allowed, and within loafing areas and around salt/supplement sites. Ongoing weed control efforts and rangeland vegetation monitoring would minimize invasive plant establishment by early detection and treatment measures. Sites where high utilization would be allowed (typically in State 2A or 2B) have crossed an ecological threshold and are unlikely to recover without active restoration.

As rangelands recover from historic grazing (prior to WDFW acquisition), biomass, and consequently litter, is expected to accumulate. Trenching associated with 6 spring redevelopments is expected to result in short-term effects to upland vegetation associated with springs. Effects would include removal of vegetation in an area up to two feet wide for the length of the pipe. Disturbed areas would be reseeded with native plant species, and monitored for weed invasions.

Riparian Vegetation

Riparian PFC assessments were conducted along four miles of Parke Creek. The upper 1.75-mile reach (Upper Parke Pasture) was rated as properly functioning, with slightly less riparian-wetland vegetation than expected. The streambed in this reach is predominantly comprised of colluvial material, water flow is low, and the occurrence of surface water is restricted to spring months. Riparian-wetland vegetation along this reach is limited to facultative wetland shrubs such as black hawthorn and the occasional coyote willow. Effects to this reach under Alternative 1 would be minor to moderate, due to the Proposed Grazing System and BMPs. Potential effects could include the deceleration of recovery of riparian-wetland vegetation. The potential of this reach to support obligate riparian-wetland vegetation is unknown, but suspected to be minimal.

The 2-mile middle reach of Parke Creek (Whiskey Jim pasture) was rated as non-functional, due primarily to rerouting and channelization during past road construction. This site also supported less riparian-wetland vegetation than expected, however, vigorous and expanding stands of cottonwoods and willows were noted. Due to the presence of fish, livestock will be excluded

from this reach through the use of temporary fencing. Therefore, effects from livestock grazing on this reach will be minimal. An additional 0.25-mile reach of Parke Creek (Lower Parke pasture) was not assessed, but will be fenced (temporary fencing) to exclude livestock. Effects to this reach are also expected to be minimal.

PFC assessments were not conducted along the remaining streams within the Alternative 1 area, but could occur in the future as time and funding allows. Several small pools of perennial water exist along Whiskey Jim Creek within the Whiskey Jim pasture. Current vegetation at these sites includes aspen, watercress and other obligate wetland vegetation, primarily early seral. The remainder of Whiskey Jim Creek and other streams in the Alternative 1 area are intermittent and support narrow bands of facultative wetland or upland shrubs, including black hawthorn, bitterbrush, and big sagebrush. Effects would likely include the deceleration of recovery, rather than further riparian-wetland vegetation loss, given the current state of riparian areas. Effects to these riparian areas are expected to be minor to moderate, due to the Proposed Grazing System, spring and early summer grazing period, and BMPs. During the cooler months of spring, livestock would disperse more widely than in the mid to late summer. Little shrub browsing and trampling in the riparian area is expected in the spring, however, both these effects will increase as the season progresses. Effects would be temporary, since the Proposed Grazing System would allow grazed and trampled areas to recover and is not expected to limit the development of proper functioning riparian systems.

Trenching associated with six spring redevelopments is expected to result in short-term effects to riparian vegetation associated with springs. Effects would include removal of vegetation in an area up to two feet wide for the length of the pipe. Disturbed areas would be reseeded with native plant species, and monitored for weed invasions. Spring redevelopment would result in decreased grazing pressure along creeks, thereby decreasing adverse effects from trampling and grazing.

Rare Plants

Under Alternative 1, adverse effects to sensitive plant species such as Hoover's tauschia, Pauper milk-vetch, and hedgehog cactus are unlikely. Habitat for these species is found on shallow, rocky soils (lithosols) on ridge tops and slopes. Generally, livestock avoid these habitats due to rocky footings and the paucity of available forage. This is supported by the good to excellent range condition of lithosol plant communities in the Alternative 1 area. In addition, no cattle attractants (water, salt, or supplements) will be placed within or near rare plant populations. Effects to sensitive plant species from livestock grazing under this alternative would be negligible.

Summary

Implementation of the Proposed Grazing System under Alternative 1 would do little to adversely affect existing vegetative communities. Current upward trends in rangeland condition (indicated by increased abundance of perennial bunchgrass species such as bluebunch wheatgrass and Idaho fescue, increased native plant diversity, and decreased bare ground and exotic plant density), are not expected to change under Alternative 1. Riparian vegetation is expected to continue increasing, particularly in fenced areas. In addition, fire return intervals are expected to be unaffected by implementation of Alternative 1.

3.4.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Alternative 2 represents a 10 percent increase in AUMs over Alternative 1, but includes 170 percent more acreage. Alternative 1 utilizes five WDFW-managed pastures in the grazing rotation, while Alternative 2 utilizes nine WDFW-managed pastures, with comparable AUMs. Therefore, direct and indirect effects in the "Western Pastures" (Vantage Highway, Whiskey Jim, Lower Parke, Upper Parke, and South Wild Horse) would be reduced, but direct and indirect effects in the "Eastern Pastures" (Rocky Coulee, Lone Star, West Whiskey Dick, and East Whiskey Dick) would be increased. On average, four out of the nine WDFW-managed pastures will be grazed each year.

Upland Vegetation

Through implementation of the Proposed Grazing System and BMPs, effects from livestock grazing throughout the majority of the area will be minor. No changes in plant species composition, structure, and density are expected, with the exception of areas within 100 meters of developed stock water, where 60 percent utilization would be allowed. Areas within 100 meters of developed stock water are currently dominated by both weedy and native plant communities. Weedy sites are not expected to either improve or decline. Native plant communities may decline, as evidenced by increased weed invasion, reduced bunchgrass and forb cover, and increased sagebrush. Additional site-specific information and analyses are presented below, based on the rangeland inventory data collected across the CRM area (Rangeland Health, range condition, and vegetation state).

Effects to Western Pastures would be similar to those described under Alternative 1, except that recovery of certain sites (sites in State 1C; sites in fair to good rangeland condition; or sites with biotic integrity ratings at slight to moderate or moderate) would be faster, as these pastures would be grazed less frequently over a 5-year period.

Biotic integrity assessments across the Eastern Pastures indicate that approximately 89 percent of the assessed area is similar to reference sites using the indicators discussed above (departure from reference conditions was rated as "none to slight" on 26 percent of the assessed area and "slight to moderate" on 63 percent of the assessed area). Approximately five percent of the assessed area was rated as moderate, or potentially "at risk", and five percent was rated as moderate to extreme, which indicates significant departure from the ecological site reference. Sites rated as moderate to extreme are not expected to recover, unless active restoration occurs. All other sites are expected to remain stable or gradually improve, with the exception of sites located within 100 meters of water (see below for analysis of these sites). Beyond 100 meters from water, sites with slight to moderate or moderate departures from the ecological site reference are expected to continue gradual recovery.

Assessment of current vegetation state of big sagebrush/bluebunch wheatgrass plant communities estimate the acreage in State 1 (i.e. dominated by native species) and State 2 (i.e., dominated by weedy species). Based on species composition and vegetation structure, three plant communities are recognized in State 1 and two are recognized in State 2. Of the acres assessed for vegetation state in the Eastern Pastures, approximately 54 percent are in State 1A, 2 percent are in State 1B, 35 percent are in State 1C, 7 percent are in State 2A, and two percent are in State 2B. Sites close to water and/or on gentle slopes are commonly in State 2 (A or B). No recovery is

expected on these sites without active restoration, with or without livestock grazing. Beyond 100 meters from water, sites in State 1B and 1C are expected to gradually move towards State 1A, while sites in State 1A are expected to remain stable.

Range condition status of lithosol plant communities in the Alternative 2 area indicates that approximately five percent are in excellent condition, 94 percent are in good condition, and one percent are in fair condition (Tables B-14 to B-25). Sites in good or excellent condition are expected to remain stable. Sites in fair condition are expected to gradually recover. Lithosol plant communities were not generally found within 100 meters of water.

High utilization (up to 60 percent) will be allowed on approximately 0.5 percent of the Eastern Pastures. Biotic integrity at these high use sites is highly variable; some sites had only slight departure from the ecological site reference, while other sites were significantly departed. Rangeland state was also variable; some sites were in State 1, while others were in State 2A or 2B. Effects at high utilization sites are expected to be moderate, and could result in the deceleration of recovery, increased potential for invasive plant establishment, and/or further departure from the ecological site reference.

In the Eastern Pastures, Alternative 2 will result in reduced biomass and reduced litter, particularly in areas where 60 percent utilization is allowed. Overall, this reduction will be minor, as less than 35 percent of forage production will be consumed by cattle beyond 100 meters from water, and no forage is expected to be consumed on steep hillsides far from water. The Western Pastures may see an increase in litter, as compared to Alternative 1, as these pastures will be grazed less frequently under Alternative 2.

Trenching associated with 12 spring redevelopments is expected to result in short-term effects to upland vegetation associated with springs. Effects would include removal of vegetation in an area up to two feet wide for the length of the pipe. Disturbed areas would be reseeded with native plant species, and monitored for weed invasions.

Riparian Vegetation

Effects to Eastern Pastures are expected to differ from effects to Western Pastures, as with upland vegetation. Effects to Western Pastures will be similar to those described under Alternative 1, except that recovery would occur more rapidly, as these pastures would be used less frequently over a 5-year period. Effects to riparian vegetation in Eastern Pastures are discussed below.

Riparian PFC assessments were conducted along 2.25 miles of Whiskey Dick Creek. The lower 1.5-mile reach (East Whiskey Dick Pasture; just west of the confluence with the Columbia River) was rated as properly functioning. This reach was characterized by an incised creek channel, with floodplain formation at the current water level. Riparian vegetation along this reach is comprised of a dense band of shrubs (coyote willow and mockorange), graminoids such as reed canarygrass and smooth scouring rush, and poison ivy. Due to the presence of endangered steelhead, temporary fencing will be used to exclude livestock grazing from this reach. Therefore, effects to riparian vegetation from grazing along this reach are expected to be minimal.

A 0.25-mile reach at the confluence of Whiskey Dick Creek and Hartman Creek was rated as Functional At Risk, due primarily to the likelihood of natural downcutting without beaver activity to slow water flow and replenish sediment. This reach contains a patch of the native common reed biotype, along with sedges, rushes, and coyote willow. Temporary fencing will be used to exclude livestock grazing from this reach, therefore, effects are expected to be minimal.

A 0.5-mile reach immediately upstream of the Hartman-Whiskey Dick confluence was rated as non-functional, due to an extremely incised creek channel and no functional floodplain. Proper functioning is unlikely to return naturally, without the reintroduction of beaver. Riparian vegetation along this reach is similar to the reach described above. This reach will also be fenced to exclude livestock, therefore, effects are expected to be minimal.

PFC assessments were not conducted along the remainder of Whiskey Dick Creek, or other streams within the Alternative 2 area, but could occur in the future as time and funding allows. Several small pools of perennial water exist along Hartman, Patte, Rollinger, Bryant, and Bohinkleman Creeks, primarily associated with springs (see Figure 3-2). Current vegetation at these sites includes reed canarygrass, basin wildrye, sedges and rushes, elderberry, red-osier dogwood, serviceberry, and hawthorn. The majority of these sites will be fenced to exclude livestock (Figure 3-3), therefore effects are expected to be minimal. Effects will be lessened through implementation of the Proposed Grazing System, use during cooler months (spring and early summer), and BMPs, which include utilization triggers for riparian areas. During the cooler spring months, livestock are expected to disperse more widely than in the mid to late summer. Little shrub browsing and trampling in the riparian area is expected during the early spring, however, both these effects will increase as the season progresses. Effects would be temporary, since the Proposed Grazing System would allow grazed and trampled areas to recover and is not expected to limit the development of proper functioning riparian systems.

The remainder of these streams and other streams in the Eastern Pastures are intermittent and support narrow bands of facultative wetland or upland shrubs, including black hawthorn, bitterbrush, and big sagebrush, along with basin wildrye. Effects will be lessened through implementation of the Proposed Grazing System, use during cooler months (spring and early summer), and BMPs, which include utilization triggers for riparian areas. Effects to these areas would be similar to those described above, but would likely be minor to moderate due to the lack of surface water as an attractant to cattle.

Trenching associated with 12 spring redevelopments is expected to result in short-term effects to riparian vegetation associated with springs. Effects would include removal of vegetation in an area up to two feet wide for the length of the pipe. Disturbed areas would be reseeded with native plant species, and monitored for weed invasions. Spring redevelopment is expected to result in decreased grazing pressure in riparian areas, thereby decreasing adverse effects from trampling and grazing.

3.4.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Under this alternative, livestock grazing would not occur. Recovery of vegetation in the Western Pastures is expected to be more rapid, particularly in riparian areas associated with non-fish bearing streams. In addition, the potential for increased invasive weed establishment within 100

meters of developed stock water would no longer be expected. Within Western and Eastern pastures, sites in either State 2A or 2B are still not expected to improve without active restoration. Spring redevelopments and the temporary effects associated with trenching would not occur.

3.4.2.4 Cumulative Effects

Combined, WDFW and WDNR manage approximately 12 percent of Washington's remaining shrub-steppe. Several extensive areas of continuous shrub-steppe are in close proximity to the CRM area, and are primarily on federal or tribal holdings (Yakima Training Center, Hanford Nuclear Site, and the Yakama Nation). The Wild Horse CRM area accounts for approximately 19 percent of remaining shrub-steppe within Kittitas County.

Conversions to dryland agriculture, which occurred prior to 1940, and use of irrigation to expand farming and orchards, which has occurred from 1950 on, have reduced the once-expansive native steppe and shrub-steppe of eastern Washington to a fragmented landscape with very few large areas of native vegetation. Shrub-steppe communities are continually being lost due to urban and suburban growth associated with population growth and increased cultivated agriculture. At the state level, the area of historical shrub-steppe habitat that has been lost due to conversion to agriculture is estimated to be 50 percent (Vander Haegen 2007). In central Washington, 75 percent of the shrub-steppe regions containing loamy soils have been converted to agriculture or other land uses, where less than 15 percent of shrub-steppe growing in shallow soils have been converted (Knick et al. 2003).

Human population growth and associated development in Kittitas County and Kittitas Valley, expansion of existing road networks, and future regional energy projects needed to support growth, would all be sources of ground disturbance and habitat fragmentation.

Alternative 1
The effects to the shrub-steppe habitat in the region would not be exacerbated by Alternative 1, as minor effects are expected overall. Spring redevelopments could occur on DNR ownerships within WDFW-managed pastures, and on PSE-managed pastures.

Alternative 2
Cumulative effects under Alternative 2 would be the same as Alternative 1, except grazing would occur across a larger area. Spring redevelopment could occur on DNR and BLM ownerships within WDFW-managed pastures, and on PSE-managed pastures.

Alternative 3
With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE ownership. In addition, DNR and BLM would have the option to pursue grazing leases on their ownerships within the CRM area. Most of these parcels are inholdings within the Quilomene and Whiskey Dick WAs, and additional fencing would be required to exclude trespass livestock on WDFW ownership.

3.5 Wildlife

3.5.1 Affected Environment

Washington's shrub-steppe communities support a wide diversity of wildlife (Dobler et al. 1996), including many WDFW Priority Species. Within the CRM area, priority mammals include elk, mule deer, California bighorn sheep, white-tailed and black-tailed jackrabbit, and Townsend's ground squirrel. Priority bird species that may occur include golden eagle, ferruginous hawk, bald eagle, prairie falcon, peregrine falcon, burrowing owl, sage thrasher, sage sparrow, loggerhead shrike, and sage-grouse. Priority amphibians and reptiles that may occur in the area include the Columbia spotted frog, short-horned lizard, yellow-bellied racer, and western rattlesnake. In addition, lower elevations of the Whiskey Dick Wildlife Area are within the largest core habitat for the striped whipsnake. Three-quarters of all known snake species in Washington occur in this region of the state, as well as five known lizard species and five known amphibian species, making this an exceptionally diverse area for reptiles and amphibians.

The CRM area is characterized by steep, rocky slopes and a series of ridges (WDFW 2006b), with several WDFW Priority Habitats known to occur in the area, including shrub-steppe, riparian, wetland, cliff, and talus habitats. The area provides important winter and spring habitat for mule deer and elk and year-round use by bighorn sheep. Cliffs and talus provide key habitat for various species including golden eagles and peregrine falcons. Riparian and wetland areas account for less than 1 percent of the CRM area, but provide critical life requisites such as cover, forage, and travel corridors. Riparian areas provide key habitat for more than 75 percent of all wildlife species during a portion of their lifecycle, and provide habitat for more species of birds than all other rangeland types combined (Chaney et al. 1990).

Big Game

There are regular, large concentrations of mule deer (700 to 800 animals) using the CRM area during the winter and spring (WDFW 2006a, 2008b). Critical winter and spring forages for deer, such as bitterbrush and Sandberg's bluegrass, occur throughout the CRM area. These provide the quality forage needed for winter survival and successful fawning. Populations of deer and elk also occur year-round in small numbers.

A large portion of the Colockum Elk Herd (1,500 to 2,000 animals) uses the CRM area during the winter and spring (WDFW 2006a, 2008b). Winter elk forage includes native grass species such as Sandberg's bluegrass, which greens up with fall rains. Elk also utilize portions of the CRM area for calving and as a migration corridor to summer range. Elk calve in the late spring (May through June), as forage production and nutrition levels peak.

Bighorn sheep populations declined significantly in the 1970s, due to a disease outbreak. Between 1993 and 1996, 43 California bighorn sheep were released at the mouth of Quilomene Creek (WDFW 2006b). Bighorn sheep are now distributed along the Columbia River from Malaga to Vantage. The current population ranges from 148 to 182 sheep (WDFW 2008b) with regular, large concentrations of bighorn sheep occurring in the Skookumchuck pasture (WDFW 2008b). Lower levels of use also occur on suitable habitat within the East Whiskey Dick pasture and the Ginkgo Petrified Forest State Park. The greatest threat to bighorn sheep continues to be an outbreak of disease such as pneumonia from domestic sheep.

Small Mammals

State-listed small mammals that occur in the CRM area include white-tailed and black-tailed jackrabbits, and Townsend's ground squirrel. Black-tailed and white-tailed jackrabbit have been documented in and adjacent to the CRM area, and suitable habitat occurs throughout the CRM area. Townsend's ground squirrels have also been documented in the CRM area, primarily on deeper soil types. Historically, pygmy rabbits occurred in shrub-steppe habitat in five central Washington counties but were never documented in Kittitas County (WDFW 1995). Additional WDFW Priority small mammals that have the potential to occur within the CRM area include bats and shrews. PHS bats include roosting concentrations of big-brown bats, *Myotis* bats, and pallid bats, as well as any occurrence of Townsend's big-eared bat. Priority shrews include Merriam's and Preble's shrews.

Birds

The CRM area, bordered on the east by the Columbia River, contains several Priority Habitats which support a diversity of bird species. The CRM area is also located within the Pacific Flyway, one of four principal north-south bird migration routes in North America.

State-listed birds that occur in the CRM area include sage-grouse, golden eagle, bald eagle, peregrine falcon, loggerhead shrike, sage sparrow, and sage thrasher (Table 3-6). Burrowing owls and ferruginous hawks have been documented adjacent to, but not within, the CRM area.

Sage-Grouse

Sage-grouse are a state threatened species and a federal candidate species. Sagebrush provides food and cover throughout the year for sage-grouse, while the grass-forb understory supplies food and cover from spring through fall (Sveum et al. 1998, Crawford et al. 2004, Stinson et al. 2004). Sage-grouse once occurred year-round on the CRM area, and are still occasionally observed. In September 2007 an abandoned sage-grouse nest was located on the Wild Horse Wind Power Facility, and a female was observed in the vicinity of the nest (J. Diaz, pers. comm.). The CRM area lies within the 146,565-acre Colockum Sage-Grouse Management Unit of the Sage-Grouse Recovery Area. The Colockum Unit provides an important habitat linkage between the Moses Coulee and Yakima Training Center Sage-Grouse Management Units, although "it is handicapped by relatively rugged terrain, much of which may be unsuitable for sage-grouse" (Stinson et al. 2004). The nest, along with the occasional grouse sightings, point to the importance of the CRM area for meeting the objectives of the Sage-Grouse Recovery Plan.

Raptors

Golden eagles, a state candidate species, are known to nest and forage within and adjacent to the CRM area. Peregrine and prairie falcons are known to nest on and adjacent to the CRM area, utilizing cliffs proximal to the Columbia River for nesting and perching. Bald eagles have been documented nesting north and south of the CRM area along the Columbia River, and are likely to utilize the portion of the CRM area adjacent to the river in the winter. Ferruginous hawks have been documented in the vicinity and prefer the open areas with less than 50 percent shrub cover. Burrowing owls are typically associated with grasslands that have short or patchy grasses with high rodent populations, and have been documented adjacent to the CRM area.

Shrub-Steppe Associates

Mature shrub structure and landscape connectivity in the CRM area provides for a diversity and abundance of shrub-steppe associated birds, such as sage thrasher, sage sparrow, and loggerhead shrike. Shrub-steppe habitat with greater structural complexity tends to support a more diverse

assemblage of bird species (Dobler et al. 1996). Both the sage sparrow and sage thrasher are typically found where shrubs are the dominant structural feature in the landscape (Dobler et al. 1996). In Washington, distribution of the loggerhead shrike is limited to the Columbia River Basin, which includes the CRM area (Vander Haegen 2004c). Loggerhead shrikes occur in the CRM area from March to September, and use grasslands or pastures with short or patchy grasses for foraging (Vander Haegen 2004c).

Reptiles and Amphibians

The CRM area is located within the largest core habitat for the striped whipsnake, a state candidate species, and by far the least abundant of all the snakes in the state. Whipsnakes occur in relatively undisturbed native grasslands, sagebrush flats, and dry rocky canyons. The CRM area is also within the potential range of the Columbia spotted frog. The Columbia spotted frog inhabits marshes and marshy edges of ponds, streams, and lakes.

Table 3-6 Special Status Species that Occur or Have Potential to Occur in the CRM Area

Common Name	Federal Status	State Status	Occurrence Within the CRM Area
Sage-grouse	Candidate	Threatened	Occurs onsite
Ferruginous hawk	Species of concern	Threatened	Occurs onsite
Burrowing owl	Species of concern	Candidate	Suitable habitat exists in CRM area but species not documented
Loggerhead shrike	Species of concern	Candidate	Occurs onsite
Bald eagle	Species of concern	Sensitive	Occurs onsite
Peregrine falcon	Species of concern	Sensitive	Occurs onsite
Black-tailed jackrabbit	None	Candidate	Occurs onsite
White-tailed jackrabbit	None	Candidate	Occurs onsite
Townsend's ground squirrel	None	Candidate	Occurs onsite
Golden eagle	None	Candidate	Occurs onsite
Sage sparrow	None	Candidate	Occurs onsite
Sage thrasher	None	Candidate	Occurs onsite
Columbia spotted frog	None	Candidate	Suitable habitat exists in CRM area but species not documented
Striped whipsnake	None	Candidate	Suitable habitat exists in CRM area but species not documented

Source: WDFW 2008c

3.5.2 Environmental Consequences

Ungulate herbivory can change the species composition of plant communities, alter forage production and quality, and modify plant community structure across the landscape. Indirect improvement of forage quality may occur when grazing removes standing, mature vegetation that impedes the ability of an herbivore to access new growth (Vavra 2005). Under the Proposed Grazing System, livestock are expected to remove older, standing dead grass and increase the availability of more palatable and nutritious growth.

Livestock grazing has the potential to effect several of the Priority Habitats within the CRM area, including shrub-steppe, riparian, and wetland habitats (cliff and talus habitats are not expected to

be affected by grazing). Effects to the vegetation in these habitats was discussed in Section 3.4. Potential effects to wildlife from grazing within shrub-steppe habitats could include disturbance to nesting birds, temporal displacement of deer and elk, small mammal and/or reptile burrow collapse, reduced foraging potential for herbivores, and reduced vegetative cover, structure, and composition. Potential effects to wildlife from grazing within riparian and wetland habitats could include disturbance to nesting birds, reduced vegetative cover, composition and structure, reduced foraging potential for herbivores, damage to burrows or hibernacula in streambanks, trampling of amphibians, and reduced water quality for amphibians.

Big Game

Cattle grazing during the spring and early summer could improve the quality of winter forage for elk, provided that cattle are removed early enough to allow re-growth (Vavra 2005). Experimental results supporting this hypothesis have been mixed. Some studies have suggested that livestock can have a positive effect on crude protein and digestibility of elk forage (Ganskopp et al. 2004, Taylor et al. 2004, Yeo et al. 2003). Other research has failed to find forage improvements (Skovlin et al. 1983, Westenkow-Wall et al. 1994). However, most range management experts agree that managing the timing and intensity of grazing is critical to maintaining healthy shrub-steppe. Moderate to heavy grazing during the critical growth period over consecutive years reduces bluebunch wheatgrass vigor and abundance (Rickard et al. 1975), which could result in an increase of early seral species (e.g. cheatgrass and Sandberg's bluegrass). The Proposed Grazing System uses light intensity grazing (35 percent) in a rest-rotational system, whereby pastures will be grazed at most 1 out of every 3 years during the critical growth period.

New boundary fences would increase the potential for injury from entanglement. Wildlife-friendly fencing will be used for all permanent fencing (40-inch high top wire, 30-inch high middle wire, 18-inch high bottom wire). Temporary electric fences will be used around select springs and creeks (see Figure 2-2); these fences will only be up when cattle are present.

Small Mammals

Ground squirrels generally tolerate moderate levels of grazing, as long as sufficient perennial grasses and forbs remain in May and June to meet their nutritional needs during aestivation and hibernation (Fehmi et al. 2005, Tarifa and Yensen 2004). Where natural disturbances such as fire have been eliminated, moderate levels of livestock grazing could benefit ground squirrels, by creating a favorable plant community structure and forage quality (Sherman and Runge 2002).

WDFW management recommendations for shrews include the following: avoid overgrazing (i.e., repeated grazing that exceeds the recovery capacity of the vegetation); protect patches of known habitat including habitat corridors (e.g., riparian areas). WDFW management recommendations for bats state that, should grazing occur, a deferred rotation or rest-rotation grazing system should be implemented, and water developments should be spaced in order to disperse livestock.

Birds

Sage-Grouse

The effects of grazing in sage-grouse habitat depends on the timing and intensity of defoliation. Residual grass cover following grazing is critical for maintaining quality sage-grouse nesting habitat (Beck and Mitchell 2000). Heavy grazing may degrade nesting habitat by reducing vertical structure, which may lead to increased nest predation or desertion, or may prevent use of

a site. However, light to moderate cattle grazing in a managed system can maintain or improve the quantity and quality of summer forage (i.e. forbs) for sage-grouse.

Sage-Grouse Recovery Plan guidelines (Stinson et al. 2004) recommend an average utilization of no more than 35 percent, seasonal rotations through pastures, and periodic rest or deferment of each pasture. Where site potential allows, the guidelines recommend maintaining at least 7 inches (15-18 cm) of grass/forb height for breeding (March to mid-April) and brood-rearing periods (April through July). The Proposed Grazing System implements all of these recommendations.

New fencing may provide additional predator perch sites, and increases the potential for fence collisions. Temporary fences would be used where appropriate to minimize these affects. In addition, fence markers will be installed on permanent fence to make wires more visible and reduce collision hazard.

Raptors
The Proposed Grazing System is not expected to adversely affect the raptor prey base (ground squirrels, jackrabbits, chukar, etc). PHS guidelines for raptors will be implemented during the construction period for spring redevelopments and fences (permanent fence only). Construction activities within 300 meters of occupied golden eagle nests will not occur during the nesting season (mid February to mid July). New boundary fences would provide additional perch sites but could also increase the potential for fence collisions. Temporary fences and fence markers on permanent fences would minimize these affects.

Shrub-steppe Associates
WDFW management recommendations for sage thrasher, sage sparrow, and loggerhead shrike suggest that livestock grazing be kept at low to moderate levels (25 to 40 percent) and that more than 50 percent of the current year's perennial bunchgrass production be allowed to persist through the following breeding season (Vander Haegen 2004a, b, c). Sage thrashers are known to tolerate moderate levels of grazing (Saab et al. 1995). A local study (Downes 2003) found no difference in sage thrasher nesting success between grazed and ungrazed pastures within the CRM area.

Heavier utilization that is consistently greater than 60 percent would tend to increase sagebrush density and cover, reduce abundance of understory grass and forbs, and increase annual species such as cheatgrass. While this could increase the availability of nest sites for some shrub-nesting birds, it could reduce understory foraging habitat. Species that nest on the ground would respond negatively to heavier grazing (Saab et al. 1995). Grazing has the potential to increase brown-headed cowbird abundance that could result in increased nest parasitism and reduced annual recruitment of host shrub-steppe species. Sage sparrows are known to be affected by cowbirds in central Washington, however, overall parasitism rates are low (less than 10 percent) (Vander Haegan and Walker 1999). The Proposed Grazing System uses light intensity grazing (35 percent) in a rest-rotational system.

Reptiles and Amphibians
Management recommendations for striped whipsnake (Nordstrom and Whalen 1997) encourage conservation of rodent burrow systems. Optimal habitats for this species are near talus slopes,

rocky canyons, and dry rocky streambeds; these areas would be unlikely to attract livestock concentrations. Limited surveys in the Whiskey Dick WA found no whipsnakes (pers. comm. Bernatowicz 2009). Habitat for the Columbia spotted frog is limited to marshes and marshy edges of ponds, streams, and lakes. According to the National Wetlands Inventory (NWI), 68 acres of wetlands exist within the CRM area. Of these wetlands, 13 acres are actually man-made impoundments in various states of functionality. Impoundments in the Eastern Pastures have not been maintained, and no longer hold water or support hydrophytic vegetation. Several of the impoundments in the Western Pastures have been maintained, and hold water for a portion of the year, but the majority are either breached or otherwise non-functional. No Columbia spotted frogs have been documented within the CRM area. Wetlands and riparian areas that will be fenced to exclude livestock are depicted in Figure 2-2.

3.5.2.1 Alternative 1: No Action

Direct and Indirect Effects

Big Game

Utilization standards under the Proposed Grazing System will reduce the potential for forage competition between livestock, mule deer, and elk. Utilization monitoring will measure combined deer, elk, and cattle use of key grasses, and livestock will be moved when this cumulative use threshold is reached. Elk use of the Alternative 1 area is dependent on weather conditions and human disturbance. Cattle turnout will occur in lower elevation pastures, and use will be rotated to middle and upper elevation pastures as the season progresses. Under this schedule, many elk are expected to have moved out of each pasture prior to cattle entrance, and remaining elk are expected to be displaced to adjacent pastures. No displacement of mule deer by cattle grazing is expected.

The level of grazing proposed under this alternative would have minor, short-term effects on forage quantity for mule deer and elk. Slight improvement of big game forage quality could also occur but it might be inconsequential under light utilization and frequent rest. Adverse effects to big game winter range are not expected with implementation of the Proposed Grazing System and BMPs.

New fences could limit big game movement. Under Alternative 1, 5.2 miles of permanent fence would be constructed. This represents a 7 percent increase in the miles of permanent fencing present within the Alternative 1 area. Fencing effects would be long-term (for the life of a fence). Wildlife friendly fencing, which includes high bottom wires and low top wires, will be used to facilitate movements by deer and elk. Existing pasture fences would continue to be maintained, and this could also affect big game movement. Fence maintenance and construction crews may temporarily displace elk to adjacent areas, this effect is expected to be minor. Overall, effects from fencing under this alternative would be minor as 5.2 miles of wildlife-friendly fence will be constructed and existing fences are already in place and in good repair.

There are no bighorn sheep within the Alternative 1 area, therefore, no effects from grazing would occur.

Small Mammals

Ground squirrels tolerate grazing if sufficient perennial grasses and forbs remain in May and June to meet their nutritional needs during aestivation and hibernation (Fehmi et al. 2005, Tarifa

and Yensen 2004); this is expected through the implementation of the Proposed Grazing System. Effects to ground squirrels under Alternative 1 are expected to be minor.

The Proposed Grazing System meets or exceeds PHS guidelines for bats and shrews, therefore, effects to these species are expected to be negligible.

Birds

Sage-Grouse

Adverse effects from livestock grazing would be minimized through implementation of Sage-Grouse Recovery Plan recommendations (SGRP; Stinson et al. 2004). Following these recommendations, livestock grazing will be light intensity, seasonally rotated, and no new springs will be developed. Further, participation in the Wild Horse CRM allows WDFW to influence grazing practices on adjacent PSE-owned land, where sage-grouse have been sighted in recent years.

Under the Proposed Grazing System, grazing effects to shrub-steppe habitat are expected to meet the grass/forb and shrub height and cover requirements identified in the SGRP for nesting and brood rearing periods. Riparian and wetland areas with a herbaceous understory also provide suitable habitat for sage-grouse during brood rearing. The majority of such riparian and wetland areas will be fenced to exclude livestock (see Figure 2-2). Therefore, effects to sage-grouse nesting and brood rearing habitat will be minor. Winter forage for sage-grouse is almost exclusively sagebrush. As sagebrush is a minor component of cattle diets, negligible effects to winter habitat are expected.

Under Alternative 1, 5.2 miles of permanent fence would be constructed. This represents a seven percent increase in the miles of fencing present within the Alternative 1 area. A very slight increase in the potential for fence collisions could occur due to new fencing. In addition, this new fence represents a slight increase in the potential for avoidance, and increased predation risk. In addition, fence markers will be installed on new permanent fence to make wires more visible and reduce collision hazard. Fence markers will be installed on existing permanent fence over time, as funding is available. Areas with the highest likelihood for sage-grouse will be targeted for fence markers first. Existing pasture fences would be maintained, and this could also affect sage-grouse, although given the low abundance of sage-grouse and the use of fence markers, this effect is expected to be minor.

Raptors

Proposed grazing would not measurably affect habitat conditions for bald eagle, golden eagle, burrowing owl, peregrine falcon, prairie falcon and ferruginous hawk, nor cause long-term displacement of any sensitive species. While it is possible for short-term disturbance to occur, the likelihood is relatively low because of the small percentage of area affected relative to the habitat distributions, and the implementation of PHS guidelines around active nests. Prey abundance for these species would not be expected to change by implementing this alternative.

Shrub-steppe Associates

Under the Proposed Grazing System, pastures would be lightly grazed and allowed to re-grow, providing litter and screening cover for ground-nesting birds. The proposed light to moderate levels of grazing would have relatively little effect on many shrub-steppe associates, due to their

ecological plasticity and ability to adapt to local grazing patterns (Saab et al. 1995). This would be expected for grazed pastures and no direct effects would be apparent in years of rest.

The introduction of new fences could adversely affect ground-nesting birds by providing additional predator perches and increasing collision risk. Collisions would be reduced through the use of fence markers. Overall, a very slight increase in fence-related conflicts with shrub-steppe associates could occur due to new fencing. New fences could be beneficial to loggerhead shrike.

Reptiles and Amphibians

There is no known striped whipsnake habitat within the Alternative 1 area, therefore, no effects to this species are expected. The Columbia spotted frog is not known to occur within the project area; however, potential suitable habitat does exist. Livestock grazing in riparian areas and wetlands in the Lower Parke and Whiskey Jim pastures has the potential to negatively affect the Columbia spotted frog, however these effects will be minimal as most suitable habitat will be fenced to exclude livestock (See Figure 2-2).

3.5.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Alternative 2 represents a 10 percent increase in AUMs over Alternative 1, but includes 170 percent more acreage. Alternative 1 utilizes five WDFW-managed pastures in the grazing rotation, while Alternative 2 utilizes nine WDFW-managed pastures, with comparable AUMs. Therefore, direct and indirect effects in the "Western Pastures" (Vantage Highway, Whiskey Jim, Lower Parke, Upper Parke, and South Wild Horse) would be reduced, but direct and indirect effects in the "Eastern Pastures" (Rocky Coulee, Lone Star, West Whiskey Dick, and East Whiskey Dick) would be increased. On average, four out of the nine WDFW-managed pastures will be grazed each year.

Big Game

Alternative 2 will reduce the potential for forage competition between livestock, mule deer, and elk in the Western Pastures, as these pastures would be grazed less frequently. However, increased competition could result in the Eastern Pastures, as livestock grazing would be introduced into previously ungrazed areas. Utilization monitoring will measure combined deer, elk, and cattle use of key grasses, and livestock will be moved when this cumulative use threshold is reached, or earlier, depending on the rotation schedule. Elk use of the Alternative 2 area is dependent on weather conditions and human disturbance. Cattle turnout will occur in lower elevation pastures, and use will be rotated to middle and upper elevation pastures as the season progresses. Motorized access is currently restricted in the Eastern Pastures from February 1 to April 30, which should minimize human disturbance in the spring. During April, there is potential for elk displacement (likely to ungrazed drainages within the same pasture or adjacent pastures). After April, many elk are expected to have moved out of each pasture prior to cattle entrance. No displacement of mule deer by cattle grazing is expected.

The level of grazing proposed under this alternative would have minor, short-term effects on forage quantity for mule deer and elk. Slight improvement of big game forage quality could also occur but it might be inconsequential under light utilization and frequent rest. As with

Alternative 1, adverse effects to big game winter range are not expected with implementation of the Proposed Grazing System and BMPs.

New fences could limit big game movement. Under Alternative 2, 8.4 miles of permanent fence would be constructed. This represents a 10 percent increase in the miles of fencing present within the Alternative 2 area. Fencing effects would be long-term (for the life of a fence). Wildlife friendly fencing, which includes high bottom wires and low top wires, will be used to facilitate movements by deer and elk. Existing pasture fences would be maintained, and this could also affect big game movement. Fence maintenance and construction crews may temporarily displace elk to adjacent areas, this effect is expected to be minor. Of the 20 miles of pasture fences in the Eastern Pastures, approximately 13 miles are expected to require significant repairs. Overall, effects from fencing under this alternative would be moderate as 8.4 miles of wildlife-friendly fence will be constructed and existing fences will need significant repairs. Where practical, components of wildlife-friendly fences will be incorporated into existing fence rebuilds.

Bighorn sheep are present within the Alternative 2 area, but due to their preference for steep, rocky terrain, habitat overlap with cattle is expected to be minimal. Therefore, effects to bighorn sheep are expected to be negligible.

Small Mammals
Ground squirrels tolerate grazing if sufficient perennial grasses and forbs remain in May and June to meet their nutritional needs during aestivation and hibernation (Fehmi et al. 2005, Tarifa and Yensen 2004); this is expected through the implementation of the Proposed Grazing System. Effects to ground squirrels under Alternative 2 are expected to be minor.

The Proposed Grazing System meets or exceeds PHS guidelines for bats and shrews, therefore, effects to these species are expected to be negligible.

Birds
Sage-Grouse
Effects to sage-grouse are expected to be similar to those described under Alternative 1. However, the Eastern Pastures are characterized by relatively rugged terrain, much of which may be unsuitable for sage-grouse. Adverse effects from livestock grazing would be minimized through implementation of Sage-Grouse Recovery Plan recommendations (SGRP; Stinson et al. 2004). Overall, effects are expected to be minor.

Under Alternative 2, 8.4 miles of permanent fence would be constructed. This represents a 10 percent increase in the miles of fencing present within the Alternative 2 area. A very slight increase in the potential for fence collisions could occur due to new fencing. Of the 20 miles of pasture fences in the Eastern Pastures, approximately 13 miles are expected to require significant repairs. Overall, effects from fencing under this alternative would be moderate as 8.4 miles of wildlife-friendly fence will be constructed and existing fences will need significant repairs. Where practical, components of wildlife-friendly fences will be incorporated into existing fence rebuilds.

As with Alternative 1, the new fence represents a slight increase in the potential for avoidance, and increased predation risk. In addition, fence markers will be installed on new permanent fence

to make wires more visible and reduce collision hazard. Fence markers will be installed on existing permanent fence over time, as funding is available. Areas with the highest likelihood for sage-grouse will be targeted for fence markers first. Existing pasture fences would be maintained, and this could also affect sage-grouse, although given the low abundance of sage-grouse and the phased-in use of fence markers, this effect is expected to be minor.

Raptors
As with Alternative 1, proposed grazing would not measurably affect prey abundance or habitat conditions for bald eagle, golden eagle, burrowing owl, peregrine falcon, prairie falcon and ferruginous hawk, nor cause long-term displacement of any sensitive species.

Shrub-steppe Associates
As with Alternative 1, the Proposed Grazing System would provide litter and screening cover for ground-nesting birds. The Western Pastures could see increased litter and cover, as they would be grazed less frequently than under Alternative 1. The Eastern Pastures would have reduced litter and screening cover, but this would have relatively little effect on many shrub-steppe associates, due to their ecological plasticity and ability to adapt to local grazing patterns (Saab et al. 1995). No direct effects would be apparent in years of rest.

Overall, a very slight increase in fence-related conflicts with shrub-steppe associates could occur due to new fencing. As with Alternative 1, new fences could be beneficial to loggerhead shrike. In addition, rebuilding pasture fences should benefit this species.

Reptiles and Amphibians
Potential habitat for the striped whipsnake exists adjacent to the Columbia River. However, optimal habitats for this species are near talus slopes, rocky canyons, and dry rocky streambeds; these areas would be unlikely to attract livestock concentrations. Effects to striped whipsnake are expected to be negligible. The Columbia spotted frog is not known to occur within the project area; however, potential suitable habitat does exist. Livestock grazing in riparian areas and wetlands in the Lower Parke, Whiskey Jim, East Whiskey Dick, and West Whiskey Dick pastures has the potential to negatively affect the Columbia spotted frog, however these effects will be minimal as most suitable habitat will be fenced to exclude livestock (See Figure 2-2).

3.5.2.3 Alternative 3: No Grazing

Direct and Indirect Effects
Under this alternative, livestock grazing would not occur. Overall, recovery of shrub-steppe and riparian habitat in the Western Pastures is expected to be more rapid than under Alternatives 1 or 2. However, potential improvements to elk forage would not occur. Pasture fence maintenance would not occur; this could benefit sage-grouse over the long-term, but may adversely affect loggerhead shrike.

3.5.2.4 Cumulative Effects

Combined, WDFW and WDNR manage approximately 12 percent of Washington's remaining shrub-steppe. Several extensive areas of continuous shrub-steppe are in close proximity to the CRM area, and are primarily on federal or tribal holdings (Yakima Training Center, Hanford Nuclear Site, and the Yakama Nation). The Wild Horse CRM area accounts for approximately 19 percent of remaining shrub-steppe within Kittitas County.

The dramatic conversions to agriculture have reduced the once-expansive native steppe and shrub-steppe of eastern Washington to a fragmented landscape, which has reduced or eliminated wildlife value. Population growth and associated development, which results in conversion of habitat, is the main threat to wildlife in Kittitas County.

Livestock grazing is expected to continue on PSE-managed pastures under all three alternatives. Up to 2 miles of pasture fencing would be constructed on PSE land to exclude livestock from their mitigation parcel.

Alternative 1
Livestock grazing does not result in a conversion of habitat, and at the proposed level will not affect the ecological integrity of the landscape. Cumulative effects to wildlife in the region are not expected under Alternative 1.

Alternative 2
Livestock grazing does not result in a conversion of habitat, and at the proposed level will not affect the ecological integrity of the landscape. Cumulative effects to wildlife in the region are not expected under Alternative 2.

Alternative 3
With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE ownership. In addition, DNR and BLM would have the option to pursue grazing leases on their ownerships within the CRM area. Most of these parcels are inholdings within the Quilomene and Whiskey Dick WAs, and additional fencing would be required to exclude trespass livestock on WDFW ownership.

3.6 Fish

3.6.1 Affected Environment

Rainbow trout, which are indistinguishable from the federally endangered upper Columbia River steelhead, are known to occur in Skookumchuck Creek, the North Fork of Skookumchuck Creek, and the lower end of Whiskey Dick Creek (Figure 3-4). Upper Columbia River summer steelhead and their redds have been documented in the lower end of Skookumchuck Creek and habitat for inland redband trout extends up to the confluence of the Skookumchuck and Upper North Fork Skookumchuck, within the Wild Horse Crossing pasture. Parke Creek contains rainbow trout and speckled dace in the Lower Parke and Whiskey Jim pastures. There is no surface water connection between Parke Creek and the Yakima River. Therefore, rainbow trout in Parke Creek are resident, and not federally endangered steelhead. No other streams in the CRM area are known to contain federally listed fish species. Grazing is not proposed for WDFW ownership along Skookumchuck Creek and Upper North Fork Skookumchuck Creek (Skookumchuck and Upper Skookumchuck pastures and the WDFW parcel within Wild Horse Crossing pasture).

Table 3-7 presents a list of fish species with federal and/or state status identified by the USFWS, National Oceanic and Atmospheric Administration Fisheries, and/or WDFW as potentially occurring in these streams.

Table 3-7 Special Status Fish Species that Could Occur in the CRM Area

Common Name	Scientific Name	Status	Occurrence within CRM Area
Bull trout	*Salvelinus confluentus*	FT/SC	No suitable habitat present in CRM area*
Chinook salmon	*O. tshawytscha*	FT/SC	No suitable habitat present in CRM area*
Mountain sucker	*Catostomus platyrhynchus*	SOC	No suitable habitat present in CRM area*
Pacific lamprey	*Lampetra tridentate*	SOC	No suitable habitat present in CRM area*
Redband	*O. m. gairdneri*	SOC	Suitable stream habitat exists in CRM area but species not documented
Steelhead	*O. mykiss*	FE/SOC	Occurs onsite
Westslope cutthroat	*O. clarki lewisi*	SOC	Suitable stream habitat exists in CRM area but species not documented

*Species may occur transiently
FT – Federal Threatened; SC – State Candidate; SOC – Species of Concern

3.6.2 Environmental Consequences

Riparian areas function as buffers for sediment delivery. Vegetation increases stream bank stability, binding bank materials and reducing erosion and sedimentation. Maintenance of riparian vegetation is essential for controlling stream temperature, providing cover, and protecting against erosion. Increased sedimentation contributes to the loss of spawning habitat and decreases the diversity of food items (Platts 1991).

Limiting factors include high stream temperatures, lack of spawning habitat, high sedimentation in spawning areas, and/or lack of preferred food items. A decrease in riparian vegetation coverage could increase water temperature above those favorable for fish. These conditions could force fish to migrate to other stream reaches or harm remaining stocks. Degradation of riparian vegetation may also increase sediment deposition in the interstitial spaces of spawning gravels because of increased overland flow (including runoff) and stream bank erosion. This increased sedimentation reduces available fish spawning habitat and potentially smothers eggs and fry already spawned, reducing survival of local stocks (Hartman and Brown 1987, Hartman et al. 1987, Waters 1995).

Riparian areas are often grazed more heavily than upland areas because they offer water, shade, and more succulent vegetation (Platts and Nelson 1985, Platts 1991). Livestock grazing can change the riparian and stream environment by reducing or eliminating vegetation or degrading stream bank integrity (Kauffman and Krueger 1984, Platts 1991). Cattle grazing in streams or on stream banks can also change channel morphology. Less plant cover to protect the soil surface from erosion, disturbance, and hoof shearing can widen the stream channel and increase fine sediments entering a stream. Generally, grazing in these areas could alter water flow in a stream reach and potentially lead to streambed scouring and reduced fish habitat.

Fish are typically more successful and numerous in ungrazed zones than in heavily grazed zones with degraded habitat. However, research suggests livestock grazing on a rest-rotation schedule limits stream bank disturbance, and therefore minimizes effects to adjacent stream quality and fish habitat (Platts 1991).

Structural range improvement projects such as fences have the potential for short-term negative effects on aquatic habitat through surface disturbance and the potential for sediment delivery to

streams. Long-term negative effects could occur if livestock movement patterns parallel to the fence line create trails that channel run-off into streams.

3.6.2.1 Alternative 1: No Action

Direct and Indirect Effects

Fish-bearing stream reaches will be fenced to exclude livestock. Effects to unfenced stream reaches above fish habitat are expected to be minor to moderate, due to implementation of the Proposed Grazing System, spring redevelopments, spring and early summer grazing period, and BMPs. During the cooler months of spring, livestock would disperse more widely than in the mid to late summer. Little shrub browsing and trampling in the riparian area is expected in the spring, however, both these effects will increase as the season progresses. Effects would be temporary, since the Proposed Grazing System would allow grazed and trampled areas to recover and is not expected to limit the development of proper functioning riparian systems. In a study in Idaho, Platts and Nelson (1985) observed that cattle were more likely to use uplands during spring and early summer until upland forage plants became less succulent. Marlow and others (1989) also noted good dispersal of livestock from early May through early July; they noted the poorest dispersal was during the "hot season" (July to mid-September). Early grazing, followed by complete livestock removal, allows riparian plants to re-grow before the dormant period in the fall (USDA 2006).

The more riparian vegetation is present, the more vegetation there is to filter out sediment, reducing delivery to streams. Insect populations, which are food sources for fish, would also increase as the amount of riparian vegetation increases. Under Alternative 1, fenced riparian vegetation is expected to recover rapidly, providing better fish habitat. Unfenced riparian vegetation is expected to gradually recover, reducing sediment delivery to fish-bearing stream reaches. Shade would also increase as riparian vegetation recovers.

Permanent fences are expected to have negligible effects to fish habitat, as fence posts will be set back from stream banks, and only two permanent fences intersect Parke Creek. Temporary fences may have minor effects to fish habitat, as livestock movement along fences could result in sediment delivery. Overall effects to fish under this alternative are expected to be minor, due to fencing of fish-bearing stream reaches and implementation of the Proposed Grazing System and BMPs.

3.6.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Effects to fish habitat would be similar to those described under Alternative 1. Riparian vegetation could recover more rapidly on the Western Pastures under Alternative 2, as these areas would be grazed less frequently than under Alternative 1. However, Alternative 2 includes more short-term effects to unfenced riparian vegetation in the Eastern Pastures.

Permanent fences are expected to have negligible effects to fish habitat, as fence posts will be set back from stream banks, and the closest permanent fence crossing is approximately 2.5 miles upstream of the fish-bearing reach of Whiskey Dick Creek. Temporary fences may have minor effects to fish habitat, as livestock movement along fences could result in sediment delivery. Overall, effects to fish are expected to be minor, due to fencing of fish-bearing stream reaches and implementation of the Proposed Grazing System and BMPs.

3.6.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Alternative 3 would eliminate all effects of livestock grazing to aquatic habitat on WDFW managed land in the CRM area. The elimination of livestock grazing could accelerate recovery of woody and herbaceous riparian vegetation.

3.6.2.4 Cumulative Effects

Past activities such as domestic livestock grazing (sheep, horses and cattle), road construction and maintenance, and recreation have resulted in the current stream conditions in the CRM area. These conditions include reduced riparian plant diversity and vigor, down cut and degraded stream channels, changes in upland vegetation, and altered stream flows. Present activities such as habitat improvement projects (e.g., weed control and shrub steppe restoration projects) combined with the changes in livestock grazing practices, are anticipated to result in more riparian vegetation, more stream shade, lower water temperatures, and increased streambank stability.

Other activities that are ongoing and are expected to continue into the future include weed control and recreational use. With the exception of Off Highway Vehicles (OHV) that are driven in sensitive areas and dispersed camping that occur along and on stream banks, these activities are not expected to adversely affect shade and stream banks.

Alternative 1

Cumulative effects for Alternative 1 include effects from livestock grazing on PSE-managed pastures. Skookumchuck Creek on non-WDFW ownership within the Wild Horse Crossing Pasture will continue to be accessible to livestock under Alternative 1, 1/4-mile of which is fish bearing. This could result in sediment delivery into Skookumchuck Creek, potentially affecting fish habitat and water quality.

Alternative 2

Cumulative effects for Alternative 2 would be the same as those discussed for Alternative 1, potentially affecting fish habitat and water quality over a larger area.

Alternative 3

With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE ownership. In addition, DNR and BLM would have the option to pursue grazing leases on their ownerships within the CRM area. Skookumchuck Creek on non-WDFW ownership within the Wild Horse Crossing Pasture will continue to be accessible to livestock under Alternative 3; 1/4-mile of this is fish bearing. This could result in sediment delivery into Skookumchuck Creek, potentially affecting fish habitat and water quality.

3.7 Land Use and Recreation

3.7.1 Affected Environment

Historic land use in the CRM area consists largely of fish and wildlife conservation, open space, and livestock grazing. A relatively new land use, industrial/wind energy production has been expanding in the area. Overall population density in the CRM area is zero, as there are no residences within the area. Lands are primarily publicly owned, by WDFW, WDNR, and BLM.

Areas within the Wild Horse North and Wild Horse South pastures are predominantly owned by Puget Sound Energy and used for the Wild Horse Wind Farm. Table 3-8 provides a summary of the land ownership within the CRM area and Figure 1-2 provides a graphical representation of the land ownership.

Table 3-8 Land Ownership Summary

Owner	Acres Owned
WDFW	35,423
WDNR	15,142
BLM	2,869
Puget Sound Energy	7,869
Other	351

Recreational activities in the CRM area include bird watching, hiking, horseback riding, mountain biking, fishing, and hunting. Primitive road networks throughout the CRM area are suitable for four-wheel drive vehicles, mountain bikes, and horses (Bentler 2008). The Washington Audubon Society designated the Colockum-Quilomene area as an Important Bird Area in Eastern Washington.

Recreation is dispersed throughout the CRM area. Off-road vehicle use occurs throughout the CRM area, and hunting activities coincide with big game and upland bird hunting seasons. Motorized vehicle use is allowed on designated roads, except during winter closures.

Ginkgo Petrified Forest State Park, east of the CRM area, is the only developed campground and day use site in the near vicinity. This fee site has pull-in units with tables, grills, and vault restrooms.

3.7.2 Environmental Consequences

Livestock grazing can be considered an incompatible use with certain land uses, such as residential and some commercial uses. Direct effects can be visual, olfactory, and auditory. The effects of grazing are highly dependent upon existing land uses; however, in most cases existing land use is agriculture, wind energy production, or open space, which are considered compatible uses with grazing.

Livestock grazing can directly impact recreation primarily through the overlap of uses. If grazing exists in the same areas used by hunters and other users, interference in the form of delays or temporary inaccessibility may result. By minimizing the interface of grazing with these uses, these effects can be reduced. Livestock grazing can also affect recreational activities through a reduction in the quality of the recreational experience. This occurs primarily through the physical alteration of wildlife habitat, including vegetation removal and erosion. Fencing associated with livestock grazing could obstruct access and could prevent or discourage recreational activities.

Should grazing be authorized on WDFW ownership, there is currently no mechanism in place to prevent grazing on adjacent ownership. Without prior authorization from other landowners, such as BLM, this grazing would constitute trespass, and may not be compatible with BLM desired or authorized land uses.

3.7.2.1 Alternative 1: No Action

Direct and Indirect Effects

The existing extent and diversity of dispersed recreation settings and the associated quality of dispersed recreation experiences would remain the same. Over the long term, proposed vegetation manipulations and fencing would enhance habitats for various game and nongame animal species, allowing for improved wildlife viewing and hunting opportunities over the long term. The extent of new fencing (pastures, riparian corridors, etc.) would cause an insignificant increase of inconvenience for hunters and hikers in traversing them. Construction and maintenance of range improvements is not expected to significantly affect recreational users.

3.7.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Direct and indirect effects on dispersed recreation resulting from livestock grazing would be same as under Alternative 1, except that grazing would occur across a larger area.

3.7.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE ownership. In addition, DNR and BLM would have the option to pursue grazing leases on their ownerships within the CRM area. This would result in increased fencing to prevent trespass grazing on WDFW ownership.

3.7.2.4 Cumulative Effects

Alternative 1

Analysis of cumulative effects to land use and recreation primarily considers population growth in Kittitas County, as well as future regional wind energy projects. Existing uses and activities would not be affected by future wind power projects, as agriculture (including grazing) and open space uses are compatible with wind power. The visual effects of future wind projects may affect users recreating in the area through a decrease in overall scenic quality; however, hunting, wildlife viewing, and other activities could still occur.

Population growth in the region could adversely affect existing land use and recreation, as additional roads and other infrastructure would be needed. However, because most of the lands in the CRM area are publicly owned, none of the alternatives would contribute to future regional development to an extent that would result in substantial effects to either resource.

Alternative 2

Cumulative effects for Alternative 2 would be the same as those discussed for Alternative 1, except grazing would occur across a larger area.

Alternative 3

No grazing would occur in WDFW ownership, however, grazing would continue on PSE-managed pastures. Other cumulative effects would be similar to those discussed in Alternative 1.

3.8 Cultural and Historical Resources

3.8.1 Affected Environment

The CRM area lies on the Mid-Columbia Plateau and is situated within the ceded territory of the Confederated Tribes and Bands of the Yakama Indian Nation; the Yakama, Kittitas, and Wanapum Tribes, in particular, are historically associated with the locale. The CRM area is also within the traditional-use territories of the Wenatchi and Sinkayuse, members of the Colville Confederated Tribes (Eastern Washington University 2008).

Larger villages that are known to have existed near the CRM area include the Wanapum villages *sháp'tĭlĭk* and *pná*, situated above and below Priest Rapids, respectively, and 3 other villages north of *sháp'tĭlĭk*, all approximately 1 mile apart. Kittitas, Sinkayuse, and Wenatchi villages are located on the east and west sides of the Columbia River (Eastern Washington University 2008). There were regionally important fisheries along the Columbia at Rock Island (north of the CRM area) and Priest Rapids as well as important root and berry gathering grounds above the Kittitas Valley that were shared by neighboring tribes. A number of lithosol habitat plants with edible roots and bulbs, including bitterroot, biscuitroot, wild onions, and yellowbells, along with shrubs including serviceberry and chokecherry, were economically important crops that were potentially gathered in the CRM area. The Kittitas Valley was a focal point for the region's tribes, and there was a system of trails along the Quilomene, Skookumchuck, and Whiskey Dick creeks that connect the valley to the Columbia River (Eastern Washington University 2008).

Most previous investigations within the region were driven by large hydroelectric development projects during the mid-twentieth century. Locally, archaeological research has been focused on the Wanapum Reservoir. Additional cultural resources surveys have been conducted within or near the project areas by BLM, WDFW, Washington State Parks and Recreation Commission (WSPRC) and DNR. Other projects in the area include an archaeological survey of the Wild Horse Wind Power Project (Flenniken and Trautman 2004) and BPA's Schultz-Hanford Area Transmission Line Access Roads and Reroutes, an archaeological and historical overview for WSPRC's John Wayne Pioneer Trail (Luttrell 1999), and the Columbia-Hanford Area Fiber Optic Line Locations (Griffith and Churchill 2002).

Members of the present-day Yakama Indian Nation and the Colville Confederated Tribes (CCT) continue to use the area for plant resource gathering and hunting. The Yakama Nation has treaty hunting rights within the boundaries of the Colockum herd (WDFW 2006b). Tribal harvest from the Colockum herd is unknown, although field checks, meat locker forms, and population surveys/modeling suggest that tribal harvest is less than 40 animals annually (WDFW 2006b).

In June 2008, Eastern Washington University undertook a **Cultural Resources Survey** for WDFW's proposed spring redevelopments within the CRM area. This survey included searching site files at the Washington State Department of Archaeology and Historic Preservation (DAHP) in Olympia, contacting the Confederated Tribes of the Colville Reservation and the Confederated Tribes and Bands of the Yakama Indian Nation, reviewing General Land Office records, and undertaking a field survey (Eastern Washington University 2008).

No traditional cultural properties (TCPs) within the CRM boundary were identified by this survey. However, 12 cultural resource sites were recorded or revisited as part of the Cultural

Resources Survey on WDFW ownership. These sites include eight prehistoric archaeological sites, one prehistoric isolate, and three sites with historic and prehistoric components (Eastern Washington University 2008). All of the sites have been affected in the past by agricultural activities, such as the construction and use of access roads, cisterns, pipelines, water troughs, troughs, and fence lines. Concentrated livestock use in some of the locations has also effected native vegetation and contributed to ground compaction and/or erosion.

Sites eligible for listing on the National Historic Register of Places (NHRP) must have the potential to provide important information about history or prehistory. All 12 sites identified as part of the Cultural Resource Survey are potentially eligible for the NHRP because they could have intact buried cultural deposits and could provide important information regarding history and prehistory (Eastern Washington University 2008).

3.8.2 Environmental Consequences

Livestock grazing has the potential to exacerbate the effects of natural agents, such as wildfires, flooding, and weathering, in degrading cultural and historical resources. Potential effects to cultural resources include trampling, which may lead to displacement of archaeological and historic remains and artifact breakage, at areas of livestock concentration. Since grazing has occurred in the CRM area for the past 100 years, it is probable that archaeological surfaces in the area have already been affected. Existing range improvements (i.e., fencing and water developments) indicate that the area has previously been disturbed. Fence maintenance activities will take place within previously disturbed sites, and effects to cultural resources are expected to be minimal for this activity. Effects are most likely to occur at sites adjacent to water resources or salting/protein sites, where livestock tend to congregate.

The sites proposed for redevelopment have been surveyed for cultural resources. Redevelopment, maintenance or relocation of sites with identified cultural resources would be consistent with and in compliance of State Executive Order 0505: Archaeologic and Cultural Resources. WDFW will work with the Department of Archaeology and Historic Preservation (DAHP) and affected Tribes to take reasonable action to avoid, minimize, or mitigate adverse effects to any archaeological and cultural resources consistent with state and federal laws. To ensure protection, site-specific plans will be developed, in coordination with the Tribes and DAHP, for each location with identified cultural resources that is proposed for redevelopment. During construction, these sites will be monitored by a professional archaeologist to ensure that the integrity of cultural properties is maintained.

3.8.2.1 Alternative 1: No Action

Direct and Indirect Effects

Under Alternative 1, livestock would continue to graze in the Western Pastures and no new springs would be developed. One mile of pasture fence, and 4.2 miles of boundary fence would be constructed. Livestock would continue to water at currently developed water sources and at identified sites along Parke Creek. Livestock distribution is not expected to change.

Under Alternative 1, the Proposed Grazing System would result in livestock spending a shorter amount of time in congregation areas than prior to WDFW acquisition, which is expected to reduce effects to archaeological sites. In general, livestock use along trails or fence lines is not expected to affect cultural resources. Gradual improvement of vegetative cover is expected

around developed water sources, due to better upland distribution of livestock provided by water developments, salt/protein stations, and fencing. Improved vegetative cover at these areas of congregation should help to stabilize soils, thereby protecting cultural resources.

One of the six proposed spring redevelopments has identified cultural resources. A site-specific plan will be developed, in coordination with the tribes and DAHP, to ensure protection of cultural resources at this site. During planning and construction an archaeologist would be on-site to ensure that placement of project components, such as the water trough, springbox, pipeline, and fencing, avoids artifacts and features. Following these protection measures, short-term effects to cultural resources from ground disturbance are expected to be minor. This site will be fenced to exclude livestock, resulting in increased long-term protection of cultural resources, compared to current conditions.

Potential effects to cultural resources adjacent to other water sources, including creeks, seeps, and springs will be reduced by the use of the Proposed Grazing System and BMPs. Fish-bearing stream reaches will be fenced to exclude livestock. Spring and early summer grazing will improve cattle distribution and minimize livestock use around riparian areas and other water sources, as compared to grazing in mid to late summer (dormant season). The Proposed Grazing System would provide adequate time between grazing periods, allowing vegetation and trampled areas to recover. These measures will result in increased long-term protection of cultural resources, compared to current conditions.

In instances where proposed range improvements under this alternative could potentially affect cultural properties, site-specific plans will be developed in consultation with DAHP and interested tribes to ensure protection of cultural resources.

3.8.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Under Alternative 2, livestock would continue to graze the Western Pastures, and would be reintroduced into the Eastern Pastures. As with Alternative 1, no new springs would be developed. Livestock would continue to water at currently developed water sources and at identified sites along Whiskey Dick and Parke Creek.

Under Alternative 2, 8.4 miles of permanent fence would be constructed. Of the 20 miles of pasture fences in the Eastern Pastures, approximately 13 miles are expected to require significant repairs. If cultural resources are discovered during construction and maintenance of fences, work will cease until a professional archaeologist has been consulted.

Under Alternative 2, the Proposed Grazing System would minimize the amount of time that livestock spend in congregation areas. This is expected to minimize effects to archaeological sites. In general, livestock use along trails or fence lines is not expected to affect cultural resources. Vegetative cover around developed water sources is expected to improve more rapidly in the Western Pastures, as these pastures will be grazed less frequently. Improved vegetative cover at these areas of congregation should help to stabilize soils, thereby protecting cultural resources. In the Eastern Pastures, vegetative cover around developed water sources will be affected, which may affect cultural resources.

Seven of the 12 proposed spring redevelopments have identified cultural resources. A site-specific plan will be developed, in coordination with the tribes and DAHP, to ensure protection of cultural resources at each of these sites. During planning and construction an archaeologist would be on-site to ensure that placement of project components, such as the water trough, springbox, pipeline, and fencing, avoids artifacts and features. Following these protection measures, short-term effects to cultural resources from ground disturbance are expected to be minor. These sites will be fenced to exclude livestock, thereby protecting cultural resources.

Potential effects to cultural resources adjacent to other water sources, including creeks, seeps, and springs will be reduced by the use of the Proposed Grazing System and BMPs. Fish-bearing stream reaches will be fenced to exclude livestock. Spring and early summer grazing will improve cattle distribution and minimize livestock use around riparian areas and other water sources, as compared to grazing in mid to late summer (dormant season). The Proposed Grazing System would provide adequate time between grazing periods, allowing vegetation and trampled areas to recover.

In instances where proposed range improvements under this alternative could potentially affect cultural properties, site-specific plans will be developed in consultation with DAHP and interested tribes to ensure protection of cultural resources.

3.8.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Alternative 3 would have no direct and indirect effects to cultural resources because grazing would be eliminated under this alternative. There would be no further direct and indirect effects to archaeological sites from trailing, hoof action, or soil disturbance and displacement. However, some cultural resources in the CRM area may continue to degrade from natural agents (wildfire, weather, wildlife, etc.) and potential disturbance from humans. Identified cultural resources that are expected to be affected by recreational users will be protected.

3.8.2.4 Cumulative Effects

Direct and Indirect Effects

Wildfires, flooding, erosion, and weathering are just some of the natural damage agents that may cause deterioration of archaeological sites. The cumulative effects of past grazing, road building, surface collecting and/or illegal digging, and fire suppression have accelerated the effects from natural causes. All of these activities would still be reflected in the integrity of these sites. With that said, archaeological sites would continue to deteriorate from natural causes, and may also be damaged by illegal human disturbances unless protective measures are implemented.

Most range improvements (such as fences and troughs) were constructed before the 1940s, therefore, most damage to archaeological sites occurred by this time. Effects to archaeological sites have previously occurred and continued grazing is not increasing the amount of damage or leading to the loss of cultural resources. More currently, projects have been designed to avoid or protect known cultural properties.

Alternative 1

Ongoing land management uses and activities would continue. Recreational users would continue to drive and recreate in the area. There would be effects to archaeological sites by cattle grazing, dispersed camping, illegal artifact collecting, and off-road vehicle use. Projects like road

maintenance, weed control, fire suppression, and fencing would continue. Spring redevelopments could occur on DNR ownerships within WDFW-managed pastures, and on PSE-managed pastures. All spring redevelopments within the CRM area will meet NRCS specifications. Up to two miles of pasture fencing would also be constructed on PSE land to exclude livestock from their mitigation parcel.

Alternative 2
Cumulative effects from Alternative 1 will also occur under Alternative 2. However, additional spring redevelopments could occur on DNR and BLM land under Alternative 2, as compared to Alternative 1.

Alternative 3
Spring redevelopment and livestock grazing would be expected to continue on PSE-managed pastures. With the elimination of livestock grazing on WDFW ownership, increased grazing pressure would potentially be placed on PSE-managed pastures.

3.9 Transportation

3.9.1 Affected Environment

Vantage Highway is the primary roadway, forming the southern boundary of the CRM area. Once a state highway but now classified as a rural minor collector, it is maintained by Kittitas County (EFSEC 2004). Roads within the southeastern portion of the CRM area are associated with the Quilomene-Whiskey Dick Green Dot Road Management Area. Green Dot roads are open to motor vehicles and are delineated with round green reflectors. All other roads and trails within these pastures are closed to all motor vehicles. The roads designated as Green Dot roads include (see Figure 3-5):

- Pumphouse Road
- Whiskey Dick Ridge Road
- Whiskey Dick Creek Road
- Hartman Road
- Cayuse Road

The above roads are currently closed to all motor vehicles between February 1 and April 30. The total mileage of the Green Dot roads within the CRM is 42.7 miles. Roads in the remainder of the project area are currently outside of the Green Dot Road Management Area. On public land outside of the Road Management Area, all existing roads are currently open to motor vehicles.

3.9.2 Environmental Consequences

Livestock grazing effects to transportation include (1) direct effects to transportation routes, which comprise roads and trails (BLM 2006); and (2) direct effects to travel, including the movement of users. The level of impact is highly dependent upon intensity of use of the cattle within the grazed areas and the overlap with the roads and trails, as well as the intensity of use by other users, i.e., recreational users.

3.9.2.1 Alternative 1: No Action

Direct and Indirect Effects

Direct effects on roads within the Alternative 1 grazing area could include delays along or temporary inaccessibility of certain roads or trails during livestock herding, and during completion of range improvements and maintenance activities. Construction of 5.2 miles of new permanent fencing, and re-development of six springs would result in a temporary increase in travel by heavy equipment and administrative vehicles.

3.9.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Green Dot roads in West Whiskey Dick, East Whiskey Dick, Rocky Coulee, and Lone Star pastures, as well as the roads noted in Alternative 1, could be affected by livestock grazing under Alternative 2. Cattle grazing in these pastures could lead to direct effects including delays and temporary inaccessibility.

In Alternative 2, direct effects to transportation would include delays along or temporary inaccessibility to certain roads or trails during livestock grazing and herding, and during completion of range improvements and maintenance activities. Under Alternative 2, 8.4 miles of new permanent fencing would be constructed and 12 springs would be re-developed. The construction and maintenance activities associated with Alternative 2 would result in a temporary increase in travel by heavy equipment and administrative vehicles. Delays or temporary inaccessibility could result in short-term direct effects throughout the 42.7 miles of Green Dot roads within the CRM.

3.9.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Under Alternative 3, no grazing would occur on WDFW-managed land in the CRM area. There would be no increase in travel by administrative vehicles, or travel delays caused by livestock or herding activities. Direct adverse effects would result from construction of 5.2 miles of new fencing. These activities would introduce additional vehicles to the CRM area, which could cause delays or interference for those recreating in the area.

3.9.2.4 Cumulative Effects

Alternative 1

Regional development such as upgrades at the Yakima Training Center, future wind energy projects, or regional transportation networks could impact transportation, if several of those projects were implemented simultaneously. Additional vehicles associated with construction activities and commuters could cause congestion. However, this alternative would add substantially to cumulative adverse effects. Future transportation network upgrades associated with population growth could beneficially impact local roads by allowing easier access for those recreating in the region.

Alternative 2

Cumulative effects under Alternative 2 would be the same as those discussed for Alternative 1.

Alternative 3

There would be no cumulative effects on transportation if Alternative 3 is implemented.

3.10 Energy Resources

3.10.1 Affected Environment

The Wild Horse Wind Power project, located on Wild Horse North, Wild Horse South, and Wild Horse Crossing pastures, provides renewable energy within the CRM. The project consists of 127 turbines and is on approximately 8,600 acres. A permanent footprint of approximately 165 acres is required to accommodate the turbines and supporting infrastructure (EFSEC 2004). Nonrenewable resources are gravel mines (EFSEC 2004). Gravel mining pits and quarries are located in the CRM area, and their output is used locally, primarily for construction projects (EFSEC 2004).

3.10.2 Environmental Consequences

To determine the effects of the alternatives on energy resources, the analysis considered the extent to which energy resources would be consumed to implement the actions under each alternative.

Livestock grazing has no direct or indirect effects on energy resources, as no such resources are consumed by grazing. Grazing management activities and support infrastructure, such as electric fences and pumps for water infrastructure, can consume energy resources.

3.10.2.1 Alternative 1: No Action

Direct and Indirect Effects

The grazing and associated range improvements and maintenance activities under Alternative 1 would not consume significant energy resources. Energy resources needed to implement the actions under this alternative would be limited to fuel for vehicles and construction equipment. No electricity would be needed, as the electric fence within the CRM is solar-powered. Thus, no direct or indirect effects on energy resources would result from implementing Alternative 1.

3.10.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Direct and indirect effects on energy resources resulting from livestock grazing would the same as under Alternative 1, except that grazing would occur across a larger area.

3.10.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Since there are not direct and indirect effects resulting from the implementation of Alternative 3, there would be no cumulative effects.

3.10.2.4 Cumulative Effects

Alternative 1

The proposed action for Alternative 1 would not impact local energy resources. However, population growth and associated development would contribute to local energy demands. Planned projects, such as wind energy projects, would create a local/regional supply of power. Construction activity and vehicle use associated with road development, wind farm development, and rural residential housing would require non-renewable energy resources, primarily in the form of gas and other fuels. The demands of all of these projects and uses are not anticipated to result in significant cumulative effects to energy resources.

Alternative 2
Cumulative effects for Alternative 2 are the same as those discussed for Alternative 1.

Alternative 3
Cumulative effects for Alternative 3 are the same as those discussed for Alternative 1.

3.11 Socioeconomic Conditions

3.11.1 Affected Environment

Kittitas County has a rich history of ranching and farming, and both are important to the social and economic setting of the area. Ranching in the area began in the 1860s. The abundance of grasses and streams of the Kittitas Valley gave rise to a prosperous cattle industry. Cattle production continued steadily through the 20th century, as railroads provided more effective transportation to the nation's eastern markets (Cochran 2008). Today, ranching and sheep production has declined in the county, yet it is still significant as an industry and as a cultural activity.

Social Setting
Population estimates for Kittitas County and Washington State are displayed in Table 3-9 (OFM 2008). The April 2008 population estimate for the county was 39,400 people. The population increased at an average annual growth rate of 2.1 percent from 2000 to 2008, whereas the rate for the state of Washington for this period was 1.4 percent. The Office of Financial Management (OFM) projects that from 2008 to 2030 both the population of Kittitas County and the population of the state will increase by approximately 2.4 percent annually. Population growth centers within Kittitas County are primarily located in the Cities of Ellensburg, Cle Elum, Roslyn, Kittitas, and the Town of South Cle Elum, as these have been designated as urban growth areas by the county and are where the majority of the growth will occur in the future (Kittitas County Community Development Services 2006).

Table 3-9 Kittitas County and Washington State Population Trends

	Census	Current Population estimate	Average Annual Growth Rate	Projections		
	2000	2008	2000-2008	2010	2020	2030
Kittitas	33,362	39,400	2.10%	43,901	52,265	60,322
State	5,894,121	6,587,600	1.40%	7,372,751	8,713,386	10,026,660

Source: State of Washington Office of Financial Management (OFM)/Forecasting October 2007
http://www.ofm.wa.gov/cenpro90/county/default.asp#kitt

Many outdoor activities exist within Kittitas County. These activities include, but are not limited to, hunting, fishing, cross-country skiing, off-road vehicle use, and mountain biking. Elk hunting within the county has been a significant recreational activity, but it has shown a decline since the 1980s. The average number of hunters during the 1980s was 11,196, compared with 10,373 in the 1990s (see Table 3-10). This represents a 7.3 percent decline. The average number of hunters from 2000-2007 was 7,575, a 26 percent decrease from the 1990s.

Table 3-10 Elk Harvest and Hunter Trends for the Colockum Elk Herd, 1985-2007

Year	Antlered	Antlerless	Total	Hunters	Hunter Days
1960s AVG	**544**	**332**	**876**		
1970s AVG	**617**	**464**	**1081**		
1980	580	305	885		
1981	520	280	800		
1982	580	310	890		
1983	560	208	768		
1984	658	272	930	8,886	36,692
1985	743	231	974	12,266	52,134
1986	717	450	1,167	11,087	46,447
1987	567	581	1,148	10,509	54,761
1988	806	735	1,541	11,543	57,012
1989	983	537	1,520	12,884	61,299
1980s AVG	**671**	**391**	**1,062**	**11,196**	**51,391**
1990[a]	621	681	1,302		
1991	611	657	1,268	13,811	61,598
1992	809	616	1,425	13,253	59,169
1993	561	445	1,006	13,815	62,561
1994	559	741	1,300	11,338	53,154
1995	472	663	1,135	11,371	52,409
1996	471	596	1,067	12,553	54,939
1997	343	268	611	8,388	40,327
1998	496	247	743	9,776	53,563
1999	393	235	628	9,428	65,341
1990s AVG	**534**	**515**	**1022**	**10,373**	**50,306**
2000	438	293	731	8,374	37,522
2001	433	398	831	7,660	36,317
2002	436	593	1029	9,436	49,334
2003	424	393	817	7,756	39,571
2004	445	221	666	7,847	38,257
2005	412	302	714	6,768	29,758
2006	360	280	640	6,216	29,033
2007	276	270	546	6,543	31,611

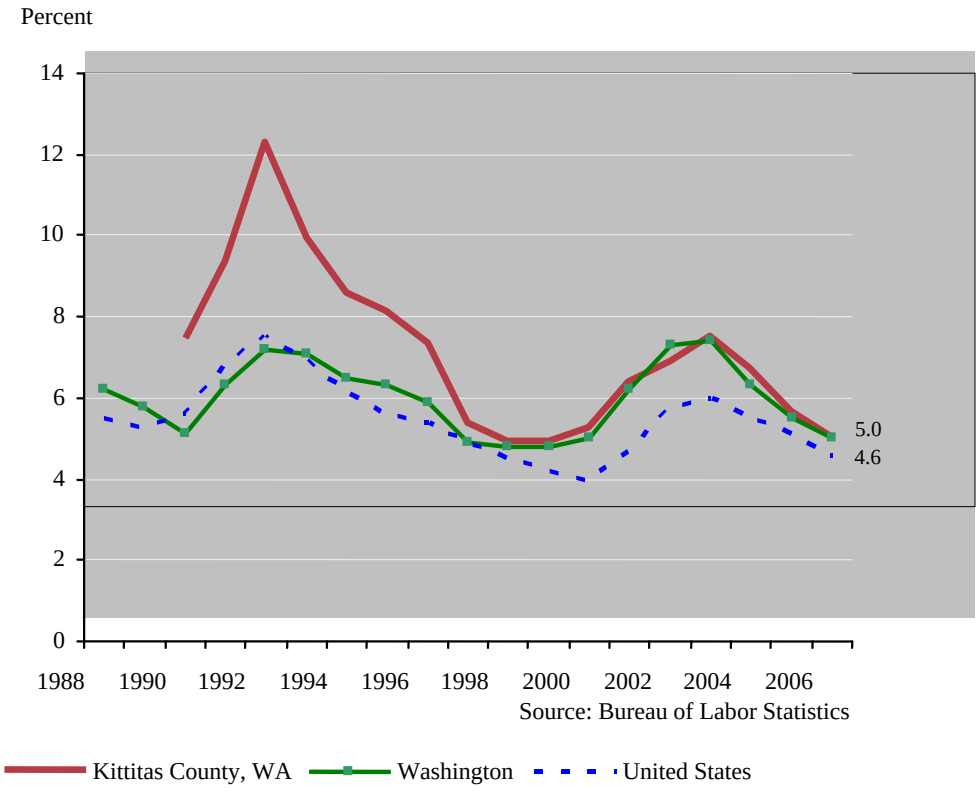
[a]Harvest estimated from report cards.
Source: Clausing, pers. comm. 2008.

Economic Conditions

Kittitas County has a relatively diverse employment base. People are employed in professional work, services, construction, government, manufacturing, mining, and agriculture. Agricultural employment makes up approximately one-tenth of the total employment in the county. However, as mentioned earlier, agriculture has a long history in the county both economically and culturally and is an important part of the community.

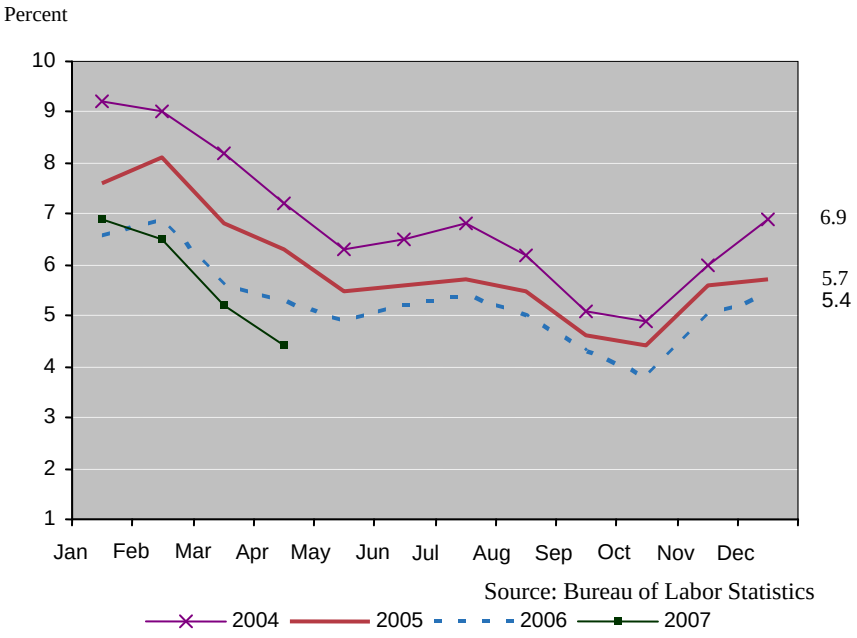
In general, a diverse employment base is linked to the health of an economy. The Bureau of Economic Analysis (BEA) recognizes both farm and agricultural services (includes ranching) as components of economic diversity (BEA 2008). Furthermore, employment in a particular area is often linked to prices for the products of that area. When the prices go up, the employment in that field tends to increase. This general principle is consistent with the trends found in Kittitas County in the farming and ranching sectors.

From 1970 to 2005, there were 8,611 new jobs created within the county. In general, the unemployment rate decreased between 1988 and 2006 (see diagram below). Although unemployment was highest (over 12 percent) in 1993, since then it has been steadily declining. In September 2008, the Washington Employment Security Department reported a 5.5 percent unemployment rate in the county, which was slightly below the national unemployment rate at that time (WESD 2008). A general increase in job opportunities will likely be followed by economic diversity, or the distribution of employment across various sectors, which can affect ranching and farming.



Unemployment Rates in Kittitas County, Washington State, and the US from 1988 to 2006

Unemployment rates vary seasonally within the county, as the diagram below shows for 2004-2007. Farming and ranching are primarily seasonal and likely contribute to the seasonal unemployment rate in Kittitas County.



Unemployment Rate Seasonality in Kittitas County 2004-2007

Farming and Agriculture Services industry employment (which includes ranching) continues to grow within the county, but at a slower rate than other industries (see Table 3-11). In 1970, the Farm and Agricultural Services labor category of the county was 13.22 percent of total employment. By 2000, it was 10.95 percent. This is a substantial decrease in the rate of growth within the farming and ranching industry. Sectors that expanded at a quicker rate over the same period include Services/Professional and, to a lesser extent, Mining. With the projected population increase, the ratio of farming and ranching to other industry sectors is likely to decline, but farming and ranching will continue to be both culturally and economically important.

Table 3-11 Employment by Industry in Kittitas County, 1970 and 2000

	1970	% of Total	2000	% of Total
Total Employment	10,215		17,541	
Farm and Agricultural Services	1,350	13.22	1,920	10.95
Farm	1,253	12.27	1,517	8.65
*Agricultural Services**	97	0.95	403	2.30
Mining	5	0.05	41	0.24
Manufacturing (including forest products)*	671	6.57	991	5.65
Services and Professional	4,836	47.34	9,533	54.34
Transportation & Public Utilities	701	6.86	650	3.71
Wholesale Trade	302	2.96	538	3.07
Retail Trade	1,889	18.49	3,546	20.22

	1970	% of Total	2000	% of Total
Finance, Insurance, & Real Estate	479	4.69	802	4.57
Services (Health, Legal, Business, Others)	1,465	14.34	3,997	22.79
Construction	528	5.17	832	4.74
Government	2,827	27.67	4,224	24.08

*Agricultural Services includes soil preparation services, crop services, and so forth, as well as forestry services, such as reforestation services, and fishing, hunting, and trapping. Manufacturing includes paper, lumber, and wood products manufacturing.

Source: BEA REIS 2005 CD Table CA25

Median income in Kittitas County increased in real terms from 1989 to 1999, as jobs increased and economic diversity expanded. Table 3-12 shows the average gain in inflation-adjusted income for both the median household income and the median family income from decade to decade. These indicators are a general measure of income distribution within the population.

Table 3-12 Income Change in Kittitas County, 1989-1999

	1989	1999	Gain
Median household income (adj. for inflation, in 2000 $)	26,995	32,546	5,551
Median family income (adj. for inflation, in 2000 $)	37,595	46,057	8,462

Source: Census Total population, Households, Families

Provided by Sonoran Institute 2006

Personal incomes from ranching compared with the larger BEA Farming and Agriculture total income category have shown a notable decline within Kittitas County over the past few decades. The gross income of ranchers decreased by 37 percent from 1970 to 2004, while the state income decreased only 8 percent over the same period. It appears that ranching was replaced by farming, because income from crops increased by 7 percent on the state level and 36 percent on the county level. In 2005, income from ranching accounted for 4.4 percent of the gross income across all industries within the county, versus 20.6 percent in 1970 (BEA 2008).

3.11.2 Environmental Consequences

Livestock grazing contributes to the local economy through generation of income related to grazing and other dependent uses and products. Increasing or decreasing the level of agriculture within a region can affect overall income and population levels.

3.11.2.1 Alternative 1: No Action

Direct and Indirect Effects

Alternative 1 is the current management alternative, where AUMs have been reduced from levels prior to 2008 and acres available for grazing remains limited to 16,648 acres. Although the changes in AUMs would have some economic impact on the permittee, the magnitude of effects depends upon a number of factors, including options available to the permittee and the goals and objectives of the livestock operation. This alternative would have a negligible effect on the socio economic structure of the county. Income generated from ranching accounted for just 4.4 percent of the gross income across all industries within the county in 2005, versus 20.6 percent in the year 1970; the small decrease in ranching (livestock grazing) under this alternative would not have a significant effect on this trend. Population, employment, and income are unlikely to be

affected as a result of this alternative, because the ranching industry represents a continually decreasing portion of the Kittitas County economy.

3.11.2.2 Alternative 2: Proposed Action

Direct and Indirect Effects

Alternative 2 represents a 170 percent increase in acreage, but only a 10 percent increase in available AUMs. Therefore, effects will be similar to Alternative 1. As stated above under Alternative 1, income generated from ranching accounted for just 4.4 percent of the gross income across all industries within the county in 2005. Population, employment, and income are unlikely to be affected as a result of this alternative, given the small and decreasing portion of the Kittitas County economy derived from ranching. Thus, Alternative 2 would have an overall minor effect on the county economy.

3.11.2.3 Alternative 3: No Grazing

Direct and Indirect Effects

Under Alternative 3, grazing would be eliminated and potentially reduce a source of income for the permittee. Whether the permittee would continue to maintain their business in a reduced form or supplement the forage loss through other means could depend on several factors. The permittee may choose a number of different options to provide forage previously provided by WDFW.

Eliminating cattle grazing from the Quilomene and Whiskey Dick WAs could affect the economic viability of the permittee's livestock operation because of the additional costs associated with securing additional range or buying supplemental feed, to accommodate herd sizes consistent with current permitted numbers. Additional costs could include the possibility of additional fencing and establishment of water on newly acquired range, along with increased trucking costs, and labor costs associated with moving and otherwise handling cattle.

Grazing reductions could affect employment and income in Kittitas County in three ways: (1) direct effects attributable to employment associated with the ranches; (2) indirect effects attributable to industries that supply materials, equipment, and services to the ranches; and (3) induced effects attributable to personal spending by the ranch owners, employees, families, and related industries. Given the small proportion of the economy derived by ranching, effects are expected to be minimal.

3.11.2.4 Cumulative Effects

Alternative 1

The economic influence from implementation of Alternative 1 is likely to be minimal within the economic context of the county area as a whole. The reduction of livestock grazing under Alterative 1 would not have a major effect on the number of people making a living from ranching.

Employment trends within Kittitas County and throughout the Central Washington area indicate the increased job supply is primarily in construction, services, and trade. Even considering other management activities in the region (timber harvest, road construction, agriculture, etc.) the economic influence would be negligible.

Alternative 2
Cumulative effects under Alternative 2 would be same as described above for Alternative 1.

Alternative 3
There would be minimal cumulative effects if this alternative is implemented. There is a potential loss of open space in the area if the permittee decides to sell their property and it is subdivided.

3.12 Best Management Practices and Mitigation Measures

The following best management practices and mitigation measures will be implemented to reduce effects to resources in the CRM Area under Alternatives 1 and 2.

Best Management Practices

- Livestock would not be turned out until the soil is firm enough to prevent compaction, and key grasses have achieved a minimum of 4 inches of new growth.
- Existing roads, trails and access points will be used whenever possible. Only roads designated for use by the Wildlife Area Manager will be used.
- The following strategies as recommended by Belknap et al. (2001) will be used to minimize disturbance to biological soil crusts: 1) a rest-rotation grazing system, and 2) herding to keep livestock well-dispersed (to limit localized, heavy disturbance).
- Control weeds and minimize ground disturbance that could open up areas to invasion by non-native species.
- Manage cattle distribution using a combination of herding, salt and protein stations, and water developments.
- Implement management recommendations included in the Sage-Grouse Recovery Plan (Stinson et al. 2004) intended to ensure that livestock grazing is compatible with sage-grouse habitat needs:
    - Planned forage utilization by livestock will not exceed 35 percent of current year's growth.
    - A long-term vegetation monitoring effort will be used to ensure that post-grazing vegetation conditions meet sage-grouse breeding and brood-rearing habitat requirements (Schroeder et al. 2004).
    - Minimize the amount of new permanent fences.
    - No development of new springs. The prioritization for re-development of existing springs incorporates sage-grouse concerns. An effort to draw cattle away from riparian areas also minimizes effects to habitat at those sites.
    - Collaborate with adjacent landowners to promote the use of management practices that improve sage-grouse habitat values.
- Continue to implement rangeland monitoring.
- Conduct utilization monitoring during the grazing period.
- Minimize effects to riparian vegetation through the use of temporary fencing, herding, and salt or protein supplement placement.
- Monitor riparian and wetlands areas. If specific habitat effects begin to occur, they would be addressed with fencing or changes to the timing or duration of the grazing period.
- Redevelop priority springs to draw cattle away from riparian areas.

- Monitor known locations of sensitive plants. Site inspections and photographs would be used in an adaptive management process to change conditions of the grazing permit as necessary to achieve the goals and objectives of the grazing permit.
- Implement land use WAC 232-13 (Public conduct rules) to protect natural resources on the wildlife areas.
- Protect cultural resources. If cultural resources are identified during construction or project-related activities, work will be halted in the immediate vicinity of the find and a professional archaeologist will be notified to assess the resource. Consultations will take place with DAHP and any interested tribes.

Mitigation Measures

- The Upper Skookumchuck and Skookumchuck pastures, along with the WDFW parcel within the Wild Horse Crossing pasture, will be rested indefinitely, in order to protect critical fish habitat in Skookumchuck Creek and cultural resources along Columbia River. This will protect approximately 20.4 stream miles and 10,000 acres of habitat.
- Construct and maintain temporary fencing to protect select streams and riparian areas. All fish-bearing stream reaches would be protected with fencing. Temporary fences will be installed in each pasture prior to cattle turnout.
- Redevelopment and protection of springs on WDFW land within the project area, to reduce effects to water quality and riparian areas. Stock fence will be constructed to protect these spring sites, as necessary. Springs will be redeveloped for each pasture before grazing is allowed.
- Permanent fences with high bottom wires and low top wires and temporary electric fences will be used to minimize wildlife effects and facilitate movements of large ungulates, such as deer and elk. Fence markers will be placed on new permanent fence wires to reduce collision risk for birds. As funding allows, fence markers will be incrementally installed on existing permanent fences.
- Cultural resource assessments will be conducted as necessary, prior to excavation or ground disturbance, to comply with Executive Order 05-05.
- WDFW, through consultations with DAHP and pertinent tribes, will develop site-specific mitigation plans for affected archaeological sites.
- During spring redevelopment, dust abatement will be implemented where necessary.

4 Contributors and Coordination

This chapter provides a list of WDFW and Ecology and Environment, Inc contributing authors and editors and Agencies consulted with.

4.1 List of Preparers and Contributing Editors

The following is a list of authors and principal contributors to the EIS process under SEPA and the formation of this DEIS.

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4.2 Coordination/Consultation with Agencies

The following is a list of Agencies the WDFW consulted with in formation of this FEIS.
Bureau of Land Management
Natural Resource Conservation Service
Department of Natural Resources
Department of Archeology and Historic Preservation

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GLOSSARY

Adaptive management: A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Animal-unit: An animal unit (AU) is one mature cow of approximately 1,000 pounds and a calf up to weaning, usually 6 months of age, or their equivalent.

Animal-unit-month: The amount of forage required by an animal unit for 1 month.

Bunch grass: A grass so-called because of its characteristic growth habit of forming a bunch.

Coordinated resource management planning (CRM): The process whereby various interest groups are involved in discussion of resource uses and collectively diagnose management problems, establish goals and objectives, and evaluate multiple use resource management.

Critical period: The critical period is the plant stage of growth when a plant species is most susceptible to damage. For native bunchgrasses the critical period is from boot stage through soft dough stage (when the plant is trying to produce seed). At Ephrata the average dates of the critical period is from April 13 – June 15. Grazing during the critical period can have a severe impact on native bunchgrasses.

Deferment: Delay of livestock grazing in an area until after the growing season

Deferred-rotation: Any grazing system, that provides for a systematic rotation of the deferment among pastures. The time of the rest period generally changes in succeeding years.

Dormant: A living plant that is not actively growing aerial shoots.

Ecological site: 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.

Ecosystem: Organisms together with their abiotic environment, forming an interacting system, inhabiting an identifiable space.

Fence: A structure that acts as a barrier to livestock, wildlife, or people.

Forage inventory: An estimate of available forage in each pasture and for the operating unit as a whole; used to project stocking rates and feed requirements for specific time periods (i.e., annually, grazing season, rotation cycle)

Forage production: The estimated air-dry weight of palatable species (excludes sagebrush and noxious weeds) produced annually in each pasture.

Forage utilization: The percentage of available forage actually consumed by the grazing animal based on net forage accumulation that occurs prior to and while they occupy the pasture unit.

Forb: Any broad-leafed herbaceous plant other than those in the Poaceae (i.e., grasses), Cyperaceae (i.e., sedges), and Juncaceae (i.e., rushes) families.

Graminoid: Grass or grass-like plant, such as Poa, Carex, and Juncus species.

Grass: A member of the family Gramineae (Poaceae).

Grazing season: (1) The time interval when animals are allowed to use a certain area. (2) On public lands, an established period for which grazing permits are issued. May be established on private land in a grazing management plan

Growing season: That portion of the year when temperature and moisture permit plant growth.

Herbaceous: Vegetative growth with little or no woody component; non-woody vegetation, such as graminoids and forbs.

Historic climax plant community: The plant community that was best adapted to the unique combination of factors associated with the ecological site. It was in a natural dynamic equilibrium with the historic biotic, abiotic, climatic factors on its ecological site in North America at the time of European immigration and settlement.

Introduced species: A species not a part of the original fauna or flora of the area in question.

Key grazing area: A relatively small portion of a pasture or management unit selected because of its location, use, or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the current grazing management over the pasture or management unit as a whole.

Key species: A single plant species (or in some situations two or three similar species) chosen to serve as a guide to the grazing use of the entire plant community. If the key species on the key grazing area is properly grazed, the entire plant community will not be excessively grazed.

Livestock: Domestic animals used for the production of goods and services.

Monitoring: Monitoring is a data-collection process that is used to detect on-the-ground, management-induced changes or responses. Soil cover, animal performance, and the density of bunchgrasses in the plant community are examples of things that can be monitored. Monitoring data are used to evaluate the effectiveness of our grazing practices during the implementation phase. Monitoring is how we detect change. Monitoring involves both record keeping and data collection.

> **Annual Monitoring:** Annual monitoring is used each year to monitor the effects of grazing and to actively manage the grazing animals. Annual monitoring techniques include: livestock use records, a record of observations, a record of photos, utilization monitoring, step-point for cover, and boot-gap for gaps between bunchgrasses.
>
> **Trend Monitoring:** Trend monitoring data is collected at 3 to 5-year intervals to detect the changes or responses that have taken place to the plant community or soil surface.

Native species: A species that is a part of the original fauna or flora of the area in question.

Noxious weed: An unwanted plant specified by Federal or State laws as being especially undesirable, troublesome, and difficult to control. It grows and spreads in places where it interferes with the growth and production of the desired crop or native vegetation.

Overgrazing: Overgrazing is continued, heavy grazing that exceeds the recovery capacity of forage plants and causes deterioration of grazing lands.

Overstocking: Placing a number of animals in a given area that will result in overuse if continued to the end of the planned grazing period.

Percent use: Grazing use of current growth, usually expressed as a percent of the current growth (by weight) that has been removed. See **Degree of use**.

Perennial plant: A plant that has a life span of three or more years.

Permittee: One who holds a permit to graze livestock on State, Federal, or certain privately-owned lands. (Syn. Lessee)

Photo point: An identified point from which photographs are taken at periodic intervals.

Plant community type: Each of the existing plant communities that can occupy an ecological site. Several plant community types will typically be found on an ecological site, including the historic climax plant community for that site.

Prescribed grazing: The controlled harvest of vegetation with grazing or browsing animals, managed with the intent to achieve a specified objective.

Producer: Rancher or stock farmer.

Proper grazing use: Grazing at an intensity that will maintain enough cover to protect the soil and maintain or improve the quantity and quality of desirable vegetation.

Proposed Grazing System: For the Quilomene-Whiskey Dick WA Grazing Plan, this system includes light-intensity grazing (less than 35 percent forage utilization), a spring and early summer grazing period, and a rest-rotation scheme.

Range improvement: (1) Any structure or excavation to facilitate management of rangeland or livestock. (2) Any practice designed to improve range condition or facilitate more efficient utilization of the rangeland. (3) An increase in the grazing capacity of rangeland (i.e., improvement of rangeland condition).

Rangeland: A type of land, not a use of land. Primarily, rangelands are grasslands, shrublands and savannas, and grasslands with scattered trees and shrubs.

Rangeland health: The degree to which the integrity of the soil, vegetation, water, and air as well as the ecological processes of the rangeland ecosystem is balanced and sustained. Integrity is defined as maintenance of the structure and functional attributes characteristic of a particular locale, including normal variability.

Rangeland inventory: The systematic acquisition and analysis of resource information needed for planning and for management of rangeland.

Rest: The absence of grazing by livestock to benefit plants for re-growth between grazing periods, typically for a full year.

Riparian ecosystems: Ecosystems that occur along watercourses or water bodies. They are distinctly different from the surrounding lands because of unique soil and vegetation characteristics that are strongly influenced by free or unbound water in the soil.

Similarity index: An assessment of the similarity of the current plant community to the historic plant community or the desired plant community, expressed as a percent similarity.

Soil map unit: A map unit is a collection of soil areas or miscellaneous areas delineated in a soil survey. They may encompass one or more kinds of soil or one or more kinds of soil and a miscellaneous area, such as rock outcrop. They are identified by a unique map symbol in a survey area.

Species composition: The proportions of various plant species in relation to the total on a given area. It may be expressed in terms of cover, density, weight, etc.

Spring: Flowing water originating from an underground source.

Spring development: Improving spring and seeps by excavating, cleaning, capping, or providing collection and storage facilities.

State: A condition of an ecological site's characteristics. As characteristics change, there is a transition to a new state. See Vegetation state.

Triggers: Triggers are indicators used to help decide when to move livestock to a different pasture. Triggers can take several forms: calendar dates, a specified maximum livestock usage in terms of AUMs harvested, a change in plant stage of growth, and the utilization level, or any incidence of use on key plant species.

Use: (1) The proportion of current year's forage production that is consumed or destroyed by grazing animals. May refer either to a single species or to the vegetation as a whole. Syn., degree of use. (2) Utilization of land for a purpose, such as grazing, bedding, shelter, trailing, watering, watershed, recreation, forestry, and wildlife habitat.

Utilization: Syn., use.

Vegetation states: The various plant communities produced by an ecological site within given site characteristics.

In addition to, terms referring to the type, intensity, and duration of effects used in this chapter include the following:

Direct Effect:	an effect that occurs as a result of action on the resource being addressed.
Indirect Effect:	an effect that occurs as a result of actions on other resources.
Cumulative Effect:	an effect that contributes to other past, present, or reasonably foreseeable actions or activities.
Negligible:	the effect is not detectable.
Minor:	the effect is slight but detectable; there would be a small change.
Moderate:	the effect is readily apparent; there would be a measurable change that could result in a small but permanent change.
Major:	the effect is large; there would be a highly noticeable or permanent measurable change.
Localized:	the effect occurs in a specific site or area, generally less than 1 acre.
Short-term:	the effect occurs only for a short time after implementation of an alternative, normally less than one year.
Long-term:	the effect occurs for an extended period after implementation of an alternative; normally an effect that requires annual monitoring or that will extend beyond the period of the permitted activity.
Permanent:	the effect is irreversible; the resource will never revert to current conditions.