

Elk Creek Conservation Area Management Plan

**A cooperative plan created by
Swan Ecosystem Center and
Confederated Salish and Kootenai Tribes**

Submitted to the Bonneville Power Administration

September 15, 2007

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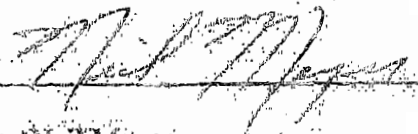
Swan Ecosystem Center
6887 Hwy 83
USFS Condon Work Center
Condon, MT 59826
T 406-754-3137
F 406-754-2965
Email: swanec@blackfoot.net
www.swanecosystemcenter.com

Confederated Salish and Kootenai Tribes
Natural Resources Department
51383 Highway 93 North
P.O. Box 278
Pablo, Montana 59855
T 406-883-2888
F 406-883-2896
www.cskt.org

Report prepared by
Donna Erickson Consulting, Inc
in collaboration with the Elk Creek Management Group
www.westernopenlands.com

SIGNATURES


SWAN ECOSYSTEM CENTER

By:  Date: 12 Sept 07

Name: Neil Meyer

Title: Chairman, Board of Directors

CONFEDERATED SALISH AND KOOTENAI TRIBES

By:  Date: 12 Sept 07

Name: Les Everts

Title: CSKT Fisheries Program Manager

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Many people worked collaboratively to envision a healthy future for the Elk Creek Conservation Area—through committee discussions, field work, mapping, data collection, and writing. This plan could not have taken shape without the knowledge, enthusiasm, and vision of local residents, Swan Ecosystem Center board members and staff, and Confederated Salish and Kootenai Tribes personnel who served on the Elk Creek Management Group. A hearty thank you to: Russ Abolt, Allen Branine, Anne Dahl, Steve Ellis, Les Evarts, Glen Gray, Rip Grubaugh, Pam Hamilton, Barry Hansen, Mo Hartmann, Steve Lamar, Neil Meyer, Bill Moore, Bud Moore, Vicki Moore, Shane Morigeau, Tom Parker, Betsy Spettigue, Rusty Sydnor, Mark Vander Meer, and Suzanne Vernon. We also appreciate the information provided by Plum Creek Timber Company.

EXECUTIVE SUMMARY

The Swan Ecosystem Center (SEC) and Confederated Salish and Kootenai Tribes (CSKT) each purchased 320 acres of contiguous land from Plum Creek Timber Company in September 2006 using mitigation funds from the Bonneville Power Administration (BPA). The mitigation property is situated at the confluence of Elk Creek and the Swan River in the Upper Swan Valley. It is near the Condon, Montana area, less than a mile from Highway 83.

Elk Creek is a vital corridor for many wildlife species. It has consistently been ranked the highest and best in every category biologists catalog and has core habitat for bull trout production. Bull trout are native species listed as “threatened” on the federal Threatened and Endangered Species list. The cottonwood and willow streamside areas and the many wetlands also offer important low-elevation habitat for grizzly bears, winter range for deer and elk, and important rare plant habitat. The Elk Creek Conservation Area helps prevent development along the stream and uplands, conserving forestlands, habitat for fish and wildlife, and community access.

The mission of Elk Creek Conservation Area management is to:

Allow dynamic processes to create and sustain habitat for all bull trout life stages. Protect and promote habitat for all native plant and animal species in a naturally functioning forest. Recognize that this forest is part of a larger landscape that supports humans. Considering that not all natural processes (such as wildfire) can be

allowed to proceed, we will follow a well-defined process for decision making to identify management interventions that simulate a naturally functioning forest.

The Elk Creek Management Group was formed late in 2006, and included Swan Valley residents, CSKT planners, foresters, biologists, and other relevant professionals. It was charged to create a cooperative management plan that encompasses both the SEC and CSKT portions of the Elk Creek Conservation Area. This plan is a result of those efforts.

The Management Group collected existing data and performed field work to inventory the property’s biological and physical characteristics. The Elk Creek Conservation Area lies within the Upper Swan Valley’s Valley Bottom Ecosystem.¹ The management plan analyzes the following characteristics: soils; ponds; streams and riparian habitats; wildlife; threatened and sensitive plant and animal species; forest stands; and disturbances.

For planning purposes, the Elk Creek Conservation Area was divided into 13 vegetation units, based on vegetative composition and topography. Two of the units are riparian and are bounded roughly by the Elk Creek and Swan River floodplains. The pattern of previous logging has also delineated the boundaries between vegetative units. Quantitative and descriptive assessments of each unit were completed in the summer of 2007.

An analysis of the area’s cultural heritage was also completed, focusing on historic uses of the Elk Creek drainage, Native

¹ Swan Ecosystem Center, 2004. *Upper Swan Valley Landscape Assessment.*

American sites and uses, and recent access to and use of the Elk Creek Conservation Area.

This inventory and analysis of biological, physical, and cultural factors led to the following broad goals and more specific objectives for management.

Goal 1. Perpetuate native species and their habitats by allowing natural processes to occur.

Objective 1. Monitor habitat conditions for all bull trout life stages by a combination of quantitative and non-quantitative methods. Bull Trout have been selected as the primary stewardship priority for the following reasons: 1) this land was purchased with funds earmarked for native species protection; 2) bull trout are an excellent surrogate representative for other native fish; 3) Elk Creek is the most important spawning tributary for the Swan Lake bull trout population; and 4) they receive federal, state and tribal protection.

Objective 2. Protect all native plant and animal species by recognizing their presence and vulnerability as all management actions are planned and performed. Follow the decision-making protocol (defined below) to evaluate and document all management activities.

Objective 3. Minimize the presence of non-native plant species, especially noxious weeds, focusing on road verges, landing areas, disturbed riparian areas, and other disturbed sites.

Goal 2. When natural processes cannot be allowed to occur, identify appropriate management interventions by means of a structured decision-making process.

Objective 1. Promote a biologically diverse forest that, over time, maintains areas of forage, thermal cover, hiding cover, etc.

Objective 2. Meet as a management committee on a set schedule, or in response to specific management proposals, to implement the decision-making protocol.

Objective 3. Document and archive all management decisions made for the property.

Goal 3. Integrate human use consistent with the mission statement.

Objective 1. Control public access to balance resource protection with recreational opportunity.

Objective 2. Protect relevant historic and cultural artifacts and sites.

Objective 3. Inform the community about the value and role of the Elk Creek Conservation Area.

Objective 4. Develop monitoring programs, utilizing professionals, students and/or residents. Collect baseline and trend data to determine management effectiveness over time.

Objective 5. Encourage appropriate recreational uses, including hiking, bird-watching, and other passive recreation appropriate to the mission. Identify and restrict recreation activities detrimental to the mission.

Goal 4: Respect our neighbors by recognizing that our actions have implications beyond the property's boundaries.

Objective 1. Understand and respect local traditions. Encourage meaningful participation by community members.

Objective 2. Coordinate management activities, to the extent feasible and appropriate, with neighboring landowners.

Future management of the Elk Creek Conservation Area will be guided by a decision-making process based on the following concepts:

- Desirable management activities are those that create conditions that will sustain natural processes.
- Passive management approaches which can solve a problem or condition within a time frame that does not place the ecosystem at unacceptable risk are preferred.
- Active management approaches will only be used when passive approaches will likely not be effective within an acceptable timeframe and where the active approach will create conditions that will sustain natural processes.
- In cases of uncertainty, default decisions will be made in the direction that favors native trout.

A protocol for using these principles in decision-making was developed. A five-member Management Committee will oversee management of the Elk Creek Conservation Area and will apply the decision-making protocol to all management proposals. Two appointments to the committee will be made by the SEC Board of Directors and two by the CSKT Natural Resources Department. These appointments will be made by January 1, 2008. One at-large person will be appointed to the committee by these four individuals. The

committee will meet in January 2008 and make its first report to SEC and CSKT by March 1, 2008.

On a project-by-project basis, the five-person Management Committee is mandated to consult with qualified experts from relevant agencies or universities outside SEC and CSKT in order to obtain unbiased technical opinions on which to base decisions.

The management committee will review the management plan at regular yearly intervals in light of information from the Elk Creek Conservation Area monitoring program. In keeping with the principles of adaptive management, observing and measuring results for each management decision (action or no action) will provide data that should be used to improve subsequent practices and enhance our knowledge of Elk Creek ecosystems. All decisions should be documented and archived for this purpose.

Several key issues will likely need to be dealt with by the management committee in the future. For some issues, further studies should be conducted. The main issues identified and discussed in the management plan are: weed control; coordination with neighbors and the public; fire; insects and disease; stream habitat and fish studies; harvests; public access; monitoring ecological processes; wildlife; and historic and cultural artifacts and sites.

CHAPTER 1: INTRODUCTION

Background

Montana Fish, Wildlife and Parks (MFWP) and the Confederated Salish and Kootenai Tribes (CSKT), under their fisheries management authority, are responsible for mitigating the impacts caused by the construction of Hungry Horse Dam. The nationally significant bull trout population residing in Flathead Lake lost about 40% of its rearing and spawning habitat because of blockage by the dam. Since 1992, these agencies have striven to mitigate these impacts with funding from Bonneville Power Administration through a wide range of activities including habitat restoration, non-native species suppression, and coordination with private landowners to reduce the impacts of development.

During the course of these activities it became apparent that while mitigation of damages is often effective, it is rarely as biologically beneficial as protection of undisturbed portions of the landscape in perpetuity. For example, the fisheries profession has learned that hatcheries cannot replace functional habitat when the goal is long-term protection of native fish populations. Consequently the agencies initiated a new mitigation program in 2003 to acquire and protect properties that border water bodies. The rationale in this new program is that maximum benefits to fish will accrue from maintaining habitat in its natural state in perpetuity. Swan River and Elk Creek were identified for acquisition because they are key components of a functioning ecosystem that supports a robust population of bull trout, and that is also under extreme development pressure, threatening its long-term integrity.

Partnership: Swan Ecosystem Center and Confederated Salish and Kootenai Tribes

The Swan Ecosystem Center (SEC) and CSKT each purchased 320 acres of contiguous land from Plum Creek Timber Company in September 2006 using mitigation funds from the Bonneville Power Administration (BPA). The mitigation property (totaling one section) is situated at the confluence of Elk Creek and the Swan River in the Upper Swan Valley. This Elk Creek Conservation Area is but one piece of a larger conservation strategy headed by SEC to protect additional acreage in the Elk Creek drainage. The proposed Elk Creek Community Forest includes the Elk Creek Conservation Area and two other sections of land, as shown in Figure 1.

The BPA holds a conservation easement on the land, protecting habitat for native bull trout in perpetuity. The Northwest Power and Conservation Council recommended allocation of BPA mitigation dollars through its fish and wildlife program and approved the Swan Valley projects in 2006. Due to the high resource values of Elk Creek, BPA earned mitigation credits for habitat lost during construction of its Hungry Horse dam and reservoir. Elk Creek is a major spawning, rearing, staging, and migratory tributary for this threatened species. The project mitigates for 4.18 km of the 125.8 km of habitat affected by the construction and inundation of the dam.

Legal Framework

Land ownership in the Swan Valley forms a checkerboard pattern, where one-square-mile sections alternate in private and public ownership. Plum Creek Timber (PCT) is by

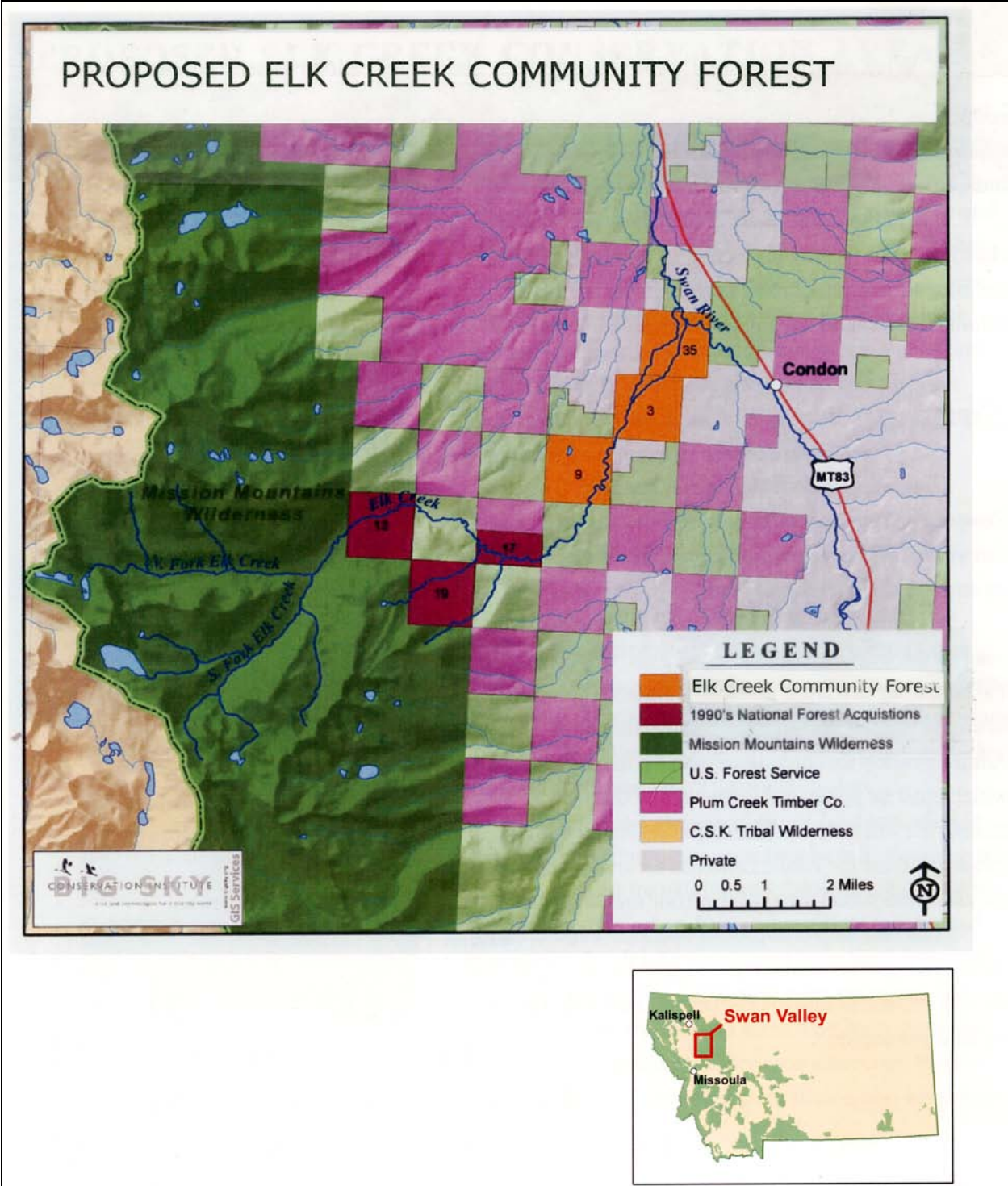


Figure 1. Elk Creek Conservation Area (section 35), shown within the larger proposed Elk Creek Community Forest (sections 35, 3 and 9). Sections 3 and 9 are currently owned by Plum Creek Timber.

far the largest private landowner in the valley, with 70,000 acres. The Elk Creek Conservation Area is one of several properties that have recently been acquired from PCT for conservation in western Montana.

The Elk Creek Conservation Area is situated in the Condon area, less than a mile from Highway 83. Its legal description is *T21N R17W Section 35* (Figure 2). The CSKT owns the east half of section 35 and SEC owns the west half.

A Memorandum of Agreement (MOA) between BPA, CSKT, and MFWP was signed to provide the funding and the overarching stipulations for land acquisition. Since SEC obtained half of the section and is not a trustee of the fisheries resource, a second MOA (Appendix 1) was signed to insure that the conservation obligations for which the funding was provided are also vested with SEC.

The MOA stipulates that the public will have reasonable access to the property and that tribal members will retain their treaty-reserved fishing rights. It also spells out prohibited uses for the Elk Creek Conservation Area; the following are prohibited, except as specifically spelled out in this management plan:

- Residential, commercial, or industrial uses of the property;
- Erecting any building, billboard, or sign;
- Depositing of soil, trash, ashes, garbage, waste, bio-solids or any other material;
- Excavating, dredging, or removing loam, gravel, soil, rock, minerals, sand, hydrocarbons or other materials;
- Otherwise altering the general topography of the property,

including the building of roads and flood control work, except for work related to restoration or enhancement projects identified in the plan;

- Livestock grazing, timber harvest, removal of shrubbery or vegetation unless those actions are specifically provided in the Management Plan for purposes which include protecting resident fish, protecting against wildfire, preventing disease, or protecting persons or property.

A conservation easement also helps govern future use of the Elk Creek Conservation Area (Appendix 2). BPA holds the easements on SEC's west half and CSKT's east half of the Elk Creek property. The conservation easement also includes a list of prohibited uses, but states that the restrictions outlined in this management plan may be substituted for those listed in the easement.

Property Description

Elk Creek, flowing from the Mission Mountains Wilderness, is a major tributary of the Swan River. The Elk Creek Conservation Area falls within the Valley Bottom Ecosystem,² which includes undulating flat lands of the valley floor and numerous wetlands. This ecosystem is a warm, moist habitat that is mostly forested with a large diversity of coniferous and deciduous tree species. Geologically, the Valley Bottom Ecosystem is highly diverse, including glacial troughs with small pockets of wet depressions and glacial outwash (kame and kettle topography).

² Swan Ecosystem Center, 2004. *Upper Swan Valley Landscape Assessment*.

Elk Creek is a vital corridor for many wildlife species. It connects habitat in the Mission Mountains Wilderness on the west side of the valley with a major wetland complex on the east side of the valley—which then connects to the Swan Range and the greater Bob Marshall Wilderness. The

U.S. Forest Service acquired the upper reaches of Elk Creek, outside the wilderness, through a land exchange in the 1990s. The 640-acre Elk Creek Conservation Area helps prevent development along the stream and uplands, providing forestlands, habitat for fish and wildlife, and community access. It

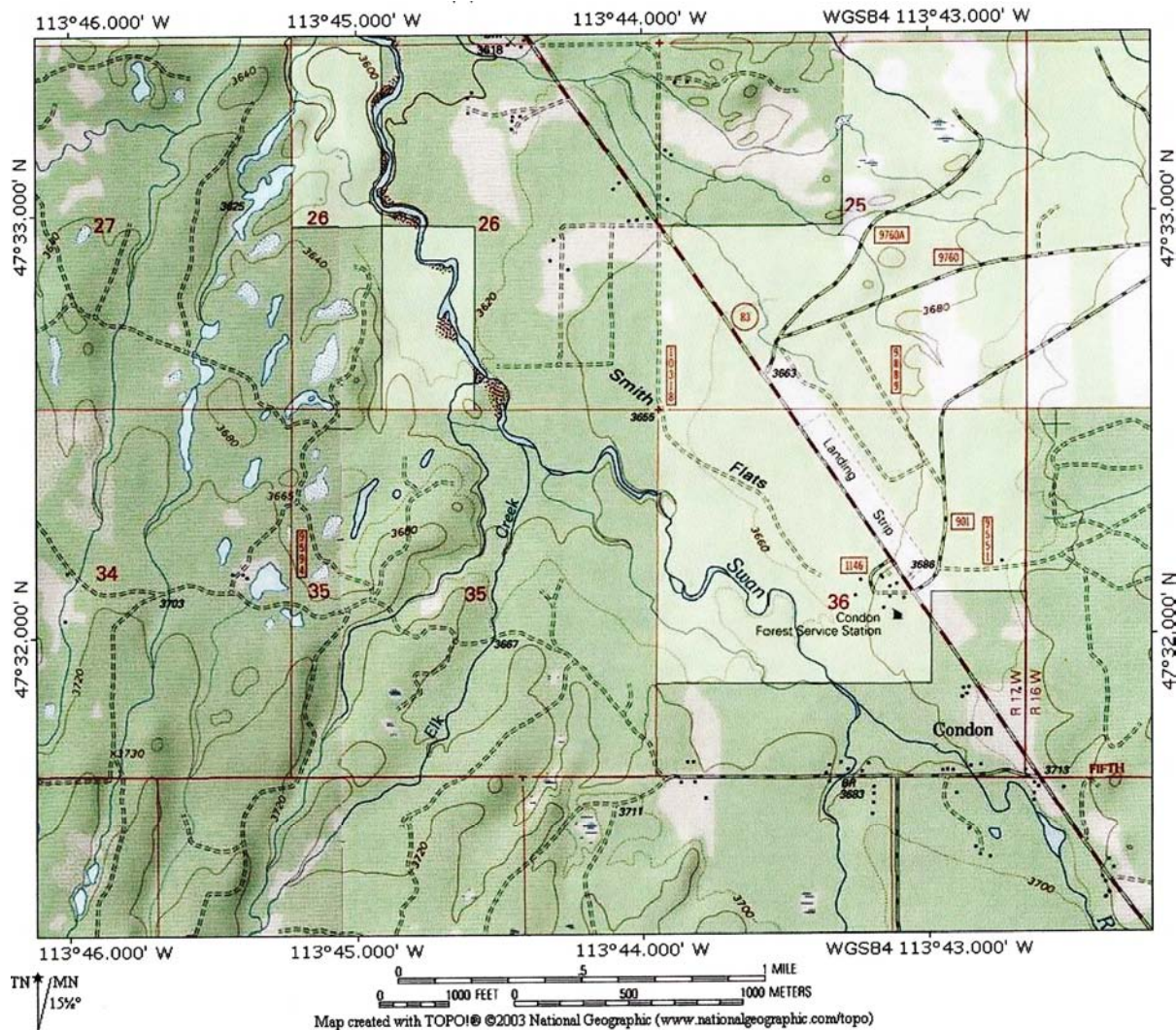


Figure 2. Topographic map of the Elk Creek Conservation Area (Section 35) in relation to Highway 83, Condon, the Swan River, and surrounding lands.

is part of a larger Swan Valley Conservation Strategy.³

Elk Creek has consistently been ranked the highest and best in every category biologists catalog. Elk Creek is a priority watershed and has core habitat for bull trout production. MFWP has repeatedly identified Elk Creek as the highest priority for conservation in the Swan Valley for lands outside grizzly bear linkage zones. Bull trout are native species listed as “threatened” on the federal Threatened and Endangered Species list. The cottonwood and willow streamside areas and the many wetlands also offer important low-elevation habitat for grizzly bears, winter range for deer and elk, and important rare plant habitat.

Most of the Swan Valley’s residential, commercial, and recreational development is located in the Valley Bottom Ecosystem. Disturbances to this zone (and to the Elk Creek Conservation Area within it) include timber harvest, sometimes encroaching to the edge of wetlands and streams. The section was logged from at least 1965 to 2001 by Burlington Northern and then Plum Creek Timber. Noxious weeds are a recent disturbance to the ecosystem and are prevalent due to logging, roads, and nearby human settlement.

Mission and Goals

The mission of Elk Creek Conservation Area management is to:

³ The Swan Valley Conservation Strategy is a partnership effort among all the agencies and organizations that have a role in the Swan Valley, working together to protect timberlands, wildlife habitat, and public access in response to divestment of Plum Creek Timber Company lands.

Allow dynamic processes to create and sustain habitat for all bull trout life stages. Protect and promote habitat for all native plant and animal species in a naturally functioning forest. Recognize that this forest is a part of a larger landscape that supports humans. Considering that not all natural processes (such as wildfire) can be allowed to proceed, we will follow a well-defined process for decision making to identify management interventions that simulate a naturally functioning forest.

Within that mission, more specific goals are to:

1. Perpetuate native species and their habitats by allowing natural processes to occur.
2. When natural processes cannot be allowed to occur, identify appropriate management interventions by means of a structured decision-making process.
3. Integrate human use consistent with the mission statement.
4. Respect our neighbors by recognizing that our actions have implications beyond the property’s boundaries.

Collaboration and Participation with Stakeholders

The Elk Creek Management Group was formed late in 2006. The Management Group includes Swan Valley residents, CSKT planners, foresters, biologists, and other relevant professionals. It was charged to create a cooperative management plan that encompasses both the SEC and CSKT portions of the Elk Creek Conservation Area. The Management Group worked actively from winter 2006 to the present in

order to engage stakeholders and create this plan. A community meeting focused on the management plan for the newly acquired Elk Creek Conservation Area was held on January 16, 2007 at the Swan Valley Community Hall in order to gather local residents' input. Several of the Management Group's 2006-2007 meetings were open to the public.

The Management Group performed field work to inventory biological, cultural and historic features in the summer of 2007. For a complete list of meetings and field days, please see Appendix 3.

Conformance with BPA Standard Planning Process

This management plan provides actions that preserve, restore, enhance and/or create naturally self-sustaining habitat. This plan is consistent with BPA's eight standard planning process steps contained in the "Watershed Management Program Record of Decision." It includes management actions that preserve, restore, enhance and/or create naturally self-sustaining native habitat or native-like habitat that supports indigenous resident fish species of the area. The BPA eight planning steps are set out in this planning document as follows:

- 1) Define the area of concern/interest—Chapter 1;
- 2) Describe the involvement of stakeholders—Chapter 1;
- 3) State desired future conditions—Chapter 4;
- 4) Characterize the historical and present site conditions and trends—Chapters 2 and 3;
- 5) Establish project goals—Chapter 4;

- 6) Develop and implement an action plan for achieving the goals—Chapters 5 and 6;
- 7) Plan monitoring to assess conditions and evaluate results—Chapter 6;
- 8) Plan for adaptive management using new information—Chapters 5 and 6.

CHAPTER 2: BIOLOGICAL AND PHYSICAL CHARACTERISTICS

The analysis of biological and physical elements for the Elk Creek Conservation Area is tiered within the larger landscape assessment completed for the Upper Swan Valley in 2004.⁴ The management and planning framework shown in this plan follows the rationale set out in that larger landscape assessment. This section outlines the features found within the Valley Bottom Ecosystem and then focuses briefly on the Elk Creek drainage. Finally, a broad analysis of the Elk Creek Conservation Area itself is summarized.

Overview of the Valley Bottom Ecosystem

The Elk Creek Conservation Area lies within the Valley Bottom Ecosystem in the upper Swan Valley (Figure 3). Most of the upper Swan Valley's residential, commercial and recreational development is also located in this ecosystem. (The shaded material, below, is taken directly from the 2004 Upper Swan Valley Landscape Assessment).

“The Valley Bottom Ecosystem includes the undulating flat lands of the valley floor with its many wetlands. This ecosystem is a warm moist habitat that is mostly forested with a large diversity of conifer and deciduous tree species. Openings in the forest are numerous since most of the people in the valley live here. It has the flattest, most productive soils and the easiest access, so homesteading and subsequent

development occurred in this ecosystem first.

“Geologically, the Valley Bottom Ecosystem is highly diverse, having been created by numerous advancing and retreating glaciers. The landtype classification is mostly glacial troughs with small pockets of wet depression and glacial outwash, known as kame and kettle.

“The Swan River and its numerous tributaries in the Valley Bottom Ecosystem form ribbons of riparian areas that weave through this ecosystem and tie all the upland pieces, riparian zones and wetlands together. This ‘green zone’ ribbon of vegetation stays green longer during summer months in contrast to the upland forests. The Swan River is young, with a channel that has changed course frequently over the years, creating many side channels. These channels have significant stands of black cottonwood, spruce, and willow.

“The upland areas are a mix of western larch, western white pine, lodgepole pine, Douglas-fir, ponderosa pine, Engelmann spruce, grand and alpine fir. The neighboring riparian zones are bordered with cottonwood, birch and aspen. Unlike many areas of Montana, the cottonwood stands in most of the riparian corridors and wetlands are healthy and show a diversity of ages.

“In addition to the riparian areas, Upper Swan Valley wetlands, often called potholes, consist of fens or peat lands, marshes, vernal pools, ponds, and lakes. Most of the wetlands are in glacial-caused depressions. Some of the wetlands hold water into the middle or late summer for

⁴ Swan Ecosystem Center, 2004, *Upper Swan Valley Landscape Assessment*.

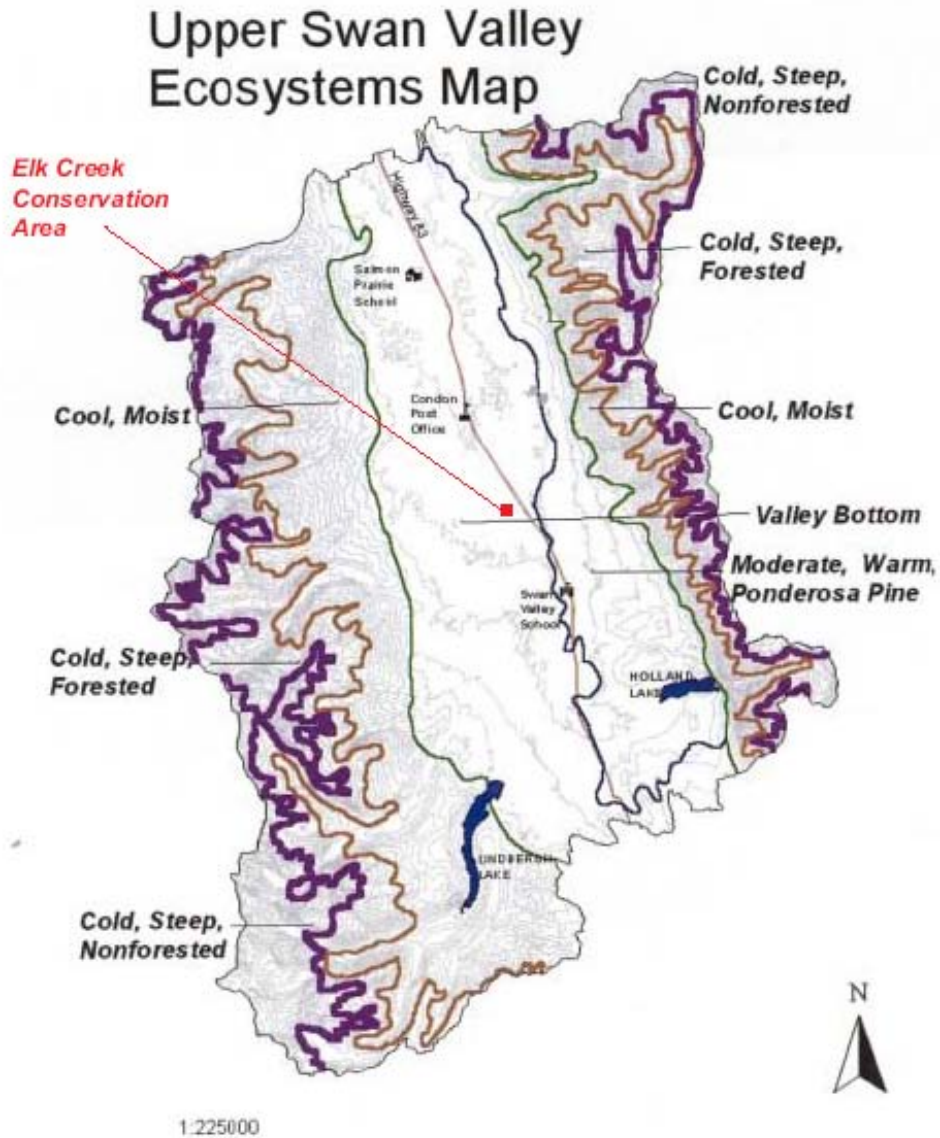


Figure 2.1. Upper Swan Valley Ecosystems Map

Source: GIS Layer, created by Barb Raible via personal communications from Landscape Committee.

February 2004

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Figure 3. Upper Swan Valley Ecosystems Map (Source: Upper Swan Valley Landscape Assessment, 2004).

aquatic vegetation and rare plants. This wetlands complex is probably the most outstanding geographic and biologic feature of the Upper Swan Valley. The extent and diversity of this system is unique in Montana for a forested landscape...Some wetlands in the Valley Bottom ecosystem are large and complex....Others are tiny and simple in structure.

“Although many wetlands and aquatic environments remain in good condition, some wetland, streamside and riparian environments have experienced timber harvest up to their edge or within a short distance.

“Many other disturbances have impacted the Valley Bottom Ecosystem in recent times. Low intensity upland fires have sometimes entered the fringe of the riparian and wetland communities and burned individual or small groups of trees...High intensity winds have occurred at intervals and caused extensive blowdown...Noxious weeds are a recent disturbance in this ecosystem and are prevalent because of extensive transportation systems and human development.”

Vital Natural Resources of the Elk Creek Drainage

Elk Creek is extremely significant for fish and wildlife in the Valley Bottom Ecosystem. Unique features include key bull trout habitat, an important wetland complex, low elevation spring grizzly bear habitat, ungulate winter range, and important rare plant habitat.

The importance of Elk Creek to sustaining bull trout in the Swan Valley cannot be overstated. This large stream has single-

handedly supported an average of 28% of all bull trout production in the Swan Valley over the past few decades. In fact, Elk Creek usually has more bull trout spawning redds⁵ than anywhere in the Swan Valley or in the Flathead National Forest. The bull trout ascend Swan River in mid-summer and stage at the confluence of Elk Creek and Swan River for about a month. Then they swim upstream for several miles until they reach spawning habitat, the same habitat that they hatched from years ago. The adults immediately leave the stream but the eggs remain behind to incubate under the clean gravels. The juvenile fish linger in Elk Creek for one to three years to take advantage of its excellent rearing habitat before descending to Swan Lake to grow up. Elk Creek is also home to native cutthroat trout, native sculpins, and low numbers of brook trout. Due to its extreme importance for bull trout conservation, MFWP has closed Elk Creek to fishing year-round.

Elk Creek in Section 35 is not used for spawning but rather for migration, rearing and foraging habitat. The best spawning habitat lies upstream and is protected in national forest ownership. However, the spawning habitat is useless if bull trout cannot safely reach it and the progeny cannot safely trickle downstream to rear and grow up. The riparian areas along Elk Creek and the Swan River need to be left undisturbed to allow the streams to wander and interact with their surrounding landscapes. Water quality needs to be protected from point-sources of sediment or altered flow conditions. With these basic conservation tactics, bull trout should continue to thrive in Elk Creek.⁶ Other land

⁵ Redds are depressions in the gravel of a spawning stream where a female lays her eggs.

⁶Personal communication from Beth Gardner, Flathead National Forest Fisheries Biologist, 2/13/06.

uses, such as recreation and upland timber management, can be fully compatible.

The Elk Creek drainage is also part of a larger landscape linkage zone for wildlife. The Glacier, Elk, and Cold Creek drainages converge in a relatively confined area of the Swan River between Glacier Creek and Cold Creek Roads near the unincorporated settlement of Condon. Many animals cross the valley and the highway in this area, including deer migrating toward the white-tailed deer winter ranges. Although it is very near much of Condon's development, the proximity of high quality habitats east of Highway 83 encourages wildlife use in this area.

Inventory and Analysis of the Elk Creek Conservation Area

Elk Creek carves a wide swathe, joining the Swan River in the northeast corner of Section 35. Most of the main creek channel and the entire river are on CSKT land, although the SEC half includes the former main channel that could in the future reestablish itself as the stream naturally moves from side to side. The broad flood plains have been logged, but cottonwoods, spruce, and other tree species grow along the banks and some young trees are getting a start in the flood zone. There is low commercial value in the upland forests, due to high-grade logging in the past.

Soils

Four different soil associations are found within the section (Appendix 4). Glaciercreek gravelly silt loam and Udifluvents are found in the low, flat

riparian areas (0-4% slopes). Jimlake gravelly silt loam and Hollandlake-Bata Complex are found in upland areas of 4-30% slopes. The hazard of surface rut formation through the operation of forestland equipment is moderate for the Hollandlake-Bata Complex, but low for all others. All soils within the section are either somewhat limited or not limited in terms of appropriateness for trail construction, based on trafficability and erodibility, and are at low risk of soil damage by fire. The forest productivity ratings for these soils are relatively high and well suited to hand and mechanical planting.

The Elk Creek Conservation Area's upland and riparian areas have experienced severe disturbance from logging practices that have compromised soil vitality. The bio-physical resiliency of these soils has been significantly compromised; natural restorative processes are slow and incomplete. Two properties—soil organic matter and soil porosity—are most influenced by timber harvesting and most related to forest integrity within the constraints of climate and topography.

These two issues are the primary soil concerns for the Elk Creek Conservation Area. Soil organic matter is influenced by fire, silvicultural prescriptions, timber harvests, decomposition and accumulation rates. Soil porosity is most influenced by mechanical compaction. Future soil assessments may be needed, particularly for monitoring the resiliency of soil conditions over time.

Ponds

There is a growing awareness about the rare plant populations in the wetlands of the Valley Bottom Ecosystem. Generally, there seems to be decreasing connectivity between

the ponds, the Swan River and its tributaries, due to logging, roads, and houses.⁷

Several year-round and seasonal ponds are scattered throughout the Elk Creek Conservation Area. These wet areas attract migratory birds, turtles, and frogs and provide important habitat for most other wildlife species native to the Swan Valley.

A complete inventory of the ponds, including GPS locations, is underway and will be completed prior to any management activity near their locations. The ponds that have been mapped are shown in Figure 4. A search of the threatened plant *Howellia aquatilis* within ponds is underway as well.

Streams and Riparian Habitats

A survey of riparian vegetation was begun in July 2007. This work is preliminary and further data need to be collected prior to the recommendation and implementation of management actions. Appendix 5 provides details on research methods and plot data.

During initial vegetation survey work, we established 12 cross-riparian step transects (Figure 5).⁸ Eight transects span the former and current Elk Creek channels; the other four transects are located within the Swan River floodplain. The main objective of the survey is to determine the coverage (in percent) of riparian plant community and habitat types, as defined by Hansen and

others⁹, as well as other cover types defined by the survey team. Cover types included descriptions of active (i.e., perennial) and seasonally dry stream channels, floodplain ponds, and areas disturbed by previous logging activities. The disturbed logging cover type was used to describe areas where logging had altered the vegetation to the point that an accurate classification of plant communities or habitat types was not possible.

As seen in Table 1, the disturbed logging cover type occupies approximately 50% within both the Swan River and Elk Creek riparian areas. Within this cover type, Engelmann spruce is the dominant tree species, represented by either large mature trees avoided during logging or newly colonized recruits from 1 to 25 years of age. The regeneration of Engelmann spruce, however, appears to be hampered within this cover type, possibly due to: 1) widespread coverage of noxious weeds (primarily Canada thistle); 2) heavy ground cover of snowberry, rose, and native and non-native grasses; and 3) drought or localized changes in groundwater depth. Black cottonwood appears to have been a more important component of the riparian vegetation community historically, as evidenced by the numerous mature to decadent specimens in the disturbed logging cover type. Regeneration of black cottonwood is poor throughout, and more study is needed to determine the reasons for this phenomenon.

Historically, much of the riparian vegetation within Units B and I was likely

⁷ Swan Ecosystem Center, 2004, *Upper Swan Valley Landscape Assessment*.

⁸ The step transect method is based on protocols described in: Winward, A.H. 2000. Monitoring the vegetation resources in riparian areas. Gen. Tech. Rep. RMRS-GTR-47. Ogden, UT. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p.

⁹ Hansen, P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Jay, and D.K. Hinckly. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous Publication No. 54. Missoula, MT. Montana Forest and Conservation Experiment Station, School of Forestry, The University of Montana. 646 p

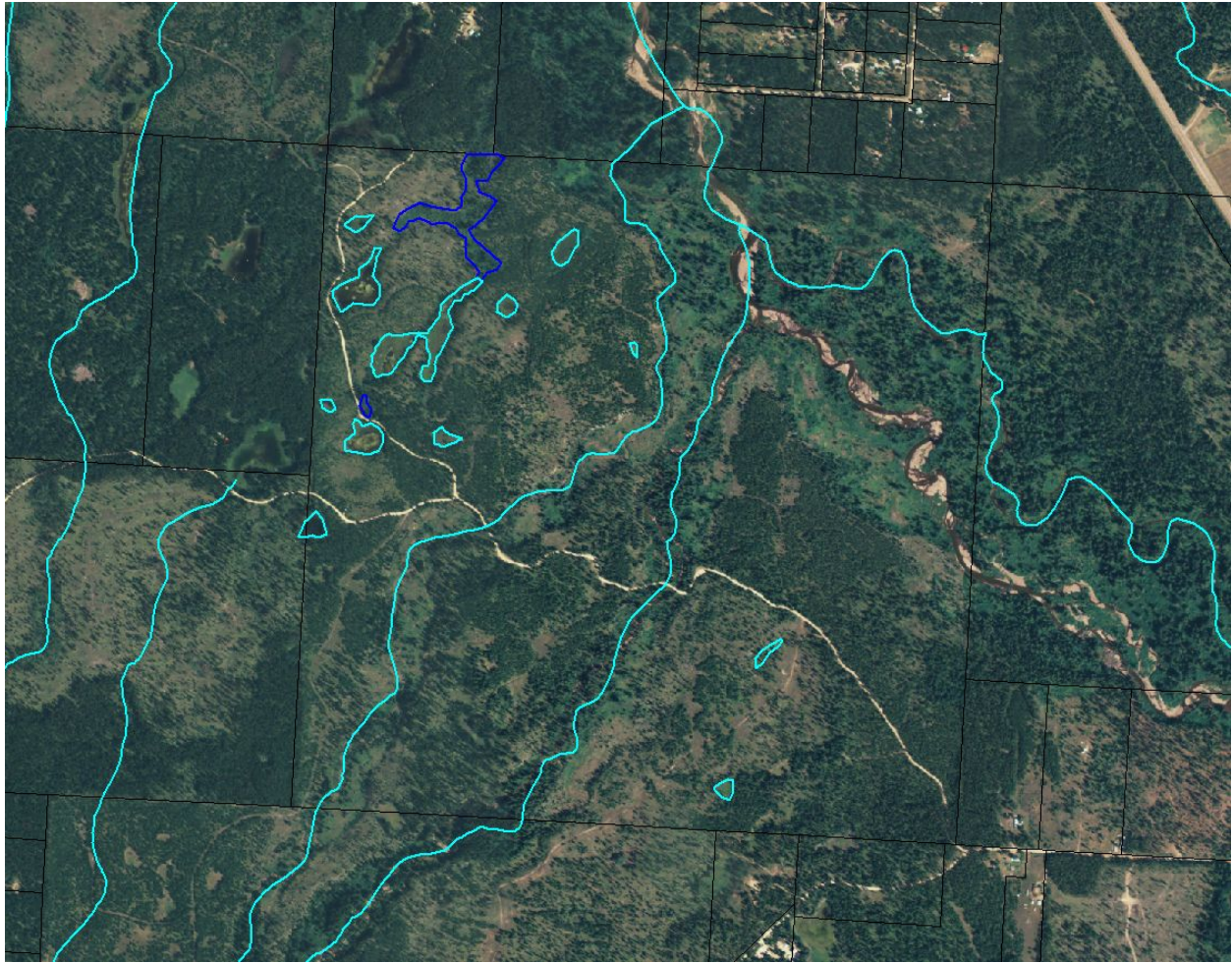


Figure 4. Aerial photo showing the ponds (light blue) and wetlands (dark blue) within the Elk Creek Conservation Area. This is a preliminary inventory only; further mapping will be needed to locate all ponds and wetland areas.

characterized by the Engelmann spruce / red-osier (Pien-Cost) or Engelmann spruce / common horsetail (Pien-Eqar) habitat types. Intact examples of these habitat types are currently more common in the active Elk Creek floodplain and the floodplain to the east of Swan River where less logging disturbances have occurred in the past. Engelmann spruce is again the dominant tree species, with red-osier dogwood, mountain alder, and alder-leaf buckthorn as common understory shrub species.

Table 1. Habitat / Community Types and Cover Types for the Elk Creek and Swan River riparian zones within the Elk Creek Conservation Area.

| Habitat / Community Type or Cover Type | Active Elk Creek Riparian | Former Elk Creek Riparian | Elk Creek Total (Unit I; 96 acres) | Swan River Riparian (Unit B; 119 acres) | Total Section 35 Riparian |
|---|---------------------------|---------------------------|------------------------------------|---|---------------------------|
| | % | % | % | % | % |
| Disturbed Logging Cover Type | 32 | 78 | 51 | 48 | 50 |
| Engelmann spruce / red osier dogwood habitat type | 29 | 5 | 19 | 20 | 19 |
| Mountain alder community type | 0 | 0 | 0 | 21 | 5 |
| Engelmann spruce / common horsetail habitat type | 8 | 0 | 5 | 0 | 4 |
| Grand fir / lady fern habitat type | 11 | 0 | 7 | 0 | 5 |
| Beaked sedge (hairgrass phase) habitat type | 2 | 0 | 1 | 0 | 1 |
| Reed canary grass habitat type | 0 | 0 | 0 | 2 | 1 |
| Active (perennial) channel cover type | 15 | 0 | 8 | 7 | 7 |
| Seasonally dry channel cover type | 1 | 17 | 8 | 2 | 7 |
| Floodplain pond cover type | 2 | 0 | 1 | 0 | 1 |
| Totals | 100% | 100% | 100% | 100% | 100% |

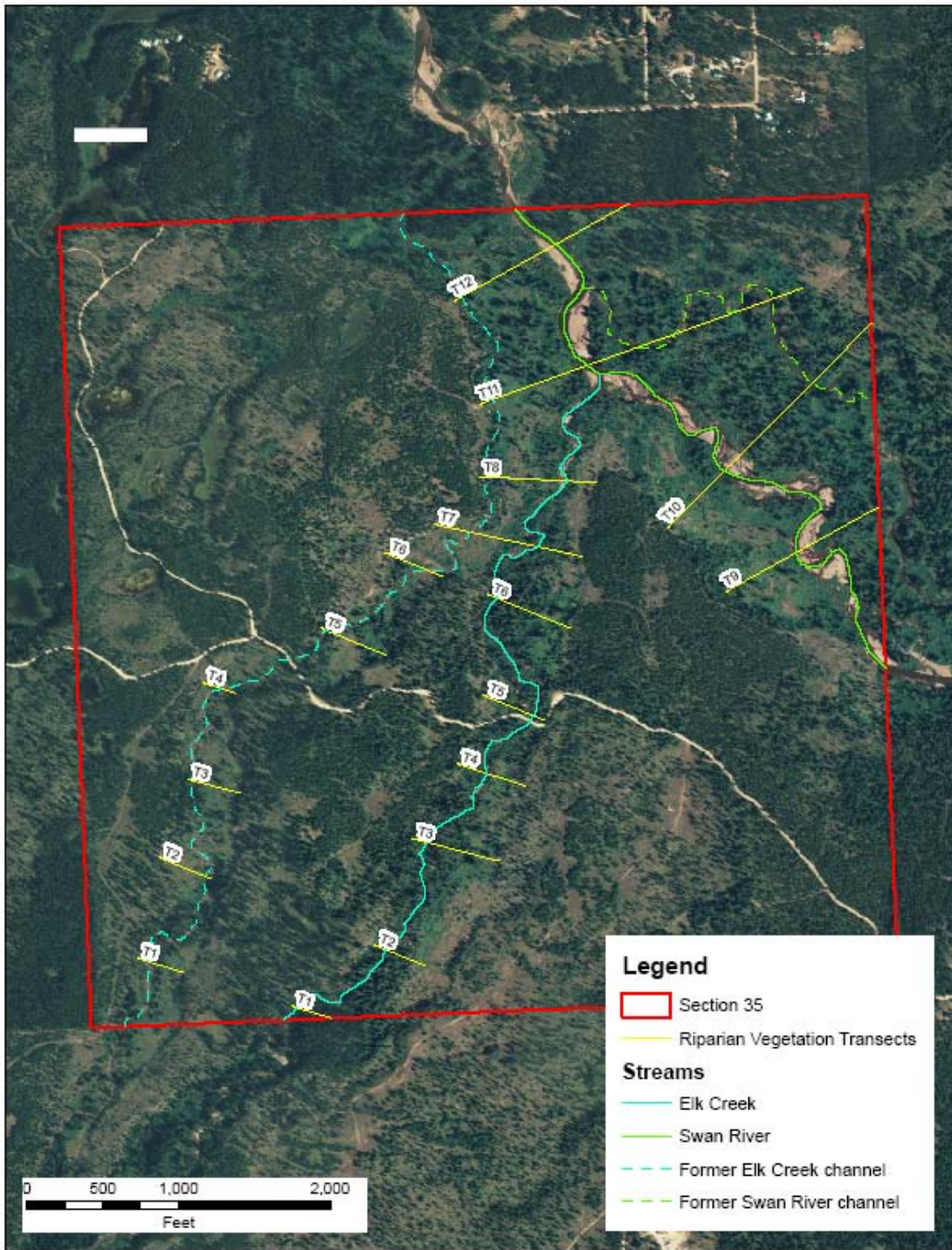


Figure 5. Riparian vegetation transects begun in summer 2007.

Wildlife

According to the 2004 Landscape Assessment,¹⁰ most terrestrial wildlife species will at one season or another use the riparian forest along the Swan River flood plain and along the Highway 83 corridor as they follow tributaries like Elk Creek downstream. “Whether it is fish, aquatic insects, neotropical birds, or mammals, the river represents the main artery sustaining life in the Swan Valley...Many old wildlife trails are used by various species, tracing an interconnected landscape that is vulnerable to disturbance.”

The Elk Creek Conservation Area lies directly in the crosshairs of an incredibly important landscape and watershed-scale wildlife linkage zone. There are few places in the valley that receive the volume of traffic from as many species of animals.

“Large numbers of many bird species such as western tanagers, warblers, flycatchers, American redstart, thrushes, and herons depend on this ecosystem with its complex of wetlands and forests. Large mammals such as white-tailed deer, elk, moose, grizzly bear, black bear and mountain lion are found in this ecosystem along with a wide diversity of small mammals. These include coyotes, skunks, weasels, otters, badgers, chipmunks, voles, mice and hares to name a few.”¹¹

However, because of the lack of forest cover and the reduction of biodiversity and complexity of forest stands in the forest, there has been a significant change in the type of wildlife use. Key seasonal and year-round habitat values have been largely lost

for many species and much of the new use is now movement through to other more functional habitat. For some species, use is limited to small areas of functional habitat.

Previous to the last several high-grade logging entries, the Elk Creek Conservation Area was functional as a key elk winter range west of the river. Increasing numbers of the Mission Mountain elk herds have abandoned traditional wintering areas west of Highway 83 and the Swan River and have searched for winter habitat elsewhere.¹² The area also served as white-tailed deer winter range in light winters. Moose also made seasonal use of this section.

When forest structure was more complex and the forest was better connected to surrounding habitats, virtually any native forest carnivore could find year-round or seasonal habitat there. Today its habitat values are insufficient for pine marten or fisher and marginal for lynx in most of the section. Wolverines may occasionally cross through the section in their constant wandering search for carrion. Bobcats may occasionally hunt for prey within the scattered pockets of dense vegetation. Gray wolves have recently established a territory in the Swan Valley and have been documented with radio telemetry using the Valley Bottom Ecosystem in and around Elk Creek.¹³

Small mammals such as voles, tree squirrels, flying squirrels, mice, shrews, and snowshoe hares have little functional habitat over much of the Elk Creek Conservation Area. Quality habitat occurs in patches, but lacks appropriate levels of connectivity.

¹⁰ Swan Ecosystem Center, 2004, *Upper Swan Valley Landscape Assessment*, p. 3.8

¹¹ *Ibid*, p. 2.6

¹² *Ibid*, p. 6.13

¹³ MFWP Wolf Monitoring Reports

Because of the vast riparian habitat values along both Elk Creek and the Swan River, and because of the numerous wetlands, there are high habitat values for mink, muskrats, beaver and otter.

Over the next thirty years or so, as the existing seedling/sapling stands advance to pole stands, existing pole stands advance to mature timber stands, and existing mature timber stands develop more complexity, thermal cover and hiding cover will improve. Habitat values for the full range of historical wildlife species could be substantially restored.

Threatened and Sensitive Plant and Animal Species

Several plant and animal species found in and around the Elk Creek Conservation Area have been listed as threatened or sensitive. Table 2 shows those species of concern, including global, federal and state designations. (See appendix 6 for federal and state ranking codes.)

Disturbances

Many disturbances have shaped the Valley Bottom Ecosystem, including timber harvesting, floods, fire, wind, and human activity. Disturbance from residential development includes roads, bridges, and buildings.

The greatest disturbance on the Swan River and Elk Creek is probably attributable to flood events that changed the course of the river and creek many times over the last 100 years. When observing the impacts of flooding it is important to note that recent timber harvests may influence how the ecosystem responds to flooding. It is likely that the area's ecosystems respond differently now compared with periods

when the area was fully stocked with timber and the riparian areas were not harvested. Natural disturbances, such as fire, would thin the weakest unhealthy trees and leave the best, most vigorous seral species—ponderosa pine, western larch and Douglas-fir. Human influenced disturbances have changed the natural pattern to take the best and biggest trees, thereby leaving the smallest, weakest ones.

Fire

Fire has been the main natural force shaping the forest stands of the Upper Swan Valley. Historically, fire shaped the vegetation according to two main factors: 1) the fire intervals or frequency and; 2) fire intensity, a measure of how hot the fire burns. Generally, the longer the interval between fires, the higher the fire intensity.¹⁴

A growing body of research shows that a century or more of fire exclusion and other practices have negatively impacted many ecosystems. Some lands are now in poor ecological condition, whereas other landscapes are still functioning in a natural state. One must first classify the type of fire regime, determined by the bio-physical setting (see Appendix 7).

The Elk Creek Conservation Area lies in a mixed severity non-lethal fire regime where fire intervals were anywhere from 5 to 30 years. The last major fire to have occurred here was probably in 1889 when a large portion of the upper Swan Valley burned. Since major fire suppression efforts have minimized the less severe frequent fires, fuel buildups lead to hotter, more intense fires. However, since human activity has replaced natural disturbances, timber harvesting over

¹⁴ Swan Ecosystem Center, 2004, *Upper Swan Valley Landscape Assessment*, page 5.1

Table 2. Species of Concern Report for Elk Creek Conservation Area (summarized from Montana Natural Heritage Program data, 2007).¹⁵ These data are the result of a database search that includes Section 35, with an additional one-mile buffer surrounding it. This is done to provide a more inclusive set of records and to capture species that may be immediately adjacent to the Elk Creek parcel. For a full interpretation of ranking codes, please see Appendix 6.

| Scientific Name | Common Name | Global Rank | State Rank | USFWS | USFS | BLM |
|------------------------------------|---------------------------|-------------|------------|-------|------------|----------------|
| <i>Birds</i> | | | | | | |
| <i>Accipiter gentiles</i> | Northern Goshawk | G5 | S3 | | Sensitive | Sensitive |
| <i>Contopus cooperi</i> | Olive-sided Flycatcher | G4 | S3B | | | |
| <i>Fish</i> | | | | | | |
| <i>Oncorhynchus clarkii lewisi</i> | Westslope Cutthroat Trout | G4T3 | S2 | | Sensitive | Sensitive |
| <i>Salvelinus confluentus</i> | Bull Trout | G3 | S2 | LT | Threatened | Special Status |
| <i>Mammals</i> | | | | | | |
| <i>Lynx Canadensis</i> | Canada Lynx | G5 | S3 | LT | Threatened | Special Status |
| <i>Ursus arctos</i> | Grizzly Bear | G4 | S2S3 | LT | Threatened | Special Status |
| <i>Vascular Plants</i> | | | | | | |
| <i>Botrychium montanum</i> | Mountain Moonwort | G3 | S3 | | | |
| <i>Grindelia howellii</i> | Howell's Gum-weed | G3 | S2S3 | | Sensitive | Sensitive |
| <i>Howellia aquatilis</i> | Water Howellia | G3 | S2 | LT | Threatened | |
| <i>Ophioglossum pusillum</i> | Adder's Tongue | G5 | S2 | | Sensitive | |

¹⁵ Additional information on species habitat, ecology and management is available on the Montana Natural Heritage web site: www.mtnhp.org.

the last 100 years has shaped the Elk Creek Conservation Area more than has fire. Small, lightning-caused fires still occur, but have never reached over an acre in size in the last 40 years on record.

Logging

Logging records for the Elk Creek Conservation Area go back to 1965, recording harvests of between one and 224 acres (Appendix 8). We found no records prior to 1965 and it is likely that no commercial logging activity occurred before that. (The logging activity in 1965 only involved one acre).

Under Burlington Northern (BN) ownership, the Elk Creek Conservation Area was logged in 1973-75, particularly harvesting large old trees. Logging roads and landings were created throughout the section. Figure 6 shows the known road locations. House logs were also taken off during BN's ownership in the 1970s.

Plum Creek logged the section from 1980 to 2001. The Streamside Management Zone law was in effect in 1993. The law requires a diversity of tree species and size classes to be retained near the stream. In 1992 Plum Creek conducted extensive logging in the floodplains of the Swan River and both the active and dry Elk Creek channels.

Upland and Riparian Vegetation Units

The Elk Creek Conservation Area encompasses forest lands that vary in aspect, slope, forest type, disturbance history, and resilience to disturbance. For planning purposes, the section was divided into 13 vegetative units, as shown in Figure 7. These units are based on vegetative composition and topography. Two of the

units are riparian and are delineated roughly by the Elk Creek and Swan River floodplains. The pattern of previous logging has also delineated the boundaries between vegetative units.¹⁶ Appendix 8 includes the cutting maps for Section 35 from 1973 to 2001. A Fire Monitoring inventory technique was used for vegetative unit A as an example of future work that could be completed for the entire section. The result of this work is shown in Appendix 9.

In June and July 2007, an inventory of the upland units was completed. It is important to note that this work was preliminary in nature and further quantification may be needed before management actions are initiated. As the management plan is implemented, boundaries will be more accurately defined, using a GPS to create shape files while ground-truthing the borders. (Management Group members have begun to mark the outside boundaries of Section 35 itself, as well as the centerline delineating the SEC and CSKT sides. This work will be completed in the near future).

As shown in Table 3, the main tree species are lodgepole pine, with mixed Douglas-fir, larch, spruce, subalpine fir, and grand fir. In some units, trees reach 80 feet and an estimated age of 75 to 80 years. In others, much smaller and younger trees predominate. About half of the section has a two-storied stand of taller overstory trees and a younger understory. The other half is a one-storied stand of larger trees with seedling and saplings in the understory.

¹⁶ Cutting maps for Section 35 were provided by Plum Creek Timber and were used to document harvesting history in descriptions of vegetative units, below.

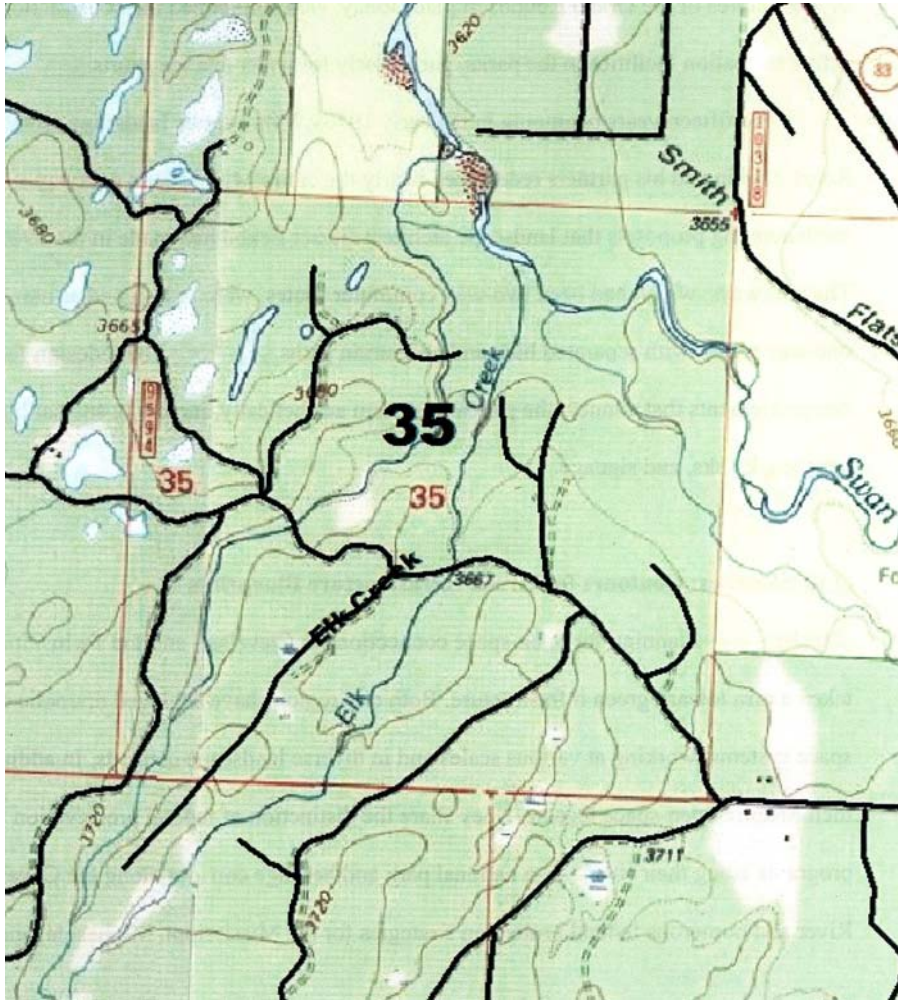
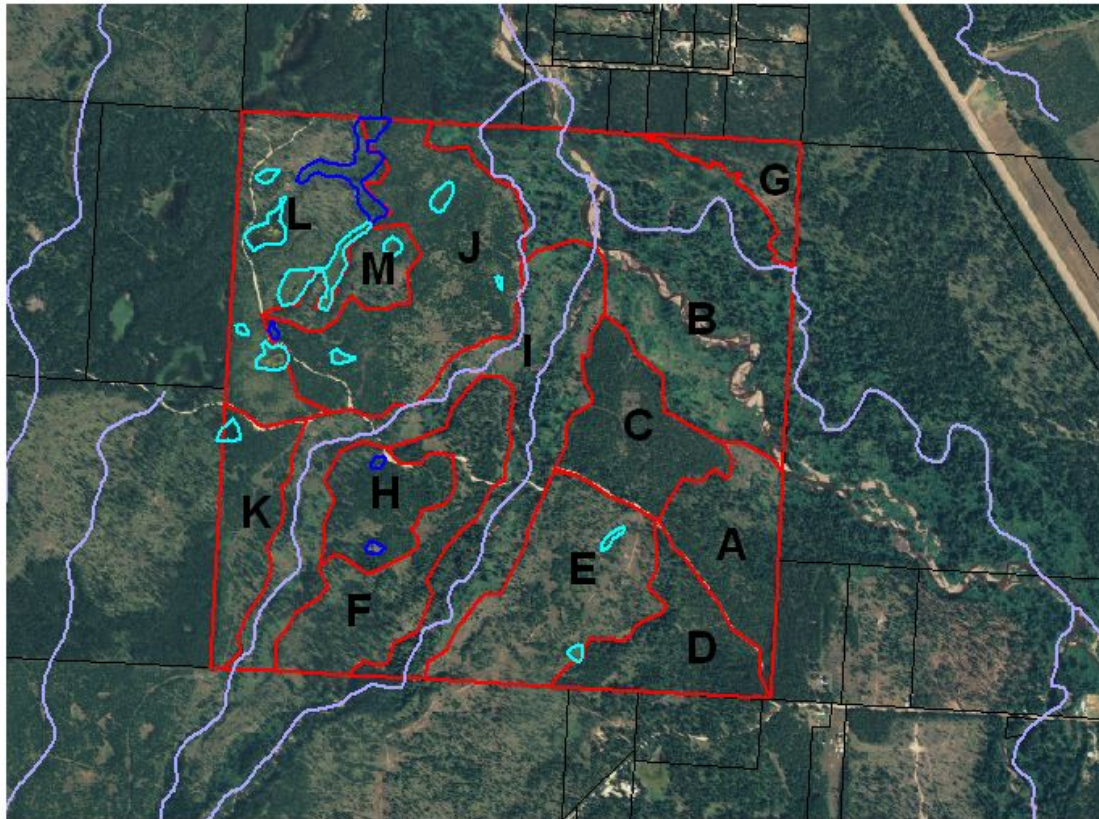


Figure 6. Roads within the Elk Creek Conservation Area (2005). Logging roads branch off from the main Elk Flats Road, which starts in the southeastern corner of Section 35, off Glacier Creek Road. (Based on 2003 digital orthographic imagery, 2002 Plum Creek Timberlands Map, 2005 NAIP imagery, and 2006 U.S.Forest Service data).

Habitat types vary across the section (see Table 3). For further information about the habitat types, see “Forest Habitat Types of Montana”, which defines distribution, vegetation, soils, productivity, management, fire history and other factors.¹⁷

¹⁷ “Forest Habitat Types of Montana.” USDA Forest Service General Technical Report INT-34, May 1977.

Elk Creek Vegetation Units



-  Elk_ponds.shp
-  Wetland11.shp
-  Wetland10.shp
-  Rosgen_mspnad83.shp
-  Elkunits.shp
-  Unitg2.shp
-  04cad_01_07.shp

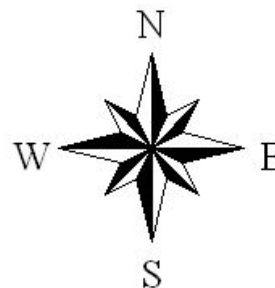


Figure 7. Vegetative Units on the Elk Creek Conservation Area, showing units A-M outlined in red.

Table 3. Summary of characteristics for vegetative units on the Elk Creek Conservation Area
(Note: Information for riparian units B and I is summarized in Table 1)

| Unit & size in acres | Tree Species (dom & co-dom) | Dom Tree Height | DBH | Forest Crown Cover (%) | Crown Ratio | Habitat Type ¹⁸ | Woody Debris (T/ac) | Topo | Tree age | Stand Structure | % Tree species cover |
|----------------------|---|----------------------------|---------------------------|------------------------|--------------------------|--|---------------------|---------|---|-----------------|---|
| A | LP major cover type in understory; DF & WL in overstory | 30' LP 70' DF 80' WL | 5" LP 12" DF 16" WL | 60 | 70 LP 50 DF 35 WL | Subalpine fir-dwarf huckleberry (Abila-Vaca) | <5 | Flat | 40 yrs, LP 63 yrs, DF 110 yrs, WL | 2-storied | 70% LP in understory; 25 % DF, WL & LP in overstory; 5% LP, SP, DF seedlings & saplings |
| C | LP, DF & SP in understory; LP, WL in overstory | 40' LP 80' WL | 5" LP 10" WL | 60 | 70 | Spruce/Queencup beadily (Picea-Clun, Vaca Phase) | 5 | Rolling | 40 yrs (LPP) | 2-storied | 10% WL, DF and LP; 80% LP in understory 10% DF and SP seedlings |
| D | LP (dominant) DF, WL (co-dominant) | 85' (dom) 75' (co-doms) | 6" LP 14" DF & WL | 80 | 40 LP 60 DF, 35 WL | Subalpine Fir/ Twinflower (Abila-Libbo, Xete Phase) | 10 | Flat | 75 yrs | 1-storied stand | 90% LP, <5% Residual DF & WL, 5% Seeding and sapling WL, DF & SP |

Species Key:

LP = lodgepole pine, DF = Douglas-fir, WL = western larch, SP = spruce, SF = subalpine fir, GF = grand fir, PP = ponderosa pine

¹⁸ For detailed information on habitat types, see "Forest Habitat Types of Montana." USDA Forest Service General Technical Report INT-34, May 1977.

| Unit & size in acres | Tree Species (dom & co-dom) | Dom Tree Height | DBH | Forest Crown Cover (%) | Crown Ratio | Habitat Type | Woody Debris (T/ac) | Topo | Tree age | Stand Structure | % Tree species cover |
|----------------------|--|----------------------------|------------------|------------------------|----------------|---|---------------------|---------|--|---------------------------------|--|
| E 57a. | SF, GF, DF, SP, LP in understory; WL, DF in overstory; | 85' | 12" | 10 | 50 | Subalpine Fir/ Queencup Beadlily (Abia-Clun, Vaca Phase) | 10 | Rolling | 75-80 yrs overstory; 0-25 yrs understory | 2-storied stand | 15% overstory, 85% understory |
| F 48a. | DF, LP, WL in understory; WL, SP, SF, DF in overstory | 80' | 12" | 30-50 | 60 | Subalpine Fir/ Queencup Beadlily (Abia-Clun, Vaca phase) | 10 | Rolling | 80 yrs overstory 0-25 yrs understory | 2-storied stand | 15% WL 30% SP 30% LP 15% DF 10% SF |
| G 14 a. | WL, DF & SP dom overstory with some LP | 70-100' | 12-16" | 40 | 45 | Subalpine fir-bluejoint (Abia-Caca) and Subalpine Fir/ Queencup Beadlily (Abia-Clun) | 10 | Rolling | 80-145 yrs | Remnant overstory multi-storied | 40% DF 30% WL 15% SP 10% LP 5% SF |
| H 24a. | LP, SP, DF understory; WL, DF & SF in overstory. | 75' WL 75' DF 70' SF | 14" WL 14" DF | 50 | 60 LP 80 DF | Subalpine Fir/ Queencup Beadlily (Abia-Clun, Vaca Phase) | | Rolling | 80 yrs overstory, 30 years understory | 2-storied stand | 50% overstory, 50% understory |

Species Key:

LP = lodgepole pine, DF = Douglas-fir, WL = western larch, SP = spruce, SF = subalpine fir, GF = grand fir, PP = ponderosa pine

| Unit & size in acres | Tree Species (dom & co-dom) | Dom Tree Height | DBH | Forest Crown Cover (%) | Crown Ratio | Habitat Type | Woody Debris (T/ac) | Topo | Tree age | Stand Structure | % Tree species cover |
|----------------------|---|--------------------------------------|--|------------------------|---------------------------------------|---|---------------------|--|---|-----------------|---|
| J 77a. | LP | 30' | 5" doms and 4-3" co-doms | 80 | 60-70 | Spruce/ Dwarf Huckleberry (Picea-Vaca, Vaca phase) | 3 | Rolling w/ slopes down to creekbed up to 20% | 30 yrs. | 1-storied stand | 90% LP <10% SP, WL & DF |
| K 27a. | LP, occasional WL in understory; DF, WL & occasional LP in over-story | 80' doms and co-doms 40' under-story | 15" dom and co-dom; 5" understory | 80 | 50 dom and co-dom; 75% under-story | Spruce/ Dwarf Huckleberry (Picea-Vaca, Vaca phase) | 5 | Rolling w/ slopes 0-30% | 100 yrs dom and co-doms; 40 yrs under-story | 2-storied stand | 10% WL 15% DF 5% SP 70% LP |
| L 62a. | LP, WL, PP, DF | 30' | 3" dom | 70 | 90% | Spruce/ Dwarf Huckleberry (Picea-Vaca, Vaca phase) | 3 | Rolling w/ slopes up to 15% | 20 | 1-storied stand | 80% LP 10% PP <10% WL, DF & SP together |
| M 15a. | GF, SP, WL, SF | 70-80' | 10" | 20 | 80 | Grand Fir/ Beargrass (Abgr-Xete) | 5 | Rolling w/ slopes up to 20% | 100 yrs. | 1-storied stand | 30% WL 20% GF 20% SF 30% SP |

Species Key:

LP = lodgepole pine, **DF** = Douglas-fir, **WL** = western larch, **SP** = spruce, **SF** = subalpine fir, **GF** = grand fir, **PP** = ponderosa pine

Unit A

The main Elk Flats Road forms the south boundary of this stand, which is similar to Unit D. Unit C to the west is a younger stand and would be considered the same vegetation unit if it were not for different harvest dates and stand ages.

Unit A is a dryer upland subalpine fir-dwarf huckleberry habitat (Abla-Vaca). In 1973, the southern portion of the unit was selectively logged, with 85% of the volume removed. It regenerated in a fairly thick lodgepole stand. A salvage cut throughout the unit was done in 1983 and overstory removal occurred in the northern part of the unit in 1992. Some residual overstory trees were left, including Douglas-fir, western larch and some remnant lodgepole pine. A large landing area lies on the north end of the stand that appears to be a helicopter landing zone for the riparian harvest that occurred in the mid-1990s. This harvesting has created a two-story stand that averages about 20 to 40 Basal Area¹⁹ for residual older 70-80 foot trees and a fast-growing understory of lodgepole pine. The pines are about 33 years old, with about 150 trees per acre in the 5 inch diameter class and 30 feet tall.

Moose, elk and deer typically use the Abla-Vaca habitat type. The unit

¹⁹ Basal Area is the cross section area of a tree stem in square feet commonly measured at breast height (4.5' above ground) and inclusive of bark, usually computed by using d.b.h. or tallied through the use of basal area factor angle gauge. The basal area factor is the number of units of basal area per acre (or per hectare) represented by each tree.

supports many white-tailed deer and some coyotes. A possible coyote den site was found. Bears also frequent the area.

Unit B.

This unit encompasses the Swan River floodplain. Historically, this floodplain was likely dominated by an Engelmann spruce / red-osier dogwood (Pien-Cost) habitat type, with seral cottonwood and/or willow community types more commonly associated with alluvial bar features along the Swan River. Currently, the vegetative component within Unit B is in various stages of recovery and adjustment due to past logging activities and more recent flooding events. This unit also includes a portion of the former Elk Creek channel and a secondary channel of Swan River that once served as the main channel.

Logging operations took place within this unit in 1991, 1992 and 1997. In general, the floodplain to the west of the Swan River was more heavily logged than the east side. The floodplain forest on the east side of the river was selectively logged by helicopter in 1997, and a smaller overstory removal was completed in 1991. The floodplain on the west side was logged with more conventional ground equipment in 1992. The recovering plant community on the west side floodplain is characterized by: scattered individuals or small clumps of mature Engelmann spruce; scattered individuals of decadent black cottonwood; localized patches of shrubs, including red-osier dogwood, mountain alder, and Drummond willow; and a continuous ground layer dominated by native and non-native grasses (including

reed canary grass in wet depressions), Canada thistle (a Montana state-listed noxious weed), and the shrubs snowberry and wild rose.

Data from preliminary vegetation surveys indicate that approximately 48% of Unit B consists of a disturbed logging cover type (primarily located on the west side of the Swan River) (Table 1). This terminology is used because it is unclear what trajectory plant succession is taking in these more heavily logged areas. Over a long period of time, this area may return to a Pien-Cost habitat type. However, we qualitatively observed poor to average regeneration of Engelmann spruce and shrubs such as red-osier dogwood and mountain alder within this disturbed cover type. The poor regeneration of trees and shrubs characteristic of the Pien-Cost habitat type is likely due to the heavy cover of native and non-native grasses, noxious weeds (e.g., Canada thistle), and snowberry and rose, all of which reduce light. The bare mineral soil conditions at the soil surface creates intense competitive interactions among species.

In addition to the disturbed logging cover type, 20% of Unit B contains the Pien-Cost habitat type. This habitat type is found primarily in the floodplain to the east of the Swan River. As mentioned previously, this area was selectively logged in the past via helicopter, but logging disturbances were minimal and the habitat appears to be in a relatively healthy condition. In addition, approximately 24% of the area is comprised of the mountain alder (Alin) community type. This community type is often seral to the Pien-Cost habitat type, so we expect succession to continue in the direction of

this habitat type. The remainder of the floodplain in Unit B is composed of active (perennial) and seasonally dry channel cover types and a small area of reed canary grass (Phar) habitat type.

Unit C.

This area was selectively logged in 1974 and a salvage harvest was done in 1983. Unit C was pre-commercial thinned in 1993. Its stocking level is good, primarily with lodgepole pine, but interspersed with larch, spruce and Douglas-fir (the latter two species are mostly in seedling phase). There is scattered blowdown. Unit C has a high resistance to mountain pine beetle. The unit contains a clearing that is infested with knapweed and orange hawkweed, which should be GPS-located and eradicated before this new invader spreads. Broken concrete blocks and other evidence of a former development was found (perhaps an old mill site). Other than weed management, no immediate management needs were found.

The stand has moderately good hiding cover, but poor thermal cover for wildlife (Figure 8). This habitat type, *Picea Clun*, often provides winter range for deer and occasionally elk and moose.



Figure 8. Lodgepole pine stand within Unit C. (photo credit: Mo Hartmann)

Unit D.

This 75 year old one-storied stand has a few residual Douglas-fir and larch that are taller than the main lodgepole stand. There is occasional grand fir, subalpine fir, spruce, and Douglas-fir in the understory regeneration. The lodgepole pine is infected with mountain pine beetles and there is a pocket of *Armillaria* in the subalpine fir. Scattered blowdowns are found throughout. If there were no fire or harvesting, the climax species would become subalpine fir. Ground covers are now kinnikinnik, beargrass, lupine, common juniper, spirea, and twinflower.

Unit D was logged in 1979, 1983 and 2000 (Figure 9). The first harvest was a selective cut, removing 70% of the forest volume, primarily of over-mature lodgepole pine. A salvage and

blowdown harvest was done in 1983 and another selective cut completed in 2000 by helicopter.

Unit D has moderate to good thermal cover and hiding cover. The habitat type, Abla-Libo, typically has light to moderate use by deer and elk. It has limited browse, but provides good cover for big game.



Figure 9. View toward the west within Unit D along logging road (photo credit: Mo Hartmann).

Unit E.

Unit E is slightly warmer and more productive than Unit D. It has a greater seral species diversity and greater potential forage production for wildlife. The historic fire interval is probably about 5-30 years, with a mixed fire regime. The logging history for this unit is basically the same as Unit D, with the addition of an earlier selective harvest of lodgepole pine and subalpine fir in 1973 on the southern part of the unit.

As a result of these harvests, seed trees were left standing, but not the best specimens. There is a good mixture of subalpine fir, grand fir, Douglas-fir, spruce, and lodgepole pine in the regeneration layer (with very few ponderosa pines). These trees are in seedling and sapling sizes with a good diversity of species. There is moderate

to good stocking of regeneration species, which are up to 20 years old. This is a two-storied stand composed of residual trees that were not logged and young trees that have grown in since logging. The overstory is poorly stocked. A small, isolated wetland pocket has black cottonwood, wild mint and other wetland species.

Unit E has neither thermal cover nor hiding cover at present. Its habitat type, Abla-Clun, typically has large quantities of browse for elk and deer in early succession stages, with winter range in lower elevations.

There is evidence of a pocket of *Armillaria* in the Douglas-fir, grand fir, and subalpine fir. In addition, a heavy infestation of Canada thistle, ox-eye daisy, knapweed and mullein was found in the vicinity of the road and landing area (Figure 10). Future management actions should include weed control.



Figure 10. View toward the northeast in Unit E, showing extensive weed infestation along logging road and clearing. (photo credit: Mo Hartmann)

Unit F.

Unit F was logged several times over the past 35 years. In 1973, a selective cut on 18 acres removed 85% of the tree volume and in 1975 about 8 acres were thinned with 65% of volume removed.

Overstory removal on another 22 acres was done in 1979. The entire unit was selectively cut in 1992.

The remaining forest has a diversity of regeneration species with larch, Douglas-fir, and lodgepole pine, at the seedling and sapling size. There are small clumps of pole-size material. Regeneration is clumpy with a good mix of species and areas with sparse regeneration that are still becoming established. At the southern end of the unit, slopes are up to 35%, but at the northern end steep benches have sharp drops (30-60%) to adjacent riparian areas (Figure 11). The overstory contributes about 40% of the crown cover and the understory about 60%. Weeds are a problem at an old landing area (about ½ acre) along the north side of the road, with ox-eye daisy and knapweed. Other than weed control, no other immediate management needs were noted. Like Unit E, Unit F has poor hiding and thermal cover (although hiding cover is better in vegetative clumps). The habitat type Abla-Clun typically has large quantities of browse for elk and deer in early stages of succession, with winter range in lower elevations.



Figure 11. View within Unit F on a high nob, viewing toward northeast. (photo credit: Donna Erickson)

Unit G.

Unit G is an upland vegetative unit that borders the main Swan River riparian stand in Unit B. All adjacent property to the north is private wildland-urban interface with several homes visible from the unit. The south border follows an old overflow channel of the Swan River. There are some cottonwoods and small riparian features. A large one-acre landing for previous harvesting and helicopter logging is compacted and very little regeneration established.

Habitat types vary between subalpine fir-queenscup beadlily (Abla-Clun) and subalpine fir – bluejoint (Abla-caca) depending on the riparian features and microclimate. A residual stand is a mixture of Douglas-fir, western larch, lodgepole pine, and spruce, averaging about 50 Basal Area. Stand age varies between 80-145 years. The area was first salvage logged in 1973 and several harvesting entries have occurred since then. In 1991 overstory removal was done and part of the unit was helicopter logged in 1997. Harvest stumps indicate that many 8-12" lodgepole pine and the best Douglas-fir, ponderosa pine, larch and spruce were taken. Very little of the historic ponderosa pine cover types are left in any of the stands. Interplanting with ponderosa pine and lop-and-scatter slash for soil restoration may restore a degree of the historic condition.

The habitat type Abla-Clun typically has large quantities of browse for elk and deer in early stages of succession, with winter range in lower elevations. Moderate summer use by deer and elk is typical in the Abla-Caca habitat type

Unit H.

This is a two-storied stand: however, the stories are not intermingled, but located in separate patches. It has rolling topography, with finger ridges into the stand and slopes that are not steep enough to have limited the harvest method. The northern boundary of Unit H is against the main Elk Creek Road, where large old trees are found. A salvage cut was done in 1983 to remove dying western larch. A more extensive overstory removal of trees 10" DBA²⁰ and higher was done in 1992.

Further into the stand is a lodgepole pine monoculture, then another inclusion (about one acre) of mature mixed timber. Another small inclusion (less than one acre) has a much younger stand of lodgepole pine in an area disturbed by machinery (landing or burn pile). The understory includes some spruce and Douglas-fir. No root rot or insect infestations are visible, but an interior clearing (about ½ acre) is infested with ox-eye daisy, mullein and knapweed. There is also evidence of a fire pile in this clearing. Another clearing (about one acre) is a natural wet meadow with spruce around it (Figure 12).

The habitat type, Abla-Clun typically has large quantities of browse for elk and deer in early successional stages, with winter range in lower elevations. There are no immediate management needs for Unit H, except weed control for disturbed sites.

²⁰ Diameter Breast Height



Figure 12. Natural wet meadow inside Unit H. (photo credit: Mo Hartmann)

Unit I

Unit I contains the current and former Elk Creek channels and associated floodplain areas. It is not clear when Elk Creek moved into its current channel, but the 1934 aerial photos of Section 35 (Figure 13) clearly shows Elk Creek in its former channel. Regardless of the active channel location, we suspect that Unit I primarily supported the Pien-Cost habitat type. Prior to the shift in channels, the southern and eastern most drainage (currently the active channel) may have supported a slightly drier habitat type dominated by grand or subalpine fir, due to the lack of year-round water flow and the disturbances (e.g., seasonal flooding events) associated with perennial water courses.

We made note of differences in vegetation patterns between the former and active channels during vegetation surveys. The primary difference is that the former Elk Creek channel and floodplain within Unit I was heavily logged (1986 and 1992), whereas logging activity was minimal in the current drainage, except for an area near the confluence of Elk Creek (current

channel) and Swan River, which was clearcut in 1986. As such, vegetation patterns were, in some cases, drastically different between the two drainages. For example, the disturbed logging cover type covered nearly two-and-a-half times the area within the former floodplain (78%) as compared to the active floodplain (32%) (Table 1).

Within the disturbed logging cover type in the former floodplain, the cover of noxious weeds was high (e.g., Canada thistle, ox-eye daisy) to low (spotted knapweed; but in small, dense localized infestations). The cover of the non-native timothy grass is also high in the former floodplain, suggesting that this grass was intentionally seeded following logging operations. The presence of noxious and non-native species appears to be having a deleterious impact on the regeneration of desirable conifer and shrub species. Ultimately, this trend is likely exacerbated by a potential lowering of the local water table (due to the shift in the active channel location) and drought conditions over the past 10 to 15 years. Other differences in cover types and plant habitat types between the active and former floodplains are summarized in Table 1.

The disturbed logging cover type in the active floodplain is located mostly to the east of Elk Creek near the confluence of Elk Creek and the Swan River. This area includes an approximately 150 foot section along the right bank of Elk Creek where riparian vegetation was completely removed during logging operations.

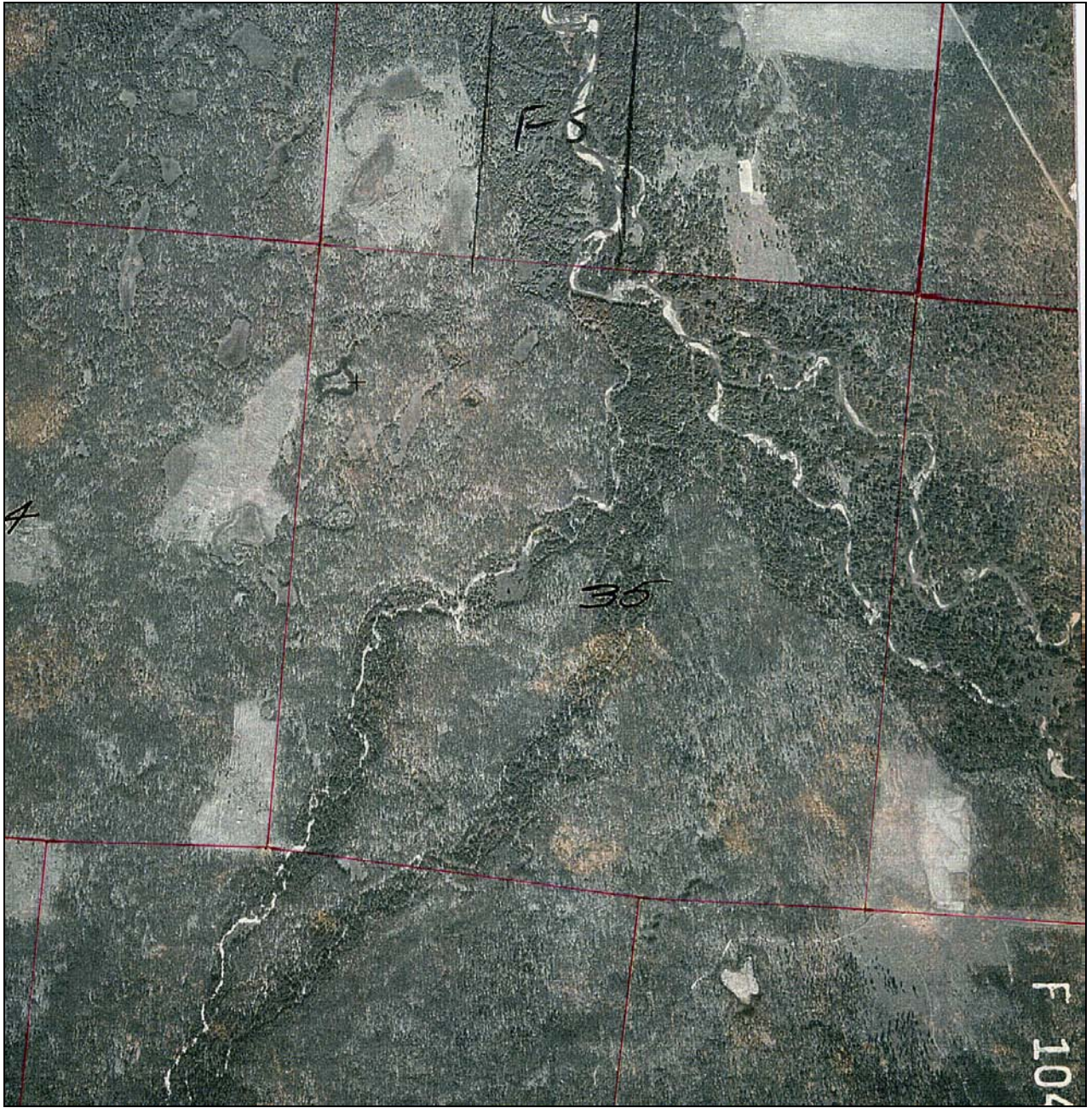


Figure 13. Aerial photo of Section 35 and adjoining properties, taken in 1934. Elk Creek is flowing through what is now the dry channel on the western side of the section.



Figure 14. Aerial photo (June 2007), at the confluence of Elk Creek (top) and the Swan River (bottom). (Photo credit: Les Evarts).

Currently, this denuded bank is actively eroding in response to a high water event in July 2006 and an upstream logjam that is directing high to intermediate flows against the exposed bank. At low flows (observed during vegetation surveys in late July 2007), a recently formed gravel bar separates the active channel and the eroding bank (Figures 14 and 15). We anticipate that this bank will continue to erode due to the lack of woody vegetation along the actively eroding bank and the position of the upstream logjam.



Figure 15. Eroded bank near confluence of Elk Creek and the Swan River. (photo credit: Donna Erickson)

Unit J.

The southern part of Unit J was logged in 1974 and again in 1993. These were selective cuts, removing 85% of volume in 1974. The northern portion of this unit was clear cut in 1982. Presently, the southern quarter of Unit J has good species diversity and includes larch, Douglas-fir, grand fir, and subalpine fir. Collectively these species contribute about 20% of the stand composition.

The southern half of unit J has occasional small clearings and sparse stocking. A few seedlings are beginning to become established. Clearings are infested with ox-eye daisy and knapweed. There is an isolated pond covering about .4 acre. *Equisetum* is growing in shallow water, distinguished from cattails and lily pads in deeper water. Management recommendations include monitoring scattered openings for natural regeneration. The habitat type, Picea-Vaca, typically provides winter range for elk and mule deer and may provide year-round habitat for moose and white-tailed deer.

Unit K.

This unit was selectively logged in 1974, removing 85% of the volume. A salvage

and blowdown harvest of large, dying western larch was done in 1983. Finally, pre-commercial thinning was completed in 1993.

Currently, the lower story is 90% of the stand, well-stocked with lodgepole pine, with occasional larch (about 10% of the stand), Douglas-fir and spruce. Very few grand fir, western white pine and subalpine fir were found, and those present may be accidental. The older class of trees is very old lodgepole pine (100+ years), of which there are only a few in the dominant class. The area has poor thermal cover and fair hiding cover.

There is a large landing area with weeds near the road; weed control should be a priority management action here. In addition, witches broom (possibly caused by mistletoe, *Arceuthobium spp*) was observed in the spruce trees. There is a small, isolated riparian area in a natural depression (about .2 acre), and a pond covering about .8 acre. The habitat type, Picea-Vaca, typically provides winter range for elk and mule deer and may provide year-round habitat for moose and white-tailed deer.

In the northwest corner of the stand there is a roughly three-acre pocket of Abia-Caca, Vaca phase habitat type.

Unit L.

A houselog harvest was completed in Unit L in 1975, removing only 5% of the volume on a five acre parcel.

Subsequent cuts include a clear cut on 75 acres in the southern part of the unit in 1982 and a storm salvage harvest on 37 acres of the northern half in 1996. Helicopter logging was done on this northern area in 2001. The dominant

and co-dominant species of unit L are lodgepole pine, larch, ponderosa pine, spruce and Douglas-fir. (The pine was probably planted, as we found no seed source). One grand fir and one western white pine were found, the latter recently killed by blister rust. Ninety percent of the unit is well-stocked; 10% is poorly stocked, but has seedlings and saplings still regenerating. There is fair hiding cover and poor thermal cover. The habitat type, Picea-Vaca, typically provides winter range for elk and mule deer and may provide year-round habitat for moose and white-tailed-deer. Management needs are mainly in the area of weed control, although pre-commercial thinning to mimic low-intensity fire may be considered within ten years around the ponderosa pine.

A half acre clearing with stumps, possibly a slash pile, has poor regeneration but some seedlings and saplings coming in. This clearing has indications of soil compaction. There is also a pond with cattails on its northern edge and lily pads throughout. A pocket of quaking aspen is present on the pond's west side in an adjacent riparian area. Another larger pond is located further north. The pond itself is only about .2 acre, but is surrounded by cattails and a sedge meadow of about 4.5 acres. This forms a long narrow stringer running north and south, forming the boundary between L and J (Figure 16).

Unit M:

This unit is a roughly round area within stand J. As in Unit E, a seed tree harvest was done, but the best trees were not left. Seeds are being provided by scattered, phenotypically inferior trees. An understory is largely absent, but

widely scattered sparse seedling
regeneration is beginning to develop.
Forage production for deer and elk from
spring through fall is typically good in
this habitat type (Abgr-Xete).



**Figure 16. Pond at the edge of Units L and J.
View looking northeast. (photo credit: Bill
Moore)**

CHAPTER 3: CULTURAL HISTORY

Elk Creek Drainage

According to Bob Newman, long-time Swan Valley resident, Elk Creek was aptly named because there had “always been elk in that drainage.” Elk Creek appeared on the 1902 General Land Office survey map, as well as the 1908 Centennial School Supply Company map of Montana. The 1912 Flathead National Forest map labeled this creek Tompkins Creek²¹, although the 1916 Flathead National Forest atlas again labeled it Elk Creek.

Elk Creek Point appeared on a 1930s era Condon Ranger District map. According to Leonard Moore, life-long Swan Valley resident, Elk Creek Point was named for a nearby elk hunting camp that was used before roads were built into the area²² (T20N, R17W, section 18). Elk Lake in the Mission Mountains Wilderness, at 6525 feet, appeared on a 1922 General Land Office survey map, as well as the 1927 Flathead National Forest map. Elk Lake is the headwaters source of Elk Creek.

Montana Fish, Wildlife and Parks fish stocking records indicate that the lake was first stocked in 1940 with rainbow trout and in 1941 with cutthroat trout.

²¹ In 1907, Frank Tompkins was a crewmember of the joint US Forest Service/Northern Pacific survey party led by Karl Woodward. Source: Steve Lamar, Swan Valley Place Names Project. Unpublished report. 2007.

²² Ibid.

Bud Cheff Sr., who helped with this stocking effort, reported that the fishing was good for five or six years, but then in a subsequent year the outlet was choked full of dead fish. Heavy snows triggered avalanches into the lake, resulting in a massive fish kill.²³

Elk Pass, at approximately 7000 feet, is located along the Mission Divide separating the Mission Mountains Wilderness and the Mission Mountains Tribal Wilderness. This pass is the site of an old Indian trail long used by Native Americans, especially Salish and Pend d'Oreille families who traveled seasonally from the Mission Valley in and out of the Swan Valley. Elk Pass appeared on Hal Kanzler's 1963 *Montana's Mission Mountains* map, as well as the 1965 Flathead National Forest map and the 1965 USGS topographical map²⁴.

Native American Sites and Uses

The Salish and Kootenai people camped in and around the Elk Creek Conservation Area for hundreds, maybe even thousands, of years. Trails and camp sites near Elk Creek and the river have long been associated with both subsistence gathering and spiritual quests.²⁵ In ancient times, the healthy fishery in the Swan River, along with abundant beaver ponds between the mouth of Elk Creek and the mouth of Cold Creek, attracted Native Americans. For instance, Pend d'Oreille families

²³ Ibid.

²⁴ Ibid.

²⁵ Confederated Salish and Kootenai Tribes, Mission Mountains Tribal Wilderness Area Management Plan, 1982.

camped on the terraces above the good fishing holes, but back from the river where the land was drier and there were fewer mosquitoes, flies and gnats.²⁶ Indians also hunted along the Swan River downstream from Elk Creek, and early homesteaders told stories about their camps along Cold Creek, and just east of the Elk Creek Conservation Area in the vicinity of the U.S. Forest Service Condon Work Center, where Swan Ecosystem Center has an office.²⁷

Native sites differ from site to site and tribe to tribe, but the data on cultural resources are highly confidential. Cultural resources are recognized by the CSKT as, *tribal elders, languages, cultural traditions, and cultural sites—that are intimately tied to the forests of the reservation*. “Tribal traditions depend on native fish and wildlife, food and medicinal plants, landmarks, traditional use sites, and other areas where tribal members practice cultural traditions.”²⁸ These cultural traditions—hunting, fishing, plant harvesting, hide-tanning, food and medicine preparation, singing, dancing, praying, feasting, story telling, and practicing ceremonies—are important in maintaining cultural

²⁶ Light, Tim. Flathead National Forest archeologist. Personal communication to Suzanne Vernon. March 2007.

²⁷ Beck, Ed. Conversation with Flathead National Forest Archeologist Gary McLean and Mission Mountains Wilderness Ranger Cal Tassinari, March 1981. Transcript (32p) at U.S. Forest Service Flathead National Forest, Kalispell. Smith, Thompson and Incashola, Tony. September 2006 presentation to students in Landscape & Livelihood program, Northwest Connections, Swan Valley.

²⁸ Confederated Salish and Kootenai Tribes, “Flathead Indian Reservation, Forest Management Plan.” 2000, p. 128.

traditions that help shape the Salish, Pend d’Oreille, and Kootenai people.

The pre-settlement landscape was strongly influenced by indigenous land management to enhance productivity. The most powerful tool for the landscape was the use and manipulation of fire. Fire has not only been recognized as a pre-white settlement practice by the CSKT in the Swan Valley but it has been recognized by other notable authors as an important use in western forests generally. Indian people have affected every ecosystem in North America in some way by the use or application of fire.²⁹

The use of fire has been documented for more than 70 uses, including tree felling, fireproofing settlements, hunting, food regeneration, and pest reduction. Riparian areas were often burned to attract big game animals. Traditional burning has not been implemented in the Upper Swan Valley for many years. The lack of fire and tribal influence has produced a much denser forest.

Although the Montana State Historic Preservation Office found no previously recorded historic sites within Section 35³⁰, the Archeology Department at the University of Montana provided three

²⁹ Kimmerer, R. and F. Lake. 2001. Maintaining the Mosaic: The Role of Indigenous Burning in Land Management. *Journal of Forestry* Vol. 99 No. 11.

³⁰ In a letter dated March 12, 2007, Damon Murdo at the State Historic Preservation Office states that he conducted a cultural resource file search for Section 35. He states that “According to our records there have been no previously recorded sites within the designated search locales.” He does, however, reference the inventory conducted by Elaine Howard in 1979, which concerned a dump road.

cultural reports for Sections 35 and 36. First, a site with 15 scarred ponderosa pine trees is found across the Swan River from the Elk Creek Conservation Area, where trees were peeled by Native Americans to procure cambium. These trees were about 245 years old when this study was completed in 1995. Similar sites within the Elk Creek Conservation Area are likely.³¹ Second, an archeological inventory was completed in Sections 35 and 36 in 1979, focused on a dump road.³² Finally, a State of Montana historic site survey was conducted for the Swan Valley Community Hall in 1983 (Section 36).³³

A thorough historic survey has not yet been conducted in the Elk Creek Conservation Area. However, it has been noted that Native Americans occupied the area for hunting and encampment. One historical document states, "Residence sites along Swan Lake, a widening of Swan River in the mountains east of Flathead Lake, indicate that this area probably was inhabited continuously during the period of the Flathead Lake residence. A definite trail of tools and weapons and ornaments from the Plains leads through the Swan Valley from the Sun River and

³¹ USDA Forest Service, Flathead National Forest. (Gary Maclean, Forest Archeologist) Field #95-SL-1, 1995. State # 24MO0546. Missoula County, T21N R17W NW ¼ Sec 36.

³² USDA Forest Service, Flathead National Forest. (Elaine Howard, Social Science Technician) 1979. Missoula County, T21N R17W NW ¼ Sec 35 & 36.

³³ State of Montana Archeological and Historic Site Survey, 1983. Site number 24M091, Swan Valley Community Hall, Project Name: M00H, MT Dept of Highways, Condon North-South.

into the Flathead Valley."³⁴ The same document mentions that Indians traveled through the Swan Valley to hunt buffalo in the Sun River area.³⁵ This is just one historical text that affirms native sites and uses in the area.

An interview with a CSKT elder was conducted to identify potential sites and uses within the Elk Creek Conservation Area. Antoine Incashola is a highly regarded member of the CSKT cultural committee of the Flathead Reservation. He listed many different cultural and traditional uses in the Swan Valley aboriginal territory. According to Incashola, the area has been used mostly by the Pend d' Oreille and Upper Kalispell Indians, using many old trails to get to the Sun River area for buffalo hunts. Camps were set up and the area was used for berry picking, medicinal plant gathering, fishing, and hunting. Sweat houses were usually the first thing to be set up when a camp site was established and many of these may still exist.

Incashola predicts that the area may have a lot of scarred trees from Native American use. The bark was scraped out to get to the cambium, which was eaten as a sweet treat. Many trees are also scarred as trail markers. Incashola acknowledged that some spiritual areas are located in the area as well. The tribes are very sensitive about these sites and do not reveal exact locations.

³⁴ Olga W. Johnson (1969). Flathead and Kootenay: The Rivers, the Tribes, and the Region's Traders. Glendale, CA: A. H. Clark Co., p. 42.

³⁵ Ibid, page 56.

However, it is important to know that these sites exist.

Today, many of the original Native American trails have grown in or been destroyed by logging, but the area is still used for berry gathering and spiritual use. Many CSKT families come into the Swan Valley to hunt, camp, fish, and gather berries.

An inquiry was made to the CSKT Preservation Office in order to learn more about cultural resources on the Elk Creek Conservation Area. The response indicates that further historic study should be done in the future, particularly before some types of management actions occur. A letter dated May 1, 2007 states: “The Confederated Salish & Kootenai Tribes do have concerns in Section 35. A historic trail lies within the boundaries. There is another site but we don’t think that it is going to be impacted by the management plan. A complete Culture Resource Survey will be conducted if and when there is a project planned in the area.”

Early Homesteading

Although government surveyors did not reach Section 35 to survey it until 1902 and 1904, the Northern Pacific Railroad had already received title to the land as part of the “in-lieu-of” sections granted as compensation for completion of the railroad line across the western United States. Over the years, ownership changes were dictated by corporate reorganizations beginning with the Northern Pacific Railway Company in the late 1800s, then with Burlington Northern Incorporated in 1970, Burlington Northern Resources in 1981 and then Plum Creek Timber Company in 1989.³⁶

Homesteaders used wagons and horses to navigate the roads and trails in and out of the Swan River country from the late 1800s up until about 1919. Early owners managed Section 35 for its timber value, which explains the lack of private development on the section, although many homesteaders established residences in the area. Historic places in the section include the Elk Creek School (1918-1923) (Figures 17 and 18) and the original bridge location across Elk Creek downstream from the current bridge (Figure 19). See Appendix 9 for more complete information about the Elk Creek School, early roads and trails, and recreational uses of the area. Appendix 11 summarizes a history of homesteads near the Elk Creek Conservation Area.

³⁶ Northern Pacific Corporate History Chart on file at Swan Ecosystem Center, Condon, MT from Plum Creek Timber Company, Inc, 1999.



Figure 17. Remains of outhouse walls from Elk Creek School. (photo credit: Bill Moore, 2007)



Figure 18. Elk Creek School in 1918 (photo credit: Alice Brunson Lawrence)



Figure 19. Elk Creek Bridge, 1918 (photo credit: Minnie Brunson-Melton)

Recent Access and Use of the Elk Creek Conservation Area

In 1975, Burlington Northern Inc. deeded an easement through Section 35 to Missoula County, transferring ownership of the bridge and the road to the county. Records from that time list the road as Elk Flats Road. In 1996, Plum Creek Timber Company, in cooperation with Missoula County, replaced the old railroad car bridge structure with the new bridge which is still in use. This brought the bridge up to standards suitable for logging trucks and other heavy equipment.

While it was the intention of Burlington Northern that the Elk Flats Road be added to the county-maintained road system, this was never done. Missoula County accepts ownership of the easement, but will not consider it for addition to its system until the road is brought up to current engineering standards. However, the county does both own and maintain the bridge.³⁷

Additional logging roads were constructed in Section 35 during the 1970s and early 1980s, one of which is now registered with Missoula County as Coyote Forest Lane, giving access to private land in Section 26. However, Plum Creek Timber Company never deeded a legal easement to the property owner in Section 26.³⁸ See Appendix 8, which includes maps of road clearing within Section 35.

In 1993 the seventeen property owners who accessed their land via the Elk Flats

³⁷ Moore, William R. "Bud." Personal communication to Suzanne Vernon, March 2007.

³⁸ Ibid.

Road formed an organization to facilitate road maintenance, including grading and snowplowing. In 2003 the Elk Flats Road Maintenance Cooperative formed as an official non-profit, tax-exempt organization that is still in operation.³⁹ The Co-op covers road maintenance through Sections 35, 34 and 4 in T21N R17W, and also addresses weed control in its Bylaws and Articles of Incorporation.

The Missoula Electric Cooperative and the Blackfoot Telephone Cooperative both own utility easements through Section 35 to access private properties in adjoining Sections 34 and 26.

Figure 20 shows the Elk Creek Conservation Area in the context of surrounding ownership parcels, Highway 83 and the settlement of Condon.

³⁹ From documents of the Elk Flats Road Maintenance Co-op, Inc. in the possession of William R. "Bud" Moore, 2007.

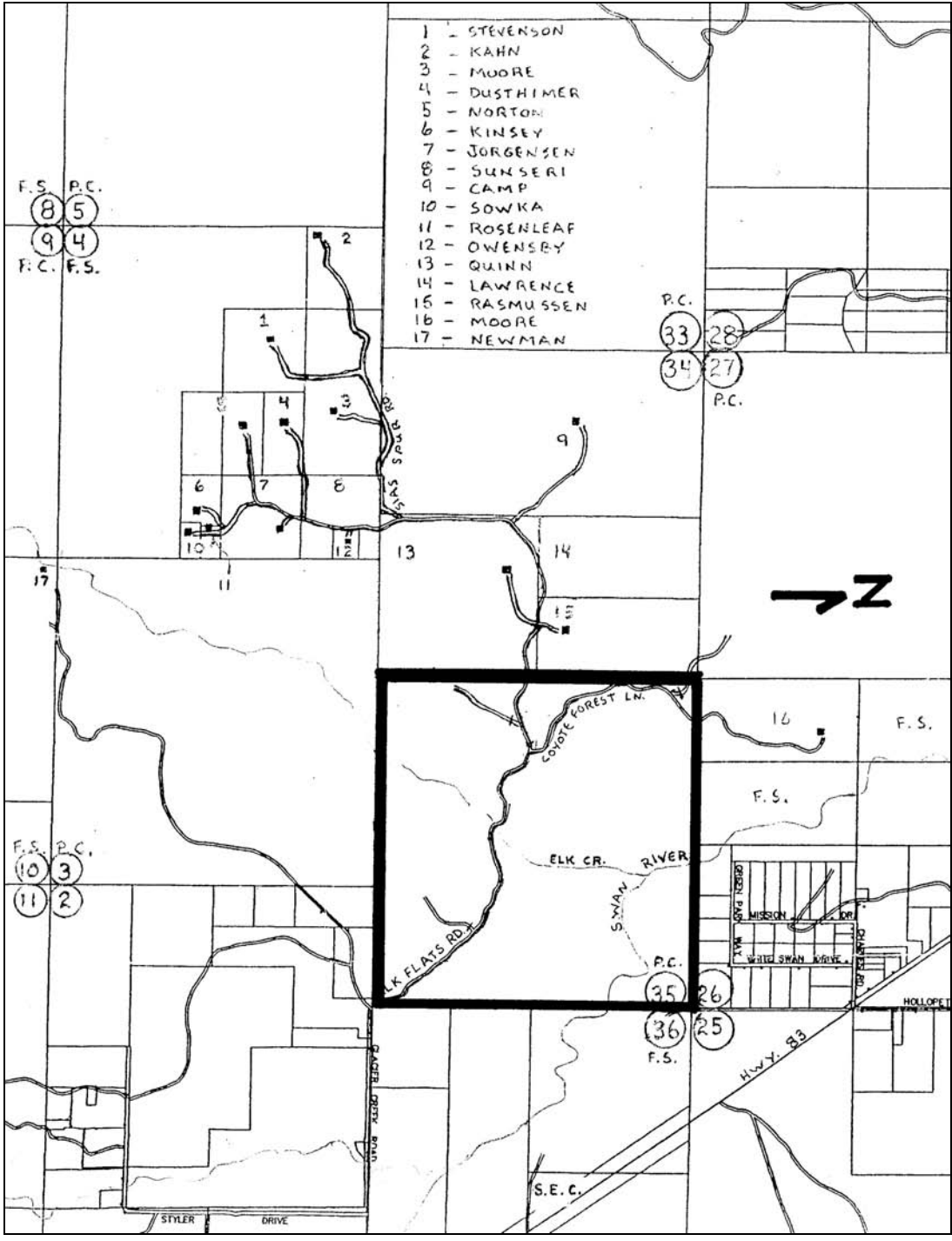


Figure 20. The Elk Creek Conservation Area (Section 35) in relation to other ownership parcels, Highway 83, and the Swan Ecosystem Center.

CHAPTER 4: GUIDING PRINCIPLES

The inventory and analysis of biological and physical factors shown in Chapter 2, as well as the cultural features outlined in Chapter 3, motivate broad goals and more specific objectives for the management of the Elk Creek Conservation Area. The following goals and objectives are consistent with the mission shown here and in Chapter 1.

Mission

Allow dynamic ecological processes to create and sustain habitat for all bull trout life stages. Protect and promote habitat for all native plant and animal species in a naturally functioning forest. Recognize that this forest is part of a larger landscape that supports humans. Considering that not all natural processes (such as wildfire) can be allowed to proceed, we will follow a well-defined process for decision making to identify management interventions that simulate a naturally functioning forest.

Goal 1. Perpetuate native species and their habitats by allowing natural processes to occur.

Objective 1. Monitor habitat conditions for all bull trout life stages by a combination of quantitative and non-quantitative methods. Bull Trout have been selected as the primary stewardship priority for the following reasons: 1) this land was purchased with funds earmarked for native species

protection; 2) bull trout are an excellent surrogate representative for other native fish; 3) Elk Creek is the most important spawning tributary for the Swan Lake bull trout population; and 4) they receive federal, state and tribal protection.

Task 1. Collect existing baseline measures of bull trout habitat and establish timeline for completion.

Task 2. Monitor trends in bull trout baseline conditions every 1-5 years.

Objective 2. Protect all native plant and animal species by recognizing their presence and vulnerability as all management actions are planned and performed. Follow the decision-making protocol (defined in Chapter 5) to evaluate and document all management activities.

Task 1. Establish fire history for the Elk Creek Conservation Area and determine a timeline for completion.

Task 2. Inventory riparian plant habitat and community types throughout the Elk Creek and Swan River floodplains. Describe how geomorphological and other stream channel processes influence riparian vegetation and promote in-stream habitat.

Objective 3. Minimize the presence of non-native plant species, especially noxious weeds, focusing on road verges, landing areas, disturbed riparian areas, and other disturbed sites.

Task 1. Determine timeline to inventory weed distribution, density, and species.

Task 2. Propose a comprehensive strategy that may include mapping, spraying, pulling and encouraging growth of native species appropriate to the site.

Task 3. Monitor progress on weed control.

Goal 2. When natural processes cannot be allowed to occur, identify appropriate management interventions by means of a structured decision-making process.

Objective 1. Promote a biologically diverse forest that, over time, maintains areas of forage, thermal cover, hiding cover, etc.

Objective 2. Meet as a management committee on a set schedule, or in response to specific management proposals, to implement the decision-making protocol.

Objective 3. Document and archive all management decisions made for the property.

Goal 3. Integrate human use consistent with the mission statement.

Objective 1. Control public access to balance resource protection with recreational opportunity.

Task 1. Conduct a more thorough inventory of all roads and culverts, including their conditions.

Task 2. Define public access guidelines, appropriate to the mission, including the use of motorized and non-motorized vehicles.

Task 3. Inform the public about the rules of access.

Objective 2. Protect relevant historic and cultural artifacts and sites.

Task 1. Inventory historic artifacts and sites. Conduct cultural resource studies with the CSKT Preservation Office.

Task 2. Implement measures to protect relevant resources identified in inventories as soon as possible following their identification.

Objective 3. Inform the community about the value and role of the Elk Creek Conservation Area.

Task 1. Develop on-site education and interpretation programs that reveal ecological processes and human uses of the Elk Creek Conservation Area.

Objective 4. Develop monitoring programs, utilizing professionals, students and/or residents. Collect baseline and trend data to determine effectiveness over time.

Objective 5. Encourage appropriate recreational uses, including hiking, bird-watching, and other passive recreation appropriate to the mission. Identify and restrict recreation activities detrimental to the mission.

Task 1. Provide nature study programs at the Elk Creek Conservation Area.

Task 2. Support fishing regulations in Elk Creek.

Task 3. Include community members on the committee overseeing implementation of the management plan.

Goal 4: Respect our neighbors by recognizing that our actions have implications beyond the property's boundaries.

Objective 1. Understand and respect local traditions. Encourage meaningful participation by community members

Task 1. Develop community forums, field tours, news releases, and educational programs.

Task 2. Liaison with the Condon Community Council, as needed.

Task 3. Describe the role of Elk Creek to the Swan Lake bull trout population.

Objective 2. Coordinate management activities, to the extent feasible and appropriate, with neighboring landowners.

Task 1. Develop a system to notify neighbors of management plans and decisions. Likewise, encourage neighbors to share plans that may affect the Elk Creek Conservation Area.

Task 2. Create opportunities to meet regularly with neighbors through meetings and field tours.

CHAPTER 5: STEWARDSHIP PROCESS

Decision-Making Process

Introduction

This decision-making process is based on the following concepts:

- Desirable management activities are those that create conditions that will sustain natural processes.
- Passive management approaches that can solve a problem or condition within a time frame that does not place the ecosystem at unacceptable risk are preferred.
- Active management approaches will only be used when passive approaches will likely not be effective within an acceptable timeframe and where the active approach will create conditions that will sustain natural processes.
- In cases of uncertainty, default decisions will be made in the direction that favors native trout.

This process is intended as a guide to maintain consistency with the mission statement by a group of stakeholders having widely differing points of view. The process should facilitate problem solving, maintain a positive working relationship, and provide documentation of the logic behind decisions.

This document uses a dichotomous key to assist in developing proposals that are consistent with the mission statement, as

shown in Figure 21. The guidelines and questions assist the proponent in developing a written proposal for the activity. Once a proposal is developed it is reviewed by the committee for consensus and implementation. The process is intended to funnel wide ranging proposals into a clearly identified condition and then into a specific activity.

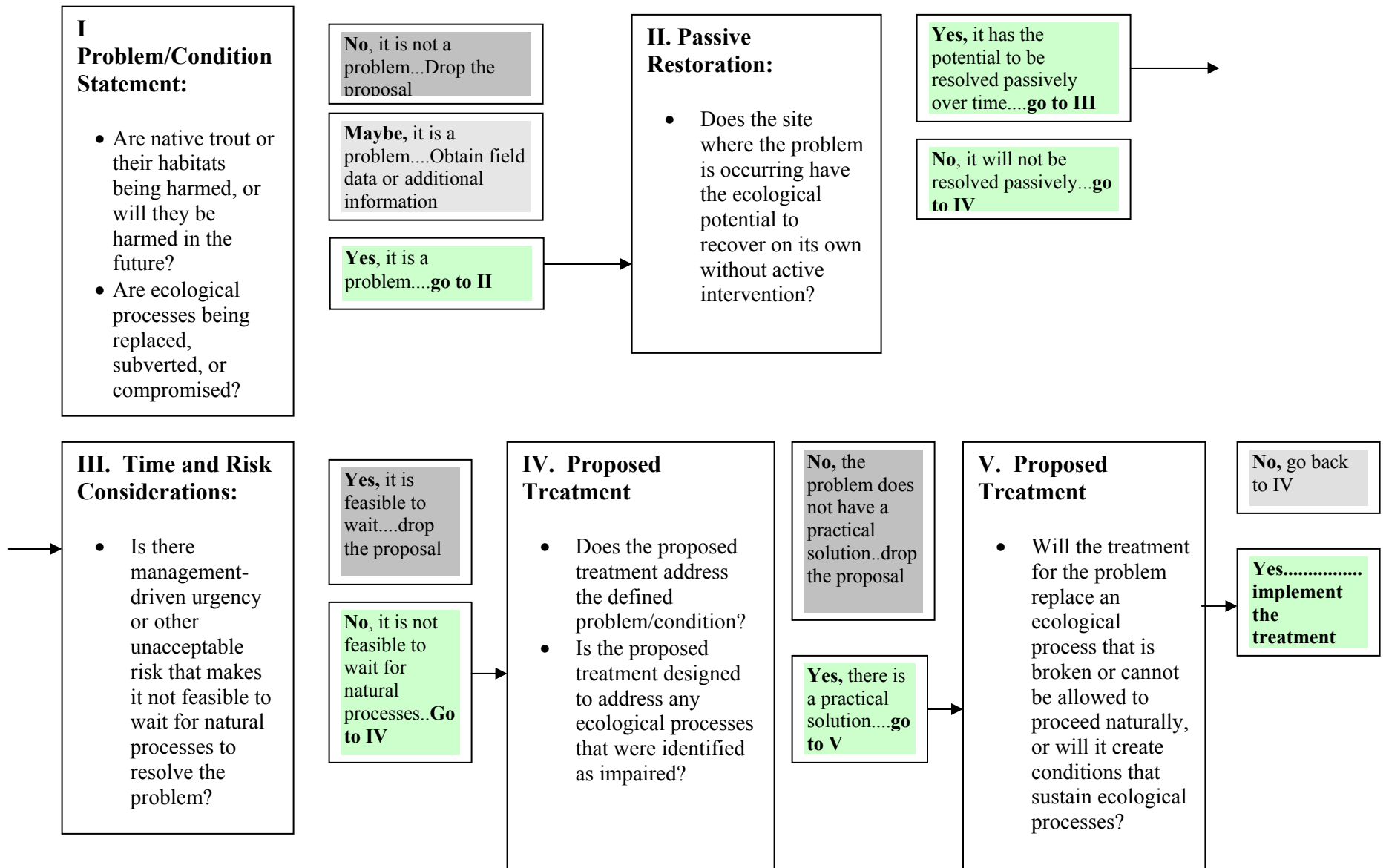
Some activities will be a part of the Management Plan and therefore will be prescribed in advance (see Chapter 6). Other activities will be generated spontaneously and require review by the committee. After the condition is agreed upon, and taken through the protocol, the second step is to choose the best method of treatment. No treatment methods are summarily excluded. Each method must be evaluated in terms of the condition it is treating.

Defining a Proposal

A proposal must be stated in the form of a problem/condition that includes a specific measurable management objective and the ecological process(es) that is/are linked to the management objective. The initial proposal should not contain methods.

A proposed treatment should both address the defined problem/condition and be designed to address any ecological processes that were identified as impaired or subject to improvement.

Figure 21. Decision Tree for Management Actions on the Elk Creek Conservation Area



Example

The following example illustrates how one would use the decision-making outline to present a proposal and evaluate it.

In this example, accelerated bank erosion is taking place on a segment of Elk Creek. While bank erosion and channel migration are ecological processes, the rate of erosion *appears* to be accelerated beyond natural rates. The high rate of erosion is probably the result of insufficient bank vegetation because of past logging activities and possibly other disturbances, including fire. In addition, an upstream logjam appears to be deflecting high to intermediate flows towards the exposed bank, possibly accelerating bank erosion.

Vegetation is not re-establishing along the streambank because the short-term site potential has shifted from one that is suitable for growing conifers to one that is best suited to growing grasses and low shrubs. The management objective is to reduce the rate of streambank erosion to less than average x feet per year within x years.

The term “appear” is frequently used in the following description because this proposal is based on subjective rather than quantitative information. It will be the responsibility of the committee to determine when subjective evaluations are insufficient and when empirical data are required.

I. Problem/condition statement: A high rate of bank erosion is occurring in a specific portion of Elk Creek. This erosion is likely the result of insufficient bank vegetation because of past logging

activities. While bank erosion and channel migration are ecological processes, the rate of erosion *appears* to be accelerated beyond natural rates.

Yes, this is a problem. Bull trout habitat is being degraded by changes in channel dimension, reductions in shade, and increases in fine sediment to a degree outside the range of natural variability. While wood jams in streams are a natural channel forming process, the successional ecology of the associated riparian vegetation *appears* to have been impaired by past logging practices.

Fire, like timber harvest, often removes riparian vegetation, leaving streambanks denuded of vegetation. So, why would this erosion rate be considered above the range of natural variability? *It appears* that the method of harvest has resulted in a modified site condition and a sod mat that is currently precluding the establishment of woody vegetation. Under these conditions, extensive time is required to change the site condition to make it suitable for establishment of woody vegetation.

Yes, this is a problem.....go to II

II. Passive restoration: This condition would likely resolve passively, as the channel will migrate to locations with adequate bank vegetation, or sufficient vegetation will become established on the existing bank to reduce the rate of erosion to within the range of natural variability.

However, given the length of time since the past logging activity and because the riparian zone is composed of grasses and rotting stumps *it appears* that the natural succession processes would not

reestablish woody bank vegetation in the foreseeable future.

As indicated in the problem statement, there is not enough data to conclusively state that the natural succession process is impaired. It *appears* to be impaired because of the amount of time since the last logging entry.

Yes, it has the potential to be resolved passively over time.....go to III

III. Time and risk considerations: Even if we assume natural succession rates, considerable erosion could occur with each spring flood event. A large flood event prior to vegetation establishment could cause considerable erosion if the log jam does not move with the flood.

It is hard to predict what might happen without intervention because it is hard to assess the longevity of the log jam and magnitude of flooding events. Active intervention here will have no measurable impact, and passive restoration would result in continued and excessive bank erosion and sedimentation. Therefore, in balance it is desirable to act soon on this problem.

No, it is not feasible to wait for natural processes.....go to IV.

IV. Proposed Treatment: Weaken the woody debris jam and plant woody vegetation on the raw bank. The basic problem is the deflection of high flows by a debris jam into a highly erosive stream bank. We propose to use chainsaws to weaken the debris jam so that in the next “high” flow event the debris will dislodge and move downstream. In addition, we propose to

plant vegetation on the poorly vegetated bank. Finally we recommend collecting more data on the local streamside area here to understand why the woody riparian vegetation was not able to re-establish itself following the timber harvest.

There is a practical solution.....go to V

V. Compatibility of Treatment with Ecological Processes: The proposed treatment will create conditions that bring the rate of bank erosion within the range of natural variability by reducing stress on the bank through the weakening of the debris jam, and by strengthening the bank integrity through the planting of riparian vegetation.

Yes,.....Implement the treatment

Management Committee

A five-member Management Committee will oversee decisions about management of the Elk Creek Conservation Area. Two appointments to the committee will be made by the SEC Board of Directors and two by the CSKT Natural Resources Department. SEC and CSKT each will set terms for their respective representatives. These appointments will be made by January 1, 2008. One at-large person will be appointed to the committee by these four individuals, who will set the term for the fifth member. The committee will meet in January 2008 and make its first report to SEC and CSKT by March 1, 2008.

On a project-by-project basis, the five-person Management Committee is

mandated to consult with qualified experts from relevant agencies or universities outside SEC and CSKT in order to obtain unbiased technical opinions on which to base decisions.

Any revenue that may be generated from the management of the Elk Creek Conservation Area will align with property ownership. Any revenues generated from the east half will be returned to BPA. Revenues generated from the west half will be available for sustainable management of the conservation area and other resource conservation projects.

The Management Committee will decide how often it needs to meet and determine other organizational details. It will strive to work by consensus; when consensus is not possible, a majority vote will be required for making decisions.

Recognizing that the Memoranda of Agreement and Conservation Easements are restrictive, the management committee is charged with initiating actions that are exceptions to, but complement, these documents.

The Management Committee will decide when, if, and how it becomes necessary to hire staff, for instance an Ecosystem Steward. If an Ecosystem Steward is appointed, he/she would meet regularly with the Management Committee and annually with the SEC Board and CSKT's Fish, Wildlife, Recreation and Conservation Division.

The management committee will review the management plan at regular yearly intervals in light of information from the Elk Creek Conservation Area monitoring

program. In keeping with the principles of adaptive management, observing and measuring results for each management decision (action or no action) will provide data that should be used to improve subsequent practices and enhance our knowledge of Elk Creek ecosystems. All decisions should be documented and archived for this purpose.

Technical Advisors

In addition to the Management Committee, technical advisors will be called upon to give advice on management decisions, as needed. For instance, expertise from the Montana Department of Natural Resources and Conservation, CSKT Forestry Department, Montana Fish, Wildlife and Parks, or the U.S. Forest Service may be needed.

CHAPTER 6: CURRENT MANAGEMENT ISSUES

Chapter 4 lists tasks, linked to specific objectives, which the Management Committee should accomplish. Those tasks are incorporated within the following sections, connecting to several key issues that the committee will encounter. For some issues, further studies should be conducted. As outlined in Chapter 2, the vegetation units themselves can be further analyzed, particularly to refine the boundaries between them. This section outlines the main issues and the types of information that will be needed for decision-making.

All actions to be undertaken on the Elk Creek Conservation Area will go through the decision-making process shown in Chapter 5 and be supervised by the Management Committee. The assessment of vegetative units (Chapter 2) found few management needs in the very near future, other than weed control.

Weed Control

Weeds are an ecological problem in the Elk Creek Conservation Area, where they out-compete native vegetation and compromise sound habitats. The Management Committee should propose a comprehensive strategy that includes mapping, spraying, and pulling weeds. In addition, it may consider supplemental planting of tree and shrub species in areas where woody plant regeneration is impaired, especially in the former Elk Creek channel area. The establishment of tree and shrub species

will help to shade out weeds over time. A weed program should begin very soon and the Management Committee should determine a timeline for completing an inventory of weed distribution, density and species. Anecdotal evidence shows that weeds are mostly found along the roads, in openings that were previously used as landings for the logging operations, and in the riparian areas logged prior to the Streamside Management Zone law. Weed populations should be managed to avoid further infestation.

The most problematic weeds present are:

- spotted knapweed *Centaurea stoebe* L. ssp. *micranthos*, synonym *C. maculosa* or *C. biebersteinii*)
- ox-eye daisy (*Leucanthemum vulgare* Lam., synonym *Chrysanthemum leucanthemum*)
- mullein (*Verbascum thapsus*)
- Canada thistle (*Cirsium arvense*(L.) Scop.).
- orange and yellow hawkweeds (*Hieracium aurantiacum* and *Hieracium caespitosum* Dumort.)

The hawkweeds are new invaders that must be eradicated when found. Lastly, reed canarygrass (*Phalaris arundinacea* L.) is present in the riparian zone. The Management Committee will need to collect more field data to determine the extent to which this species has become established and the appropriate eradication in this sensitive zone.

Coordination with Neighbors and the Public

Goals 3 and 4 outline objectives and tasks related to public outreach and neighbor relations. Several tasks could be started soon. SEC could continue to develop on-site education and interpretation programs that reveal ecological processes and human uses of the Elk Creek Conservation Area. This effort could include community forums, field tours, news releases, and educational programs. The role of Elk Creek to the Swan Lake bull trout population should be a primary focus.

For neighbor relationships, a system could soon be developed to notify neighbors of management plans and decisions. Create opportunities to meet regularly with neighbors through meetings and field tours. The Management Committee should discuss its activities with the Condon Community Council, as opportunities arise.

Fire

Since major fire suppression efforts have minimized the less severe, frequent fires in the Swan Valley, fuel buildups are leading to hotter, more intense fires. The fire regime condition classification is a nationally recognized modeling tool to define the degree of departure from the natural fire frequency. Most of the Elk Creek Conservation Area is within condition class 2, which is described as: *Moderate departure from the reference fire regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated*

*disturbances.*⁴⁰ See Appendix 11 for an overview of condition classes.

However, timber harvesting over the last 100 years has shaped the Elk Creek Forest more than has fire. Some of the forest may be categorized as condition class 3, because of unnatural disturbances that do not mimic natural successional stages of the biophysical setting or potential natural vegetation group (PNVG). Two PNVG descriptions for the Elk Creek Conservation Area are included in Appendix 7.

Although fire is a natural ecological process in the Swan Valley, as noted in the mission statement, wildfire can rarely be allowed to burn in the Elk Creek Conservation Area. Methods for replicating the effects of wildfire will need to be explored in order to approximate natural conditions. In addition, a more precise fire history for the area should be determined.

Insects and Disease

Like fire, insects and diseases are part of the forest's natural processes. We know that *Armillaria* root rot is infecting one area of the Elk Creek Conservation Area. An action may be necessary or a "no action" outcome may be prescribed after following the decision-making process. However, in some cases, it may be necessary to take measures to control insects and disease, for instance where negative effects will occur on neighboring lands. Further studies will

⁴⁰ Rapid Assessment Reference Condition Model, a component of the LANDFIRE project. See www.landfire.gov.

need to be conducted in order to determine both current and projected conditions related to insects and disease.

Stream Habitat and Fish Studies

To monitor stream conditions, it will be necessary to consult with hydrologists and geomorphologists before any management action is considered. Photo points should be established along Elk Creek and the Swan River, as well as in the area where the two Elk Creek channels split in neighboring Section 3. Restoration in the riparian areas should be considered carefully prior to action. There may not be an immediate need to act, despite obvious disturbances due to past logging. (See the example used in Chapter 5 regarding log jams near the confluence of Elk Creek and the Swan River).

A data search is needed to determine use by bull trout and cutthroat trout during all seasons and life stages. The Management Committee could review the MFWP and U.S. Forest Service records for all historic fisheries surveys on Elk Creek. The entire creek could be included because both bull trout and cutthroat trout are known to be migratory and the Elk Creek Conservation Area would need to be used by all migratory fish moving into and out of the Elk Creek basin from either Swan Lake or the Swan River. If data from previous studies is not available, surveys should be conducted.

A number of scientists have given advice on studies that could be performed as a basis for management action for the

riparian habitats. According to Beth Gardner⁴¹ “It might be wise to gather some baseline fish habitat data on the streams as soon as possible. I would suggest either a R1/R4 habitat survey or a ‘representative reach’ inventory of about 200m or both. The R1/R4 survey is a great way to quickly measure the entire stream in the section. It would take a 3 person crew about four days to survey the section. This gives you good information on the limiting factors but it is not very strong for monitoring. A representative reach takes about 1 or 2 days to complete and gives you outstanding monitoring data, but it is not very good at characterizing the entire stream. Doing both surveys solves the problem. Both take some technical skill.”

In addition, an invertebrate study may be needed in order to further understand the ecological integrity of the aquatic life.

Harvests

The management committee, using the decision-making process, must evaluate all issues related to removing forest products from the Elk Creek Conservation Area, not only related to thinning and other timber harvest, but also considering the removal of firewood, mushrooms, and other foods or materials. When and if timber harvests are approved, they will be used as “showcases” that illustrate how logging can be an ecosystem management tool, not merely a commercial activity.

⁴¹ Personal Communication from Beth Gardner, Flathead National Forest Fisheries Biologist, March 26, 2007.

Public Access

Unrestricted access to the Elk Creek Conservation Area's many logging roads creates ecological problems, including the weed problem described above. Access is an issue that should be considered early on, including a thorough inventory of roads and culverts. The Management Committee needs to define public access guidelines, appropriate to the mission, including the use of motorized and non-motorized vehicles. Following that, it needs to inform the public about the rules of access.

Until the management committee addresses public access and recreation, access rules will remain the same as on adjacent U.S. Forest Service and Plum Creek Timber lands. Foot, horse and bicycle traffic are allowed. Elk Creek is closed year-round to fishing to protect bull trout. Changes to the public access must be considered by following the decision-making process shown in Chapter 5.

The area directly above and below the Elk Creek Bridge on Elk Flats Road is an area of special management concern regarding the stream channel. In this area, the stream channel makes an "S" curve, flowing generally south, then east, and finally north and under the Elk Creek Bridge. In extreme high water, it tends to cut straight across the "S" curve and flow across the road approximately 100 feet west of the bridge. This is further complicated by a barrow pit on the south side of the road in that area that was cut so that it almost reaches the Elk Creek stream flow channel as it moves easterly above the road. Should the stream channel cut through this area

it is conceivable that it could cut across the Elk Flats Road, leaving the bridged area entirely.

The Elk Flats Road Cooperative will monitor debris build-up in this area. It will propose solutions to the Management Committee, as needed, to maintain the stream channel in the area of the bridge.

Monitoring Ecological Processes

Chapter 2 outlines a number of studies that could be performed to learn more about the forest's past and current conditions. Monitoring the change in natural resource health should begin immediately to provide base knowledge for further study and to gauge the rate and direction of ecological change. Specifically, baseline measures of bull trout habitat should be established as delineated under Goal 1, and trends monitored over time. Monitoring progress on weed control will also be critical for an adaptive management approach.

Monitoring also occurs at the project level. Once an approved management action has been carried out, the results will be monitored over a long enough period of time to determine whether or not the action actually achieved the desired objectives. For each approved decision, the management committee should define the scope of monitoring to follow, carry out the monitoring, analyze the resulting data and integrate the new knowledge gained into subsequent management decisions. This reflects the cyclical nature of adaptive management.

Historic and Cultural Artifacts and Sites.

As described in Chapter 3, the Elk Creek Conservation Area contains sites of significant historic and cultural value. These sites should be further inventoried and decisions made about potential preservation and interpretation. The Management Committee should work closely with the CSKT Preservation Committee in order to conduct cultural resource studies and implement the findings of those studies.

Wildlife

The Elk Creek Conservation Area is similar in many regards to most other valley bottom industrial forest lands. It has been heavily high-graded, with many areas showing severe soil impacts that have affected plant, animal and hydrological system integrity.

Management towards emulating nature and restoration efforts to replace the once-present ponderosa pines could be considered in order to restore this to a

more natural and complete ecosystem that includes diverse wildlife species. A long-term restoration program favoring historically dominant tree and plant species within each forest stand and disfavoring noxious invaders would greatly enhance the biological resilience of forest stands to normal stresses such as fire, disease, insects, and weather. Such a restoration program would also greatly increase wildlife habitat values. The recruitment of downed woody debris and standing large diameter snags in the uplands would significantly improve habitat values for birds, small mammals and all other dependent carnivores.

Anything that can be done to direct these forest stands to natural and historic complexity and diversity, including recreating a multi-story forest canopy, is useful. This would directly benefit the entire wildlife community, improve hydrologic function, and assist in the restoration of the ecological integrity of the larger landscape.

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Appendix 1

**MEMORANDUM OF AGREEMENT
BETWEEN
THE SWAN ECOSYSTEM CENTER,
THE CONFEDERATED SALISH AND KOOTENAI TRIBES,
THE STATE OF MONTANA
AND
THE BONNEVILLE POWER ADMINISTRATION
FOR RESIDENT FISH MITIGATION
(HUNGRY HORSE DAM AND RESERVOIR)**

This Memorandum of Agreement is made by and between **the SWAN ECOSYSTEM CENTER (SEC)**, the **CONFEDERATED SALISH AND KOOTENAI TRIBES OF THE FLATHEAD RESERVATION (CSKT or Tribes)**, the **STATE OF MONTANA**, acting through the Montana Department of Fish, Wildlife, and Parks (MFWP), and the **UNITED STATES OF AMERICA**, acting through the Department of Energy, Bonneville Power Administration (BPA). SEC, CSKT, MFWP, and BPA are separately and jointly referred to as “Party” and “Parties,” respectively.

RECITALS

A. The Swan Ecosystem Center (SEC) is a nonprofit corporation located at 6887 Hwy 83 Condon, Montana 59826, exempt under Section 501(c)(3) of the Internal Revenue Code for the purpose of maintaining a strong, vital community in the Swan Valley, Montana, through partnerships that encourage sustainable use and care of public and private lands. As a Montana corporation SEC is entitled to own land under Montana Code Ann. §§ 35-2-117 and 35-2-118.

B. CSKT is an Indian tribal government organized under Section 16 of the Indian Reorganization Act of 1934, 25 U.S.C. § 461 et seq. (2004). CSKT has a unique interest in the land, water and other natural resources of the Flathead Indian Reservation as the Tribal homeland and in the land, water and other natural resources of the Tribes’ aboriginal territory for hunting, fishing and gathering purposes, all as guaranteed by the Treaty of Hellgate, 12, Stat. 975, July 16, 1855. With regard to resident fish, pursuant to Article III of the Hellgate Treaty, the Tribes reserved the right to protect, preserve and utilize the fishery in common with the citizens of Montana, the right to access, protect, and utilize the usual and accustomed places where they practiced their traditional fishing activities, and the right to the quantum and quality of water necessary to make the fishing right meaningful. The Tribes regulate fishing by Tribal members. The Tribes regulate and manage the Flathead Reservation fishery and its attendant habitat. The Tribes participate with other state and federal agencies in preserving and protecting fish and fish habitat throughout the Tribes’ aboriginal territory. Fish habitat and populations the Tribes relied upon historically have been profoundly impacted by the construction and operation

of, and inundation resulting from, federal hydroelectric projects on the Columbia River and its tributaries.

C. MFWP is an executive state agency established as the state fish and wildlife agency pursuant to state law, Mont. Code Ann. §2-15-3401, entrusted with responsibility for protecting, preserving, managing, and propagating fish within the State of Montana. Mont. Code Ann. §87-1-201. MFWP is further authorized to acquire real property interests suitable for protecting, preserving, managing, and propagating fish, by gift, purchase or exchange, Mont. Code Ann. §87-1-209, to cooperate with the CSKT in matters involving hunting and fishing, Mont. Code Ann §87-1-228, and to administer a river restoration program cooperatively with tribal and federal organizations. Mont. Code Ann. §87-1-257. The Montana Fish, Wildlife and Parks Commission established by Mont. Code Ann. § 2-15-3402, and the Montana Board of Land Commissioners, established by Art. X, sec. 4, Mont. Const., have the authority to and are required by Mont. Code Ann. § 87-1-209 to approve acquisitions of land or interests in land by MFWP.

D. BPA is a power-marketing agency within the United States Department of Energy (DOE). The Pacific Northwest Electric Power Planning and Conservation Act, 16 U.S.C. §§ 839-839h (Northwest Power Act) directs BPA to protect, mitigate, and enhance fish and wildlife affected by the development and operation of federal hydroelectric projects on the Columbia River and its tributaries in a manner consistent with the purposes of the Act, the fish and wildlife program (Program) adopted by the Pacific Northwest Electric Power Planning and Conservation Council (Council) under subsection 4(h) of the Act, and other laws. Federal law places a trust responsibility on the Federal Government, which includes the responsibility to protect the sovereignty of the Tribal government and to preserve Tribal culture and trust resources. DOE's American Indian and Alaska Native Tribal Government Policy and BPA's Tribal Policy recognize and commit to a government to government relationship with the Tribes (<http://www.em.doe.gov/public/tribal/policy2.html>; <http://www.bpa.gov/corporate/kt/trblpolicy.pdf>).

E. The CSKT and MFWP are co-trustees for the Flathead River Basin fishery and have each developed a resident fish mitigation program to assist BPA in fulfilling its fish mitigation obligation under the Northwest Power Act associated with the construction of, and inundation created by Hungry Horse Dam. The acquisition and subsequent management of real property made pursuant to this agreement by SEC shall follow the terms of this Agreement.

F. BPA has completed the Wildlife Mitigation Programmatic Environmental Impact Statement (EIS) and Record of Decision (ROD) and the Watershed Program Management EIS and ROD under the National Environmental Policy Act (NEPA), 42 U.S.C. 4321-4370c, pursuant to Federal law, and these documents provide the basis for BPA's NEPA compliance for this Agreement.

G. The purpose of this Agreement generally is to provide a mechanism for BPA to fund, and SEC, on behalf of MFWP, to implement the permanent protection and mitigation of resident fish and especially bull trout staging, spawning, and rearing habitat to partially mitigate the direct construction and inundation impacts of Hungry Horse Dam based on the *Fisheries Mitigation Plan for Losses Attributable to the Construction and Operation of Hungry Horse Dam*, March

1991; and *Determination of Fishery Losses in the Flathead System Resulting from the Construction of Hungry Horse Dam*, January 1986. The Council adopted the losses for Hungry Horse into the Council's program in 1993.

H. The purpose of this Agreement specifically is to memorialize SEC's role, responsibilities, and duties with respect to a parcel of land it acquired using BPA resident fish mitigation funding in September 2006 as a result of a Memorandum of Agreement between CSKT, MFWP, and BPA dated March 28, 2006 (referred to herein as the "2006 MOA"). The parcel of land is more particularly described as the west ½ of Section 35, T21N, R17W, P.M.M., Missoula County, Montana (referred to herein as the "Property"). This Agreement, and the terms contained herein, are intended to govern only actions to be taken with respect to the Property and not any other site.

I. The east ½ of Section 35, T21N, R17W, P.M.M., Missoula County, Montana abuts the Property and was simultaneously purchased by the CSKT pursuant to the 2006 MOA. This Agreement does not alter the Tribe's role, responsibilities, and duties under the 2006 MOA.

J. The east ½ and the west ½ of Section 35, T21N, R17W, P.M.M., Missoula County, Montana are referred to collectively in this Agreement as the "Elk Creek Parcel."

TERMS AND CONDITIONS

1. Funding. MFWP, in September 2006, requested and ultimately received approval from BPA for a \$6,100,000 within in-year capital budget amendment; \$4,800,000 of which was applied by MFWP to purchase the Property in the name of SEC; \$200,000 of which was applied by CKST to acquire the east half of the Elk Creek Parcel; and the \$1,100,000 balance was applied by MFWP toward purchase of a conservation easement on another parcel. The Northwest Power Planning Council and BPA both approved the funding for acquisition of the Elk Creek Parcel in September 2006. The entirety of the Elk Creek Parcel was purchased for \$9,600,000 using BPA funding, with \$5,000,000 in funding from MFWP's allocated Council-recommended BPA project budget (including the within-year modification) and the balance from CSKT's 2005 and 2006 Council-recommended BPA project budget, less capital funds used by both BPA and the CSKT for project-related costs.

2. Elk Creek Parcel Description. The east half of Section 35 T21N, R17W, P.M.M., Missoula County, Montana (approximately 320 acres), is now owned by the CSKT while the west half of Section 35 T21N, R17W, P.M.M., Missoula County, Montana (approximately 320 acres), is now owned by SEC. Closing took place on September 15, 2006 in Seattle, Washington.

3. Due Diligence. During 2006, the Parties completed the required NEPA, cultural, hazardous waste, appraisal, and all other due diligence work required by BPA prior to the closing on the Elk Creek Parcel.

4. Title and Conservation Easements. To ensure that the Property is protected permanently as mitigation for resident fish habitat losses, SEC shall grant and deliver to BPA a deed of conservation easement substantially in the form found in Attachment A, incorporated

herein by this reference as the Deed of Conservation Easement for the West Half of the Elk Creek Property. This conservation easement shall be conveyed to BPA in conjunction with the signing of this Agreement.

5. Fisheries Credits.

A. BPA is obligated by law to protect, mitigate and enhance fish affected by the development of federal hydroelectric projects pursuant to section 4(h)(10)(A) of the Northwest Power Act, 16 U.S.C. 839b(h)(10)(A). The Parties hereto agree that the quantum of resident fish habitat directly affected by construction and inundation of Hungry Horse Dam is:

1. Fifty-seven (57) kilometers of the South Fork Flathead River; and
2. Sixty-eight and eight tenths (68.8) kilometers of tributary habitat

as described in the *Fisheries Mitigation Plan for Losses Attributable to the Construction and Operation of Hungry Horse Dam*, March 1991, and *Determination of Fishery Losses in the Flathead System Resulting from the Construction of Hungry Horse Dam*, January 1986 pages 15 and page 11 of Appendix B of that document, respectively.

B. The Parties hereto agree that the Elk Creek Parcel yields 4.18 km of tributary resident fish habitat and that the corresponding 4.18 km of resident fish habitat mitigation credit shall vest in BPA against tributary resident fish losses associated with the construction of and inundation by Hungry Horse Dam. The Parties hereto further agree that the amount of resident fish habitat mitigation credit quantified and taken by BPA pursuant to this Agreement is irreducible, and cannot be diminished as a result of any failure by SEC, the Tribes, or MFWP to carry out their obligations under this Agreement, so long as a court has not found BPA in breach of this Agreement and BPA has not cured its breach.

6. Operations and Maintenance. SEC shall be responsible for all future operations and maintenance costs associated with the Property.

7. Management Plan. SEC and CSKT agree to produce a joint draft Management Plan for the Elk Creek Parcel (640 acres) on or before September 15, 2007 and submit said Management Plan to BPA for review and approval. BPA shall have 60 days to review the Plan for approval and ensure it conforms to the terms of the 2006 MOA, this Agreement, Elk Creek Parcel conservation easements, pertinent NEPA documents, and other BPA legal obligations. Once approved, the Management Plan shall be deemed incorporated into and made a part of the 2006 MOA and this Agreement.

The draft Management Plan shall be based upon and consistent with the eight standard planning process steps and the nine resource specific mitigation measures contained in the Wildlife EIS and/or Watershed EIS Records of Decision (see Recital D of 2006 MOA).

The Management Plan will provide for management actions that preserve, restore, enhance and/or create naturally self-sustaining native habitat or native-like habitat that supports indigenous resident fish species of the area, particularly loss assessment target species and ESA-listed species.

SEC shall request participation from other local resource managers in reviewing and commenting on the draft Management Plan. SEC shall also request participation from the public, and private landowners in the immediate area as is appropriate and helpful in developing the draft Management Plan, and all subsequent amendments to it.

SEC shall undertake only those management activities on the Property that are allowed by this Agreement until a Management Plan is executed for the Property.

8. Incidents of Ownership. SEC shall have all management and operational control of the Property and will, therefore, be responsible for all incidents of ownership.

9. Environmental Liability. SEC shall hold BPA harmless for any environmental liabilities or costs which may arise at the Property after closing and BPA will not provide funding to support such costs, unless BPA is directly responsible for the liability or costs in accordance with applicable law.

10. Assurances; Prohibited Uses. SEC will ensure that all the habitat acquired and/or managed pursuant to this Agreement is permanently protected and managed for resident fish on behalf of BPA and the United States by means of a perpetual conservation easement attached hereto as Attachment A, and will take all actions within its powers to prevent any and all uses that are inconsistent with this Agreement, the Pacific Northwest Power and Conservation Planning Council's Program, the Northwest Power Act, the Management Plan required by Section 7 of this Agreement, and the ESA to the extent allowable by law, taking into consideration any encumbrances from pre-existing rights or first-in-time rights held by non-fee title third parties, including, but not limited to, encumbrances related to (i) third party ownership of oil and gas rights and (ii) validly recorded easements burdening the property. The Parties intend that any activity that violates the purposes of this Agreement, or unduly limits additional resident fish mitigation credit accruing to BPA from natural regrowth and regeneration of the habitat, is prohibited, and therefore the list identified below is not exhaustive. Prohibited uses include:

A. All residential, commercial, or industrial uses of the properties, except as permitted in the Management Plan;

B. Erecting of any building, billboard, or sign except as approved in the Management Plan;

C. Depositing of soil, trash, ashes, garbage, waste, bio-solids or any other material, except as allowed under applicable federal, state, and local laws at locations approved in the Management Plan;

D. Excavating, dredging, or removing of loam, gravel, soil, rock, minerals, sand, hydrocarbons or other materials, except as permitted in the Management Plan;

E. Otherwise altering the general topography of any property acquired or managed pursuant to this Agreement, including but not limited to building of roads and flood control work, except for work related to restoration or enhancement projects identified in the Management Plan;

F. Granting any easement, lien, or other property interest for any purpose (without the written consent of BPA), over any property (including water rights) acquired or managed pursuant to this Agreement;

G. Any other use that is not included in the management plan, and that BPA determines has a material negative impact to the conservation values identified in Attachment A.

H. Livestock grazing, timber harvest, removal of other shrubbery or vegetation unless those actions are specifically provided in the Management Plan for purposes which include, but are not limited to protecting resident fish, protecting against wildfire, preventing disease, or protecting persons or property.

11. Permanent Resident Fish Habitat Protection. Unless otherwise agreed by the Parties in writing, SEC will dedicate the Property to resident fish habitat protection and will manage the Property according to the terms of this Agreement, and the Management Plan required under Section 7.

12. Electrical Transmission Easement. If BPA needs a transmission line right-of-way over the Property, then SEC shall grant BPA such a perpetual easement at no cost. Upon BPA's request for such an easement, SEC and BPA will negotiate an agreement for the easement that will recognize the purposes for which the underlying fee of the Property was acquired, and include appropriate mitigation measures consistent with this Agreement and otherwise identified as part of the environmental analysis for the transmission right of way under the NEPA, the ESA and the Clean Water Act or any other applicable federal laws. Transmission right-of-way easements shall be for the sole purpose of transmission of electrical power and ancillary transmission communications.

13. Remedies.

A. Notice of Failure. If BPA determines that SEC is in violation of the terms of this Agreement (including any and all Conservation Easements acquired pursuant to this Agreement) or that a violation is threatened, BPA shall give written notice to SEC of such violation and demand corrective action sufficient to cure the violation and, where the violation involves injury to the Property resulting from any use or activity inconsistent with the purpose of this Agreement to restore the portion of the Property so injured.

- B. SEC's Failure to Respond. Providing that SEC has not initiated Alternative Dispute Resolution actions to which the parties are subject to as set forth in Section 20 below regarding the alleged violation, BPA may bring an action as provided in subsection 13.C.3 below, if SEC:
1. Fails to cure the violation within thirty (30) days after receipt of notice from BPA; or
 2. Under circumstances where the violation cannot reasonably be cured within the thirty (30) day period, fails to begin curing such violation within the thirty (30) day period, or fails to continue to diligently cure such violation until finally cured.
- C. BPA's Action. Providing that SEC has not initiated Alternative Dispute Resolution actions to which the parties are subject to as set forth in Section 20 below regarding the alleged violation, if BPA determines that SEC is in violation of the terms of this Agreement, or that a violation is threatened, it may bring an action at law or in equity to enforce the terms of this Agreement to enjoin the violation, to recover any damages to which it may be entitled for such violation, and to require the restoration of the Property to the condition existing before the violation, or to undertake such restoration as required by the terms of this Agreement if SEC does not and be reimbursed by SEC for such effort.
- D. Immediate Action Required. If BPA determines that circumstances require immediate action to prevent or mitigate significant damage to the conservation values of the Property, BPA may pursue its remedies under this section without prior notice to SEC without waiting for the period provided for cure to expire.
- E. Acts of God. Nothing contained in this Agreement shall be construed to entitle BPA to bring any action against SEC for any injury to or change in the Property resulting from causes beyond SEC's control, including, without limitation, naturally caused fire, flood, storm, and earth movement, or from any prudent action taken by SEC under emergency conditions to prevent, abate, or mitigate significant injury to a the Property resulting from such causes. Such excuse from performance shall only be allowed if such catastrophic event or other event beyond the SEC's control has caused a substantial degradation of the habitat. The Parties will make all reasonable efforts to resume performance promptly once the force majeure is eliminated.
- F. SEC Action. The Parties to this Agreement acknowledge that the terms of this Agreement are unique, apply only to the Property, and are being agreed to in order to facilitate the operation and maintenance of the Property. If SEC determines that BPA is in violation of the terms of this Agreement for acts or omissions of BPA directly related to the Property, then it may bring an action against BPA at law or in equity to enforce the terms of this Agreement to enjoin the violation, to recover any damages, and to seek any other remedy to which it

may be entitled for violation of the terms of this Agreement. SEC shall not use any provision of this Agreement or the 2006 MOA against the CSKT in any proceeding or litigation, as an admission or otherwise, except in a proceeding or litigation to enforce the terms of this Agreement. SEC shall not use any provision of this Agreement or the 2006 MOA to challenge any act or omission of the CSKT at any site other than the Property.

14. Future Conveyance of the Property

- A. If SEC determines that a sale or exchange of the Property would provide no net loss in resident fish habitat or stream kilometers (from conditions at the time of the proposed sale or exchange), or aid in the fulfillment of the management objectives as stated in this Agreement, then SEC may sell or exchange the Property ensuring the following conditions are met:
1. Any newly acquired real property interests shall be of equal or greater resident fish habitat value to the habitat existing on the Property, or aid in fulfillment of the joint BPA/MFWP/CSKT resident fish mitigation project or facilitate management of real property already acquired.
 2. If SEC desires to sell the Property, then SEC shall first offer the property to MFWP for the price and on the terms of the intended sale. MFWP shall have sixty days from the date of such offer to accept or reject it.
 3. SEC must consult with BPA, CSKT, and MFWP regarding any proposed sale or exchange, and can only proceed to consummate any such transaction with approval of BPA, CSKT, and MFWP. Approval shall not be unreasonably withheld.
- B. Notwithstanding any other terms of this Agreement to the contrary, if SEC determines that it may no longer act in the capacity as the steward for this property, for whatever reason, it may divest itself of fee title to the Property for no consideration by deeding the Property to:
1. a successor organization in the form of another 501(c)(3) conservation organization that meets the standards required to fulfill the intended stewardship over this property and that is approved in writing by BPA, MFWP and CSKT, which shall not be unreasonably withheld; or
 2. MFWP if MFWP, in its sole discretion, consents to acquisition of the Property; or
 3. CSKT, if CSKT, in its sole discretion, consents to acquisition of the Property.

Each Party represents that it will work cooperatively with each of the other Parties to find an appropriate and satisfactory successor if SEC determines that it may no longer act in the capacity as the steward for this property, for whatever reason.

15. Public Access. The public shall have reasonable access to the Property. The Management Plan will define the scope of public access. Until the Management Plan is adopted, the scope of public access is deemed to be consistent with the existing condition (i.e. Plum Creek's Open Land Policy). SEC shall not provide access or use that will result in material adverse impacts to resident fish, a material reduction of habitat values, or the material alteration of other natural resource values for which the Property is managed, or impede any anticipated increase in habitat values. Nothing in this Agreement limits the authority or ability of SEC to manage the Property for public safety and fish and wildlife habitat conservation, or to preserve and protect cultural, historic, and religious sites.

16. Tribal Access. The parties acknowledge that the Hungry Horse Hydropower Project and the Property are both located within the aboriginal territory of the Tribes. The Parties further acknowledge that the Tribes retain certain interests in and rights to land and resources within their aboriginal territories pursuant to treaty agreement with the United States. For purposes of this Agreement, it is the Parties' mutual intent that members of the Tribes have access to and use of the Property for the purpose of exercising their treaty-reserved fishing rights so long as said activities are consistent with the purposes of the 2007 MOA and the Joint Management Plan, however, nothing in this Agreement is intended to nor shall abrogate or define any federally protected or reserved Indian right.

17. Reporting. SEC shall provide BPA with an annual written report generally describing the condition of the Property and management activities required in the Management Plan. If requested, SEC shall provide BPA with access to all related financial records, and allow BPA to seek answers to any questions it may have related to the Property and compliance with this Agreement.

18. Right To Enter. BPA shall have the right to enter upon the Property at reasonable times and upon reasonable notice to monitor SEC's compliance with this Agreement and to enforce its terms.

19. Binding Effect. This Agreement shall be binding on the Parties and their assigns and successors. Each Party shall have the right to enforce the terms of this Agreement in any court of competent jurisdiction.

20. Alternative Dispute Resolution. These dispute resolution provisions may be triggered by any Party to address issues directly related to the Property and arising in the implementation of this Agreement with regard to the Property, particularly sections regarding management plan development and approval, termination, and crediting. Providing that litigation has not been initiated with regard to a particular dispute, the Parties may either mediate or arbitrate said dispute, but they may not do both.

A. If no Party has initiated litigation or mediation, then subject to and consistent with the Administrative Disputes Resolution Act of 1996, 5 U.S.C. §§ 571-583, any

Party may initiate arbitration for a controversy or claim arising out of or relating to this contract, or the breach thereof. The Parties must agree to the arbitration, and must agree in advance whether the arbitration will be binding or non-binding. Arbitration shall be administered by the American Arbitration Association Seattle, Washington, office in accordance with its Commercial Arbitration Rules, unless the Parties otherwise agree to different rules. The arbitration will be done using a single arbitrator—unless the Parties agree to more than one arbitrator, follow the Federal Rules of Civil Procedure, and with each Party paying its own costs and attorney fees and -sharing equally in all arbitration costs. There will be limited discovery allowed, as determined by the arbitrator, consistent with the goal of delivering a just, speedy, and cost-effective resolution of the dispute. In determining appropriate discovery, the arbitrator shall take into account any responses made by BPA or the Department of Energy to a Party in response to a Freedom of Information Act request. Judgment on the award rendered by the arbitrator may be entered in any court having jurisdiction thereof.

- B. If no Party has initiated litigation or arbitration, any Party may initiate mediation. The Parties agree that a controversy arising out of or relating to this Agreement shall be submitted to Judicial Arbitration and Mediation Service (JAMS), or its successor, for mediation. The Parties may commence mediation by providing to JAMS a written request for mediation, setting forth the subject of the dispute and the relief requested. The Parties will cooperate with JAMS and with one another in selecting a mediator from JAMS' panel of neutrals, and in scheduling the mediation proceedings. The Parties covenant that they will participate in the mediation in good faith, and that they will share equally in its costs and fees. All offers, promises, conduct and statements, whether oral or written, made in the course of the mediation by any of the Parties, their agents, employees, experts and attorneys, and by the mediator or any JAMS employees, are confidential, privileged and inadmissible for any purpose, including impeachment, in any arbitration or other proceeding involving the Parties. There will be limited discovery allowed as determined by the mediator, consistent with the goal of assisting the Parties to obtain a just, speedy, and cost-effective resolution of the dispute. In determining appropriate discovery, the mediator shall take into account any responses made by BPA or the Department of Energy to a Party in response to Freedom of Information Act request.

21. Effective Date & Counterpart Signatures. This Agreement shall be effective when signed by a duly-authorized representative of SEC; by the Chairmen of the Tribes pursuant to a Tribal Resolution (Attachment B); by the Director, MFWP; by BPA's Manager, Real Property Services; and by BPA's Vice President for Environment, Fish and Wildlife. This Agreement shall be executed in counterparts, each of which is deemed to be an executed original even if all signatures do not appear on the same counterpart. Facsimile copies and photo copies of this Agreement will have the same force and effect as an original.

22. Modification. The Parties by mutual agreement may modify the terms of this Agreement. Any such modification shall be in writing signed by all Parties.

23. Applicable Law. All activities undertaken pursuant to this Agreement must be in compliance with applicable laws and regulations. Federal law shall govern the implementation of this Agreement and any action, whether arbitrated, mediated, or litigated, brought or enforced. In full knowledge of the provisions of this Agreement, SEC, CSKT and MFWP waive any claim or defense they may have against BPA or its successors in interest under or pertaining to this Agreement based upon waiver, laches, estoppel, adverse possession, prescription, or sovereign immunity. Any payments from SEC, CSKT or MFWP shall be payable only from monies, assets, or real or personal properties derived from this Agreement or the benefits of this Agreement. All other monies, assets or properties of SEC, CSKT, or MFWP shall be unavailable to satisfy a judgment. The waivers of sovereign immunity by the United States bind BPA and can be found generally in the statutes establishing the jurisdiction of the United States District Courts, 28 U.S.C. § 1346, the Court of Claims, 28 U.S.C. § 1491, and the Federal Tort Claims Act, 28 U.S.C. §§ 1346, 1402, 2401, 2402, 2411, 2412, 2671 *et seq.*

24. Attorney Fees. In the event of litigation, arbitration or mediation involving this Agreement each Party shall bear its own costs and attorney fees, including those incurred on appeal, unless expressly provided otherwise herein.

25. Waiver. The failure of any Party to require strict performance of any term of this Agreement or a Party's waiver of performance shall not be a waiver of any future performance or of a Party's right to require strict performance in the future.

26. Assignment. During such time SEC is the fee title holder of the Property, SEC may not assign or transfer its rights or delegate its responsibilities under this Agreement without written approval from BPA, MFWP, and CSKT. Such written approval shall not be unreasonably withheld and shall mirror the written approval governing SEC exchanging or selling the Property as provided in Section 14 above. At such time SEC is not the fee title holder to the Property, SEC shall have no further responsibility regarding the Property pursuant to this Agreement.

27. Notice. Any notice permitted or required by this Agreement shall be in writing, delivered personally to the persons listed below, or shall be deemed given five (5) days after deposit in the United States mail, certified and postage prepaid, return receipt requested and addressed as follows, or at such other address as any Party may from time to time specify to the other Party in writing. Notices may be delivered by facsimile or other electronic means, provided that they are also delivered personally or by certified mail. The addresses listed below can be modified at any time through written notification to the other Party.

Notices to BPA:
Manager, Fish & Wildlife
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208

Notices to SEC:
Swan Ecosystem Center
6887 Hwy 83
Condon, MT 59826

Notices to MFWP:
Montana Dept. of Fish, Wildlife & Parks
P.O. Box 200701
Helena, MT 59620-0701

Notices to CSKT
Chairman - Tribal Council
Confederated Salish and Kootenai Tribes
P.O. Box 278
Pablo, MT 59855

IN WITNESS WHEREOF, the parties have signed this Agreement below:

BONNEVILLE POWER ADMINISTRATION

By: _____ Date: _____
Gregory K. Delwiche
Vice President
Environment, Fish and Wildlife

By: _____ Date: _____
Margareth H. Wolcott
Manager, Real Property Services

CONFEDERATED SALISH AND KOOTENAI TRIBES

By: _____ Date: _____
James Steele, Jr.
Chairman – Tribal Council

MONTANA DEPARTMENT OF FISH, WILDLIFE AND PARKS

By: _____ Date: _____
M. Jeff Hagener
Director

SWAN ECOSYSTEM CENTER

By: _____ Date: _____

Name: _____

Title: _____

Appendix 2

DEED OF CONSERVATION EASEMENT

[*WEST HALF OF THE ELK CREEK PROPERTY*]

THIS DEED OF CONSERVATION EASEMENT is made by The Swan Ecosystem Center, a nonprofit corporation organized pursuant to Montana law and doing business at 6887 Hwy 83 Condon, Montana 59826 (“SEC”), in favor of the United States of America, acting by and through the Department of Energy, Bonneville Power Administration (“BPA”), based in Portland, Oregon. SEC and the United States are jointly referred to herein as the Parties.

WITNESSETH

Purposes and Intent. BPA and SEC entered into a Memorandum of Agreement Between the Swan Ecosystem Center, Confederated Salish and Kootenai Tribes, the State of Montana and the Bonneville Power Administration for Resident Fish Mitigation (2007)(hereinafter the “2007 MOA”). The 2007 MOA allows BPA to fund and SEC to acquire the west half of the Elk Creek Property to mitigate for the impacts to resident fish from construction and inundation of the Hungry Horse federal hydroelectric project. A copy of the 2007 MOA is on file with the BPA Manager, Real Property Services, P.O. Box 3621, Portland, OR 97208-3621. In accordance with the 2007 MOA, BPA seeks, and SEC seeks to provide, a conservation easement on the west half of the Elk Creek Property, a parcel of land located in Missoula County, Montana and owned in fee by SEC. The purpose of this easement is to preserve, create, enhance, restore, and protect the functional values of riparian lands, wetlands and other lands, and for the conservation of natural values including fish and wildlife habitat, water quality improvement, flood water retention, groundwater recharge, open space, aesthetic values and environmental education consistent with the 2007 MOA.

Authority. This acquisition of Easement Deed by the BPA is authorized by the Northwest Power Act, 16 U.S.C., §§ 839b(h) and 839f(a), the Federal Columbia River Transmission System Act, 16 U.S.C. §838i(b), or the Bonneville Project Act, 16 U.S.C. §§ 832a, which allow BPA to acquire real property interests for meeting fish and wildlife obligations under the Northwest Power Act.

NOW THEREFORE, for and in consideration of funding BPA provided to fund SEC’s acquisition of the west half of the Elk Creek Property as recommended and supported by the Montana Department of Fish, Wildlife and Parks, SEC, hereby grants and conveys to the United States of America and its assigns, in perpetuity, a conservation easement in the real property (“land” or “lands”) comprising the easement area described in Part I below, but reserving to SEC, those rights, title and interest expressly enumerated in Part II. This easement shall constitute a servitude upon the land so encumbered, shall run with the land in perpetuity and shall bind SEC, its heirs, successors, assigns, lessees, and any other person or entity claiming under them.

SUBJECT, however, to all valid rights of record, if any.

PART I. Description of the Easement Area. The lands encumbered by this easement deed, referred to herein as the easement area, are described as:

West ½ of Section 35, T.21N., R.17W., P.M.M., Missoula County, Montana, containing 320 acres, more or less.

PART II. Reservations in SEC on the Easement Area. Subject to the rights and interest conveyed by this easement deed to BPA SEC reserves:

Title. Record title, along with SEC's right to convey, transfer, and otherwise alienate title to these reserved rights.

Quiet Enjoyment. The right of quiet enjoyment of the rights reserved on the easement area.

Control of Access. The right to prevent trespass and control access consistent with the 2007 MOA.

Rights Not Granted. All rights and interests not expressly granted by this easement deed.

PART III. Obligations of the Landowner. SEC shall comply with the following:

A. Prohibitions. Unless authorized as a compatible use under Part IV, it is expressly understood that the following activities and uses are prohibited on the easement area to the extent such prohibitions are allowed by law, including encumbrances against the property arising from pre-existing valid rights of record held by third parties:

1. Haying, and/or mowing;
2. Altering of grassland, woodland, wildlife habitat or other natural features by burning digging, plowing, disking, cutting or otherwise destroying the vegetative cover;
3. Dumping refuse, wastes, sewage or other debris;
4. Harvesting wood products;
5. Draining, dredging, channeling, filling, leveling, pumping, diking, impounding or related activities, as well as altering or tampering with water control structures or devices;
6. Diverting or causing or permitting the diversion of surface water into, or out of the easement area surface by any means;
7. Building or placing buildings or structures on the easement area;
8. Planting or harvesting any crop;
9. Grazing or allowing livestock on the easement area;
10. Mining—excavation, dredging, or removal of soil, sand, gravel, rock, minerals or other surface or subsurface materials;
11. Incompatible Uses—surface use except for such purposes necessary to preserve,

- enhance, restore or create wetlands and riparian resource functions and values;
- 12. Acts Detrimental to Conservation—activities detrimental to fish and wildlife habitat, flood control, erosion control, water quality protection and enhancement, traditional cultural materials production, aesthetics, and low impact recreation; and
- 13. Subdivision—subdivision of land into multiple independently platted parcels.

B. Noxious plants. SEC is responsible for control of noxious weeds.

C. Fences. Costs involved in maintenance of fences and related improvements to exclude livestock shall be the responsibility of SEC.

D. Taxes. SEC shall pay any and all real property and other taxes and assessments, if any, which may be levied against the land by an agency with jurisdiction for such tax or assessment.

E. Reporting. SEC shall report to the BPA any conditions or events which may adversely affect the riparian, wetland, wildlife, and other natural values of the easement area.

PART IV. Allowance of Compatible Uses by SEC.

General. The use of the easement area for compatible economic uses, including, but not limited to, managed timber harvest, periodic haying, or grazing may be allowed if addressed and approved by BPA in the management plan for the property required by the 2007 MOA. Once the management plan is completed and approved by both Parties, the Parties may agree to record a copy in the county or other appropriate land records office, and substitute the restrictions in the plan for those in Part III, above.

Limitations. Compatible use authorization in the management plan will only be made if such use is consistent with the long-term protection and enhancement of the conservation purposes of the easement area.

PART V. Rights of the BPA. The rights of the BPA include:

A. Regulatory activities. BPA shall have the right to enter onto the easement area to undertake, at its own expense, any regulatory activity reasonably necessary to assure SEC's compliance with the terms of this Deed of Conservation Easement, including but not limited to conducting inventories to confirm the conservation values of the property, such as for fish and wildlife habitat.

B. Access / Inspection. The authorized representatives of the BPA may utilize light vehicles and other reasonable modes of transportation for access purposes. Representatives of the BPA may enter the easement area in a reasonable manner and at reasonable times to assure compliance.

C. Violations and Remedies - Enforcement.

1. Remedies. If there is any failure of SEC to comply with any of the provisions of this Deed of Conservation Easement, then the United States shall have injunctive and equitable remedies available to it to enjoin any activity on, or use of, the easement area which is inconsistent with this Deed of Conservation Easement and to enforce the reasonable restoration of such areas or features of the easement area as may be damaged by such activities, including the right to enter upon the easement area to perform necessary work for prevention of or remediation of damage to wetland or other natural values and the right to assess all related expenses incurred by BPA against SEC.
2. Forum. This Deed of Conservation Easement may be enforced in any court of competent jurisdiction.
3. Stipulation. The Parties agree that this Deed of Conservation Easement may be introduced in any enforcement proceeding brought before a court of competent jurisdiction as the stipulation of the Parties hereto.

PART VI. General Provisions.

A. Successors in Interest. The rights granted to the United States shall accrue only to the United States and its assigns. All obligations of SEC under this Deed of Conservation Easement shall also bind SEC's heirs, successors, agents, assigns, lessees, and any other person claiming under it.

B. Rules of Construction. All rights and interests in the easement area not acquired by the United States shall be deemed reserved by SEC. Any ambiguities in this Deed of Conservation Easement shall be construed in favor of the United States to affect the habitat and conservation purposes for which this Deed of Conservation Easement is being acquired.

C. Termination of SEC Obligations and Responsibilities. At such time SEC divests itself of the property by transfer, exchange, sale or other transaction, all duties, obligations and responsibilities of SEC under this Deed of Conservation Easement shall terminate.

TO HAVE AND TO HOLD the easement granted herein to the United States and its assigns in perpetuity. SEC covenants to comply with the terms and conditions enumerated in this document for the use of the easement area and adjacent public roadway for access, and to refrain from any activity that is inconsistent with the purposes of this Deed of Conservation Easement.

FOR SWAN ECOSYSTEM CENTER:

[NAME]

[TITLE]

Date:

)
) (Seal)
)

This instrument was acknowledged before me on this _____ day of _____, 2007
by _____ as _____ of the Swan Ecosystem Center.
[NAME] [TITLE]

Notary Public for the State of Montana
Residing at:

My Commission Expires:

ACCEPTANCE BY THE U.S., ACTING THROUGH THE DEPARTMENT OF ENERGY, BONNEVILLE POWER ADMINISTRATION:

Manager, Real Property Services

Date

Appendix 3

Public meetings, Management Group meetings, and field days, 2006-2007

A community meeting about developing a management plan for the new Elk Creek Conservation Area was held on January 16, 2007 at the Swan Valley Community Hall. SEC also wrote about the Elk Creek Conservation Area in its 2006 Fall/Winter, 2007 Spring, and 2007 Summer newsletters, the *Swan Lands Update*.

Meetings of the Elk Creek Management Group (ECMG) were held at the Swan Ecosystem Center or in the field at the Elk Creek Conservation Area on the following dates:

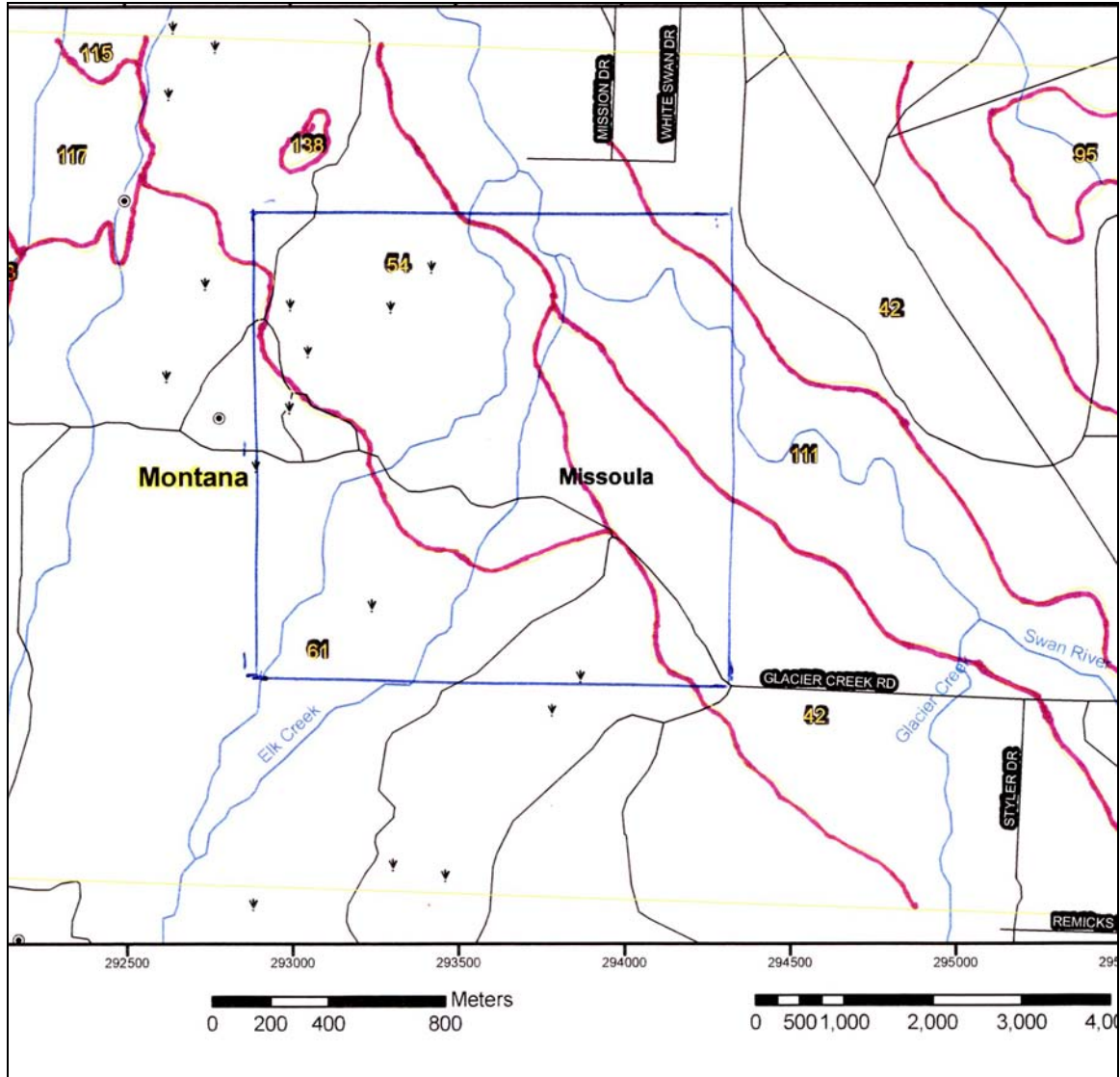
2006 Meetings and field days

- Oct 20, Field tour
- Oct 30, (Stewardship Committee receives Elk Creek report)
- Nov 20, ECMG meeting
- Nov 30, Public meeting, SEC, Seeley Lake Clearwater Resource Council and Blackfoot Challenge
- Dec 11, ECMG meeting

2007 Meetings and field days

- Jan 11, Stakeholders committee receives Elk Creek report
- January 2 (ECMG meeting)
- February 12 (ECMG meeting)
- March 5 (ECMG meeting)
- March 26 (ECMG meeting)
- April 16 (Field day and ECMG meeting)
- May 7 (ECMG meeting)
- May 15 (Field day)
- May 25 (Field day)
- May 30 (ECMG meeting)
- June 25 (Field day)
- June 26 (ECMG meeting)
- July 3 (Field day)
- July 11 (Glen, Barry, Donna meeting on goals and objectives)
- July 26-30
- August 27 (ECMG meeting)

Appendix 4. Soils map of the Elk Creek Conservation Area



- 54 = Hollandlake-Bata Complex, 4-30% slopes
- 61 = Jimlake gravelly silt loam, 4-30% slopes
- 111 = Udifluvents, 0-2% slopes
- 42 = Glaciercreek gravelly silt loam, 0-4% slopes

(Source: Natural Resources Conservation Service Web Soil Survey, <http://websoilsurvey.nrcs.usda.gov>)

Note: a range of other information can be found in the soil survey, by soil types, including forest productivity, suitability for roads and trails, soil rutting hazards and other factors.

Appendix 5. Riparian Vegetation Plot Data and Research Methods

An inventory of the riparian units was begun in July 2007. This work is preliminary and further data need to be collected prior to the recommendation and implementation of management actions. During initial vegetation survey work, we established 12 cross-riparian step transects.⁴²

Using this methodology, we walked 8 of the 12 transects and counted our steps within each clearly defined cover type (e.g., disturbed logging, active (perennial) or seasonally dry channel, road surface, etc.) or plant habitat or community type. We were then able to estimate the area occupied by each unique cover or habitat/community type within each unit by dividing the number of steps taken within that type by the total number of steps.⁴³

We also began a more in-depth vegetation data collection effort within certain cover or habitat types throughout both riparian units. This methodology involves establishing a 10 meter by 10 meter plot within a previously defined cover type (e.g., disturbed logging) or habitat type (e.g., Engelmann spruce-field horsetail). We recorded all tree species within this plot, as well as cover, density,

age class distribution, and diameter at breast height (dbh) for each tree species.

Within the larger 10m x 10m plot, we then established a 5m x 5m plot in which we recorded shrub species cover and age class distribution. Finally, we randomly placed four 0.5m x 1m quadrats within the larger 10m x 10m plot to record cover of herbaceous species (graminoid, forb, and fern or fern-like species), as well as shrub sprouts or seedlings. We made every attempt to place the 10m x 10m plot in an area that captured the tree, shrub, and herbaceous characteristics of the larger cover or habitat type.

⁴² The step transect method is based on protocols described in: Winward, A.H. 2000. Monitoring the vegetation resources in riparian areas. Gen. Tech. Rep. RMRS-GTR-47. Ogden, UT. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 49 p.

⁴³ Plant community and habitat types are based on classification by: Hansen, P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Jay, and D.K. Hinckly. 1995. Classification and management of Montana's riparian and wetland sites. Miscellaneous Publication No. 54. Missoula, MT. Montana Forest and Conservation Experiment Station, School of Forestry, The University of Montana. 646 p.

| RIPARIAN VEGETATION PLOT DATA | |
|--|------------------------------------|
| DATE | 7/27/2007 |
| DATA COLLECTORS | R. Sydnor |
| TRANSECT NUMBER | 6 |
| COVER TYPE NUMBER (from X-Section Data Form) | CT #9 (Picea/Equisetum arvense HT) |

| 10M X 10M TREE PLOT | | | | | | |
|---------------------|-----------|--|--------------------|-----------------|-------------------|------|
| Species | % Cover | % Age Class Delineation within Species | | | | |
| | | Seedling / Decadent | Sapling / Decadent | Pole / Decadent | Mature / Decadent | Dead |
| Abilas | 15 | | | | 100 / 0 | |
| Piceng | 30 | | | | 100 / 0 | |
| Total | 45 | | | | | |
| Species | | Density & DBH by Age Class | | | | |
| | | Seedling | Sapling | Pole | Mature | Dead |
| Abilas (dbh) | | | | | 15", 12" | |
| Abilas (density) | | | | | 2 | |
| Piceng (dbh) | | | | | 25", 9" | |
| Piceng (density) | | | | | 2 | |

| 5M X 5M SHRUB PLOT | | | | | | |
|----------------------|-----------|--|-------------------|------|--|--|
| Species ¹ | % Cover | % Age Class Delineation within Species | | | | |
| | | Seed / Sap / Decadent | Mature / Decadent | Dead | | |
| Alninc | 3 | 0 | 100 / 0 | 0 | | |
| Corsto | 5 | 0 | 100 / 0 | 0 | | |
| Rhaaln | 15 | 20 / 0 | 80 / 0 | 0 | | |
| Ribes spp. | 1 | 0 | 100 / 0 | 0 | | |
| Rubida | 1 | 100 / 0 | 0 | 0 | | |
| Rubpar | 20 | 20 / 0 | 80 / 0 | 0 | | |
| Symocc | 30 | 60 / 0 | 30 / 10 | 10 | | |
| Total | 75 | | | | | |

1 - Incidental species include: Spibet, Pruvir, Roswoo, Samrac, Corcan, Berrep

| HERBACEOUS PLOTS (2 m ² total area) | | | | | | |
|--|------------------------------------|-----------|-----------|-----------|--------------|-----------|
| Species | % Cover by Quadrat (0.5 m X 1.0 m) | | | | | |
| | Q1 | Q2 | Q3 | Q4 | Mean Cover | Constancy |
| Aranud | 8 | 7 | 40 | 0 | 13.75 | 0.75 |
| Athfel | 0 | 0 | 0 | 6 | 1.5 | 0.25 |
| Berrep | 0 | 0 | 2 | 2 | 1 | 0.5 |
| Carex spp. | 0 | 0 | 2 | 0 | 0.5 | 0.25 |
| Elygla | 4 | 2 | 3 | 0 | 2.25 | 0.75 |
| Equarv | 55 | 35 | 0 | 40 | 32.5 | 0.75 |
| Galium spp. | 1 | 4 | 3 | 1 | 2.25 | 1 |
| Gymdry | 12 | 15 | 5 | 16 | 12 | 1 |
| Poa spp. | 3 | 0 | 0 | 0 | 0.75 | 0.25 |
| Pruvir | 0 | 2 | 0 | 0 | 0.5 | 0.25 |
| Roswoo | 0 | 0 | 1 | 0 | 0.25 | 0.25 |
| Rubpar | 0 | 5 | 1 | 8 | 3.5 | 0.75 |
| Senecio spp. | 0 | 0 | 0 | 10 | 2.5 | 0.25 |
| Smiste | 1 | 1 | 0 | 0 | 0.5 | 0.5 |
| Spibet | 0 | 2 | 0 | 0 | 0.5 | 0.25 |
| Symocc | 5 | 6 | 15 | 6 | 8 | 1 |
| Thaocc | 1 | 1 | 0 | 0 | 0.5 | 0.5 |
| Unknown forb(s) | 3 | 2 | 4 | 5 | 3.5 | 1 |
| Unknown grass | 0 | 0 | 1 | 1 | 0.5 | 0.5 |
| Vegetation Subtotal | 93 | 82 | 77 | 95 | 86.75 | |
| Bare soil | 0 | 0 | 0 | 0 | 0 | |
| Dead wood (>4 inches) | 0 | 0 | 0 | 6 | 1.5 | |
| Litter / Duff | 85 | 85 | 70 | 70 | 77.5 | |
| Rock / Gravel / Cobble | 0 | 0 | 0 | 0 | 0 | |
| Ground Cover Subtotal | 85 | 85 | 70 | 76 | 79 | |

| RIPARIAN VEGETATION PLOT DATA | |
|--|---------------------------|
| DATE | 7/30/2007 |
| DATA COLLECTORS | R. Sydnor, A. Boetsch |
| TRANSECT NUMBER | 3 |
| COVER TYPE NUMBER (from X-Section Data Form) | CT #2 (Disturbed logging) |

| 10M X 10M TREE PLOT | | | | | | |
|---------------------|-----------|--|--------------------|-----------------|-------------------|------|
| Species | % Cover | % Age Class Delineation within Species | | | | |
| | | Seedling / Decadent | Sapling / Decadent | Pole / Decadent | Mature / Decadent | Dead |
| Abilas | 4 | 0 | 0 | 100 / 0 | 0 | 0 |
| Piceng | 8 | 0 | 13 / 0 | 85 / 0 | 0 | 2 |
| Total | 12 | | | | | |
| Species | | Density & DBH by Age Class | | | | |
| | | Seedling | Sapling | Pole | Mature | Dead |
| Abilas (dbh) | | 0 | 0 | 4.25", 5" | 0 | 0 |
| Abilas (density) | | 0 | 0 | 2 | 0 | 0 |
| Piceng (dbh) | | 0 | 1" | 6.75", 4.5" | 0 | 18" |
| Piceng (density) | | 0 | 1 | 2 | 0 | 3 |

| 5M X 5M SHRUB PLOT | | | | | | |
|--|-----------|--|-------------------|------|--|--|
| Species ¹ | % Cover | % Age Class Delineation within Species | | | | |
| | | Seed / Sap / Decadent | Mature / Decadent | Dead | | |
| Alninc | 1 | 100 / 0 | 0 | 0 | | |
| Pruvir | 3 | 100 / 0 | 0 | 0 | | |
| Rubida | 1 | 100 / 0 | 0 | 0 | | |
| Rubpar | 1 | 100 / 0 | 0 | 0 | | |
| Symocc | 45 | Oct-00 | 90 / 10 | 0 | | |
| Total | 51 | | | | | |
| 1 - Incidental species include: Spibet, Ribes spp., Rhaaln | | | | | | |

| HERBACEOUS PLOTS (2 m ² total area) | | | | | | |
|---|------------------------------------|-----------|-----------|-----------|-------------|-----------|
| Species | % Cover by Quadrat (0.5 m X 1.0 m) | | | | | |
| | Q1 | Q2 | Q3 | Q4 | Mean Cover | Constancy |
| Cirarv | 60 | 45 | 10 | 35 | 37.5 | 1 |
| Elygla | 15 | 4 | 60 | 15 | 23.5 | 1 |
| Fravir | 0 | 1 | 0 | 0 | 0.25 | 0.25 |
| Gymdry | 0 | 0 | 3 | 0 | 0.75 | 0.25 |
| Phaarv | 0 | 40 | 0 | 0 | 10 | 0.25 |
| Phlpra | 0 | 0 | 4 | 0 | 1 | 0.25 |
| Pruvir | 0 | 0 | 0 | 1 | 0.25 | 0.25 |
| Rubida | 0 | 0 | 1 | 3 | 1 | 0.5 |
| Smiste | 0 | 0 | 2 | 0 | 0.5 | 0.25 |
| Symocc | 2 | 7 | 8 | 20 | 9.25 | 1 |
| Unknown forb(s) | 1 | 0 | 0 | 1 | 0.5 | 0.5 |
| Vegetation Subtotal | 78 | 97 | 88 | 75 | 84.5 | |
| Bare soil | 0 | 0 | 0 | 5 | 1.25 | |
| Dead wood (>4 inches) | 0 | 0 | 0 | 0 | 0 | |
| Litter / Duff | 70 | 75 | 75 | 45 | 66.25 | |
| Moss | 0 | 0 | 0 | 20 | 5 | |
| Rock / Gravel / Cobble | 0 | 0 | 0 | 0 | 0 | |
| Ground Cover Subtotal | 70 | 75 | 75 | 70 | 72.5 | |
| Incidental herb spp. Include: Chrleu, Achmil, Epilobium spp., Herlan, Galium spp., Aranud, Desces | | | | | | |

Appendix 6. Federal and State Species Ranking Status Codes

All of the species in the Animal Field Guide are categorized into several groups based on their population and other factors. The Animal Field Guide lists ranking codes of four different organizations:

- Montana Species of Concern
- Montana Species Ranking Codes
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- U.S. Bureau of Land Management

Montana Species of Concern

The term “Species of Concern” includes taxa that are at-risk or potentially at-risk due to rarity, restricted distribution, habitat loss, and/or other factors. The term also encompasses species that have a special designation by organizations or land management agencies in Montana, including: Bureau of Land Management Special Status and Watch species; U.S. Forest Service Sensitive and Watch species; U.S. Fish and Wildlife Service Threatened, Endangered and Candidate species.

MONTANA SPECIES RANKING CODES

Montana employs a standardized ranking system to denote global (G - range-wide) and state status (S) (NatureServe 2003). Species are assigned numeric ranks ranging from 1 (critically imperiled) to 5 (demonstrably secure), reflecting the relative degree to which they are “at-risk”. Rank definitions are given below. A number of factors are considered in

assigning ranks - the number, size and distribution of known “occurrences” or populations, population trends (if known), habitat sensitivity, and threat.

G1 S1

At high risk because of extremely limited and potentially declining numbers, extent and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.

G2 S2

At risk because of very limited and potentially declining numbers, extent and/or habitat, making it vulnerable to global extinction or extirpation in the state.

G3 S3

Potentially at risk because of limited and potentially declining numbers, extent and/or habitat, even though it may be abundant in some areas.

G4 S4

Uncommon but not rare (although it may be rare in parts of its range), and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern.

G5 S5

Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range.

Other Codes and Modifiers

X

Presumed Extinct - Species believed to be extinct throughout its range. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.

H

Possibly Extinct - Species known from only historical occurrences, but may nevertheless still be extant; further searching needed.

U

Unrankable - Species currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

HYB

Hybrid-Entity not ranked because it represents an interspecific hybrid and not a species.

T

Infraspecific Taxon (trinomial) - The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank.

?

Inexact Numeric Rank - Denotes inexact numeric rank

Q

Questionable taxonomy that may reduce conservation priority-Distinctiveness of this entity as a taxon at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority (numerically higher) conservation status rank.

C

Captive or Cultivated Only - Species at present is extant only in captivity or cultivation, or as a reintroduced population not yet established.

A

Accidental - Species is accidental or casual in Montana, in other words, infrequent and outside usual range. Includes species (usually birds or butterflies) recorded once or only a few times at a location. A few of these species may have bred on the one or two occasions they were recorded.

Z

Zero Occurrence - Species is present but lacking practical conservation concern in Montana because there are no definable occurrences, although the taxon is native and appears regularly in Montana.

P

Potential that species occurs in Montana but no extant or historic occurrences are accepted.

R

Reported - Species reported in Montana but without a basis for either accepting or rejecting the report, or the report not yet reviewed locally. Some of these are very recent discoveries for which the program has not yet received first-hand information; others are old, obscure reports.

SYN

Synonym - Species reported as occurring in Montana, but the Montana Natural Heritage Program does not recognize the taxon; therefore the species is not assigned a rank.

*

A rank has been assigned and is under review. Contact the Montana Natural Heritage Program for assigned rank.

B

Breeding - Rank refers to the breeding population of the species in Montana.

N

Nonbreeding - Rank refers to the non-breeding population of the species in Montana.

U.S. FISH AND WILDLIFE SERVICE

LE

Listed endangered - Any species in danger of extinction throughout all or a significant portion of its range (16 U.S.C. 1532(6))

PE

Proposed endangered - Any species for which a proposed rule has been published in the Federal Register to list the species as endangered

LT

Listed threatened - Any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(20)).

PT

Proposed threatened - Any species for which a proposed rule has been published in the Federal Register to list the species as threatened.

E(S/A) or T(S/A)

Any species listed endangered or threatened because of similarity of appearance.

C

Candidate - Those taxa for which sufficient information on biological status and threats exists to propose to list them as threatened or endangered. We encourage their consideration in environmental planning and partnerships; however, none of the substantive or procedural provisions of the Act apply to candidate species.

PDL

Proposed for delisting - Any species for which a final rule has been published in the Federal Register to delist the species.

NL

Not listed - No designation.

XE

Essential experimental population - An experimental population whose loss would be likely to appreciably reduce the likelihood of the survival of the species in the wild

XN

Nonessential experimental population - An experimental population of a listed species reintroduced into a specific area that receives more flexible management under the Act.

CH

Critical Habitat - The specific areas (i) within the geographic area occupied by a species, at the time it is listed, on which are found those physical or biological features (I) essential to conserve the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by the species at the time it is listed upon

determination that such areas are essential to conserve the species.

PS

Partial status - status in only a portion of the species' range. Typically indicated in a "full" species record where an infraspecific taxon or population, that has a record in the database has USESA status, but the entire species does not.

PS:value

Partial status - status in only a portion of the species' range. The value of that status appears in parentheses because the entity with status is not recognized as a valid taxon by Central Sciences (usually a population defined by geopolitical boundaries or defined administratively, such as experimental populations.

none

Usually indicates the taxon does not have any federal status. However, because of potential lag time between publication in the Federal Register and entry in the central databases and refresh of this website, some taxa may have a status that does not yet appear.

FOREST SERVICE

The status of species on Forest Service lands as defined by the U.S. Forest Service manual (2670.22). These taxa are listed as such by the Regional Forester (Northern Region). The Forest Service lists animal species as:

Endangered

Listed as Endangered (LE) by the USFWS.

Threatened

Listed as Threatened (LT) by the USFWS.

Sensitive

Any species for which the Regional Forester has determined there is a concern for population viability within the state, as evidenced by a significant current or predicted downward trend in populations or habitat.

Watch

Any species recognized by Forest Supervisors that are either not known to occur on national forest land but predicted to occur there on the basis of suitable habitat, or known to occur on national forest land but with no immediate or predicted threats to population viability.

BUREAU OF LAND MANAGEMENT

The status of species on Bureau of Land Management Lands as defined by the BLM 6840 Manual; designated by the Montana State Office of the BLM in 1996.

Special Status / Sensitive

Any species proven to be imperiled in at least part of its range and documented to occur on BLM lands.

Watch

Any species either known to be imperiled and suspected to occur on BLM lands; suspected to be imperiled and documented on BLM lands; or needing further study for other reasons.

Appendix 7. Fire Regime Condition Classes: History and Evolution

Overview

A growing body of research shows that a century or more of fire exclusion and other practices have negatively impacted many ecosystems. Some lands are now in poor ecological condition, whereas other landscapes are still functioning in a natural state.

Early research, by Sampson (1919) and Daubenmire (1947), devised relatively simple rating systems for characterizing ecosystem "health" and biodiversity. Since that time, classification systems have been refined for evaluating forests, riparian function, wildlife habitat, and other resource values. Ecosystems are assessed not only to derive condition class, but also to diagnose trends and values at risk. Classifying fire regimes also has a long history, dating from the 1940's work of Harold Weaver, a Bureau of Indian Affairs forester. Since that time, other ecologists have developed systems to describe fire regimes.

In the simplest definition, a fire regime describes the basic "personality" of fire for a given vegetation type. Although fire frequency and severity are the most commonly used descriptors, many other aspects have been studied, such as fire spread patterns, fire seasonality, and post-fire patch dynamics.

As early as the 1980's, scientists and fire managers warned of an escalating fire problem in the United States. Many fire-prone landscapes seemed to be experiencing increasingly severe or more-frequent wildfires. These apparent trends likely stemmed, in part, from past management practices such as long-term exclusion of fire. Consequently, many ecosystems have become degraded. These problems underscore the need for an assessment tool to help interpret landscape condition and possible fire regime departure. As a result, the Fire Regime Condition Class method was born. FRCC is a tool that categorizes a landscape's potential degree of departure from its reference condition.

The FRCC system uses two sets of descriptors that, when combined, can be used to diagnose condition class. The first set of factors measures vegetation composition and structure changes. The second set measures possible changes in fire frequency and severity. FRCC also uses a Fire Regime Classification system of five broadly defined Fire Regimes. This FRCC system is explained further in the online training and in the FRCC Guidebook.

LANDFIRE Rapid Assessment (RA) fire regime condition classes (FRCC) delineate a standardized, interagency index to measure the departure of current conditions from reference conditions. FRCC is defined as a relative measure describing the degree of departure from the reference fire regime (Hann and Bunnell 2001). This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (such as insect and disease mortality, grazing, and drought) (Schmidt and others 2001). FRCC is composed of three classes:

- FRCC 1** – Within the natural (historical) range of variability (“reference fire regime”) of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances
- FRCC 2** – Moderate departure from the reference fire regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances
- FRCC 3** – High departure from the reference fire regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances

Additional data layer values were included to represent non-vegetated types (such as water, snow/ice, and barren), wetlands/alpine, development (such as residential, commercial, roads, and mines), agriculture, and unclassified vegetation (in other words, vegetation that was not classified during the RA process).

LANDFIRE Rapid Assessment FRCC was calculated for each RA potential natural vegetation group (PNVG) within an ECOMAP subsection using standard Interagency Fire Regime Condition Class Guidebook methods (Hann and others 2004). Reference conditions were estimated through the RA PNVG modeling effort (for more information, please visit the [RA Reference Condition Models](#) section of this website). Current conditions were estimated as part of the [RA Succession Classes](#) spatial data layer. For additional information on the methods used to calculate FRCC, please visit www.frcc.gov.

Biophysical Settings

The Biophysical Settings (Bp) layer represents the vegetation that may have been dominant on the landscape prior to Euro-American settlement and is based on both the current biophysical environment and an approximation of the historical disturbance regime. It is a refinement of the Environmental Site Potential layer; in this refinement, we attempt to incorporate current scientific knowledge regarding the functioning of ecological processes - such as fire - in the centuries preceding non-indigenous human influence. Map units are based on [NatureServe's Ecological Systems classification](#), which is a nationally consistent set of mid-scale ecological units (Comer and others 2003). LANDFIRE's use of these classification units to describe biophysical settings differs from their intended use as units of existing vegetation. As used in LANDFIRE, map unit names represent the natural plant communities that may have been present during the reference period. Each BpS map unit is matched with a model of vegetation succession, and both serve as key inputs to the LANDSUM landscape succession model (Keane and others 2002). The LANDFIRE BpS concept is similar to the concept of potential natural vegetation groups used in mapping and modeling efforts related to fire regime condition class (Schmidt and others 2002; www.frcc.gov).

Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R0WLLPDF Western Larch, Lodgepole Pine, and Douglas-Fir Mix

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

Modelers

Cathy Stewart cstewart@fs.fed.us

Reviewers

Steve Barrett sbarrett@mtdig.net

Vegetation Type

Forested

General Model Sources

- Literature
 Local Data
 Expert Estimate

Rapid Assessment Model Zones

- California Pacific Northwest
 Great Basin South Central
 Great Lakes Southeast
 Northeast S. Appalachians
 Northern Plains Southwest
 N-Cent Rockies

Dominant Species*

LAOC
PSEU
PICO
ABLA

LANDFIRE Mapping Zones

| | |
|----|----|
| 10 | 21 |
| 19 | 22 |
| 20 | 29 |

Geographic Range

Western Montana and northern Idaho, west of the Continental Divide.

Biophysical Site Description

Montane and lower subalpine zones, approximately 3000-6000 feet primarily on north-facing aspects west of the Continental Divide. Lower subalpine sites typically occur as relatively moist subalpine fir habitat types (e.g. ABLA/CLUN) (Pfister et al. 1977).

Vegetation Description

Western larch occurs on more moist/northerly Douglas-fir habitat types and more productive subalpine fir habitat types. Larch is mixed in with seral Douglas-fir, lodgepole pine, or ponderosa pine in the overstory. Long fire intervals promote the development of Engelmann spruce and subalpine fir stands with an increase in root disease. Mountain pine beetles often reduce the lodgepole pine component, possibly promoting mixed severity fires.

Disturbance Description

Fire Regime Group III, with a mean fire return interval of approximately 70 years. Mountain pine beetle will reduce canopy cover of lodgepole pine.

Adjacency or Identification Concerns

Equates with Pfister et al. (1977) moist Douglas-fir and subalpine fir habitat types. It may be difficult to differentiate this PNVG from R0GFLP and R0GFDF, as the three types commonly overlap. The other two PNVGs are limited to grand fir habitat types.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Scale can be in small patches of 50 acres but generally is hundreds to thousands of acres (due to stand replacing fires requiring dry conditions or being wind driven).

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Issues/Problems

Model Evolution and Comments

Workshop code was WLLPDF.

Split out from old (FRCC Guidebook) SPF11 and DFIR2. Pure stands of western larch occur in northwest Montana and Northern Idaho, and it occurs in mixed stands on edge of range.

Review comments incorporated on 3/16/2005. As a result of the peer-review process, this type was modified to increase the amount of mixed severity fire to 70% (from 60%) and the age ranges of late-development classes were adjusted to begin at 80 years (from 65 years). The end result was more late-development conditions (E) and more closed conditions (B and E).

| Succession Classes** | | | | | | | | | | | | | | |
|--|---|--|--|-----------|------------|--------------|------|-------|---------------|---------|---------|------------------------|---------|--|
| <i>Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).</i> | | | | | | | | | | | | | | |
| <p>Class A 10%</p> <p>Early I PostRep</p> <p><u>Description</u></p> <p>Young larch and lodgepole establish on site with some Douglas-fir.</p> | <p><u>Dominant Species* and Canopy Position</u></p> <p>LAOC PSEUD PICO ABLA</p> <p><u>Upper Layer Lifeform</u></p> <p><input type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree</p> <p><u>Fuel Model</u> no data</p> | <p><u>Structure Data (for upper layer lifeform)</u></p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th><i>Mn</i></th> <th><i>Max</i></th> </tr> </thead> <tbody> <tr> <td><i>Cover</i></td> <td>0 %</td> <td>100 %</td> </tr> <tr> <td><i>Height</i></td> <td>no data</td> <td>no data</td> </tr> <tr> <td><i>Tree Size Class</i></td> <td colspan="2">no data</td> </tr> </tbody> </table> <p><input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:</p> | | <i>Mn</i> | <i>Max</i> | <i>Cover</i> | 0 % | 100 % | <i>Height</i> | no data | no data | <i>Tree Size Class</i> | no data | |
| | <i>Mn</i> | <i>Max</i> | | | | | | | | | | | | |
| <i>Cover</i> | 0 % | 100 % | | | | | | | | | | | | |
| <i>Height</i> | no data | no data | | | | | | | | | | | | |
| <i>Tree Size Class</i> | no data | | | | | | | | | | | | | |
| <p>Class B 50%</p> <p>Mid I Closed</p> <p><u>Description</u></p> <p>Larch, lodgepole and Douglas-fir (poles to medium trees) continue to dominate. Without disturbance, Douglas-fir can increase in understory. Subalpine fir may be present.</p> | <p><u>Dominant Species* and Canopy Position</u></p> <p>LAOC PSEUD PICO ABLA</p> <p><u>Upper Layer Lifeform</u></p> <p><input type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree</p> <p><u>Fuel Model</u> no data</p> | <p><u>Structure Data (for upper layer lifeform)</u></p> <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th></th> <th><i>Mn</i></th> <th><i>Max</i></th> </tr> </thead> <tbody> <tr> <td><i>Cover</i></td> <td>40 %</td> <td>100 %</td> </tr> <tr> <td><i>Height</i></td> <td>no data</td> <td>no data</td> </tr> <tr> <td><i>Tree Size Class</i></td> <td colspan="2">no data</td> </tr> </tbody> </table> <p><input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:</p> | | <i>Mn</i> | <i>Max</i> | <i>Cover</i> | 40 % | 100 % | <i>Height</i> | no data | no data | <i>Tree Size Class</i> | no data | |
| | <i>Mn</i> | <i>Max</i> | | | | | | | | | | | | |
| <i>Cover</i> | 40 % | 100 % | | | | | | | | | | | | |
| <i>Height</i> | no data | no data | | | | | | | | | | | | |
| <i>Tree Size Class</i> | no data | | | | | | | | | | | | | |

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Class C 15%

Mid1 Open
Description

Larch, with some Douglas-fir, lodgepole, or subalpine fir. Open condition is created by disturbance (fire, insect, or disease), which opens up more closed conditions (i.e., B or E).

Dominant Species* and Canopy Position

LAOC
PSEUD
PICO
ABLA

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 0 % | 40 % |
| Height | no data | no data |
| Tree Size Class | no data | |

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class D 5%

Late1 Open
Description

Large larch and Douglas-fir, favored by disturbance. Subalpine fir and lodgepole will be reduced or eliminated by fire or insect or disease.

Dominant Species* and Canopy Position

LAOC
PSEUD
PICO
ABLA

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 0 % | 40 % |
| Height | no data | no data |
| Tree Size Class | no data | |

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Class E 20%

Late1 Closed
Description

Large diameter larch and Douglas-fir dominate overstory, subalpine fir is present in the middle and understory. Lodgepole pine will be largely absent.

Dominant Species* and Canopy Position

LAOC
PSEUD
PICO
ABLA

Upper Layer Lifeform

- Herbaceous
- Shrub
- Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 40 % | 100 % |
| Height | no data | no data |
| Tree Size Class | no data | |

- Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:

Disturbances

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Disturbances Modeled

- Fire
- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other

Historical Fire Size (acres)

Avg: no data
 Min: no data
 Max: no data

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

Fire Regime Group: 4

I: 0-35 year frequency, low and mixed severity
 II: 0-35 year frequency, replacement severity
 III: 35-200 year frequency, low and mixed severity
 IV: 35-200 year frequency, replacement severity
 V: 200+ year frequency, replacement severity

Fire Intervals (FI)

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

| | <i>Avg FI</i> | <i>Min FI</i> | <i>Max FI</i> | <i>Probability</i> | <i>Percent of All Fires</i> |
|--------------------|---------------|---------------|---------------|--------------------|-----------------------------|
| <i>Replacement</i> | 170 | 50 | 200 | 0.00588 | 72 |
| <i>Mixed</i> | 450 | 40 | 500 | 0.00222 | 27 |
| <i>Surface</i> | | | | | |
| <i>All Fires</i> | 123 | | | 0.00811 | |

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Rapid Assessment Reference Condition Model

The Rapid Assessment is a component of the LANDFIRE project. Reference condition models for the Rapid Assessment were created through a series of expert workshops and a peer-review process in 2004 and 2005. For more information, please visit www.landfire.gov. Please direct questions to helpdesk@landfire.gov.

Potential Natural Vegetation Group (PNVG)

R0LPDFnr Lower Subalpine Lodgepole Pine

General Information

Contributors (additional contributors may be listed under "Model Evolution and Comments")

Modelers

Steve Barrett sbarrett@mt.dig.net
Cathy Stewart cstewart@fs.fed.us

Reviewers

Pat Green pgreen@fs.fed.us
Kris Hazelbaker khazelbaker@fs.fed.us

Vegetation Type

Forested

General Model Sources

- Literature
 Local Data
 Expert Estimate

Rapid Assessment Model Zones

- California Pacific Northwest
 Great Basin South Central
 Great Lakes Southeast
 Northeast S. Appalachians
 Northern Plains Southwest
 N-Cent. Rockies

Dominant Species*

PICO
PSEU
ABLA
PIEN

LANDFIRE Mapping Zones

| | |
|----|----|
| 10 | 21 |
| 19 | 22 |
| 20 | 29 |

Geographic Range

This PNVG spans the entire northern and central Rocky Mountains, from Montana south into Wyoming and eastern Washington east into Montana and Wyoming.

Biophysical Site Description

Lower subalpine zone on gentle to moderately steep terrain (e.g. 10-60% slope).

Vegetation Description

This PNVG corresponds to dry, lower subalpine habitat types (Pfister et al. 1977). Relatively dry sites are generally dominated by lodgepole pine and relatively moist sites are dominated by various combinations of mixed conifers (e.g., lodgepole pine, Douglas-fir, Engelmann spruce, and subalpine fir).

Disturbance Description

Fire Regimes IV and II, moderately long- to long-interval (e.g., 50-300 year) stand replacement- and mixed-severity fires.

Mountain pine beetle would affect the system by both replacing patches (causing transitions to early-development, class A) and by opening up the canopy, causing transitions to mid- and late-development open classes (C and D). Blow down and other weather-related disturbances would also affect this PNVG.

Adjacency or Identification Concerns

This type is generally below the upper subalpine PNVGs (e.g., R0WBLLP, Whitebark Pine-Lodgepole Pine, Upper Subalpine) in elevation and just above mixed conifer types, including lodgepole pine, Douglas-fir, larch, grand fir, and aspen mixes.

Note that west of the Continental Divide, western larch is also a major seral dominant, and it also occurs in other lower subalpine and mesic montane PNVGs. If larch is present, the PNVG R0WLLPDF-- Western

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Larch, Lodgepole Pine, Douglas-Fir should be examined.

Scale Description

Sources of Scale Data Literature Local Data Expert Estimate

Patch sizes are generally 100's to 1000's acres in variable mosaics.

Issues/ Problems

Model Evolution and Comments

Workshop code was LSAL1.

Peer review incorporated on 4/11/2005. Comments note that for mapzone 10 (northern Idaho), the insect and pathogen activity may be higher and the proportion of late-development conditions may be less than in the rest of the Northern and Central Rockies Model Zone. Mixed severity fire may be as frequent as 40 MFI in some parts of the Model Zone.

| Succession Classes** | | | | | | | | | | | | | | |
|--|---|---|--|-----|-----|-------|------|-------|--------|---------|---------|-----------------|---------|--|
| <i>Succession classes are the equivalent of "Vegetation Fuel Classes" as defined in the Interagency FRCC Guidebook (www.frcc.gov).</i> | | | | | | | | | | | | | | |
| <p>Class A 20%</p> <p>Early I PostRep</p> <p>Description</p> <p>Shrub and tree sapling dominated early successional community after replacement and relatively severe mixed severity fires. In some early seral conditions there may be higher fine and coarse fuel loads owing to past fire-generated snags and downed wood, making this class burn more readily.</p> | <p>Dominant Species* and Canopy Position</p> <p>PICO PSEUD</p> <p>Upper Layer Lifeform</p> <p><input type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree</p> <p>Fuel Model no data</p> | <p>Structure Data (for upper layer lifeform)</p> <table border="1"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>0 %</td> <td>100 %</td> </tr> <tr> <td>Height</td> <td>no data</td> <td>no data</td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2">no data</td> </tr> </tbody> </table> <p><input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:</p> | | Min | Max | Cover | 0 % | 100 % | Height | no data | no data | Tree Size Class | no data | |
| | Min | Max | | | | | | | | | | | | |
| Cover | 0 % | 100 % | | | | | | | | | | | | |
| Height | no data | no data | | | | | | | | | | | | |
| Tree Size Class | no data | | | | | | | | | | | | | |
| <p>Class B 35%</p> <p>Mid I Closed</p> <p>Description</p> <p>Shade intolerant- and mixed conifer saplings to poles.</p> | <p>Dominant Species* and Canopy Position</p> <p>PICO PSEUD</p> <p>Upper Layer Lifeform</p> <p><input type="checkbox"/> Herbaceous <input type="checkbox"/> Shrub <input type="checkbox"/> Tree</p> <p>Fuel Model no data</p> | <p>Structure Data (for upper layer lifeform)</p> <table border="1"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>40 %</td> <td>100 %</td> </tr> <tr> <td>Height</td> <td>no data</td> <td>no data</td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2">no data</td> </tr> </tbody> </table> <p><input type="checkbox"/> Upper layer lifeform differs from dominant lifeform. Height and cover of dominant lifeform are:</p> | | Min | Max | Cover | 40 % | 100 % | Height | no data | no data | Tree Size Class | no data | |
| | Min | Max | | | | | | | | | | | | |
| Cover | 40 % | 100 % | | | | | | | | | | | | |
| Height | no data | no data | | | | | | | | | | | | |
| Tree Size Class | no data | | | | | | | | | | | | | |
| <p>Class C 15%</p> <p>Mid I Open</p> <p>Description</p> <p>Primarily shade intolerant saplings to poles.</p> | <p>Dominant Species* and Canopy Position</p> <p>PICO PSEUD</p> | <p>Structure Data (for upper layer lifeform)</p> <table border="1"> <thead> <tr> <th></th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>Cover</td> <td>0 %</td> <td>40 %</td> </tr> <tr> <td>Height</td> <td>no data</td> <td>no data</td> </tr> <tr> <td>Tree Size Class</td> <td colspan="2">no data</td> </tr> </tbody> </table> | | Min | Max | Cover | 0 % | 40 % | Height | no data | no data | Tree Size Class | no data | |
| | Min | Max | | | | | | | | | | | | |
| Cover | 0 % | 40 % | | | | | | | | | | | | |
| Height | no data | no data | | | | | | | | | | | | |
| Tree Size Class | no data | | | | | | | | | | | | | |

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Upper Layer Lifeform Upper layer lifeform differs from dominant lifeform.
 Height and cover of dominant lifeform are:
 Herbaceous
 Shrub
 Tree

Fuel Model no data

Class D 10%

Late I Open

Description

Moderate- to large-diameter, shade intolerant and mixed conifer species in small to moderate-sized patches, generally on south aspects.

Dominant Species* and Canopy Position

ABLA
 PIEN
 PSEUD

Upper Layer Lifeform

Herbaceous
 Shrub
 Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 0 % | 40 % |
| Height | no data | no data |
| Tree Size Class | no data | |

Upper layer lifeform differs from dominant lifeform.
 Height and cover of dominant lifeform are:

Class E 20%

Late I Closed

Description

Moderate- to large-diameter shade intolerant and mixed conifer species, in moderate- to large-size patches, all aspects.

Dominant Species* and Canopy Position

ABLA
 PIEN
 PSEUD

Upper Layer Lifeform

Herbaceous
 Shrub
 Tree

Fuel Model no data

Structure Data (for upper layer lifeform)

| | Min | Max |
|-----------------|---------|---------|
| Cover | 40 % | 100 % |
| Height | no data | no data |
| Tree Size Class | no data | |

Upper layer lifeform differs from dominant lifeform.
 Height and cover of dominant lifeform are:

Disturbances

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit <http://plants.usda.gov>.

Disturbances Modeled

- Fire
- Insects/Disease
- Wind/Weather/Stress
- Native Grazing
- Competition
- Other:
- Other

Historical Fire Size (acres)

Avg: no data
 Min: no data
 Max: no data

Sources of Fire Regime Data

- Literature
- Local Data
- Expert Estimate

Fire Regime Group: 4

- I: 0-35 year frequency, low and mixed severity
- II: 0-35 year frequency, replacement severity
- III: 35-200 year frequency, low and mixed severity
- IV: 35-200 year frequency, replacement severity
- V: 200+ year frequency, replacement severity

Fire Intervals (FI)

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class. All values are estimates and not precise.

| | Avg FI | Min FI | Max FI | Probability | Percent of All Fires |
|-------------|--------|--------|--------|-------------|----------------------|
| Replacement | 170 | 50 | 200 | 0.00588 | 72 |
| Mixed | 450 | 40 | 500 | 0.00222 | 27 |
| Surface | | | | | |
| All Fires | 123 | | | 0.00811 | |

References

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Appendix 8. Record of logging, by year, on the Elk Creek Conservation Area

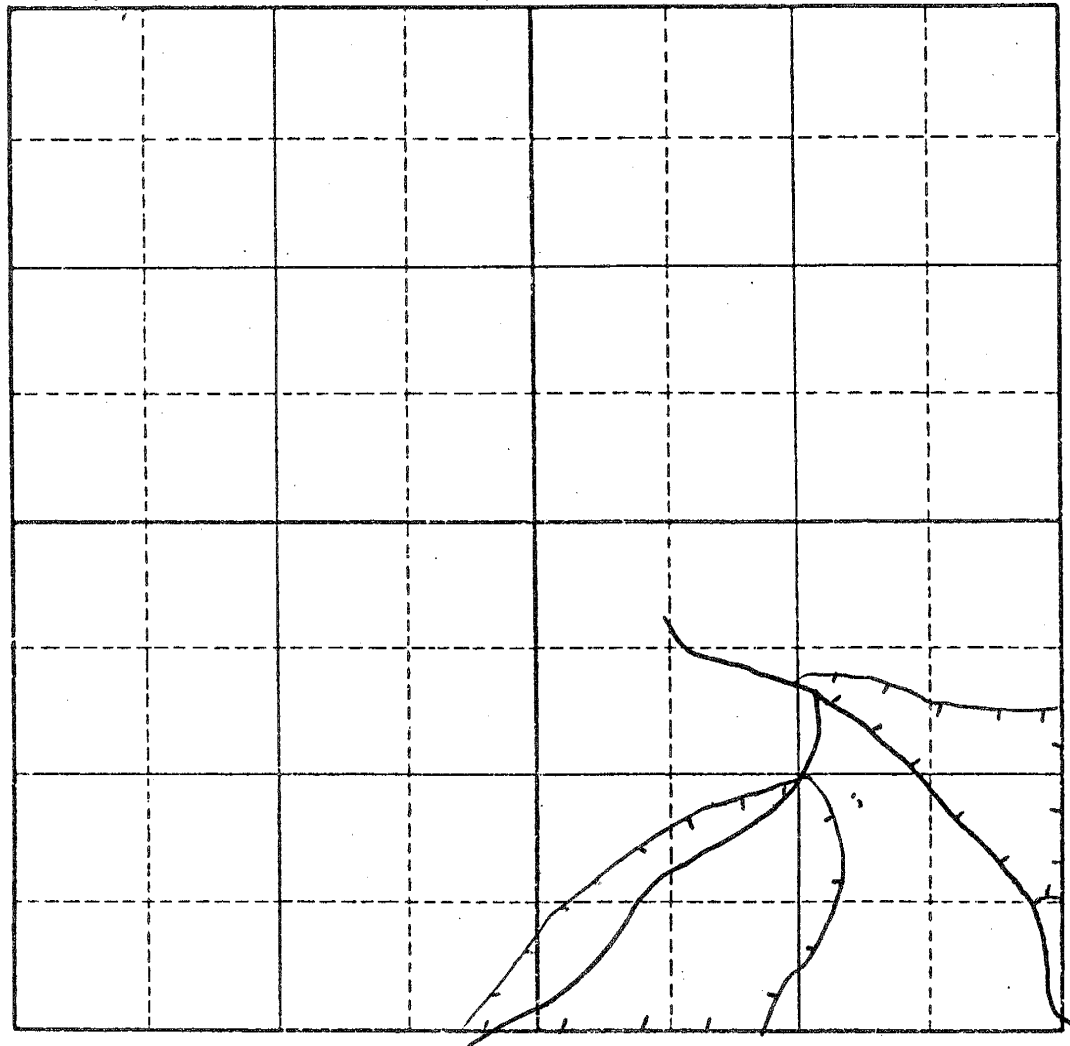
| YEAR | SALE | Contract # | CONTRACTOR | VOLUME | ACRE/ Harvest Type* |
|------|--------------------------|--------------------------------|-----------------------------------|------------|--|
| 1965 | Gravel Pit | 6079 | | MBF or CCF | 1ac CC |
| 1973 | Packer Camp | 7639 | Clay | 73M | 31 Sal |
| 1973 | Elk Cr LPP | 7589 | Lewis | 384M | 53 Sel |
| 1973 | Elk Flats LPP | 7742 | R&L | 97M | 18 Sel |
| 1974 | Elk Flats LPP (7-742) | 751-273-0340 | K&L Dull | 852M | 99 Sel |
| 1975 | Elk Flats Thinning | 711-2.75-0080 | K&L | 100M | 16 Sel |
| 1975 | W.R. Moore Houselogs | 711-2.75-0130 | | | 5 Sel |
| 1975 | K&L Shatlog | 711-2.75-0050 | K&L | 33M | Part of cutting area for other 1975 harvests |
| 1979 | Jim's Houselogs | 711-2.79-0280 | Rustics | 318M | 50 Sel |
| 1979 | Moore LLP | SF 296 711- 279-0670 | Rustics | 205M | 22 Sel |
| 1980 | W. Glacier Flats R/W | 751-2.08-1000 751-2.80-0570 | Anderson (deck Ryan (end haul) | 5M | 1.3 C.C. |
| 1981 | | | | 4M | Part of cutting area for 1980 sale |
| 1981 | So Cold Island R/W | 751-2.81-0820 | Rustics | 31M | 1.9 C.C. |
| 1982 | Elk Flats | 751-2.81-1430 | Wills (E-Z) | 1288M | 7.5 C.C. |
| 1983 | Collective Sale & BD | 751-2.83-1010 | Kearney | 1448M | 215 C.C. |
| 1985 | Condon Blowdown | | | 10 | 3 Sal |
| 1986 | Elk Creek Blowdown | | Clearwater | 145 | 4 C.C. 52 Sal |
| 1989 | Swan Salv. & R/W | | Clearwater Forestry | 66 | 9 Sal |
| 1991 | Powder Room | | | 330 | 41 OR |
| 1992 | More Elk | 751-2.92-0160 | A&S | 2090M | 224 OR |
| 1993 | Elk Creek Thinning | | Vernon? | | 93 PCT |
| 1996 | Storm Salvage | | Hulett | 24 | 37 Sal |
| 1997 | Salmon Helo 3 | | | 235 | 53 Sel |
| 2000 | Elk Spruce 35 | | A&S | 1031 | 94 SS |
| 2001 | LP Fairway | | Birky | 1195 ccf | 34 Sel |

*CC= clear cut Sel= Select Sal=Salvage OR= Overstory Removal PCT= Pre-Commercial Thi

Sec. 35 Twp. 21N Rge. 17W

SECTION PLAT

-Elk Cr. Lpp



REMARKS:

SALE NAME Elk Cr. Lpp
 T & M NO. 7589
 YEAR LOGGED 1973
 TOTAL ACRES LOGGED 53
53 ACRES SELECT 85% volume removed
 ACRES CLEAR-CUT All Lodgepole and sub-alpine
 ACRES OVERSTORY REMOVAL Fir cut
 ACRES _____
 Cruiser _____
 Compassman _____
 Date Examined: _____

Sec. 35 Twp. 21N Rge. 17W

SECTION PLAT

PACKER CAMP SALE

REMARKS:

SALE NAME PACKER CAMP SALE

T & M NO. 71039

YEAR LOGGED 1973

TOTAL ACRES LOGGED 31

ACRES SELECT

ACRES CLEAR-CUT

ACRES OVERSTORY REMOVAL

31 ACRES SALVAGE 20% VOLUME REMOVED

Cruiser

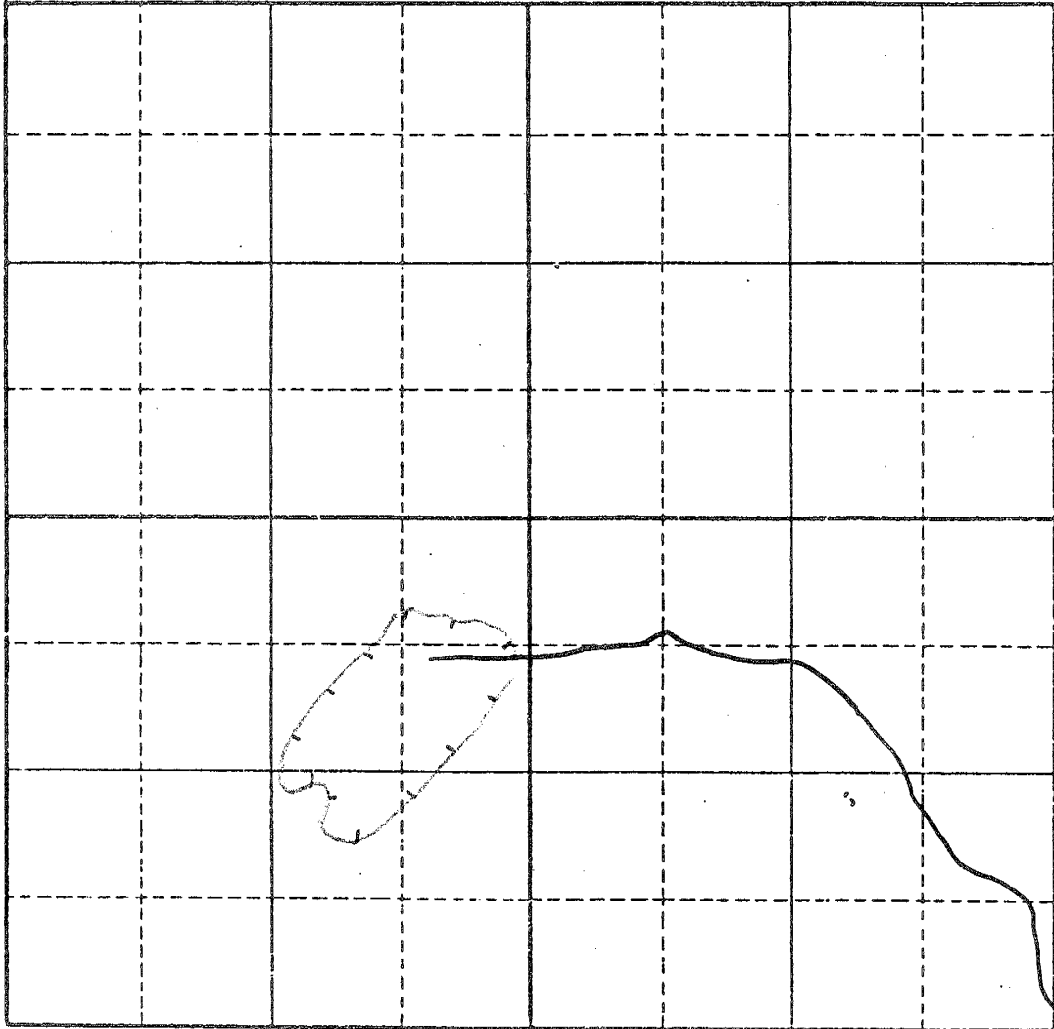
Compassman

Date Examined:

Sec. 35 Twp. 21N Rge. 17W

SECTION PLAT

Eik Flats LPP



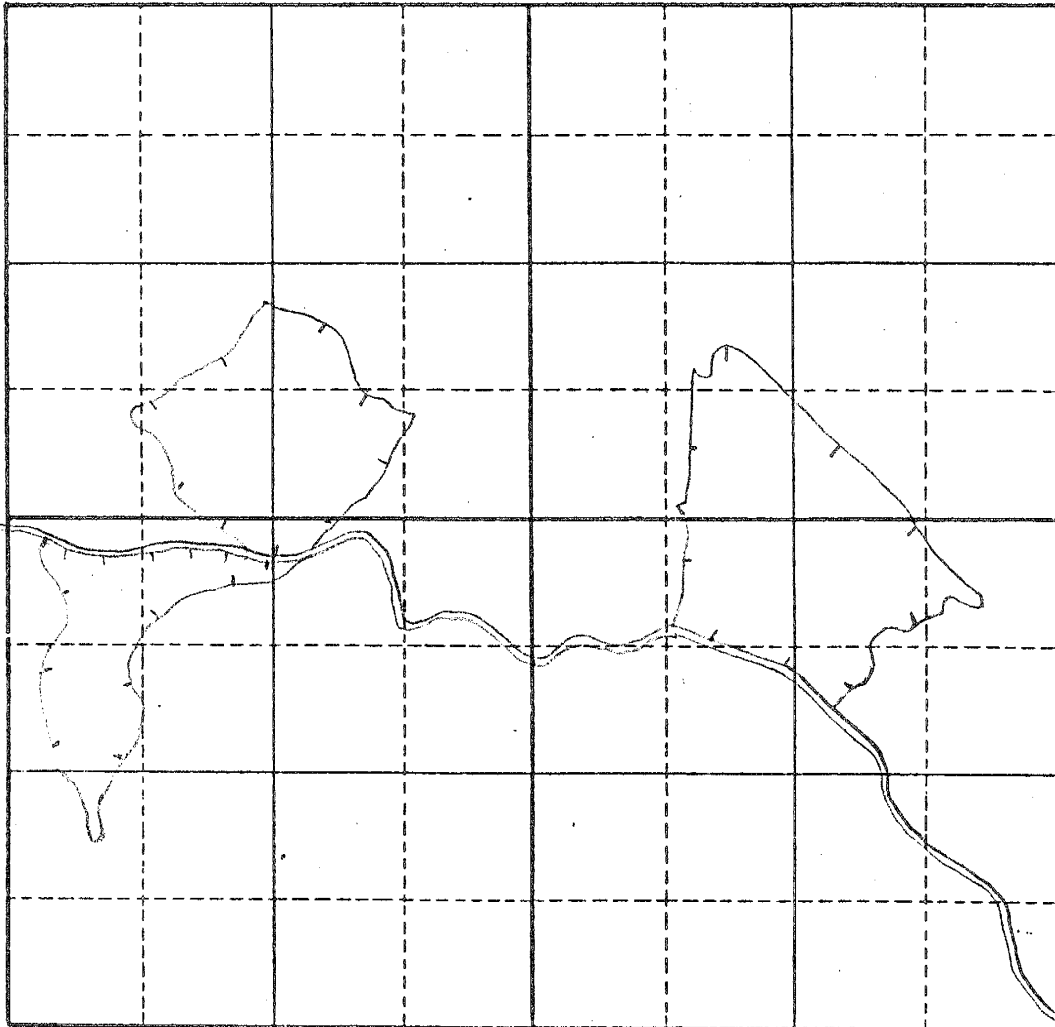
REMARKS:

SALE NAME Eik Flats LPP
 T & M NO. 7742
 YEAR LOGGED 1973
 TOTAL ACRES LOGGED 18
18 ACRES SELECT 85% volume removed
 ACRES CLEAR-CUT All lodgepole and sub-alpine
 ACRES OVERSTORY REMOVAL Fir removed
 ACRES _____
 Cruiser _____
 Compassman _____
 Date Examined: _____



Sec. 35 Twp. 21N Rge. 17W

SECTION PLAT



Scale: 1" = 1000'

REMARKS: Cutting Map - 1974

Contract No.: 751-2.73-0340

Sale Name: E/R Flats LPP

LEGEND

Sale Area Boundary --- . ---

Roads ====

Cutting Area Boundary |||||

 Acres clear cut

 99 Acres selectively cut, 85% of volume removed

 Acres

Cruiser

Compassman

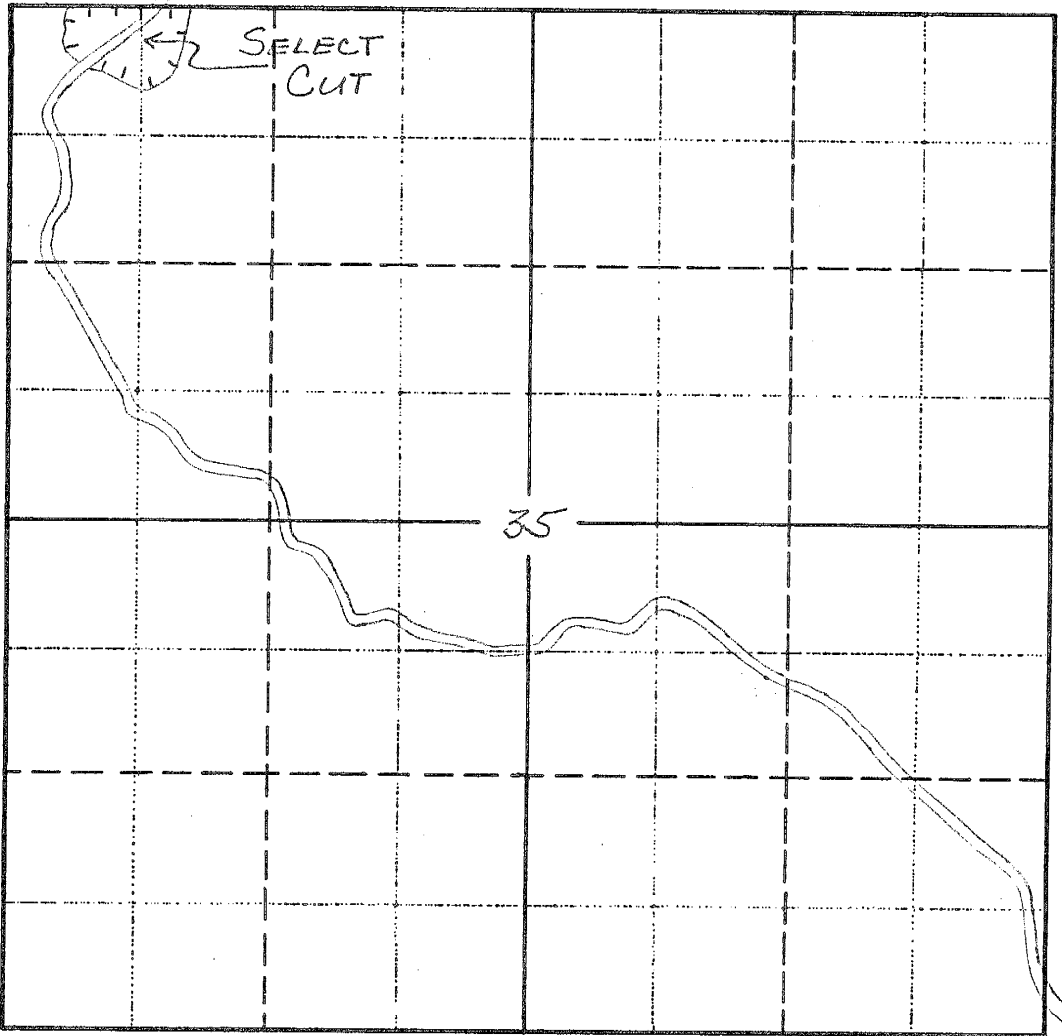
Date Examined:



CUTTING MAP

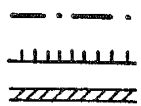
19 75 SWAN-PLACID MANAGEMENT UNIT

SEC 35 TWP 21N RGE 17W



LEGEND

SALE AREA BOUNDARY
CUTTING AREA BOUNDARY
RIGHT-OF-WAY CUTTING



SCALE: 1"=1000'
ROADS

SALE NAME: W.R. MOORE HOUSELOGS.

CONTRACT NO: 711-2.75-0130

ACRES CLEAR CUT:

ACRES SELECTIVELY CUT: 5 AC.

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

TOTAL ACRES CUT: 5 AC.

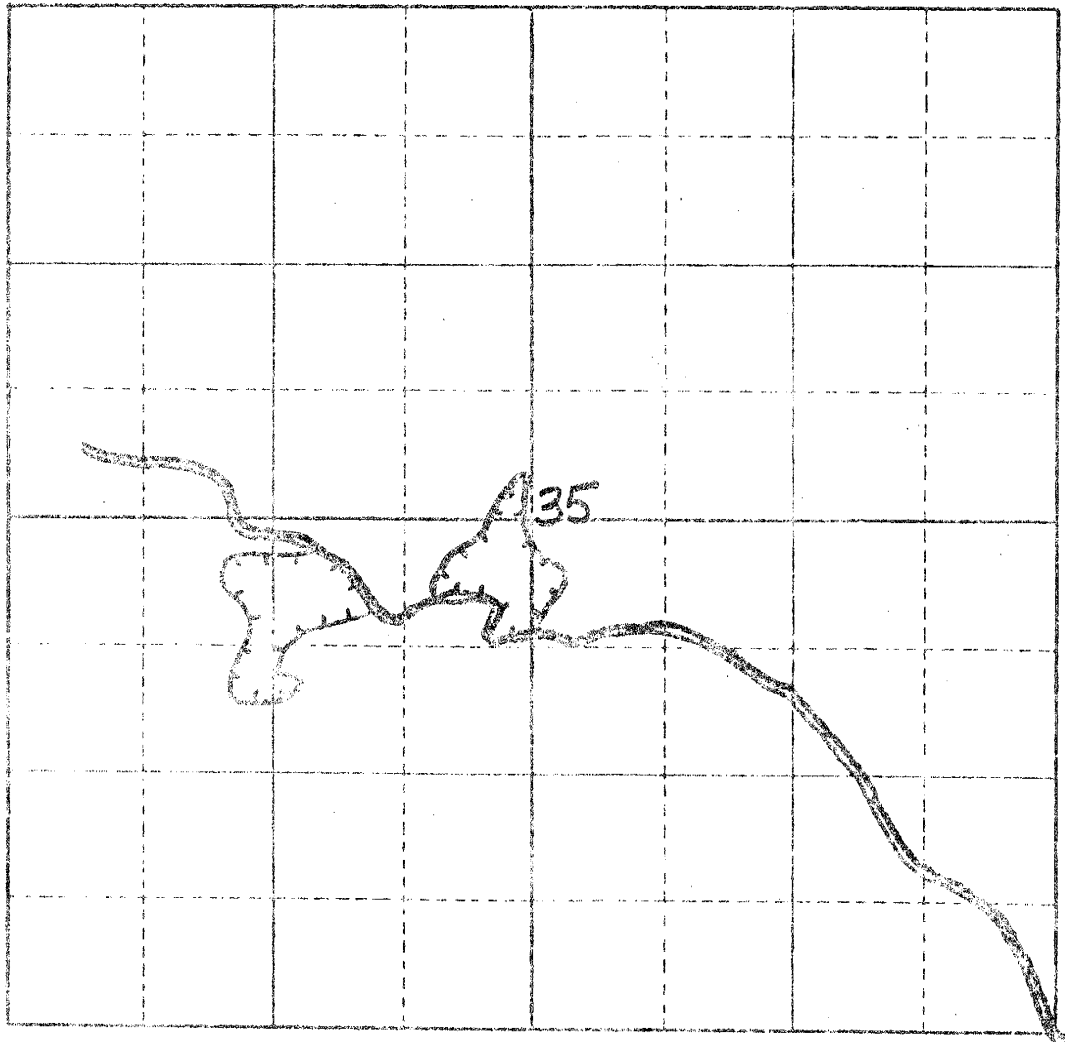
5 % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS: _____

PREPARED BY G.R. SCHAEFER 104 DATE JAN. 8, 1976.

Sec. 35 Twp. T21N Rge. R17W

SECTION PLAT



Scale: 1" = 1000'

REMARKS: Cutting Map - 1975

Contract No.: 711-2.75-0080

Sale Name: ELK FLATS THINNING

LEGEND

Sale Area Boundary ---

Roads ==

Cutting Area Boundary ----

 Trees clear cut

16 Acres selectively cut, 65 % of volume removed

 Acres

Cruiser

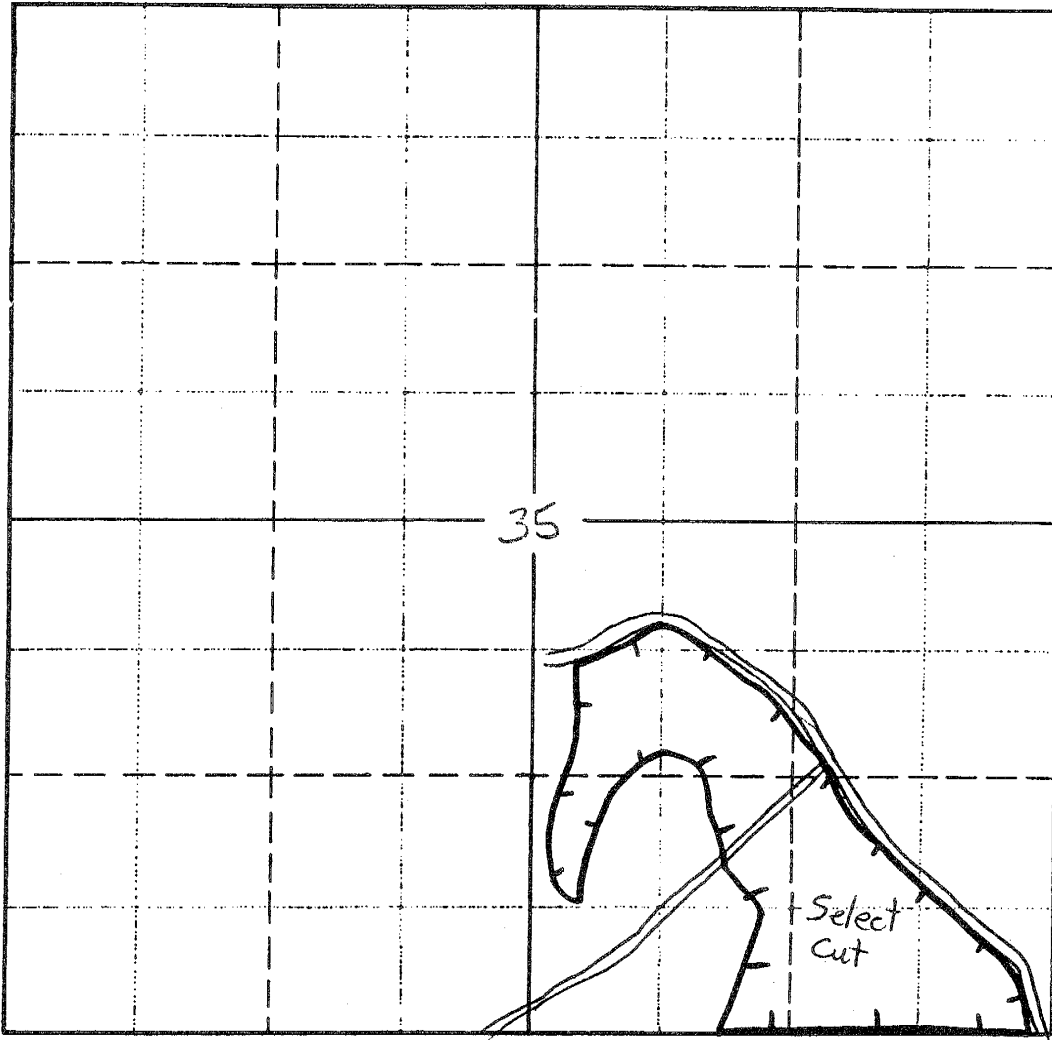
Compassman

Date Examined:

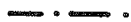





CUTTING MAP

1979 SWAN PLACED MANAGEMENT UNIT
SEC 35 TWP 21N RGE 17W



LEGEND

SALE AREA BOUNDARY 
CUTTING AREA BOUNDARY 
RIGHT-OF-WAY CUTTING 

SCALE: 1"=1000'
ROADS 

SALE NAME: Jim's House logs
CONTRACT NO: 711-279-0280

ACRES CLEAR CUT: _____
ACRES SELECTIVELY CUT: 50

TOTAL ACRES CUT: _____

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

70 % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

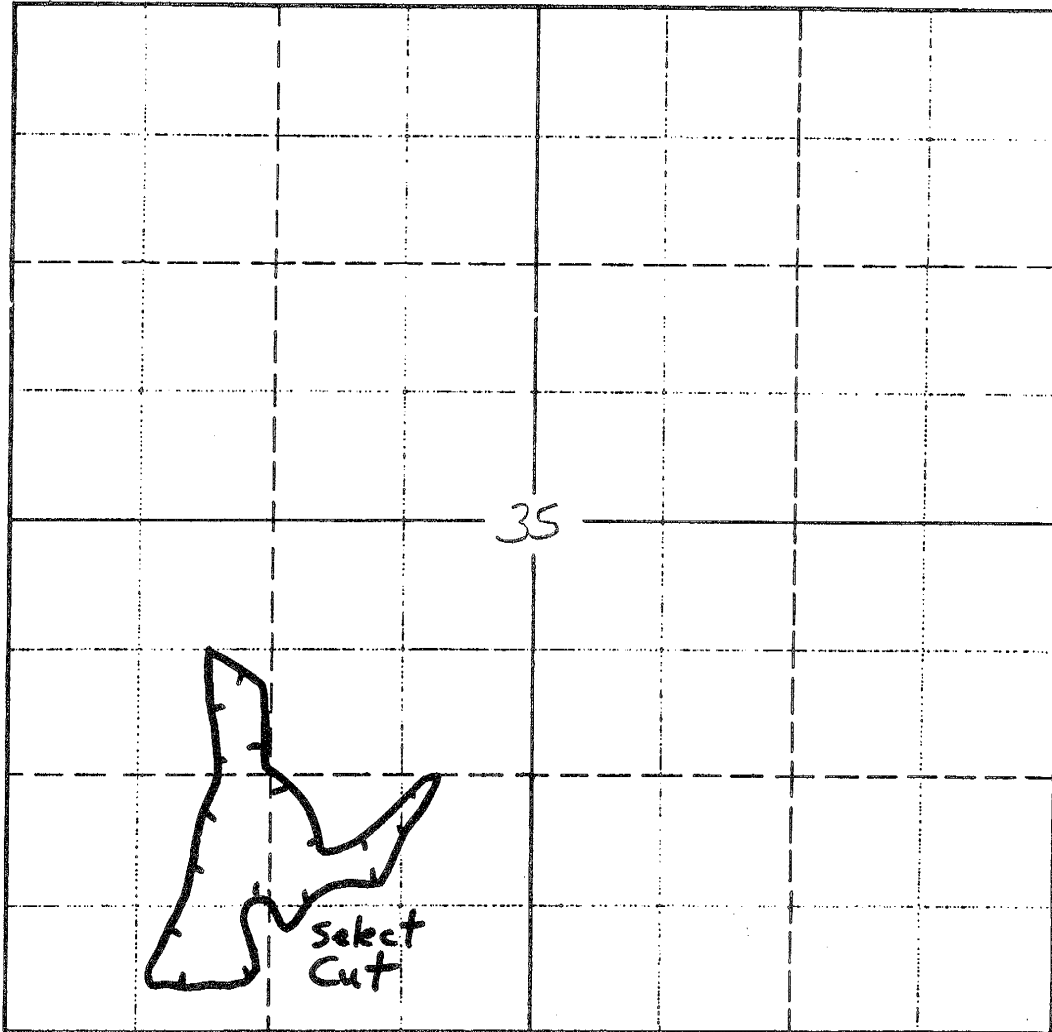
REMARKS: Removal of Overmature Lodgepole

PREPARED BY PR Coffey 106 DATE 7/17/79



CUTTING MAP

19 79 SWAN - PLACID MANAGEMENT UNIT
SEC 35 TWP 21N RGE 17W



LEGEND

SALE AREA BOUNDARY --- · --- ·
CUTTING AREA BOUNDARY |||||
RIGHT-OF-WAY CUTTING ///////

SCALE: 1"=1000'
ROADS ====

SALE NAME: MOORE LPP
CONTRACT NO: SFC #296 711-2.79-0670

ACRES CLEAR CUT: _____
ACRES SELECTIVELY CUT: 22

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

TOTAL ACRES CUT: 22

70 % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

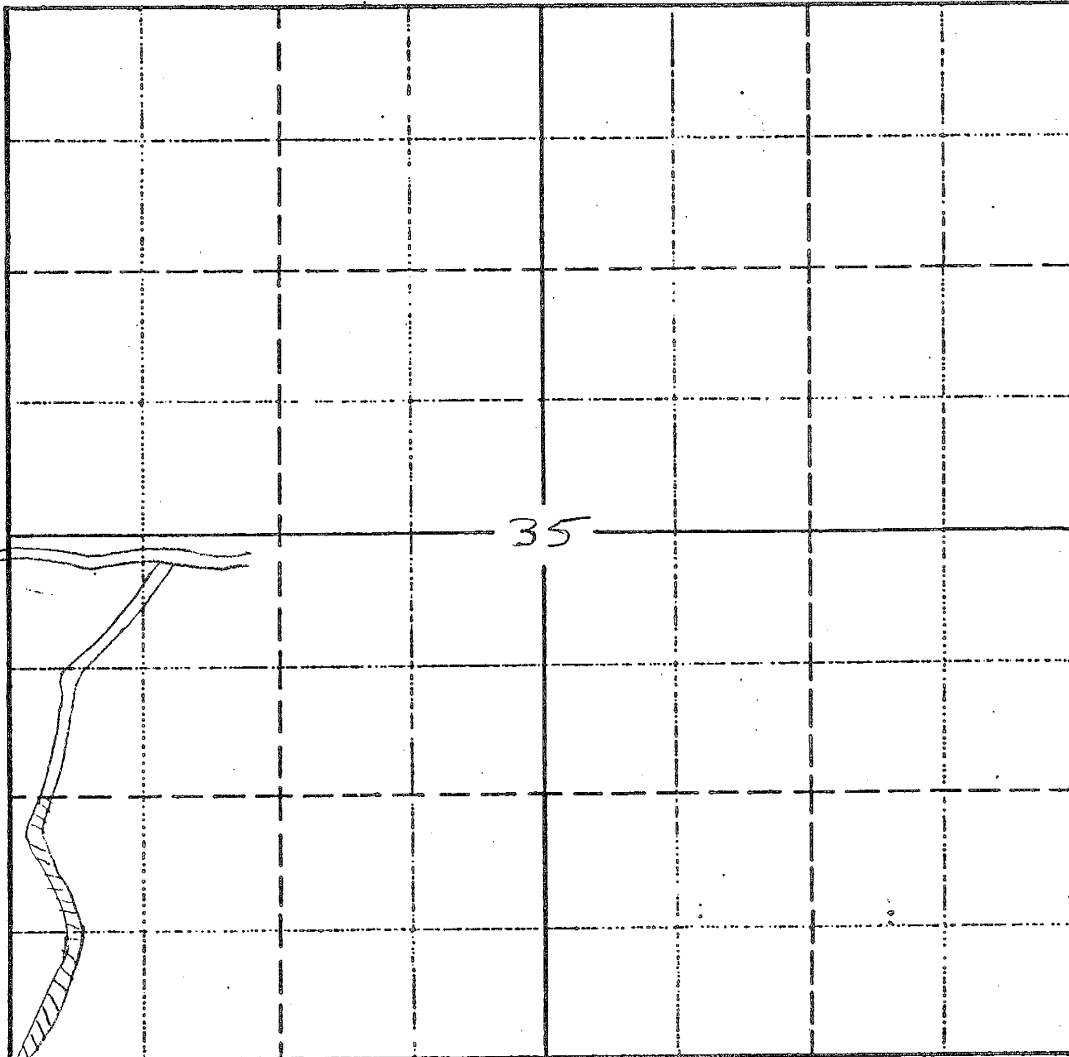
REMARKS: overstory Removal of Lodgepole Pine

PREPARED BY PR Coffey ¹⁰⁷ DATE 11/5/79



CUTTING MAP

1980 SWAN-PLACID MANAGEMENT UNIT
SEC 35 TWP 21 N RGE 17 W PMM



LEGEND

SALE AREA BOUNDARY --- · --- ·
CUTTING AREA BOUNDARY |||||
RIGHT-OF-WAY CUTTING //////

SCALE: 1"=1000'
ROADS ====

SALE NAME: WEST GLACIER FLAT R/W

CONTRACT NO: 930-2.80-0510 751-2.80-1000

ACRES CLEAR CUT: 1.3

ACRES SELECTIVELY CUT: 0

ACRES SELECTIVELY CUT: 0

ACRES SELECTIVELY CUT: 0

TOTAL ACRES CUT: 1.3

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

REMARKS: % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS: _____

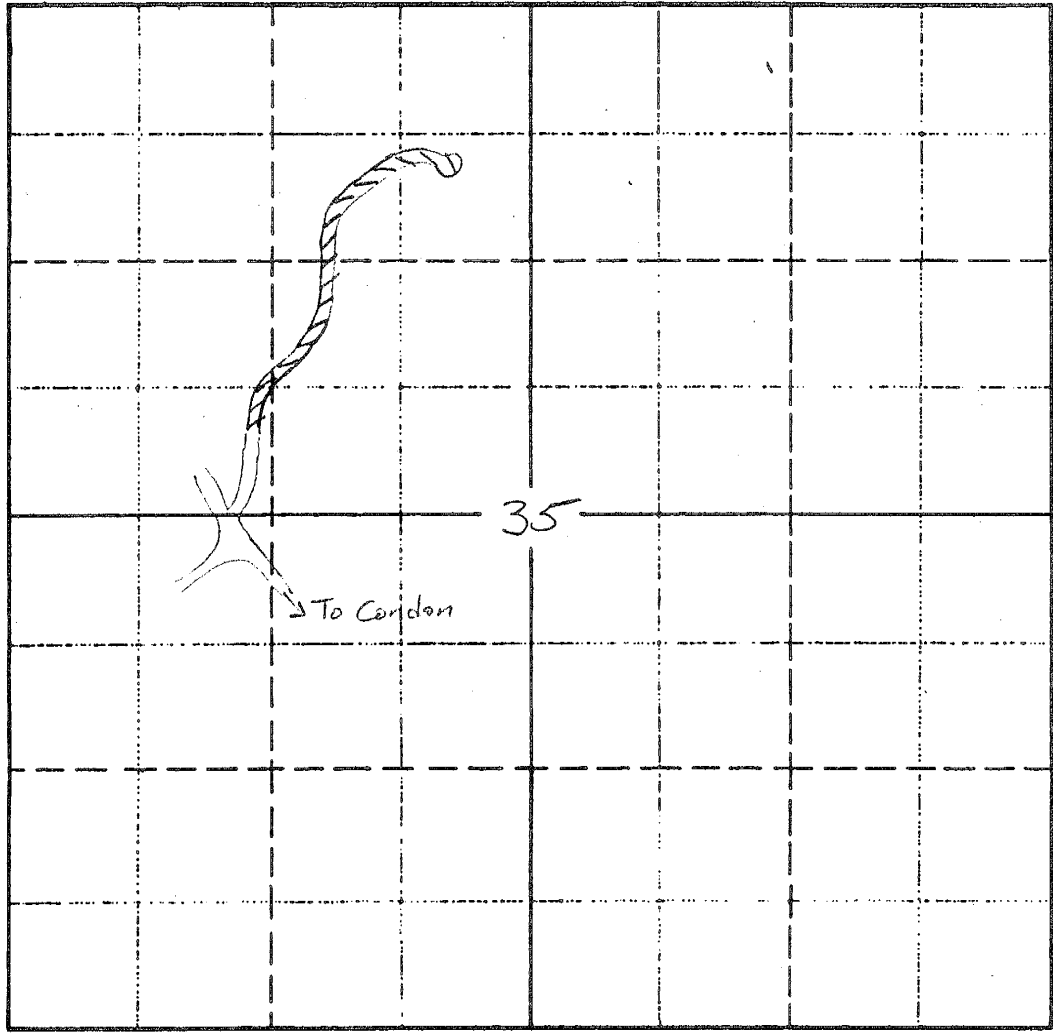
PREPARED BY N.A. CRAWFORD DATE 1/22/81



MISSOULA CO.

CUTTING MAP

1981 Swan-Placid MANAGEMENT UNIT
SEC 35 TWP 21N RGE 17W PMM



LEGEND

| | | |
|-----------------------|-----------|-----------------|
| SALE AREA BOUNDARY | — · — · — | SCALE: 1"=1000' |
| CUTTING AREA BOUNDARY | ----- | ROADS == |
| RIGHT-OF-WAY CUTTING | //// | |

SALE NAME: South Cold Islands R/W
 CONTRACT NO: 930-2.81-0380 751-2.81-0820

ACRES CLEAR CUT: 1.9
 ACRES SELECTIVELY CUT: 0
 _____: 0
 _____: 0

(INDICATE TYPE OF CUTTING IN WRITING ON THE MAP)

TOTAL ACRES CUT: 1.9

0 % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

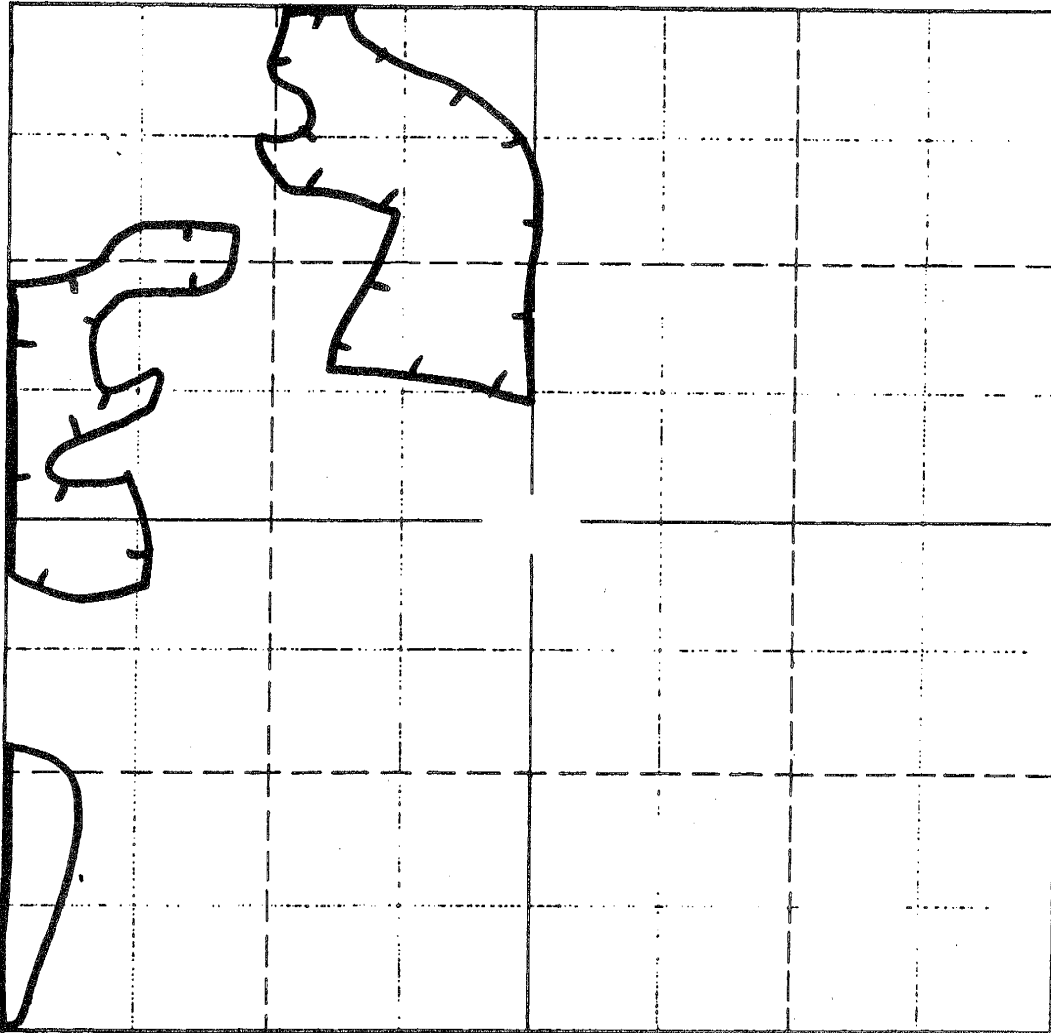
REMARKS: _____

PREPARED BY NA Crawford 109 DATE Nov. 4, 1981



CUTTING MAP

1982 SWAN-PLACID MANAGEMENT UNIT
SEC 35 TWP 21N RGE 17W



LEGEND

SALE AREA BOUNDARY



SCALE: 1"=1000'

CUTTING AREA BOUNDARY



ROADS

RIGHT-OF-WAY CUTTING



SALE NAME: ELK FLAT LP

CONTRACT NO: 751-2.81-1430

ACRES CLEAR CUT: 75

ACRES SELECTIVELY CUT: _____

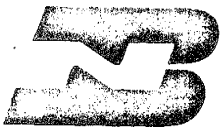
(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

TOTAL ACRES CUT: 75

_____% OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS: _____

PREPARED BY PR Coffey¹¹⁰ DATE 9/3/82

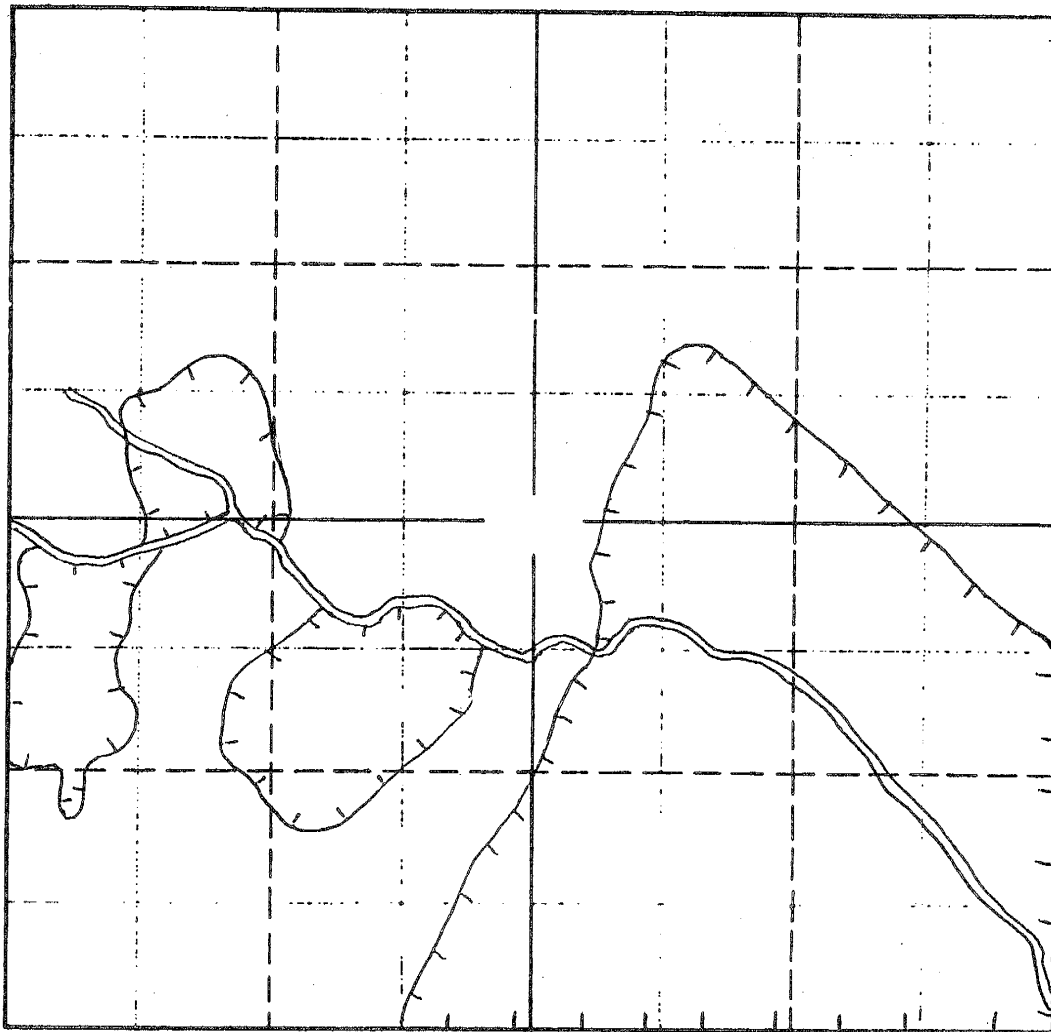


BURLINGTON
NORTHERN

MISSOURIA

CUTTING MAP

1983 Swan-Placid MANAGEMENT UNIT
SEC 35 TWP 21N RGE 17W



LEGEND

| | | |
|-----------------------|-------------|-----------------|
| SALE AREA BOUNDARY | - . - . - . | SCALE: 1"=1000' |
| CUTTING AREA BOUNDARY | | ROADS == |
| RIGHT-OF-WAY CUTTING | ////// | |

SALE NAME: Collective Salvage & Blowdown

CONTRACT NO: 751-2.83-1040

ACRES CLEAR CUT: _____

ACRES SELECTIVELY CUT: _____

Salvage Cut : 215

TOTAL ACRES CUT: 215

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

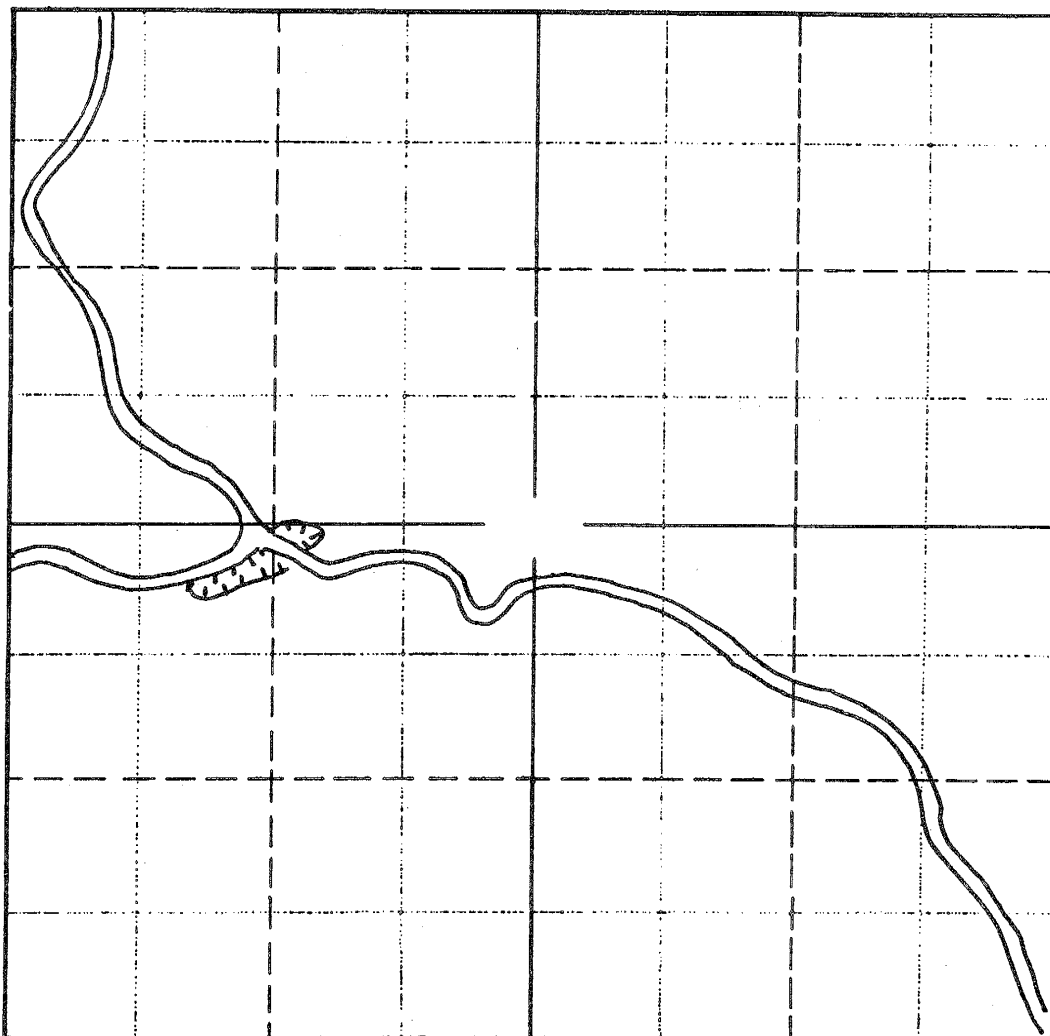
REMARKS: Salvage large dying WL.

PREPARED BY McVetter 111 DATE 1/2/84



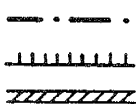
CUTTING MAP

1985 Clearwater MANAGEMENT UNIT
SEC. 35 TWP 21N RGE 17W



LEGEND

SALE AREA BOUNDARY
CUTTING AREA BOUNDARY
RIGHT-OF-WAY CUTTING



SCALE: 1"=1000'
ROADS

SALE NAME: Condon Blowdown Salvage

CONTRACT NO: 751-2.85-1500

ACRES CLEAR CUT: _____

ACRES SELECTIVELY CUT: _____

Acres Salvaged : _____

3

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

TOTAL ACRES CUT: _____

_____% OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS: _____

PREPARED BY Ron Johns

112

DATE 12/16/85

CUTTING MAP

19 86 Clearwater Management Unit

Sec. 35 Twp. 21N Rge. 17W , _____



LEGEND

- SALE AREA BOUNDARY
- CUTTING AREA BOUNDARY
- RIGHT-OF-WAY CUTTING
- ROADS

SALE NAME: EIK Creek Blowdown

CONTRACT NO: 751-2.86-1400

ACRES CLEAR CUT: 4 40m

ACRES SELECTIVELY CUT: _____ (INDICATE TYPE OF CUTTING

ACRES SALVAGE CUT : 52 105m IN WRITING ON THE MAP)

TOTAL ACRES CUT: 56

_____ % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

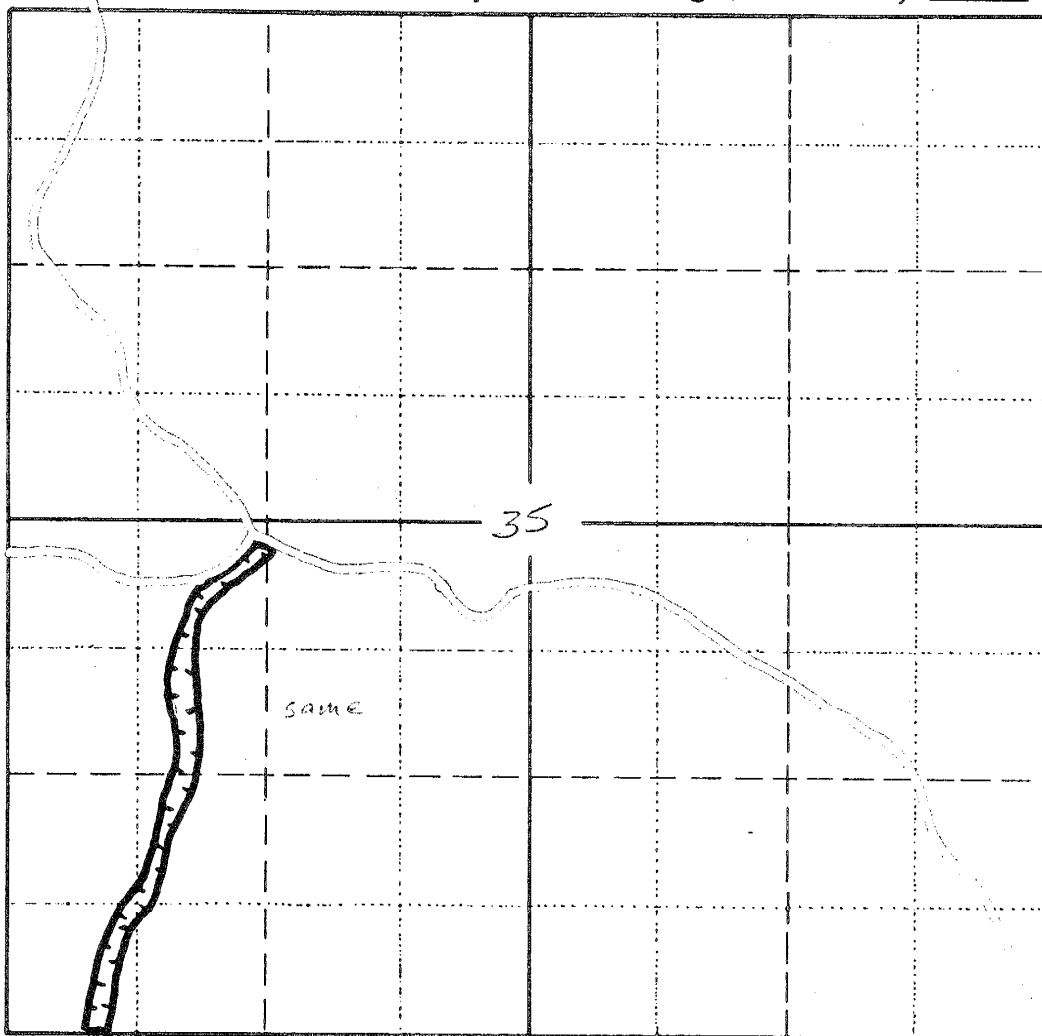
REMARKS: Salvage blowdown



CUTTING MAP

19 89 Clearwater Management Unit

Sec. 35 Twp. 21N Rge. 17W, PMM Missouri

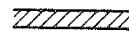


LEGEND

SALE AREA BOUNDARY



RIGHT-OF-WAY CUTTING



CUTTING AREA BOUNDARY



ROADS



SALE NAME:

Swan Salvage and R/W

CONTRACT NO:

751-287-0040

ACRES CLEAR CUT:

ACRES SELECTIVELY CUT:

Salvage

:

9

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

TOTAL ACRES CUT:

9

66 mbf

_____% OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS:

Salvage ES blowdown along Elk Creek tributary.

Scale 1" = 1,000'

Prepared by

Roger Marshall

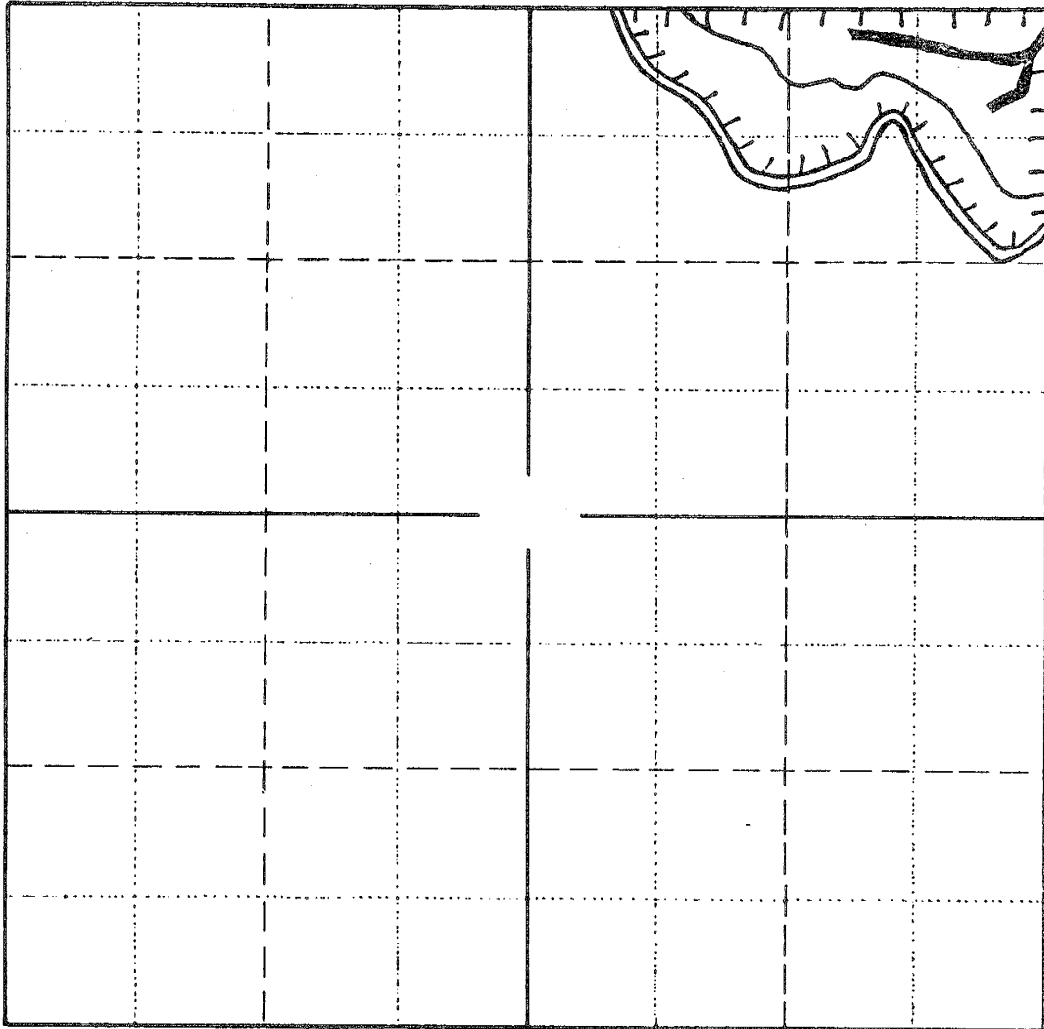
Date

1-16-90



CUTTING MAP

19 91 LEADWATER Management Unit
Sec. 35 Twp. 21 N Rge. 17 W, PMM



0922
(All)



LEGEND

- SALE AREA BOUNDARY
- CUTTING AREA BOUNDARY
- RIGHT-OF-WAY CUTTING
- ROADS
- RIVER

SALE NAME: POWDER ROOM

CONTRACT NO: 751-290-5700

ACRES CLEAR CUT: _____

ACRES SELECTIVELY CUT: 41 (330 MBF) (INDICATE TYPE OF CUTTING IN WRITING ON THE MAP)

TOTAL ACRES CUT: 41

100 % OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS: _____

must be an OR

(61)

Swan - Elk Cr

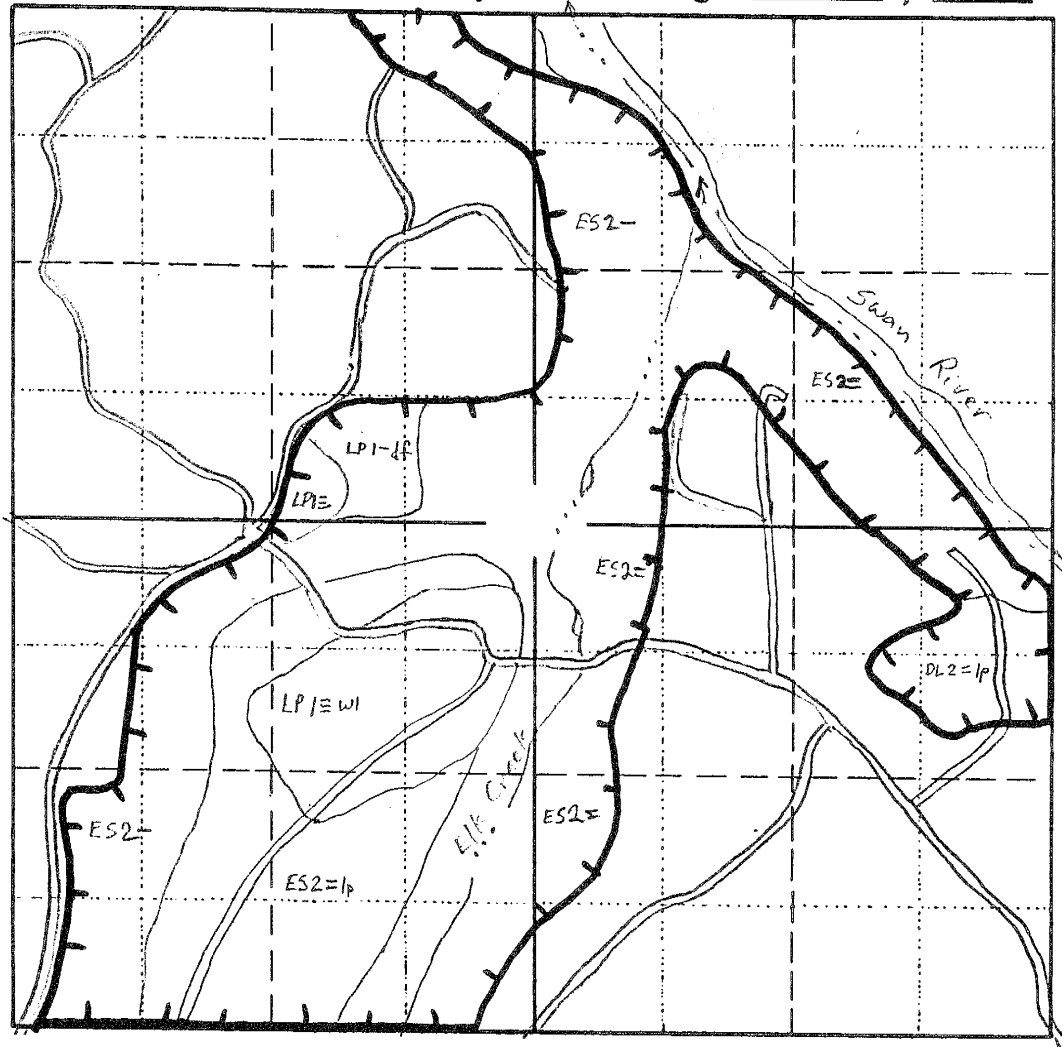
MSLA

Jan
OR
815
GEN
R v



CUTTING MAP

19 92 Clearwater Management Unit
Sec. 35 Twp. 21N Rge. 17W, PMM



LEGEND

- SALE AREA BOUNDARY
- CUTTING AREA BOUNDARY
- RIGHT-OF-WAY CUTTING
- ROADS

SALE NAME: More Elk

CONTRACT NO: 751-2.92-0160

ACRES CLEAR CUT: _____

ACRES SELECTIVELY CUT: _____

Over story Removal 10" + DBH: 224 ac

(INDICATE TYPE OF CUTTING
IN WRITING ON THE MAP)

TOTAL ACRES CUT: 224

2090 mbf

_____% OF VOLUME REMOVED ON SELECTIVELY CUT AREA

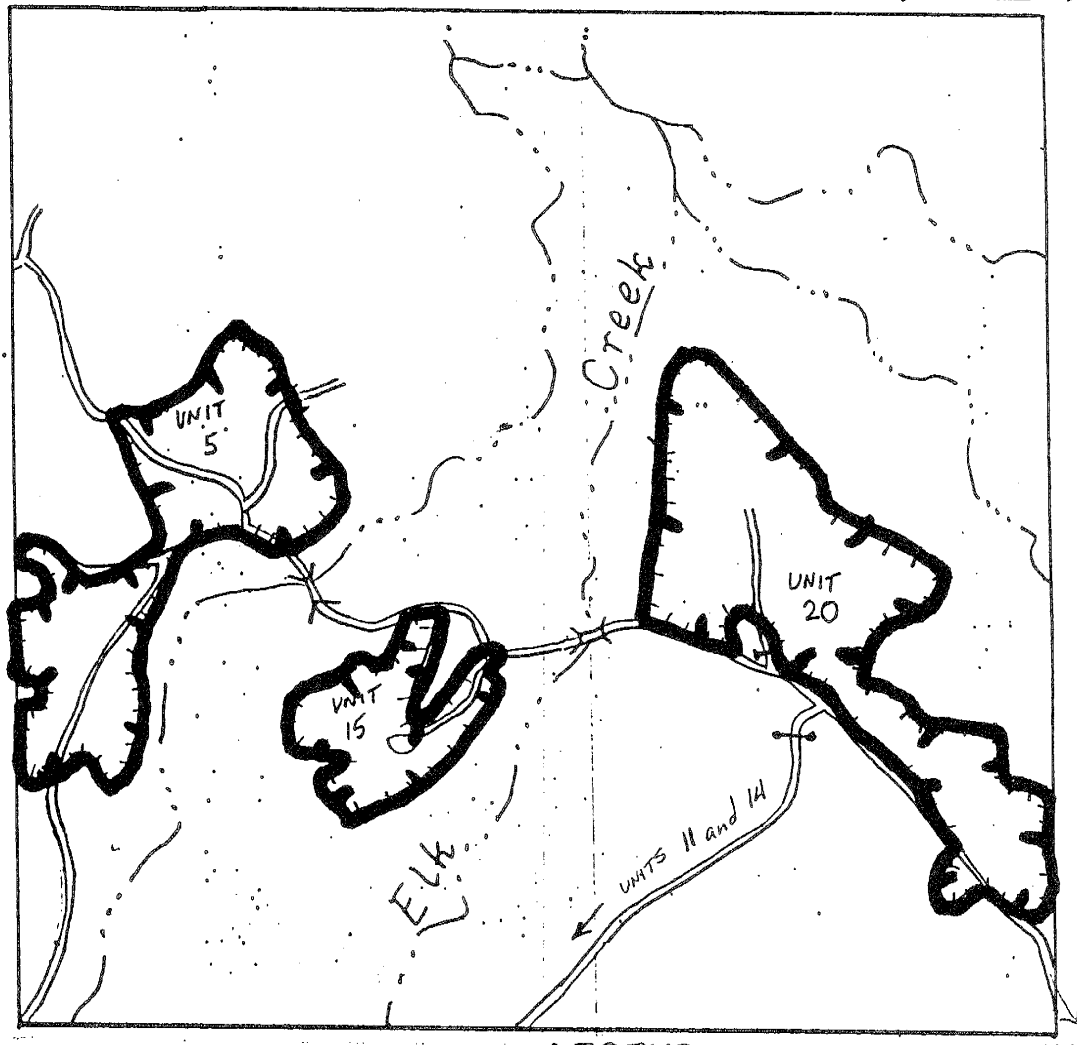
REMARKS: _____

9/93



CUTTING MAP

19 93 Clearwater Management Unit
Sec. 35 Twp. 21N Rge. 17W, P.M.M.



LEGEND

- SALE AREA BOUNDARY
- CUTTING AREA BOUNDARY
- RIGHT-OF-WAY CUTTING
- ROADS

SALE NAME: Elk Creek Thinning

CONTRACT NO: 730-13,293-38

ACRES CLEAR CUT: _____

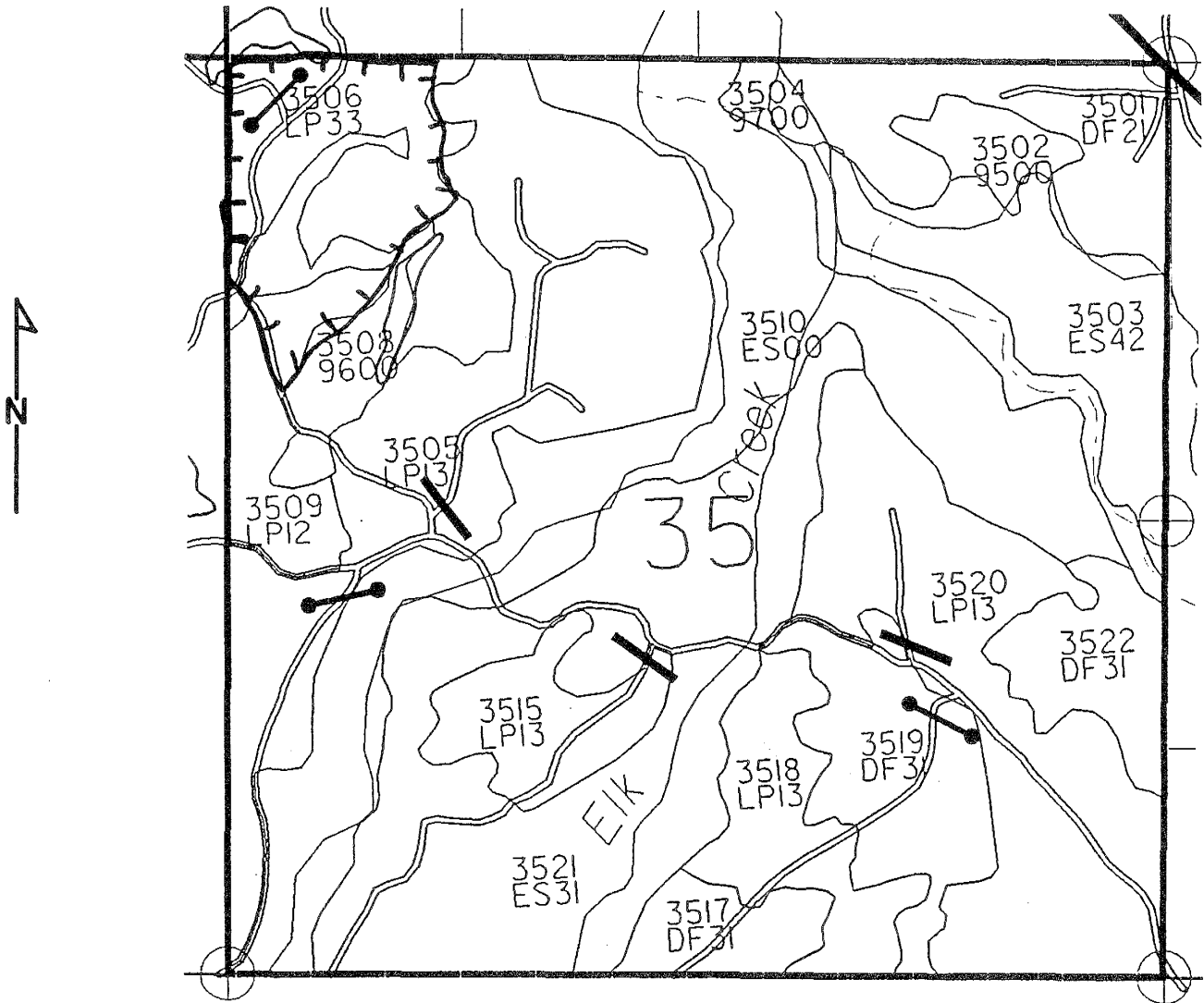
ACRES SELECTIVELY CUT: PCT : 93

(INDICATE TYPE OF CUTTING IN WRITING ON THE MAP)

TOTAL ACRES CUT: 93

_____% OF VOLUME REMOVED ON SELECTIVELY CUT AREA

REMARKS: _____



| | | |
|-------------------------|-----------------|-------------------------------|
| SALE NAME: | . Storm Salvage | |
| CONTRACT NO. | . 751-2.95-5280 | |
| County: | Missoula | DRAINAGE: . Elk Creek |
| ACRES CUT | | COUNTY NO.: . 32 |
| CLEAR CUT: | . | HARVEST YR/MO: . 96/11 |
| RAW: | . | ELEVATION: . 3700' |
| SELECTIVELY CUT: | . | SLASH TONS/AC: . 2 |
| SEED TREE: | . | HARVEST TYPE: . SAL |
| SALVAGED: | . 37 24m | SLASH TREATMENT: . 10 |
| OTHER: | . | GENERAL/SPECIAL: . GEN |
| TOTAL ACRES CUT: | . 37 24m | BURN STATUS: . R |

Remark: Blowdown Salvage, No Type Change

Prepared By: Roger Marshall

Date: 12/17/96

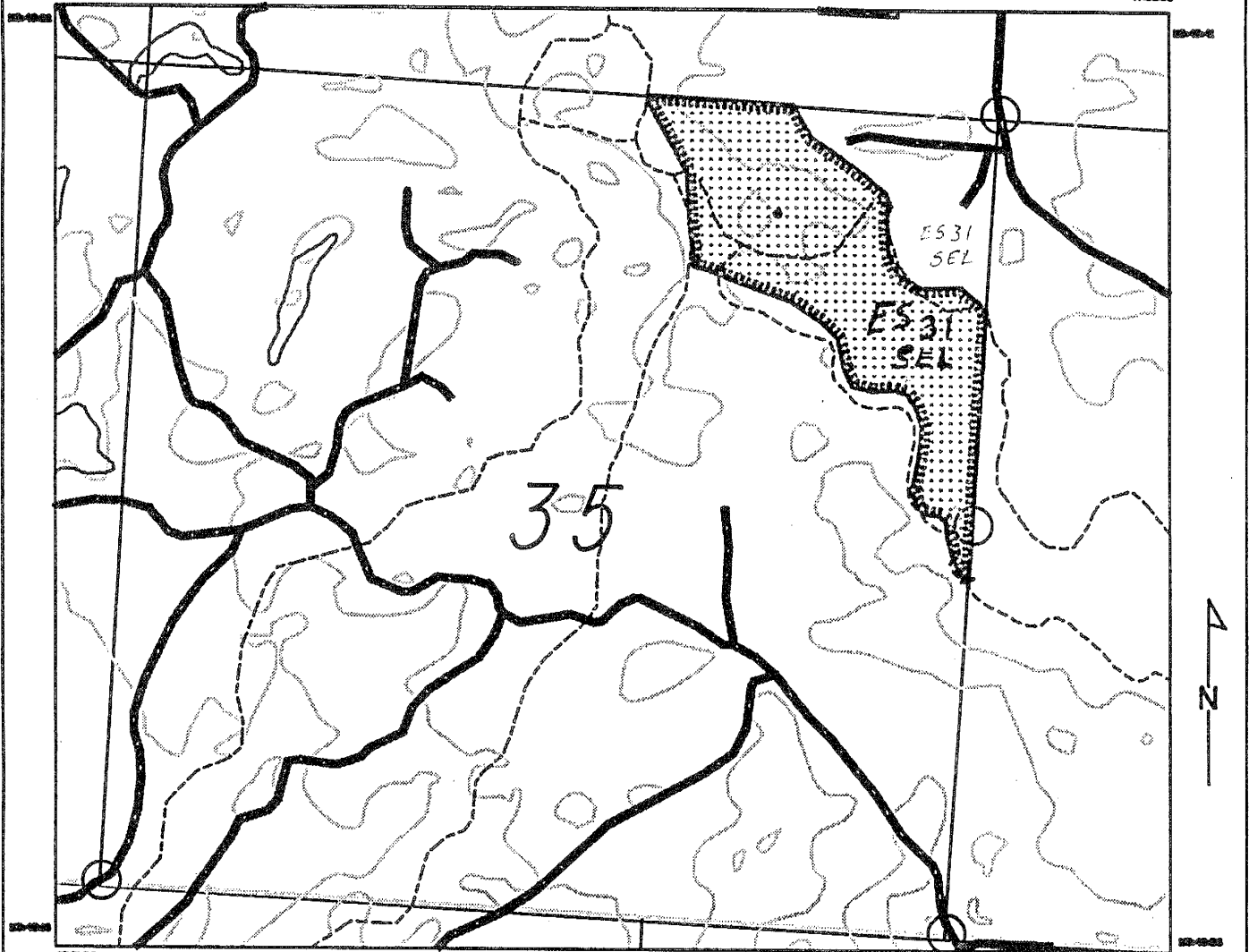
Scale: 1:12000

Cutting Map 1997

PC
Plum Creek

SALMON HELO 3
Sec. 35 T21N R17W

Clearwater Unit
Scale: 1:12000
Date: 02/13/97



| UNIT | ACRES | VOL | SLASH | Rx |
|------|-------|---------|------------------------------|---|
| 1 | 53 | 250 MBF | Lop or yard tops to landings | Harvest trees are marked for cutting with blue point. |

Contract # 751-2.97-0960

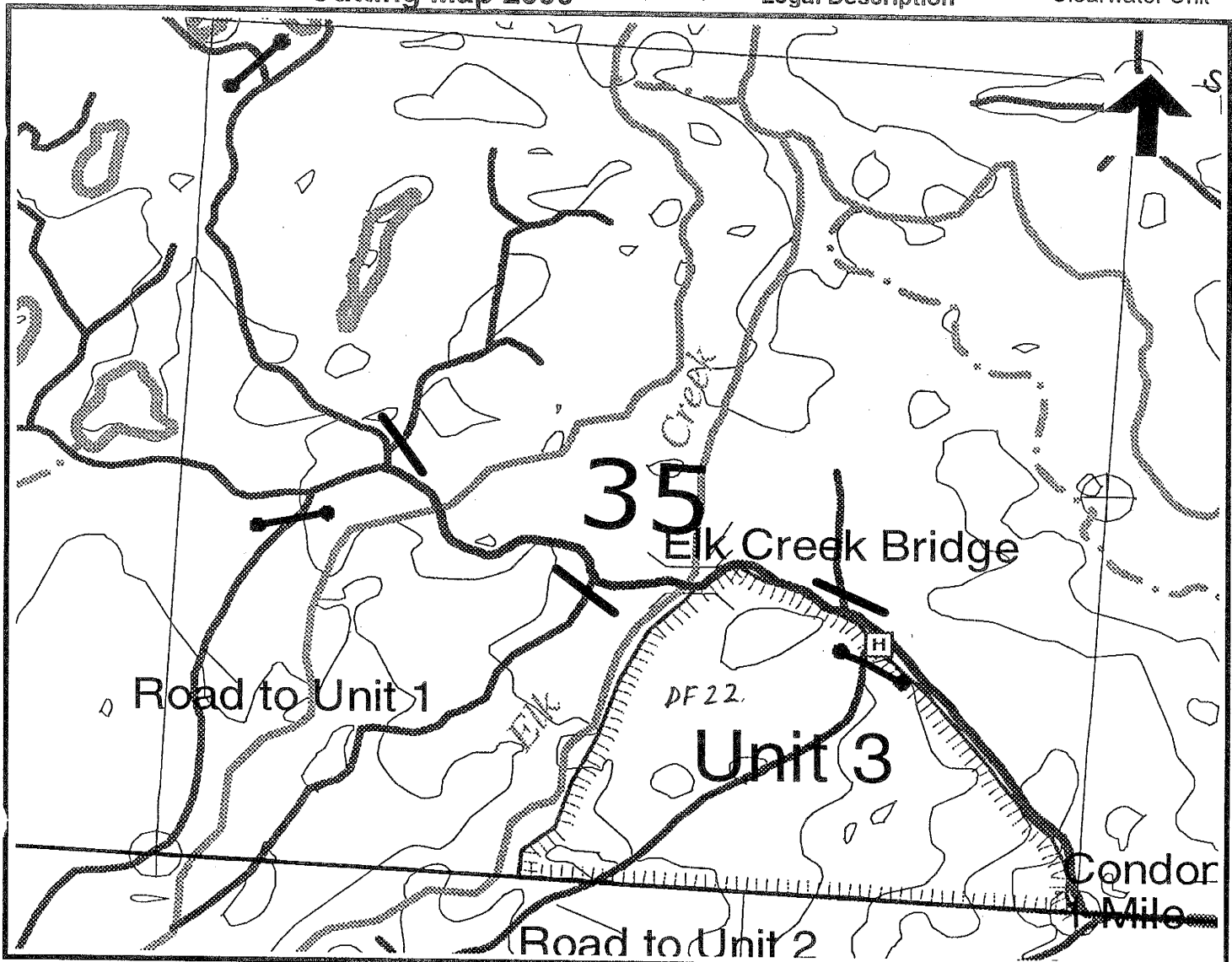
Acres Select cut 53 235mbf

Swan River
Cty 32
YR/mo 97/3
Elev. 3650'
HT. 56L
slash 10; Gen, Ready

| Line | OWNER |
|------|----------|
| --- | CONTOUR |
| --- | CREEKS |
| --- | ROADS |
| --- | HARVUNIT |

| Symbol | Found Corner |
|--------|--------------|
| ○ | Gate |

Block: CONDON
County: Flathead
Prepared By: WBS
ROM 2/13/98



Elk Spruce 35

Harv Contract No: 751-2.00-0010

Rd Contract No:

County Name: Missoula
 Logger: A&S Logging

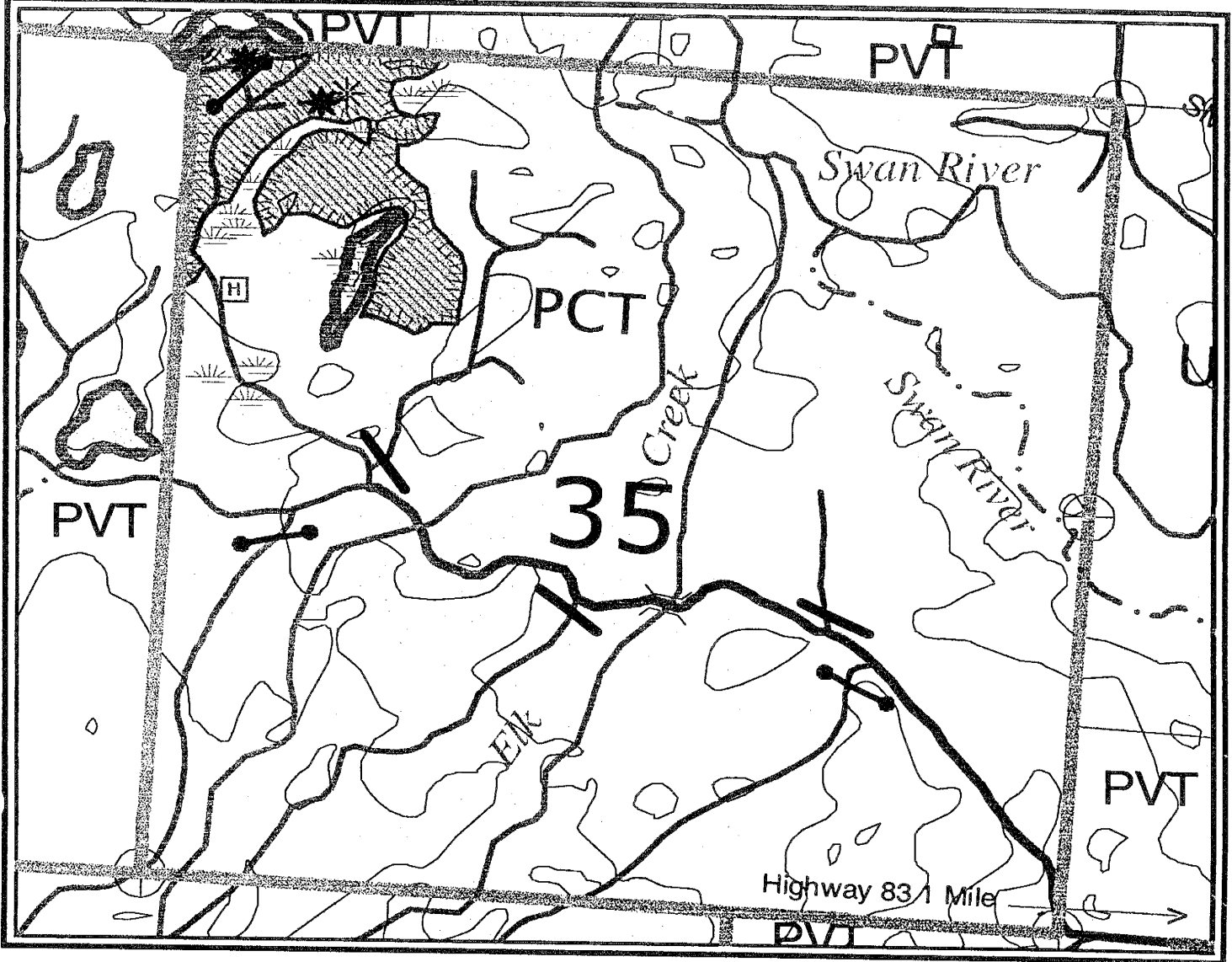
| | Ac. Cut 2000 | CCF Cut 2000 | | |
|--------------------------|--------------|--------------|---------------------|-----------|
| Clear Cut : | 0 | | 0 Drainage : | Elk Creek |
| R/W : | 0 | | 0 Harvest Yr/Mo: | 00/02 |
| Selectively Cut : | 94 | 1031 | Elevation: | 3800 |
| Seed Tree : | 0 | | 0 Slash Tons/Ac: | 7 |
| Commercial Thin : | 0 | | 0 Harvest Type : | Tractor |
| Salvaged : | 0 | | 0 Slash Treatment : | PNB |
| Other : | 0 | | 0 General/Special : | Gen |
| Total Acres Cut : | 94 | | Burn Status : | Ready |
| CCF Removed : | | 1031 | | |

| | | | |
|--|--------------------------|--|------------------|
| | Helispot | | Harvest_Boundary |
| | Gate | | Found_Corners |
| | Roads - Woods Road | | Contour_40FT |
| | Hydrology - Perennial | | Bridges |
| | Hydrology - Intermittent | | |

Helispot Location: -113:44:14.7209,
 47:31:56.0745. 0
 Lon.Lat(d:m:s).

Original Map Scale: 1: 12000
 Prepared By Roger Marshall

Map Creation Date : 01/02/01



LP Fairway

Harv Contract No: 751-2.01-0130
 Rd Contract No:

County Name: Missoula
 Logger: Birky's Shop

| | Ac. Cut 2001 | CCF Cut 2001 | | |
|--------------------------|--------------|--------------|-------------------|-----------|
| Clear Cut : | 0 | 0 | Drainage : | Elk Creek |
| R/W : | 0 | 0 | Harvest Yr/Mo: | 1-Jan |
| Selectively Cut : | 34 | 1195 | Elevation: | 3500 |
| Seed Tree : | 0 | 0 | Slash Tons/Ac: | 15 |
| Commercial Thin : | 0 | 0 | Harvest Type : | SEL |
| Salvaged : | 0 | 0 | Slash Treatment : | 15,8 |
| Other : | 0 | 0 | General/Special : | G |
| Total Acres Cut : | 34 | 1195 | Burn Status : | PNB |
| CCF Removed : | | | | |

| | | | |
|--|-----------------------|--|--------------------|
| | Hydrology - Perennial | | Roads - Woods Road |
| | PCT_Property | | Owner - Plum Creek |
| | Harvest_Boundary | | Owner - Private |
| | Gate | | Landing piles |
| | Found_Corners | | |

Helispot Location: -113:45:09.0621,
 47:32:17.1411. 0
 Lon.Lat(d:m:s).
 Original Map Scale: 1: 12000
 Prepared By Roger Marshall

Plum Creek

Map Creation Date : 3/28/00, 9/11/01

Appendix 9. Plot Data for Vegetative Unit A

The following plot data were collected on only one Vegetative Unit (A) as an example of the type of work that could be done for the rest of the Elk Creek Conservation Area.

These data are used to determine the volume of timber, the species diversity present and the total biomass on the land. It can also show growth. Now that this data is in the system we can show the Vegetation Unit on the Stand Visualization System (SVS). This is useful for showing how the stand looks now and what the desired future condition could be.

The plot data was cruised on a 20 basal area factor, and 10 plots were inserted at a 4 chain interval running in north south grid lines.

It is interesting that within Vegetation Unit A, there are two distinct cover type strata. There is 20 BA for lodgepole and 20 BA for Douglas-fir. Both of these are two different strata in one vegetative Unit.

Project Name: Elk Creek
Date of Run: 09/05/07

*** Individual Strata Appraisal Tables ***

All trees heights were not recorded.
Volume equations used were Western Montana.
All trees ages were not recorded.
Used general knowledge of user, trees are;
over 80 years for species:; WP; WC; WH; CW
under 80 years for species: PP; DF; WL; ES; LP; AF; GF
Acres= 33
Cut /leave data not recorded.
Minimum DBH for data calculation was 6
Log length was 16 ft.
Options for Height/Age Regression
Minimum DBH for data calculation was 6 .
All trees.
Both cut/leave trees.

Average tarif number for species 202 = 21.9518 (Sample size = 8)
Average tarif number for species 73 = 34.4601 (Sample size = 3)
Average tarif number for species 108 = 21.69302 (Sample size = 7)

Section = 35 Township = 21 Range = 17
Location = Elk Creek Conservation Area

A Summary of Per Acre Estimates for Requested Variables
Both ALIVE and DEAD

| VAR | SPECIES | | | | | | | TOTAL | %SE |
|------|---------|-------|-------|------|-------|-------|--------|-------|-----|
| | DF | WL | LP | AF | GF | DD | | | |
| CVTS | 441.2 | 214.8 | 395.5 | 38.1 | 53.4 | 82.6 | 1225.6 | 26.81 | |
| SV6 | 1497.4 | 920.0 | 372.8 | 0.0 | 236.9 | 141.9 | 3169.0 | 42.60 | |
| BA | 20.0 | 6.0 | 20.0 | 2.0 | 2.0 | 4.0 | 54.0 | 22.80 | |
| TPA | 29.0 | 7.3 | 75.2 | 10.2 | 1.4 | 11.5 | 134.5 | 22.00 | |
| CV6 | 368.8 | 185.8 | 115.6 | 0.0 | 50.5 | 43.9 | 764.6 | 39.08 | |
| NSV8 | 1047.1 | 622.6 | 45.2 | 0.0 | 186.6 | 0.0 | 1901.4 | 52.65 | |
| NSV6 | 1334.8 | 777.7 | 359.6 | 0.0 | 189.5 | 128.5 | 2790.1 | 41.85 | |

Tract Totals for Requested Variables
Results are in Thousands
Both ALIVE and DEAD

| VAR | SPECIES | | | | | | | TOTAL | %SE |
|------|---------|------|------|-----|-----|-----|-------|-------|-----|
| | DF | WL | LP | AF | GF | DD | | | |
| CVTS | 14.6 | 7.1 | 13.1 | 1.3 | 1.8 | 2.7 | 40.4 | 26.81 | |
| SV6 | 49.4 | 30.4 | 12.3 | 0.0 | 7.8 | 4.7 | 104.6 | 42.60 | |
| BA | 0.7 | 0.2 | 0.7 | 0.1 | 0.1 | 0.1 | 1.8 | 22.80 | |
| TPA | 1.0 | 0.2 | 2.5 | 0.3 | 0.0 | 0.4 | 4.4 | 22.00 | |
| CV6 | 12.2 | 6.1 | 3.8 | 0.0 | 1.7 | 1.4 | 25.2 | 39.08 | |
| NSV8 | 34.6 | 20.5 | 1.5 | 0.0 | 6.2 | 0.0 | 62.7 | 52.65 | |
| NSV6 | 44.0 | 25.7 | 11.9 | 0.0 | 6.3 | 4.2 | 92.1 | 41.85 | |

Report: CVTS - Gross Cubic Foot Volume includes top & stump per Acre
Both ALIVE and DEAD

| DBH | SPECIES | | | | | | | TOTAL | %SE |
|-------|---------|-------|-------|--------|--------|-------|---------|--------|-----|
| | DF | WL | LP | AF | GF | DD | | | |
| 6 | 0.0 | 0.0 | 117.8 | 38.1 | 0.0 | 0.0 | 155.9 | 54.60 | |
| 7 | 0.0 | 0.0 | 121.1 | 0.0 | 0.0 | 0.0 | 121.1 | 70.27 | |
| 8 | 41.7 | 0.0 | 113.2 | 0.0 | 0.0 | 82.6 | 237.5 | 37.86 | |
| 9 | 38.7 | 65.2 | 0.0 | 0.0 | 0.0 | 0.0 | 103.9 | 69.33 | |
| 10 | 45.1 | 0.0 | 43.4 | 0.0 | 0.0 | 0.0 | 88.4 | 66.68 | |
| 11 | 43.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 43.7 | 100.00 | |
| 12 | 138.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 138.8 | 71.73 | |
| 15 | 46.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 46.5 | 100.00 | |
| 16 | 0.0 | 82.1 | 0.0 | 0.0 | 53.4 | 0.0 | 135.4 | 100.00 | |
| 17 | 40.1 | 67.5 | 0.0 | 0.0 | 0.0 | 0.0 | 107.6 | 69.33 | |
| 19 | 46.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 46.8 | 100.00 | |
| TOTAL | 441.2 | 214.8 | 395.5 | 38.1 | 53.4 | 82.6 | 1225.62 | | |
| %SE | 48.38 | 72.18 | 37.49 | 100.00 | 100.00 | 66.67 | | 26.81 | |

Report: SV6 - Gross Volume Board Ft to 6 in. Top per Acre
Both ALIVE and DEAD

| DBH | SPECIES | | | | | | | |
|-------|---------|-------|-------|------|--------|-------|---------|--------|
| | DF | WL | LP | AF | GF | DD | TOTAL | %SE |
| 7 | 0.0 | 0.0 | 73.3 | 0.0 | 0.0 | 0.0 | 73.3 | 66.74 |
| 8 | 74.9 | 0.0 | 183.3 | 0.0 | 0.0 | 141.9 | 400.0 | 39.39 |
| 9 | 85.7 | 172.7 | 0.0 | 0.0 | 0.0 | 0.0 | 258.4 | 71.23 |
| 10 | 133.1 | 0.0 | 116.2 | 0.0 | 0.0 | 0.0 | 249.3 | 66.86 |
| 11 | 136.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 136.4 | 100.00 |
| 12 | 503.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 503.4 | 71.88 |
| 15 | 191.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 191.2 | 100.00 |
| 16 | 0.0 | 416.2 | 0.0 | 0.0 | 236.9 | 0.0 | 653.0 | 100.00 |
| 17 | 164.3 | 331.2 | 0.0 | 0.0 | 0.0 | 0.0 | 495.5 | 71.23 |
| 19 | 208.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 208.5 | 100.00 |
| TOTAL | 1497.4 | 920.0 | 372.8 | 0.0 | 236.9 | 141.9 | 3168.98 | |
| %SE | 51.84 | 69.86 | 59.55 | 0.00 | 100.00 | 66.80 | | 42.60 |

Report: BA - Basal Area per Acre
Both ALIVE and DEAD

| DBH | SPECIES | | | | | | | |
|-------|---------|-------|-------|--------|--------|-------|-------|--------|
| | DF | WL | LP | AF | GF | DD | TOTAL | %SE |
| 6 | 0.0 | 0.0 | 6.0 | 2.0 | 0.0 | 0.0 | 8.0 | 55.26 |
| 7 | 0.0 | 0.0 | 6.0 | 0.0 | 0.0 | 0.0 | 6.0 | 71.14 |
| 8 | 2.0 | 0.0 | 6.0 | 0.0 | 0.0 | 4.0 | 12.0 | 36.86 |
| 9 | 2.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 66.67 |
| 10 | 2.0 | 0.0 | 2.0 | 0.0 | 0.0 | 0.0 | 4.0 | 66.67 |
| 11 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 100.00 |
| 12 | 6.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 71.15 |
| 15 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 100.00 |
| 16 | 0.0 | 2.0 | 0.0 | 0.0 | 2.0 | 0.0 | 4.0 | 100.00 |
| 17 | 2.0 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 66.67 |
| 19 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.0 | 100.00 |
| TOTAL | 20.0 | 6.0 | 20.0 | 2.0 | 2.0 | 4.0 | 53.98 | |
| %SE | 47.14 | 71.15 | 36.50 | 100.00 | 100.00 | 66.67 | | 22.80 |

Report: NET SV6 - Net volume Board Ft to 6 in. Top per Acre
Both ALIVE and DEAD

| DBH | SPECIES | | | | | | | |
|-------|---------|-------|-------|------|--------|-------|---------|--------|
| | DF | WL | LP | AF | GF | DD | TOTAL | %SE |
| 7 | 0.0 | 0.0 | 71.6 | 0.0 | 0.0 | 0.0 | 71.6 | 66.85 |
| 8 | 71.1 | 0.0 | 177.6 | 0.0 | 0.0 | 128.5 | 377.2 | 40.26 |
| 9 | 77.1 | 146.8 | 0.0 | 0.0 | 0.0 | 0.0 | 223.9 | 70.58 |
| 10 | 119.8 | 0.0 | 110.4 | 0.0 | 0.0 | 0.0 | 230.2 | 66.74 |
| 11 | 122.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 122.7 | 100.00 |
| 12 | 435.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 435.9 | 71.20 |
| 15 | 191.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 191.2 | 100.00 |
| 16 | 0.0 | 332.9 | 0.0 | 0.0 | 189.5 | 0.0 | 522.4 | 100.00 |
| 17 | 139.7 | 298.1 | 0.0 | 0.0 | 0.0 | 0.0 | 437.8 | 71.91 |
| 19 | 177.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 177.2 | 100.00 |
| TOTAL | 1334.8 | 777.7 | 359.6 | 0.0 | 189.5 | 128.5 | 2790.10 | |
| %SE | 51.82 | 68.90 | 60.07 | 0.00 | 100.00 | 67.80 | | 41.85 |

Report: CVTS - Gross Cubic Foot Volume includes top & stump -- Tract Totals
Both ALIVE and DEAD
Values are in Thousands

| DBH | SPECIES | | | | | | | |
|-------|---------|-------|-------|--------|--------|-------|-------|--------|
| | DF | WL | LP | AF | GF | DD | TOTAL | %SE |
| 6 | 0.0 | 0.0 | 3.9 | 1.3 | 0.0 | 0.0 | 5.1 | 54.60 |
| 7 | 0.0 | 0.0 | 4.0 | 0.0 | 0.0 | 0.0 | 4.0 | 70.27 |
| 8 | 1.4 | 0.0 | 3.7 | 0.0 | 0.0 | 2.7 | 7.8 | 37.86 |
| 9 | 1.3 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3.4 | 69.33 |
| 10 | 1.5 | 0.0 | 1.4 | 0.0 | 0.0 | 0.0 | 2.9 | 66.68 |
| 11 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 100.00 |
| 12 | 4.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.6 | 71.73 |
| 15 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 100.00 |
| 16 | 0.0 | 2.7 | 0.0 | 0.0 | 1.8 | 0.0 | 4.5 | 100.00 |
| 17 | 1.3 | 2.2 | 0.0 | 0.0 | 0.0 | 0.0 | 3.6 | 69.33 |
| 19 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.5 | 100.00 |
| TOTAL | 14.6 | 7.1 | 13.1 | 1.3 | 1.8 | 2.7 | 40.45 | |
| %SE | 48.38 | 72.18 | 37.49 | 100.00 | 100.00 | 66.67 | | 26.81 |

Report: SV6 - Gross Volume Board Ft to 6 in. Top -- Tract Totals
 Both ALIVE and DEAD
 Values are in Thousands

| DBH | SPECIES | | | | | | | TOTAL | %SE |
|-------|---------|-------|-------|------|--------|-------|--------|--------|-----|
| | DF | WL | LP | AF | GF | DD | | | |
| 7 | 0.0 | 0.0 | 2.4 | 0.0 | 0.0 | 0.0 | 2.4 | 66.74 | |
| 8 | 2.5 | 0.0 | 6.0 | 0.0 | 0.0 | 4.7 | 13.2 | 39.39 | |
| 9 | 2.8 | 5.7 | 0.0 | 0.0 | 0.0 | 0.0 | 8.5 | 71.23 | |
| 10 | 4.4 | 0.0 | 3.8 | 0.0 | 0.0 | 0.0 | 8.2 | 66.86 | |
| 11 | 4.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.5 | 100.00 | |
| 12 | 16.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.6 | 71.88 | |
| 15 | 6.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.3 | 100.00 | |
| 16 | 0.0 | 13.7 | 0.0 | 0.0 | 7.8 | 0.0 | 21.5 | 100.00 | |
| 17 | 5.4 | 10.9 | 0.0 | 0.0 | 0.0 | 0.0 | 16.4 | 71.23 | |
| 19 | 6.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.9 | 100.00 | |
| TOTAL | 49.4 | 30.4 | 12.3 | 0.0 | 7.8 | 4.7 | 104.58 | | |
| %SE | 51.84 | 69.86 | 59.55 | 0.00 | 100.00 | 66.80 | | 42.60 | |

Report: TPA - Trees -- Tract Totals
 Both ALIVE and DEAD
 Values are in Thousands

| DBH | SPECIES | | | | | | | TOTAL | %SE |
|-------|---------|-------|-------|--------|--------|-------|------|--------|-----|
| | DF | WL | LP | AF | GF | DD | | | |
| 6 | 0.0 | 0.0 | 1.0 | 0.3 | 0.0 | 0.0 | 1.3 | 55.70 | |
| 7 | 0.0 | 0.0 | 0.8 | 0.0 | 0.0 | 0.0 | 0.8 | 72.06 | |
| 8 | 0.2 | 0.0 | 0.6 | 0.0 | 0.0 | 0.4 | 1.1 | 36.41 | |
| 9 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 66.67 | |
| 10 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 | 66.78 | |
| 11 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.00 | |
| 12 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 71.24 | |
| 15 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.00 | |
| 16 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 100.00 | |
| 17 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 66.67 | |
| 19 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 100.00 | |
| TOTAL | 1.0 | 0.2 | 2.5 | 0.3 | 0.0 | 0.4 | 4.44 | | |
| %SE | 48.61 | 82.84 | 36.92 | 100.00 | 100.00 | 66.69 | | 22.00 | |

Report: NET SV6 - Net volume Board Ft to 6 in. Top -- Tract Totals
 Both ALIVE and DEAD
 Values are in Thousands

| DBH | SPECIES | | | | | | | TOTAL | %SE |
|-------|---------|-------|-------|------|--------|-------|-------|--------|-----|
| | DF | WL | LP | AF | GF | DD | | | |
| 7 | 0.0 | 0.0 | 2.4 | 0.0 | 0.0 | 0.0 | 2.4 | 66.85 | |
| 8 | 2.3 | 0.0 | 5.9 | 0.0 | 0.0 | 4.2 | 12.4 | 40.26 | |
| 9 | 2.5 | 4.8 | 0.0 | 0.0 | 0.0 | 0.0 | 7.4 | 70.58 | |
| 10 | 4.0 | 0.0 | 3.6 | 0.0 | 0.0 | 0.0 | 7.6 | 66.74 | |
| 11 | 4.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 100.00 | |
| 12 | 14.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 14.4 | 71.20 | |
| 15 | 6.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.3 | 100.00 | |
| 16 | 0.0 | 11.0 | 0.0 | 0.0 | 6.3 | 0.0 | 17.2 | 100.00 | |
| 17 | 4.6 | 9.8 | 0.0 | 0.0 | 0.0 | 0.0 | 14.4 | 71.91 | |
| 19 | 5.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.8 | 100.00 | |
| TOTAL | 44.0 | 25.7 | 11.9 | 0.0 | 6.3 | 4.2 | 92.07 | | |
| %SE | 51.82 | 68.90 | 60.07 | 0.00 | 100.00 | 67.80 | | 41.85 | |

Timber Appraisal Summary Table
 SV6 AND NET SV6 are Unit totals in MBF
 Both ALIVE and DEAD

| SP | LOGS/MBF | SV6 | DEF | NET SV6 | XDBH | XLOG/TREE | TPA | QDBH |
|-----|----------|-------|------|---------|-------|-----------|-------|------|
| DF | 28.5 | 49.4 | 0.11 | 44.0 | 10.92 | 1.48 | 29.0 | 11.3 |
| WL | 18.3 | 30.4 | 0.15 | 25.7 | 11.71 | 2.31 | 7.3 | 12.3 |
| LP | 48.8 | 12.3 | 0.04 | 11.9 | 6.92 | 0.24 | 75.2 | 7.0 |
| AF | 0.0 | 0.0 | 0.00 | 0.0 | 6.00 | 0.00 | 10.2 | 6.0 |
| GF | 15.5 | 7.8 | 0.20 | 6.3 | 16.00 | 2.56 | 1.4 | 16.0 |
| DD | 54.9 | 4.7 | 0.09 | 4.2 | 8.00 | 0.68 | 11.5 | 8.0 |
| TOT | 28.1 | 104.6 | 0.12 | 92.1 | 8.16 | 0.66 | 134.5 | 8.6 |

Statistical Summary for Tract Total Net SV6 bdft
 Confidence Level = 90 %

| SP | SV6 M | Net SV6 M | A%AE at 90 % | CW at 90 % | CV% |
|-----|-------|-----------|--------------|------------|-------|
| DF | 49.4 | 44.0 | 94.99 | +/- 41.8 | 163.9 |
| WL | 30.4 | 25.7 | 126.30 | +/- 32.4 | 217.9 |
| LP | 12.3 | 11.9 | 110.10 | +/- 13.1 | 189.9 |
| GF | 7.8 | 6.3 | 183.30 | +/- 11.5 | 316.2 |
| DD | 4.7 | 4.2 | 124.28 | +/- 5.3 | 214.4 |
| TOT | 104.6 | 92.1 | 76.72 | +/- 70.6 | 132.3 |

***** Unit Report *****

Setup Name: NSV6NORMAL
 Minimum DBH: 5.00
 Cut/Leave Not Coded.
 All Trees (Alive & Dead).

| Species Code | LBS/Cuft |
|--------------|----------|
| GF | 60.00 |
| SAF | 55.00 |
| WL | 58.33 |
| S | 57.00 |
| LPP | 56.00 |
| WWP | 60.00 |
| PP | 62.00 |
| BP | 72.00 |
| DF | 61.70 |
| WRC | 44.00 |
| WH | 60.00 |
| PF | 56.00 |
| WB | 56.00 |
| D&D | 40.00 |

| ----- Name ----- | Sample | |
|------------------|---------|-------|
| Unit | Stratum | Type |
| 1 | UNITA | PLOT |
| | | Acres |
| | | 33.0 |

Table Title: Gross CV4 - Gross Cubic Foot Volume to 4 in. Top (M)

| Unit # | DF | GF | LPP | SAF | WL | D&D | Total |
|--------|------|-----|------|-----|-----|-----|-------|
| 1 | 13.6 | 1.7 | 12.6 | 0.9 | 8.0 | 2.4 | 39.2 |
| TOTAL | 13.6 | 1.7 | 12.6 | 0.9 | 8.0 | 2.4 | 39.2 |

Table Title: NET SV6 - Net volume Board Ft to 6 in. Top (M)

| Unit # | DF | GF | LPP | SAF | WL | D&D | Total |
|--------|------|-----|------|-----|------|-----|-------|
| 1 | 44.1 | 6.3 | 11.9 | 0.0 | 25.7 | 4.2 | 92.1 |
| TOTAL | 44.1 | 6.3 | 11.9 | 0.0 | 25.7 | 4.2 | 92.1 |

Table Title: TPA - Trees

| Unit # | DF | GF | LPP | SAF | WL | D&D | Total |
|--------|------|-----|-------|------|------|------|-------|
| 1 | 29.0 | 1.4 | 116.6 | 10.2 | 18.2 | 11.5 | 186.8 |
| TOTAL | 29.0 | 1.4 | 116.6 | 10.2 | 18.2 | 11.5 | 186.8 |

Table Title: Greens Tons based on Gross CVT

| Unit # | DF | GF | LPP | SAF | WL | D&D | Total |
|--------|-------|------|-------|------|-------|------|--------|
| 1 | 434.6 | 51.1 | 457.0 | 33.2 | 254.1 | 52.6 | 1282.6 |
| TOTAL | 434.6 | 51.1 | 457.0 | 33.2 | 254.1 | 52.6 | 1282.6 |

Unit Report for Project Name: Elk Creek
 Setup Name: NSV6NORMAL

Table Title: Difference between (CV3 -CV6) (M)

| Unit # | DF | GF | LPP | SAF | WL | D&D | Total |
|--------|-----|-----|------|-----|-----|-----|-------|
| 1 | 1.7 | 0.0 | 10.3 | 1.0 | 2.2 | 1.0 | 16.2 |
| TOTAL | 1.7 | 0.0 | 10.3 | 1.0 | 2.2 | 1.0 | 16.2 |

Table Title: Difference in Tons between (Gross CV3 - Gross CV6)

| Unit # | DF | GF | LPP | SAF | WL | D&D | Total |
|--------|------|-----|-------|------|------|------|-------|
| 1 | 50.9 | 0.9 | 288.8 | 27.9 | 62.9 | 20.5 | 452.0 |
| TOTAL | 50.9 | 0.9 | 288.8 | 27.9 | 62.9 | 20.5 | 452.0 |

Appraisal Report for Project Name: Elk Creek
 Setup Name: NSV6NORMAL
 Minimum DBH: 5.00
 Cut/Leave Not Coded.
 All Trees (Alive & Dead).

Appraisal Report Stratum - UNITA

| | | DF | GF | LPP | SAF | WL | D&D | Total |
|------------|-----|------|------|-----|-----|------|-----|-------|
| Gross SV6 | MBF | 49 | 8 | 12 | 0 | 30 | 5 | 105 |
| Defect % | | 10.9 | 20.0 | 3.5 | 0.0 | 15.5 | 9.4 | 12.0 |
| Net SV6 | MBF | 44 | 6 | 12 | 0 | 26 | 4 | 92 |
| QDBH | | 11 | 16 | 6 | 6 | 9 | 8 | 8 |
| NSV6/acre | BF | 1335 | 189 | 360 | 0 | 778 | 128 | 2790 |
| Trees/acre | | 29 | 1 | 117 | 10 | 18 | 11 | 187 |

Stratum Statistics - UNITA Confidence Level = 90 %

| NSV6 | | | | | | |
|---------|------|-------|------|--------|-------|--|
| Species | MBF | %CV | SE | -/+ CW | A%AE | |
| DF | 44.1 | 163.9 | 22.8 | 41.8 | 95.0 | |
| WL | 25.7 | 217.9 | 17.7 | 32.4 | 126.3 | |
| LPP | 11.9 | 189.9 | 7.1 | 13.1 | 110.1 | |
| GF | 6.3 | 316.4 | 6.3 | 11.5 | 183.4 | |
| D&D | 4.2 | 214.4 | 2.9 | 5.3 | 124.3 | |
| TOTAL | 92.1 | 132.3 | 38.5 | 70.6 | 76.7 | |

Appraisal Report Stratum - TOTAL

| | | DF | GF | LPP | SAF | WL | D&D | Total |
|------------|-----|------|------|-----|-----|------|-----|-------|
| Gross SV6 | MBF | 49 | 8 | 12 | 0 | 30 | 5 | 105 |
| Defect % | | 10.9 | 19.9 | 3.6 | 0.0 | 15.4 | 9.4 | 12.0 |
| Net SV6 | MBF | 44 | 6 | 12 | 0 | 26 | 4 | 92 |
| QDBH | | 11 | 16 | 6 | 6 | 9 | 8 | 8 |
| NSV6/acre | BF | 1335 | 189 | 360 | 0 | 778 | 128 | 2790 |
| Trees/acre | | 29 | 2 | 117 | 10 | 18 | 12 | 187 |

Stratum Statistics - TOTAL Confidence Level = 90 %

| NSV6 | | | | | | |
|---------|------|-------|------|--------|-------|--|
| Species | MBF | %CV | SE | -/+ CW | A%AE | |
| DF | 44.1 | 163.9 | 22.8 | 41.8 | 95.0 | |
| WL | 25.7 | 217.9 | 17.7 | 32.4 | 126.3 | |
| LPP | 11.9 | 189.9 | 7.1 | 13.1 | 110.1 | |
| GF | 6.3 | 316.4 | 6.3 | 11.5 | 183.4 | |
| D&D | 4.2 | 214.4 | 2.9 | 5.3 | 124.3 | |
| TOTAL | 92.1 | 132.3 | 38.5 | 70.6 | 76.7 | |

Appendix 10. History of the Elk Creek School, Nearby Roads and Trails, and Recreational Use

Elk Creek School

Several homesteads were located on former Forest Service land in Township 21, Range 17 W (sections 34, 28, and 26) and also upstream along Elk Creek in Township 20, Range 17 W (Sections 4 and 10). About half of these homesteaders were married and had children. (See Appendix 10, List of Patented Homesteads and List of Relinquished Homesteads)

In the early 1910s, it was common for families to build small one-room schools in neighborhoods with elementary-age children. The Elk Creek School, located between the two channels of Elk Creek in Section 35 was built in 1918 under the authority of the Missoula County Public Schools system.^{44 45} This school was one of only three in the Swan Valley at that time, the other two being the Rumble Creek School (2-1/2 miles south) and the Smith Creek School (about two miles east of the river).⁴⁶

Alice Brunson Lawrence attended Elk Creek School, and remembered her mother's stories. "At the same time my parents filed for their homestead, other families with children also filed adjoining homesteads. The A.I. Sias⁴⁷ family was directly south of us, and the M.I. Sias family was just south of Joe Richmond.⁴⁸ There were also three Sias boys close to my age. Clarence and Mrs. Maloney and their children also lived on a homestead about one mile southeast of us. With the number of families who had moved into the western edge of the valley, it soon became evident that it would be difficult for the children to get to the Rumble Creek School during the winter that was 2 to 2-1/2 miles away. Mama became very active in trying to get a school built near our location, and was successful after meeting with both the local school board and county superintendent in Missoula.

The Elk Creek School, located between Big and Little Elk Creeks, was erected in 1918. During the summer of 1918, Ethel and I attended the school under the direction of teacher Miss Jessie Larkin. She also boarded with us at our cabin and was like a big sister. In addition to us, five other students attended the 1918 summer session including Clarence and Thora Maloney, Minnie Sias, two of the Sias brothers, and Carl Haasch. . . . During

⁴⁴ According to Alice Brunson Lawrence, Walter Haasch may have built the Elk Creek School.

⁴⁵ Elk Creek School GPS coordinates: N 47 deg. 31.957 min, W 113 deg. 44.608 Min. Elk Creek School outhouse: N47 deg. 31.963 W 113 deg. 44.621 Min.

⁴⁶ Browman, Audra. In 1904 the school district had been established by Missoula County but the schools were at Placid Lake and Corlett (just south of Seeley Lake). In March 1918, Minnie Crone of Swan River succeeded in petitioning for a division of the districts at the watershed divide. The northern part of the district was named Swan District #33 and the southern part became Seeley Lake School District #34.

⁴⁷ Also spelled "Scias."

⁴⁸ Joe Richmond shows up in several early-day records of the area. However, his name is not listed in the homestead entries for this township. Lawrence wrote "a man by the name of Mr. Wiseman . . . purchased Joe Richmond's homestead." (page 9, My Swan River Memories, 1916-1990).

the winter we hiked $\frac{3}{4}$ mile with the Sias children in snow halfway up to our knees or deeper to get to school. The boys broke trail in front of us. We also crossed the Big Elk Creek Bridge that had been built by Joe Richmond.”⁴⁹

Alberta Kottka, a single woman who filed a homestead entry in 1918 west of Elk Creek, also taught at the Elk Creek School from the fall of 1920 through the spring of 1921.⁵⁰ Although the school was built in 1918, it only operated until the fall of 1923, when a chimney fire ignited the wooden roof and burned the building to the ground. Students and the teacher moved their classes to a neighbor’s cabin for the remainder of that school year, and the Elk Creek School disappeared from both the landscape and the Missoula County records. Harold Haasch remembered it this way. “One year the kids at that school had to hold their Christmas program at Red Williams' house because the school had burned down. [Red] let the kids and the teacher use his house as a school during the day, too.”⁵¹ In 1986, only a few logs from the school’s outhouse remained at the site.⁵²

Roads and Trails

Early homesteaders used wagons and horses to navigate the roads and trails in and out of the Swan River country from the late 1800s up until about 1919. Alice Brunson Lawrence, daughter of an early-day homesteader, wrote in 2001, “We first went into Swan Valley in the summer of 1916 when Dad and Mama were considering filing for a homestead. . . . Since the trails were not good enough for cars to make the trip, my parents rented a covered wagon and a team of horses from a livery stable.” Lawrence’s stories continue. “By 1919, the road from Missoula to Swan River had been extended all the way to Condon and beyond, and many of the trails to the homesteads had been improved for cars. Dad and Mama could then drive the Model T Ford all the way to the cabin although the roads were still rough and narrow and some still had stumps in the middle of them that the high-wheeled cars were able to clear.”

Two of the earliest roads shown on the 1914 map of T21N and R17W of the Swan Valley include the road labeled “Lion Creek to Ovando” east of the Swan River, and a side road labeled “the road to McCrackens.” This latter road led from the Lion Creek-to-Ovando road in the vicinity of the modern-day Swan Valley Community Hall and continued west across Swan River and the east fork of Elk Creek in Section 35, and ended in Section 34. The road was apparently built by a homesteader named Freda McCracken, who filed a

⁴⁹ The location of this bridge is unclear. That is, if the children crossed the bridge before they got to school, the bridge would have been across the westernmost channel of Elk Creek shown on the 1914 map. This channel is barely visible today. Today, remains of an early bridge can be seen just downstream from the existing Elk Creek Bridge, on the main channel of Elk Creek (GPS coordinates of abutment on east side of creek: N47 Deg. 31.996 Min. W 113 Deg. 44.492 Min.)

⁵⁰ USDA Forest Service Homestead Entries and Inspections Reports, Flathead National Forest.

⁵¹ Haasch, Harold. Upper Swan Valley Oral History Project, Summer 2001.

⁵² Wiesner, Diann E. Schools of the Swan Valley, 1918-1956 by the Swan Valley School Class of 1986. June, 1986. Unpublished report.

homestead entry in 1916 but relinquished it in 1917.⁵³ In files located at the Mansfield Library in Missoula, historian Audra Browman wrote that McCracken “must have been a very energetic soul, for his (sic) side road is the only road branching off the Ovando-Lion Creek road that is marked on early maps. A number of trails are indicated crisscrossing the valley, but none other is called a side road.”⁵⁴

Other trails of interest shown on the map include a blazed trail along the east side of the river in Section 26, along with pack trails parallel to the river in portions of sections 22, 26 (west of the river channels) and sections 35 and 36 (east of the river channels). These trails would indicate possible use of the area by Indians, early trappers and prospectors, packers, guides and homesteaders active in the area at the time of the early 1900s surveys.

Alice Brunson Lawrence remembered trails to the river in Section 34 and 35, and to the post office across the river in Section 26 (located at the Drury homestead, SE1/4 Section 26, now Charles Road). “My father had blazed a trail to the High Banks area for fishing and also another trail that branched off of it and went across Swan River on a single pole footbridge with rails to the Swan Valley post office.”

Lawrence’s stories and others told by lifelong resident Gyda Newman, who was interviewed for the Upper Swan Valley Oral History Project⁵⁵, indicate that the first bridge over Elk Creek in Section 35 was built before 1918. Remains of old bridge abutments can be seen downstream from the present-day bridge location. The original pole bridge was replaced by Burlington Northern, Inc. in the early 1970s to facilitate logging. A Missoula County letter from the bridge department to the county surveyor following a bridge inspection in 1987 states that, “The bridge consists of two adjacent railroad boxcars set on 24” diameter untreated log abutments. A timber deck was laid on the existing flatcar flooring. The total structure length is 53 feet and its width is 20 feet.”

Recreation

Recreational use of Section 35, Elk Creek and the surrounding area has consisted mainly of local residents who enjoy hunting, fishing and hiking in the area. During the 1930s, many of the homesteaders moved away from the Swan Valley in order to find full-time work. Even so, many of them maintained their cabins as summer vacation properties. Bob and Gyda Newman, longtime residents of the Swan Valley, used Gyda’s family’s homestead as a summer cabin from the 1940s through about 1972, when Bob retired from his railroad job in Missoula. “Elk Creek is the most beautiful creek in the world. We had it all to ourselves for many, many years,” Bob said during a visit to the cabin in 2003.⁵⁶

⁵³ Map of Township 21 North, Range 17 West, US Surveyor General’s Office, Helena, MT, December 14, 1914. Map in the personal possession of William R. “Bud” Moore, Condon, Montana, Coyote Forest Archives; and USFS Flathead National Forest Supervisor’s Office, Engineering, Land Records and Maps.

⁵⁴ Browman, Audra. History of the Swan Valley. Pp. 26. Unpublished paper.

⁵⁵ Newman, Gyda. Upper Swan Valley Oral History Project, 1999.

⁵⁶ Newman, Bob. Upper Swan Valley Oral History Project, 2003 notes.

(Section 10, T20N, R17W). The Newmans, along with many other summer residents of this area, treasured the quiet and beauty they enjoyed seasonally.

Alice Brunson Lawrence wrote, “After we left the homestead in 1921, we never used it as a permanent residence again but as a summer cabin.” Later, she describes those summer trips. “From the summers of 1921 to 1929, we always took our vacation at the homestead in Swan River for periods up to three weeks in late July and early August. My close friend Merlyn Jones sometimes went with us and we swam and hiked. Dad always went fishing at “High Banks” and would take two fishing baskets once a week and fill them up with bull trout and what he called “red bellies” that were probably Dolly Varden. He would bring them to the cabin and Mama and I would clean them in a wash tub.

Lawrence further describes High Banks. “Dad enjoyed fishing and had a favorite fishing spot on Swan River that he called “High Banks.” It was 1 to 1-1/2 miles northeast of our cabin, and could be reached by taking a steep trail that he had blazed down to the river,” wrote Alice Brunson Lawrence in 2001. The term “High Banks” was commonly used to describe this area as late as the 1970s, when apparently the river channels changed. Currently, this westernmost channel of the river (which was clearly marked on the 1914 GLO map) is dry and overgrown with shrubs and trees.⁵⁷

Twentieth century homesteaders in the Upper Swan Valley also depended upon fish in the streams and the river channels to supplement their diets, especially during the early summer cutthroat spawning and the fall bull trout spawning seasons.⁵⁸ Early residents said that the fishing was excellent in the river near the mouths of Elk Creek, Glacier Creek and Cold Creek.

In more modern times, local residents and avid anglers enjoyed a variety of subsistence gathering and outdoor recreation activities all along Elk Creek and along the river downstream from the mouth of Elk Creek toward the large “island” where the river braids channels through sections 35, 26 and 23. Favorite fishing areas, “High Bank” and “Little High Bank,” existed along a river channel just west of the island located on the eastern boundary of Section 27, and into Section 26. One of the country’s foremost fly fishermen and Seeley Lake author, Norman Maclean, often fished the Swan River downstream from the mouth of Elk Creek, on Forest Service land in Section 26.⁵⁹ However, for the past thirty years Elk Creek has been closed to all fishing to protect native bull trout.

⁵⁷ Harmon, Wayne A. “Butch.” Personal communication to Suzanne Vernon, 2000.

⁵⁸ Huston, Ken. Upper Swan Valley Oral History Project, 1999. Haasch, Harold. Upper Swan Valley Oral History Project, 1999. Bob Newman, July 2003 Personal communication to Suzanne Vernon.

⁵⁹ Moore, Bud. Personal communication to Suzanne Vernon, September 2006.

Appendix 11. Homesteads and relinquished homestead claims in the vicinity of Section 35.⁶⁰

| Name | Filed | Relinquished | Location | Acres | Notes |
|-----------------|--------------|---------------------|--|--------------|---|
| George McEvan | 2/11/09 | 6/25/13 | Sections 3, 4 | 109.2 | List revoked letter of 12/21/17. Also T22N, R17W, sections 33, 34 |
| Myrtle Whistler | 12/9/16 | 11/20/17 | Section 12, SW 4 | 160 | Mary Harris filed in 11/20/17 and proved up 10/3/22 |
| John Haine | 9/17/17 | 8/21/19 | Section 14, NW of SE NE of SW4, W2 of SW 4 | 40 120 | |
| Harry Raun | 12/20/16 | 5/24/17 | Section 26, E2 of NW | 80 | |
| Fred Miller | 6/18/17 | 10/23/22 | Section 26, E2 of NW | 80 | |
| Ione Hosford | 10/23/22 | 4/26/26 | Section 26, E2 of NW | 80 | This area tried 3 times and never proved up on. Fred Harrick tried in 1930 and proved up in 1935. |
| Mary Garner | 12/29/16 | 5/24/17 | Section 26, N2 of SW | 80 | This includes the north half of Bud Moore's land |
| Nathan Tracy | 11/24/16 | 11/24/16 | Section 28, E2 of SE 4, E 2 of NE 4 | 160 | Wrong location |
| Mirl Leo Sias | 9/5/16 | 12/16/19 | Section 34, SE 4 | 160 | Cancelled by GLO. Looks like he then homesteaded in T20 R17 Section 4 |
| Freda McCracken | 9/2/16 | 5/28/17 | Section 34 | 160 | Husband was Alexander – found on survey note |
| NJ (?) Frye | 12/29/16 | 5/24/17 | Section 36 | 80 | |
| Joseph Griffin | 5/24/17 | 9/9/19 | Section 36 | 80 | Jessie Forster tried in 9/9/19 and proved up 9/28/23 |
| Julia Miller | 6/2/17 | 5/1/18 | Section 36 | 40 | |

⁶⁰ U.S. Forest Service, Flathead National Forest, Kalispell. No date. Relinquished Homestead Claims, T21 N, R17 W, Sections 34, 36, 26, 3, 4, 33, 14, 28.