MONTANA DEPARTMENT OF STATE LANDS

STATE FOREST LAND MANAGEMENT PLAN

DRAFT ENVIRONMENTAL IMPACT STATEMENT APPENDIXES

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State forest land management plan :draft

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DEPARTMENT OF STATE LANDS
FORESTRY DIVISION

MARC RACICOT, GOVERNOR

2705 SPURGIN ROAD

STATE OF MONTANA

(406) 542-4300

MISSOULA, MONTANA 59801-3199

June 19, 1995

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TO THOSE INTERESTED IN STATE FOREST LAND MANAGEMENT:

Attached is the Department of State Lands' Draft Environmental Impact Statement on our proposed State Forest Land Management Plan (SFLMP).

We ask for your feedback to help us decide which strategy to adopt as overall program direction for management of forested state lands. While all your constructive comments are useful, the most helpful feedback is as clear and specific as possible.

We will accept comments on the Draft EIS until Friday, August 4, 1995. A Request for Comments information sheet is included. We will carefully review all the input received to determine what changes or additional assessments are needed. The next step will be release of a supplement to the Draft, or a Final Environmental Impact Statement (FEIS) with a preferred alternative. That step will be based on the direction comments take us.

The Board of Land Commissioners will then review the FEIS and the Department's proposed decision and make a final decision whether to take the proposed action, take an alternative action or take no action.

The planning process for the SFLMP was begun in 1990. Most of the primary components were completed before the 1995 Montana Legislature passed House Bill 201 (Ch. 517, Laws of Montana 1995), "An Act Requiring that Annual Sustained Yield Be Used As A Factor in the Management of Forested State Trust Lands" (HB 201). HB 201 directs us to commission a study to determine the annual sustainable yield on forested state lands. The sustained yield study will be initiated by the Department following the Board's final decision on the Management Plan.

Thank you for the constructive role you have already played in this process, and we look forward to receiving your additional comments now.

Sincerely,

DON ARTLEY
STATE FORESTER

DA:kmk
Attachment

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REQUEST FOR COMMENTS
Department of State Lands
Forestry Division

Comments on the Draft Environmental Impact Statement (DEIS) for the State Forest Land Management Plan will be accepted for 45 days (through Friday, August 4, 1995). Written comments should be sent to:

Pat Flowers
Department of State Lands, Forestry Division
2705 Spurgin Road
Missoula, MT 59801

Public hearings will be held for receiving comments as follows:

BILLINGS	Montana State University at Billings Student Union Building Lewis & Clark Room July 13, 1995--7:30 p.m.
DILLON	University of Montana-Dillon Lewis and Clark Room July 17, 1995-- 7:30 p.m.
BOZEMAN	Old Courthouse 311 West Main Community Room July 18, 1995--7:30 p.m.
MISSOULA	Holiday Inn 200 South Pattee July 19, 1995--7:30 p.m.
KALISPELL	Outlaw Inn 1701 Highway 93 South July 20, 1995--7:30 p.m.

**AN OPEN HOUSE WILL PRECEED EACH HEARING,
BEGINNING AT 6 P.M.**

MONTANA DEPARTMENT OF STATE LANDS

**STATE FOREST LAND
MANAGEMENT PLAN**

APPENDIXES

TO THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

JUNE 19,1995

Order of Appendixes:

Appendix WRK - How the State Forest Land Management Plan Works
Appendix MNG - Managing the Plan
Appendix LGL - Legal Framework
Appendix SCP - Scoping
Appendix SCN - Plausible Output Scenarios
Appendix RMS - Resource Management Standards
Appendix VEG - Vegetation Technical Appendix
Appendix WLD - Wildlife
Appendix FSH - Fisheries Methodology Appendix
Appendix ECN - Economic Assessment

WCS-25-49771

APPENDIX WRK

HOW THE STATE FOREST LAND MANAGEMENT PLAN WORKS

THE NATURE OF A PROGRAMMATIC PLAN

MEPA (the Montana Environmental Policy Act) requires agencies to draft and review plans for their administrative programs as well as for site-specific proposals. A programmatic plan is one that establishes a philosophy within which an agency will implement its management programs.

Using the MEPA process, we have prepared six alternative programmatic plans, or administrative philosophies. The resulting State Forest Land Management Plan will be the strategy that guides management decisions statewide.

Because of its philosophic nature, the chosen plan will not tell a manager what to decide; it will help him or her know how to weigh various factors in making a decision. It will tell us what to emphasize and where to look first when allocating resources. However, it will not prevent us from considering other options which are also consistent with the primary philosophy. The chosen plan will define DSL's forest management policy in terms of what assumptions we make about the future, and what priorities we use when we make decisions.

The plan will not allocate any land for specific use. Instead, it will focus our attention on certain types of use, or on a certain stance to take in deciding how to allocate the use. This focus will make certain land-use allocations more likely under some of the alternative plans than under others; however, a separate, site-specific MEPA assessment process will decide each actual allocation.

THE SCHOOL TRUST MANDATE

All of the six draft alternative plans have the goal of managing state lands to secure the greatest long-term income for the school trust. The different approaches represent differing beliefs and assumptions as to the best way to meet the trust mandate. Some people believe we should manage the land intensively for many products. Others think we should emphasize a single use. And, some argue that we should minimize current intervention and allow nature to preserve our future options in its own way.

Some assume that future values will far outweigh any returns we could realize now, and that current intervention would eliminate valuable future options. Others assume that relative values will remain pretty much the same as in the past, and/or believe that intervention now need not foreclose important future options.

The range of alternatives we have drafted is meant to fairly consider all of these views. We have estimated the economic and environmental effects of each alternative plan. DSL will decide which one offers our best chance to satisfy the trust mandate while managing state forest lands according to high professional standards and giving fair consideration to concerns of the public.

HOW THE PLAN RELATES TO SITE-SPECIFIC DECISIONS AND ALLOCATING LAND-USE

The plan will become one of four major elements in our overall planning process. The other three are (1) the legislature's laws and budgets; (2) DSL's Biennial Budget Program Implementation Process(BBPI); and (3) Field Operation's annual work plan.

The legislature expresses the wishes of Montana's citizens in the form of laws and budgets, which in turn shape both DSL's chosen programmatic plan and each BBPI. The BBPI is an agreement with the legislature on how to allocate finances; it tells us what annual goals and objectives we must meet, and what budget and staff we have to work with.

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Field operations managers will fit three elements together to draft a list of potential projects; the philosophy and goals of the programmatic plan; the biennial plan's goals, budget, and staffing; and their knowledge of potential uses of state lands. They will then use these potential projects to set the BBPI's annual objectives. Selected projects will be scheduled for MEPA review.

At this point, DSL will check the State Forest Land Management Plan (SFLMP) to see what resource management standards the projects will need to meet, and to determine whether any of the projects would be exempt from MEPA review. For projects that require MEPA review, we will present the analysis and decision making process in a MEPA document that shows the ties among the proposed land use allocations, the State Forest Land Management Plan, and the BBPI's goals and objectives.

During the year, field operations managers will feed information on what is working and what is not working back to Forestry Division staff through the BBPI process. This could result in modifying the plan, if the State Forester believed the plan was out of date in some way, or asking the legislature to change laws or budgets if the State Forester believed DSL needed such action to properly implement the plan.

IMPLEMENTING THE PLAN

DSL will implement the new State Forest Land Management Plan gradually. Some changes would take place almost immediately, while others might take two to five years, or more.

DSL could begin significant changes in land use by modifying traditional uses, followed by mixing new and old uses, and eventually by discontinuing some traditional uses altogether. For example, we might gradually adjust or phase out existing leases and licenses as renewal dates come up.

As DSL continues to implement the new plan, we would undoubtedly discover features of the plan that were not working well, problems that we had not adequately addressed, and issues that we had not anticipated at the time we developed the plan. DSL's Plan Management Strategy (a separate document) is meant to be flexible enough to accommodate changes as we need them, yet require a sufficiently rigorous process to protect against arbitrary departures from the philosophy of the plan.

Regardless of which alternative is chosen, we will have a programmatic plan that defines DSL's intentions, resource management standards, and preferred methods for generating revenue for Montana's schools. By having an underlying, guiding philosophy, all levels of DSL personnel will be able to make forest management decisions consistent with a single plan that supports Department goals and has been through public review.

APPENDIX MNG

MANAGING THE PLAN

ROUTINE MONITORING

Every fifth year, the Forestry Division Administrator would make a written report to the Commissioner of State Lands on the current status of Plan implementation and effectiveness, including a recommendation on the need for significant changes to the Plan.

WHEN IS A CHANGE REQUIRED AND WHAT IS THE PROCEDURE?

The Plan could be reviewed and changed at any time for one of more of the following reasons:

- 1) New legislation is passed that is not compatible with the chosen alternative.
- 2) New direction from the Board of Land Commissioners.
- 3) The Forestry Division Administrator judges that original assumptions supporting the Plan no longer apply.

Minor changes or additions could be made as long as they were compatible with the overall Plan. Cumulative minor changes could result in a programmatic review of the entire Plan.

Procedure for Making Changes

- 1) The Forest Management Advisory Committee would be responsible for drafting changes.
- 2) Draft changes would be sent to all Area Managers for review and comments.
- 3) The Forestry Division Administrator would be responsible for determining the appropriate level of MEPA review.

UNDER WHAT CIRCUMSTANCES WOULD WE BE ABLE TO CHANGE MANAGEMENT DIRECTION WITHOUT CHANGING THE PLAN?

The Forestry Division Administrator could change management direction without changing the Plan if the proposed change did not violate the fundamental intent as reflected in the Plan and supporting EIS. For example, as new information became available we might modify our biodiversity strategy without amending the plan as long as, in the judgment of the Division Administrator, the changes remained consistent with our original intent.

HOW WOULD WE TRANSLATE A "PROGRAMMATIC PLAN" TO MAKE IT USABLE IN THE FIELD?

Our implementation training process will include opportunities for field managers to test the Plan against various situations they expect to face. We expect that interpretation of the Plan will be an on-going process, especially during the first few years. Interpretation would be through continuing dialogue between field people, managers, and the Forestry Division.

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HOW WILL WE IMPLEMENT THE PLAN?

Once the Plan has been adopted, the following implementation measures would be taken.

- 1) DSL staff will provide initial and on-going training and orientation. Initial training will give people the opportunity to get their questions on interpretation and implementation answered immediately. At that time we will also explain the process field employees should use to get future Plan implementation questions answered. The training will include discussion of the authority of different administrative levels in Plan implementation.
- 2) The Department's Biennial Budget Program Implementation (BBPI) process is used to integrate budgets and program objectives. This process will also be used to ensure that the State Forest Land Management Plan (SFLMP) continues to be usable by the field.

The goals and program direction outlined in the BBPI process are updated each biennium, at which time we recommend modifications to proposed budgets and staffing. These updates would reflect management direction provided in the SFLMP. Program objectives and work plans would then be updated to be consistent with the new BBPI .

The Forest Management Bureau would meet every year with all the Land Offices to revise program objectives. At that time they would agree on the objectives that best met the intent of the State Forest Land Management Plan. They would also discuss the overall ability of the Land Offices to comply with the SFLMP. Although discussion about SFLMP implementation should go on throughout the year, this review will guarantee that SFLMP implementation is reviewed at least annually.

- 3) We will notify the public, DSL lessees/licensees, and other state land users when we begin Plan implementation.

HOW WILL WE ENSURE COMPLIANCE WITH THE PLAN?

The following measures would be used to ensure that the Plan is being followed by DSL staff.

- 1) During our annual review, we would revise Program Plan goals and objectives as necessary to remain in compliance with the State Forest Land Management Plan.
- 2) We would monitor individual resources, based on resource management standards specified in the Plan, and take the prescribed corrective actions when problems occurred. We would also ensure that prescribed corrective actions were included in contracts and implemented.

HOW WOULD DSL RESPOND TO THE POSSIBLE NEED TO MODIFY RESOURCE MANAGEMENT STANDARDS?

- 1) When Forestry Division staff or field personnel identified a resource or Department activity that may require the development of a new or modified resource management standard, they would submit a proposal to the Forest Management Advisory Committee.
- 2) The Forest Management Advisory Committee would assess the need to modify a resource management standard, and prepare a recommendation to the State Forester. The recommendation would consider the following questions:

- a) How widespread is the issue, resource or activity? Is the issue relevant only on a given Land Office or Unit, or does it affect several Land Offices or a large share of the state land base?
 - b) Does the issue or activity have long-term implications, or is it of limited duration?
 - c) To what extent is the resource management standard impacting our ability to make management decisions or to derive income from trust lands?
 - d) Why is the issue most appropriately addressed in a resource management standard?
 - e) Can the issue or activity be addressed consistently on the majority of state forested lands?
 - f) Is there sufficient information or accepted procedure to support adding or modifying a resource management standard?
 - g) How would the modification of the resource management standard affect workloads and our ability to manage other resources?
- 3) Upon approval from the State Forester, the Forest Management Advisory Committee would develop the resource management standard, using the most appropriate expertise and representation.

APPENDIX LGL

LEGAL FRAMEWORK

INTRODUCTION

The purpose of this appendix is to outline the legal framework within which the proposed State Forest Land Management Plan would be implemented. The following major topics will be covered:

- I. General Legal Framework
- II. Planning and Environmental Assessment
- III. Land Administration
- IV. Resource Management

Discussion of each topic will include brief snapshots of relevant federal and state laws, and selected rules from the Administrative Rules of Montana. All applicable federal and state laws and regulations are assumed to be incorporated as part of this framework. Certain laws and regulations not summarized here are directly incorporated by reference to code citations.

Two abbreviations are used throughout the following descriptions:

MCA - Montana Code Annotated
ARM - Administrative Rules of Montana

GENERAL LEGAL FRAMEWORK

All state school trust lands are under the direction and control of the Board of Land Commissioners which consists of the governor, superintendent of public instruction, auditor, secretary of state, and attorney general. (Article X, section 4, 1972 Montana constitution) The Department of State Lands is charged with the management of state school trust lands under the direction of the Board of Land Commissioners (2-15-3201, 77-1-301, MCA). The Board of Land Commissioners and the Department of State Lands will be referred to collectively hereafter as DSL.

Federal lands were granted to the state of Montana when Montana was admitted into the Union. The Enabling Act of 1889 (25 STAT. 679) granted the state Sections 16 and 36 in each township (or other lands in lieu of those sections) "for the support of common schools". The Enabling Act also created several other smaller trusts that provide income for the state universities and other state institutions. In Montana's 1889 constitution, the state accepted the lands and promised they would be held in trust and would be managed to conform with the provisions of the Enabling Act. Article I of Montana's 1972 constitution is a compact with the United States where the state reaffirmed its acceptance of the terms of the Enabling Act.

While all trust lands are considered state-owned, they may only be managed to fulfill the specific purposes for which the trust was created (i.e., the lands must be managed to provide income for the designated trust beneficiary such as the common schools, agricultural college, mining college, asylums, reform school, or public buildings). This means that any use of the lands must result in income to the intended trust beneficiary. Montana's constitution goes further and states that any use of the trust lands must generate "full market value."

The constitution also gives the Board of Land Commissioners the authority to manage and control the disposition of the trust lands. They can take no action contrary to the broad trust principles outlined above. However, they have broad discretion in applying those principles. That discretion is necessary because DSL is required to not only satisfy trust principles, but also to comply with state statutes.

The need for discretion on the part of DSL is alluded to in Section 77-1-202, MCA, "... these lands and funds are held in trust for the support of education and for the attainment of other worthy objects helpful to

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the well-being of the people of this state. The board shall administer this trust to secure the largest measure of legitimate and reasonable advantage to the state."

The discretionary authority of DSL is based on two principles. The first is the concept of sustained yield. The Montana Supreme Court has said, "In exercising its constitutional authority, the legislature has provided that full market value shall encompass the concept of sustained yield." Jerke vs. Department of State Lands. Therefore, it is within the discretion of the DSL to receive less income currently, if this action will maintain the long term productivity of the land and guarantee income to the beneficiaries in the long run.

For example, DSL may require designated skid trails to minimize site compaction and allow for regeneration of a future forest. Harvest values received by the DSL may be reduced because designated trails were required, but the trails should provide for sustained yield on the site that otherwise might not be realized. Another example is the DSL may prescribe a shelterwood timber harvest that generates less immediate return than a clearcut, because the shelterwood is expected to provide for regeneration and better long run financial return to the trust.

The second important principle is that DSL's management of school trust lands is subject to state and federal laws enacted to protect public health, safety, welfare or the environment. Montana's Constitution requires that "The state and each person shall maintain and improve a clean and healthful environment in Montana for present and future generations" and directs the legislature to enact laws to this end (1972 Montana Constitution, Article IX, Section 1) Several such laws are discussed in section IV of this chapter, RESOURCE MANAGEMENT.

PLANNING AND ENVIRONMENTAL ASSESSMENT

DSL's activities in management of state school trust lands are also subject to the planning and environmental assessment requirements of the Montana Environmental Policy Act (MEPA) (75-1-101 et seq., MCA) and the administrative rules implementing MEPA (ARM 26.2.628-663). This statute sets out broad policies directing state agencies "to create and maintain conditions under which man and nature can coexist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations" (75-1-103, MCA).

MEPA also imposes specific requirements for making decisions on proposed state actions affecting the environment. MEPA includes provisions, among others, which require state agencies "to the fullest extent possible" to:

- use a systematic, interdisciplinary approach in planning and decision making which may have an impact on the human environment;
- use procedures which consider unquantified environmental amenities and values as well as economic and technical considerations;
- prepare a detailed environmental impact statement on proposals for state actions significantly affecting the quality of the human environment.
- study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources;
- initiate and utilize ecological information in the planning and development of resource-oriented projects. .

In its management of state lands DSL is also required to afford citizens a reasonable opportunity to participate in the operations of the agency prior to the final decision of the agency. Article II, section 8,

1972 Montana constitution. Specific requirements for citizen participation are found at 2-3-101 et seq., MCA, ARM 26.2.701-707, and in the MEPA rules.

LAND ADMINISTRATION

Title 77, MCA and ARM Title 26 respectively contain statutes and rules which provide specific legal requirements and procedures for state land management. The subjects addressed by these laws are briefly outlined below.

I. Statutes (Title 77, MCA)

- A. Chapter 1, Administration of State Lands: contains general provisions relating to state lands including powers and duties of the Board and of the Department, multiple use management, classification, equalization payments, resource development, and ownership records. Section 77-1-203, MCA provides that:
 - 1. "The board shall manage state lands under the multiple use management concept defined as the management of all the various resources of the state lands so that:
 - a. "they are utilized in that combination best meeting the needs of the people and beneficiaries of the trust, making the most judicious use of the land for some or all of those resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions and realizing that some land may be used for less than all of the resources; and
 - b. "harmonious and coordinated management of the various resources, each with the other, will result without impairment of the productivity of the land, with consideration being given to the relative values of the various resources.
 - 2. "If a parcel of state land in one class has other multiple uses or resource values which are of such significance that they do not warrant classification for the value, the land shall, nevertheless, be managed insofar as is possible to maintain or enhance these multiple-use values."
- B. Chapter 2, Transfers and Reservations of Property Interests: contains provisions dealing with easements, exchanges, and sales of state land.
- C. Chapter 3, Rock, Mineral, Coal, Oil, and Gas Resources: contains provisions dealing with prospecting permits and mineral leases handled by the Mineral Leasing Bureau of the Lands Division of the Department.
- D. Chapter 4, Geothermal and Hydroelectric Resources: contains provisions for leasing for development of such resources.
- E. Chapter 5, Timber Resources: contains provisions relating to management of state forest lands including:
 - 1. a provision which classifies and designates as "state forests" all state-owned lands "which are principally valuable for the timber that is on them or for the growing of timber or for watershed protection" and reserves said lands "for forest production and watershed protection" (77-5-101, MCA). Also establishes 7 "state forest units . . . primarily to secure through forestry management a continuous supply of timber and the performance of watershed covers" (77-5-102, MCA).

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2. provisions dealing with timber sales and timber permits.

- F. Chapter 6, Agriculture, Grazing, and Other Surface Leases: contains provisions dealing with surface leases of state land.

II. Rules (ARM Title 26)

- A. Surface Management Rules (ARM 26.3.128-165): contain provisions dealing surface leases and licenses of state land.

RESOURCE MANAGEMENT

Management of the following natural resource areas is, in part, directed by the laws and regulations that will be described below:

- A. Air
- B. Cultural Resources
- C. Natural Areas
- D. Soil
- E. Vegetation
- F. Water
- G. Wildlife and Fish

A. AIR

Federal Law: Federal law requires each state to establish air quality regulations that meet federal standards. The Montana regulations, adopted to comply with federal standards, are recorded under Title 75, Chapter 2 of the MCA.

State Law: Under Title 75, Chapter 2 of the MCA, the State Board of Health and Environmental Sciences is empowered to establish limits on emissions of pollutants as necessary to prevent, abate or control air pollution (75-2-203 MCA).

State Regulations: The following air quality regulations may apply to DSL activities.

Open Burning Permits: DSL is considered as a "major open burning source" and so is required to secure burning permits from DHES (State Department of Health and Environmental Sciences) [ARM 16.8.1304].

Best Available Control Technology (BACT): The regulation prescribes certain conditions for minimizing the adverse air quality effects of open burning [ARM 16.8.1301].

B. CULTURAL RESOURCES

Montana Antiquities Act: Requires DSL to avoid or mitigate damage to antiquities when feasible (22-3-424 MCA).

Regulations: Regulations interpreting the Antiquities Act are contained in ARM 26.2.800.

Initial Consultation: DSL must consult with SHPO (State Historic Preservation Office) early in the project planning process. Information to be provided and procedures to follow are listed in ARM 26.2.803.

SHPO RECOMMENDATIONS: DSL must consider SHPO recommendations and consult with SHPO over disagreements; however, compliance with SHPO recommendations is not mandatory (ARM 26.2.804).

Discovery of Antiquities: If antiquities are discovered while a project is active, work must cease immediately and the SHPO consultation process must take place (ARM 26.2.807).

C. NATURAL AREAS

Montana Natural Areas Act: Specifies natural areas as one of the "other worthy objects" which may be supported by school trust lands (76-12-102 MCA). According to an Attorney General's opinion, the school trust must be compensated in money for any lands designated as natural areas (36 Opinions of the Attorney General, No. 92).

Regulations

Consideration of Suitability: Assessment of proposed actions that would cause obvious visual changes in natural characteristics of the land must include a review of qualifications to become a natural area (ARM 26.5.203). Guidance in determining suitability is found in 76-12-104(4) MCA. Consult Department attorneys for further interpretation of the Act.

D. SOIL

Montana Soil Survey Act: Identifies soils as a basic and precious natural resource and provides for completion of a soil survey and mapping program by the DNRC (Department of Natural Resources and Conservation) (76-11-202 MCA).

Protection of Forest Resources: Landowners are required to notify DSL when a "forest practice" is about to begin. DSL is required to provide information on BMPs (Best Management Practices) to the landowner (76-13-101 and 104 MCA).

Other Laws: The following laws have provisions that may affect management of soils on DSL lands.

Multiple Use Management Act (76-1-203 MCA).

Conservation District Laws (76-15 MCA).

Cooperative Fire Protection and Conservation (76-11-102 MCA)

Natural Streambank and Land Preservation Act (75-7-101).

Open Space Land and Voluntary Conservation Easement Act (76-6-101 MCA).

Solid and Hazardous Waste Disposal Act (75-10 MCA).

Montana Pesticide Act (80-8-101).

E. VEGETATION

Noxious Weeds

Montana Noxious Weed Control Act: Every county is required to have a Weed District administered by a District Weed Board for the purpose of planning and implementing a noxious weed management program for the containment, suppression, and, where possible, eradication of noxious weeds (7-22-2101--2103 MCA).

All state agencies controlling land within a weed district are required to enter into an agreement with the district which specifies mutual responsibilities for noxious weed management (7-22-2151 MCA).

It is illegal for any landowner to permit the propagation of noxious weeds. The landowner's legal responsibility is met if she or he is in compliance with the district weed management plan or if she or he

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has entered into a weed management agreement with the district and is in compliance with that agreement (7-22-2116 MCA).

Any state agency approving a mine, roadway, powerline or any other significant disturbance of the land [timber sale] must notify the district weed board. The agency must submit a revegetation plan describing the method of seeding, timing of fertilization, recommended plant species, and weed management procedures to be used. Weed-free seeds must be specified. The plan must be revised as necessary to secure approval of the district weed board (7-22-2152 MCA).

DSL has a revegetation plan for forestry related activities. Cooperative agreements have been made between DSL and weed boards in counties where forest management activities occur. These agreements are on file in Area or Unit offices.

Sensitive Plants

There are no laws explicitly for protection of sensitive plants. Current direction comes from policies evolved from interpretation of MEPA, the Natural Areas Act, and the Montana Natural Heritage Program.

Timber

Forest Land Classification: State lands are to be classified as to their principal use. Lands principally valuable for their current timber, for growing of timber, or for watershed protection are classified as state forests (77-1-401 and 77-5-101 MCA). The basis for classification is to ensure that lands are used in ways that best meet the land board's trust and multiple-use responsibilities, and that no lands are sold, leased or used under a different classification than that to which they belong (77-1-402 MCA).

DSL Responsibility for State Forests: DSL is responsible for doing all fieldwork in the selection, location, examination and appraisal of state timberlands. It shall direct the protection and improvement of state forests (77-5-103 MCA).

Sale of Timber: DSL is required to supervise all timber management (77-5-206). Timber sales in excess of 100 thousand board feet must be publicly advertised and sold by sealed bid (77-5-201 MCA). All timber sales must be approved by the land board (77-5-205 MCA). Volumes less than 100 thousand board feet may be sold by permit (200 thousand board feet in emergency situations), but repeated permits may not be used to avoid advertisement (77-5-212 MCA).

For each sale of timber, the department is required to provide the land board with estimates of the amount and values of merchantable timber, and a statement of the situation of the timber. This statement must address the risk to the timber from fire or other damage, its distance from the nearest lake, stream or railroad, and its value for watershed protection (77-5-204 MCA).

Brush Disposal and Timber Stand Improvement: Timber harvest shall be done in a way that provides for protection of standing timber and prevention of fires. The purchaser must be required to dispose of slash in an appropriate manner. The board is also authorized to set brush disposal and timber stand improvement fees to be charged to sale purchasers (77-5-204).

The department is responsible to ensure completion of fire hazard reduction or management related to timber harvest, timber stand improvement and right-of-way clearing on private lands (76-13-403 MCA). Rules for hazard reduction are currently (1/91) under development.

Portable Sawmills: Operation of portable sawmills is prohibited on forest lands in the state without a license from DSL (76-13-501 MCA).

Fire Suppression: DSL is responsible for protecting against the start or existence of fire, and suppressing the spread of fire, on state lands. The department may also provide fire protection and suppression on other ownerships at a cost to the landowner. (76-13-201 MCA)

Forest Insect and Disease Control: DSL is responsible, with land board approval, to declare a zone of infestation whenever there is an outbreak of forest insects or diseases that is a menace to the timber or forest growth of the state. The department has the authority to enter any land within such a zone and suppress, eradicate and destroy the infestation in whatever manner it approves (76-13-303,304 MCA).

F. WATER

Federal Clean Water Act (As amended by the 1987 Reauthorization Act-P.L.100-1): This act is designed to regulate discharges of all pollutants, including NPS (non-point source) pollution, and to achieve a national goal for water quality which provides for all waters to be "fishable and swimmable". The act calls for eliminating discharge of pollutants into the waters of the United States.

Section 319: Addresses NPS pollution control. The act requires the states (in Montana, the Water Quality Bureau) to prepare a NPS Assessment Report to identify waters which cannot meet water quality standards because of NPS pollution. It requires the state to identify the source of pollutants, describe the process for identifying BMPs (Best Management Practices) to control NPS pollution, and identify programs for controlling NPS pollution. The act requires the states to set conditions for the use of BMPs. States may assist, encourage, or require BMPs. DSL has been given responsibility by the state legislature for silvicultural BMP implementation monitoring (BMP audits) and coordinating the process for revising BMPs as necessary.

Section 402: Requires a permit for all point source pollutants. Certain forestry activities such as rock crushing, gravel washing, log sorting or log storage; with "any discernable, confined, and discreet conveyance" of water; are classified as point source pollutants. The permit system is administered by the Montana Department of Health and Environmental Sciences - Water Quality Bureau under the Montana Pollution Discharge Elimination System (MPDES).

Section 404: Governs the program regulating dredge and fill of water bodies. This section is administered by the Army Corps of Engineers. Section 404 does not have a big impact on silvicultural activities which include fill for basic culvert or bridge installation, because of a blanket nationwide permit granted by the Corps of Engineers.

The blanket permit applies to (1) "minor road crossing fills" that involve the discharge of less than 200 cubic yards of material below the plane of ordinary high water, and (2) "material discharged for bank stabilization, provided that the bank stabilization activity is less than 500 feet in length, is necessary for erosion prevention, and is limited to less than an average of one cubic yard per running foot along the bank (below normal high water line)...."

Section 404 applies only to areas below "headwaters". Headwaters means the point on a stream above which the average annual flow is less than five cubic feet per second. In Montana, Army Corps personnel can be contacted through DNRC in Helena.

Montana Water Pollution Control Act (MWPCA): The MWPCA is the basic water pollution law for the state. It requires the establishment of water quality standards and provides for the enforcement of those standards. Contamination or other alteration of the physical, chemical, or biological properties of any state water, in excess of Montana Water Quality Standards, is prohibited.

Surface waters included under this law are "any waters on the earth's surface, including but not limited to, streams (intermittent and perennial), lakes, ponds, and reservoirs; and irrigation and drainage systems discharging directly into a stream, lake, pond, reservoirs or other surface water...." It is also unlawful to

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

place any wastes in any location where they are likely to cause pollution of state waters. Also included is a nondegradation clause, which protects the natural water quality if it is higher than the prescribed standard. The law is enforced through the Water Quality Bureau of the Department of Health and Environmental Sciences (75-5-101 MCA).

Water Quality Standards set specific protection criteria. They identify specific beneficial uses for all stream segments and establish the desired level of protection for each use. Standards for a given stream segment serve as a reference for determining the occurrence of water pollution.

Short-term Exemptions From Water Quality Standards: The Water Quality Bureau may authorize short-term exemptions for construction activity. Exemption is necessary only when required by the DFWP as a condition of a Stream Preservation Act permit (Ref. 16.20.633 ARM). This authorization requires specific practices for sediment reduction.

Construction De-watering Discharge Permit: A permit from the Water Quality Bureau is required for discharging wastewater into a surface water body. For example, when pumping water from a coffer dam back into a creek during bridge abutment construction, water removed from the site is wastewater and subject to permit requirements. No permit is needed when water is pumped to an infiltration pond, or when the entire flow of the creek is routed around a construction site.

Public Water Supply Law: This law involves protection, maintenance, and improvement of the quality and potability of water for public water supplies and domestic use. Construction of logging roads and logging camps within the watershed of a public water supply is prohibited unless the Department of Health and Environmental Sciences has issued a permit. The permit is subject to the approval of detailed plans and specifications for protection of water quality. Application is made through the Water Quality Bureau (75-6-101 MCA).

Lakeshore Protection Act: This act requires that every city, town, and county having jurisdiction over an area containing a lake of at least 160 acres adopt regulations governing issuance of permits for work which will alter the course, current, or cross-sectional area of the lake or its shores. Lakeshore is defined as the perimeter of the lake when the lake is at mean annual high water elevation. Land within 20 horizontal feet of the high water elevation is included under the jurisdiction of this law. No alteration may occur on the above described area without a permit from the governing body having jurisdiction (75-7-201 MCA).

Montana Pesticides Act: This law provides for the administration of the Federal Fungicide and Rodenticide Act through the State Department of Agriculture. It is designed to reduce water pollution caused by intrusion of pesticides into surface water and groundwater, and to reduce harm to plant and animal life caused by the misuse of pesticides (80-8-101 MCA).

Stream Preservation Act: Any county, state, or local government agency that proposes a project that will affect any fishing waters (such as a stream crossing) must obtain a permit before conducting the activity. The law applies to any stream. Permit applications are made through the Department of Fish, Wildlife, and Parks Regional Office using Form 124SPA - Notice of Construction (87-5-501 MCA).

Natural Streambed and Land Preservation Act: This law governs stream crossings on state land that are planned by private individuals or companies (such as when DSL grants a right-of way for new construction). It is administered by local conservation district through the 310 permit process and applies only to perennial streams. Rules governing the issuance of permits vary between conservation districts, but all must meet the minimum standards set by the Board of Natural Resources and Conservation (75-7-101 MCA).

Adjudication of Water Rights: The use of water is subject to laws and regulations requiring filing of water rights with DNRC. Adjudication of water rights is based on the principal of prior appropriations and beneficial use.

Local Jurisdictions

Conservation Districts: Conservation districts have authority to regulate land use within their boundaries to conserve soil and water resources and to control erosion (76-15-701 MCA). These regulations apply to publicly owned lands (76-15-317 MCA).

Indian Reservations: State lands within Indian Reservations may be subject to additional regulation. The Flathead Reservation has established its own water quality law and associated standards. Activities on state lands within reservation boundaries are subject to such regulations.

G. WILDLIFE AND FISH

Federal Endangered Species Act: An act to provide a means whereby ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the (relevant) treaties and conventions (Endangered Species Act of 1973, PL 93-205; 87 Stat. 884)

Nongame and Endangered Species Conservation Act: Establishes the state's intent to protect endangered species and certain species of nongame wildlife, and charges DFWP with making regulations to meet that intent (87-5-103--105 MCA).

APPENDIX SCP

THE SCOPING PROCESS

PHASE I: IN-HOUSE SCOPING

We formally began our scoping process with a three-day retreat on December 11-13, 1990.¹ On the first day, members of the planning team, their supervisors, and Forestry and Lands Division Administrators discussed two questions: (1) Why are we proposing to undertake a Forest Land Management Plan? and (2) How will we reconcile the need for planning time with other demands on team members' time?

The Administrators strongly supported the need for a comprehensive programmatic plan and agreed to give this effort high priority. The group agreed to proceed with the plan, subject to two conditions. (1) The team would prepare a Statement of Purpose which would enable readers to understand the objectives of such a plan, the kinds of issues it would address, and its geographic and administrative scope. This Statement would be presented to the Commissioner of State Lands for final approval before public announcement of the planning effort. (2) Members of the planning team would be given release time from other duties, with the specifics of time reallocation to be negotiated between team members and their individual supervisors.

Administrators and supervisors left and the planning team spent the next two days exploring how they would work together and starting the actual planning process. We used the "brainstorming" technique to develop our own responses to the question, "What questions would a useful plan answer?" Next, we planned a series of small meetings with our own employees to get their responses to the same question we had asked ourselves.

Representatives from all Land Offices and Field Units, from each Forestry Division Bureau, and from the Forestry Division and Lands Division headquarters in Helena, were surveyed in a total of thirteen in-house scoping meetings held between January 7th and February 5th, 1991. In many cases, a majority of members of a work unit were present at the meeting.

The ID Team members who conducted those meetings summarized their findings in over 270 written comments. During its February 7th and 8th meeting, the team sorted those comments into the following seven categories:²

- A) Questions the Forest Management Plan should be expected to answer
- B) Questions that are outside the scope of the Plan
- C) Questions that are too specific for this level of planning
- D) Questions that relate to the manner in which the Plan will be prepared
- E) General frustrations, comments, and advice
- F) Questions that are addressed during the design and explanation of the planning framework
- G) Questions that are outside the planning team's sphere of responsibility, but of sufficient importance that they should be drawn to someone else's attention

¹ A summary of the retreat is filed at page 100 of the Project Record. The complete Planning Record is available for public viewing at the Department of State Lands headquarters, 2705 Spurgin Road, in Missoula, Montana.

² The original list of comments and notes on the category to which each was assigned are found on pages S57-S91 of the Project Record.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Next, team members assigned each of the Category A comments to a particular issue theme. A sub-committee was named to develop appropriate responses to comments in each of the other categories.³ The Category A themes were combined with the team-generated issues to produce the list of Issues Raised by Our Own Employees, which appears in Chapter I - Purpose.⁴ These in-house issues were stated in question form to reflect the team's intent to create a plan that would be a useful information source to field people. Each issue is one response to the question, "What questions would a useful plan answer?"

Our Statement of Purpose was reviewed and approved by Area Managers and Division Administrators, and submitted to the State Lands Commissioner on May 20, 1991.⁵ On August 28, 1991, the Commissioner gave approval to proceed with the plan.

PHASE II: INITIAL PUBLIC INVOLVEMENT

On September 23, 1991 we supplied a press release announcing the plan and inviting public comment to all daily newspapers in the state, the major weekly papers, and two news agencies. Five papers are known to have run stories. We also mailed a two-page invitation to comment to 442 people and organizations on our mailing list. The announcement is attached as Exhibit A.

Our invitation asked people (1) to identify their areas of concern with regard to our management of forest lands, (2) to indicate their level of interest in remaining involved in our planning process, and (3) to suggest other people or organizations that we should contact. Public response was excellent. We received over 250 written replies; 20 percent of our original mailing list (a very high response rate), plus about 160 additional replies from people and organizations that had not been on the original list.

PHASE III: IDENTIFICATION OF PUBLIC ISSUES

At our January 8-10, 1992 team meeting, we began the process of transforming nearly 250 sets of written comments into issues that we believed represented the full range of public concerns.⁶ Three sub-groups worked independently at this task and then compared results. This gave us three separately derived lists of candidate issues which the team as a whole integrated into a single list.

We were still not fully comfortable with the integrated list of issues so the team leader undertook yet another independent approach which combined all four lists.⁷ After further revisions, we agreed on the list of twelve issues filed at page 296-a5 of the Project Record. We subsequently broke out Recreation Management as a separate, thirteenth issue, and presented the complete list in the narrative form of Chapter I. The narratives include four issues that the team recognized as important, but outside the scope of this plan.

³ Our treatment of all comments raised during in-house scoping, including those that did not directly relate to the proposed plan, is documented in pages S-142 through S-188 of the Project Record.

⁴ Complete documentation of in-house issue development is found on page S-109 of the Project Record.

⁵ The Statement of Purpose is filed at page 227 of the Project Record.

⁶ The team worked from a 35 page list of 520 separate comments that was also mailed to each respondent and is on file at page S-273 of the Project Record.

⁷ This approach is described in detail at page 296 of the Project Record.

PHASE IV: FOCUS GROUP MEETINGS

We wanted more public input to help us build management alternatives that would meaningfully address the thirteen issues we had identified. We also wanted a reality check as to whether our issues were the right ones; that is, had we correctly understood what people were trying to tell us?

We approached this phase by identifying a continuum of positions that our previous scoping led us to believe different people might take on each issue. We grouped the positions in what seemed like logical clusters, each cluster representing a different philosophy toward managing state forest lands. This proved to be a difficult exercise and we made a number of different tries before arriving at position statements the team felt comfortable with.⁸

We invited members of the public to participate in one of five focus group meetings. Each participant was asked to rally round whichever position most closely reflected his or her concept of how state forest lands should be managed.⁹ The position statements were intentionally written to reflect distinctly different, and often contrasting, approaches to forest land management. We wanted to create small groups of people who held similar beliefs about how we should manage our lands, and we wanted enough differences between groups to represent the full range of positions that the public as a whole might be expected to take.

Between May 19, 1992 and June 4, 1992, we held public focus group meetings in Missoula, Dillon, Bozeman, Kalispell, and Billings. Our objectives were (1) to check the accuracy with which we had interpreted earlier public comments, and (2) to generate a range of new ideas that would help us develop alternatives for managing state forest lands.

We tried to focus the idea-generating process by asking these three questions:

- 1) Which resource uses or management programs should the Department of State Lands (DSL) emphasize?
- 2) What specific activities or methods should DSL use to implement your preferred uses and programs?
- 3) How should DSL respond to the issues you and other members of the public have raised?

A total of 120 people attended the meetings and provided nearly 30 small-group responses.¹⁰ We did not get as many brand new ideas as we had expected, but the group input reflected a good understanding of the unique revenue-generating mission of DSL, and of the range of management problems the plan would have to address. We took the scarcity of new ideas as an indication that our issues and position statements had done an acceptable job of capturing public concerns.

⁸ Our approach to this clustering problem is documented at page 312 of the Project Record.

⁹ A copy of the letter explaining the focus group process to potential participants is on file at page S-303 of the Project Record.

¹⁰ A consolidation of all the focus group responses begins at page S-382 of the Project Record. We mailed a copy of this summary to each person who participated in the focus group process.

PHASE V: DEVELOPMENT OF CORE CONCEPTS

Next, we used our scoping input to help develop draft alternatives for preliminary review by our own employees and the public. On June 16, 1992, we started this phase by examining each of the thirteen planning issues and doing two things. First, we documented the ways we respond to each issue under our current management. Aggregation of these responses to each issue represented the core of a No Action alternative. That is, it represented the way people could expect us to continue responding to the planning issues in the future if we were to select the alternative of maintaining our current management program.

Second, we developed a range of possible responses to each issue that we thought represented the range of positions reflected in our scoping input. This gave us an intimidating array of ten to twenty possible management actions for addressing each of thirteen issues. The challenge was to cluster possible management actions into logical groups that would begin to represent a reasonable range of draft alternatives. In some respects, this was the most difficult and frustrating point in our entire planning process.

At our July 13-15 meeting, we tried several different approaches to this difficult clustering process before finally settling on one that worked to everyone's satisfaction. We selected four issues that we believed represented fundamental dimensions of any management plan for state forest lands: Wildlife Management, Watershed Management, Timber Management, and Recreation Management. Working from our list of different possible actions for addressing each of the thirteen issues, we identified from two to five different management actions, each of which seemed to characterize a different approach to one of our four fundamental dimensions.¹¹

For example, we identified these four different approaches to managing wildlife:

- 1) Place primary emphasis on aggressive management of big game for the purpose of generating revenue.
- 2) Treat management of wildlife as secondary to generating revenue from a variety of sources. In cases where impacts on wildlife were uncertain, we would err on the side of making money.
- 3) Treat wildlife habitat as a by-product of a healthy ecosystem and emphasize ecosystem management as an alternative to standards and guidelines for individual species.
- 4) Shift primary emphasis from management of big game to management of threatened, endangered, sensitive, and interior dwelling, old growth dependent species.

We assigned each of the remaining wildlife management options to one of these four approaches. In a similar fashion, we assigned the remaining timber, watershed, and recreation options to the primary theme categories identified for each of those fundamental issues.

Finally, we expanded these core concepts for managing wildlife, watersheds, timber, and recreation by assigning management actions relating to the remaining nine issues to whichever core concept each action was most compatible with. We then transformed our lists of management actions into narrative form.

¹¹ Our complete list of different possible approaches to each of the thirteen issues is filed as pages 342-358 of the Project Record.

Before going further, we undertook a rigorous screening process in which we tested the core concepts against the following five criteria:

- 1) Our in-house questions
- 2) The planning issues
- 3) The focus group input
- 4) The original public comments
- 5) The plan objectives

This screening led to many additions and changes that closed gaps and resolved contradictions and inconsistencies in the core concepts. Writing the core concept narratives and completing the screening process began in mid-July and was finished in early January, 1993.

PHASE VI: DEVELOPMENT AND REVIEW OF ALTERNATIVES

By spring of 1993, we had developed the core concepts into six draft alternatives. We incorporated the drafts, preliminary resource management standards, and other supporting materials into a "Management Team Draft" which we discussed with our Area Managers on May 10-11, 1993.¹² We made changes in response to input from the management team and presented the resulting "In- House Draft Alternatives" to our field employees. The first of two, two-day meetings was held in Kalispell on July 27-28, and the second in Helena, On August 3-4.¹³

After making further changes in response to the meetings with our own employees, on October 8, 1993 we mailed copies of our proposed alternatives to the roughly 600 people and organizations on our mailing list at that time. We reasoned that if there were major flaws in our work, this additional public review would help reveal them before we invested considerable time in effects assessment of the wrong alternatives.¹⁴

Less than ten percent of persons who received the proposed alternatives responded; however, the quality of the comments we did receive was exceptionally high. For the most part, the feedback was carefully thought out and well presented. Slightly less than half of the respondents were satisfied with our proposed range of alternatives. Many people identified their preferred alternative among the range presented, while quite a few others wanted to see a blend of what they considered to be the best features of several different alternatives. Support for the alternatives exactly as we proposed them was far from unanimous; yet neither was there any significant evidence that we should substantially change the path we were on.¹⁵

¹² The components of our "Management Team Draft" are filed at pages 761-852 of the Project Record. Summary comments by participants are filed at page 866, and a transcript of the meeting is filed at page 960.

¹³ Our summary of these two meetings is filed at page 1016 of the Project Record.

¹⁴ The package we mailed out for public review is filed at page 1115 of the Project Record.

¹⁵ Comments received in response to our October 8th mailing are in a separate file indexed as page 1725 of the Project Record.

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For reasons stated in an Information Item presented at the January 8, 1994 meeting of the State Land Board, we decided to stay the course by further refining but maintaining the same range of alternatives.¹⁶

PHASE VII: PUBLIC COMMENT ON THE DEIS

The final phase of our scoping process is the 45-day period for public comment on the DEIS. Depending on where public comment takes us, we will select a preferred alternative and publish a supplement to the DEIS or a final EIS. Publication of a supplement to the DEIS would be followed by another 45-day public comment period. Responses to substantive comments on the DEIS and its supplement (if published) will be incorporated into the final EIS. After publication of the final EIS, we will issue a decision statement and rationale.

¹⁶ The Information Item is filed at page 1208 of the Project Record and attached to this appendix for easy reference.

EXHIBIT A

STATE FOREST LAND MANAGEMENT PLAN

Would you like to have a voice in the management
of State Forest Land?

Timber Supply

Public School Funding

Environmental
Protection

The Department of State Lands needs
YOUR PARTICIPATION

WHAT ARE WE DOING?

The Montana Department of State Lands is developing a plan for the management of forested School Trust Lands. We need to know your concerns about how these lands should be managed, and learn how you would like to be involved in the planning.

PLEASE TAKE A FEW MINUTES TO COMPLETE THE ATTACHED FORM AND RETURN IT TO US.

Your response is important. It will help us decide the best ways to incorporate public input into the planning process. We will provide more opportunities for you to participate as the planning proceeds.

SCOPE OF THE STATE FOREST LAND MANAGEMENT PLAN:

The federal law which created the State of Montana placed certain lands in public trust for the purpose of generating income to help support the State's public schools. The Department of State Lands is legally obligated to manage those lands in ways that generate revenue for the School Trust Fund while also protecting the environment and assuring that long-term productivity of the lands will be maintained.

The Forest Land Management Plan will incorporate your concerns and our legal obligations into a way of making land management decisions. It will include standards and guidelines for management, but it will not make site-specific land use determinations. One of the ways you can help us most is by identifying land uses and management policies that both satisfy your concerns and are within our legal mandate to generate revenue from State lands.

YOUR INVOLVEMENT NOW IS IMPORTANT.

Our planning effort is just beginning. We are inviting public participation at the earliest possible stage to be sure that the plan considers both your concerns and our legal requirements. We believe we will make better decisions if we consider the perspectives of many citizens and groups. How well we satisfy your concerns about managing State Forest Lands will be an important factor in the success of this planning effort.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

STATE FOREST LAND PLANNING RESPONSE FORM
(Attach extra page if necessary)

1. What issues relating to management of State-owned Forest Lands are most important to you? _____

2. How can we involve you in the planning process in ways that will build your confidence in our Forest Land Management decisions? Please check one of the following:

_____ Keep me informed through newspaper articles and announcements, but I prefer not to receive future mailings.

_____ I would like to receive only major mailings that are sent to everyone on your mailing list.

_____ I would like to receive all mailings, including requests to review and comment on draft planning documents.

_____ If possible, I would like to be involved in the following additional ways:

3. If you are responding on behalf of a company or organization, please give us the name and phone number of the individual you would like us to contact in the future.

Name: _____ Phone: _____

4. Can you think of any other person or organization that should be added to our mailing list? _____

5. Is there anything else you would like to tell us at this time?

Please fold, staple, and return to Gary G. Brown, State Forester, Department of State Lands, 2705 Spurgin Rd., Missoula, MT 59801.

(BE SURE YOUR RETURN ADDRESS IS CORRECTLY SHOWN.)

Thank you

CWS
12/28/93

EXHIBIT B

LBINFO.I

INFORMATION ITEM
(January Meeting)

Department of State Lands
State Forest Land Management Plan

I. INTRODUCTION

DSL Forestry Division is in the process of preparing a programmatic plan for management of forested State lands. Following are eight major Steps in our planning process:

1. Statement of Purpose	5. Effects Assessment
2. Initial Scoping	6. Draft EIS
3. Identification of Issues	7. Final EIS
4. Development of Alternatives	8. Decision

We are now beginning step five. Our target for completing the effects assessment is early spring, with public release of a Draft EIS by late spring, and a Final EIS ready for decision by mid-summer.

We are here today:

1. to explain the role of the programmatic plan in our overall land management program,
2. to share our perspective on several key planning decisions, and
3. to develop a common understanding of our decision making process for the Plan.

II. ROLE OF THE PROGRAMMATIC PLAN

We will discuss this item through reference to the attached Figure 1.

III. KEY PLANNING DECISIONS

A. Do we have the right range of alternatives?

Our six alternatives have been developed through a systematic process of integrating employee and public involvement with our legal framework and management objectives. To date, we have engaged in two rounds of meetings with our own employees, two public comment periods, and a series of public meetings at five locations across the State. Public

FORESTRY DIVISION

PROGRAMMATIC PLAN

input helped us identify thirteen driving issues which, in turn, led us to six alternative approaches to managing State forest lands. The six alternatives have been refined through screening against 1) the original public comments, 2) questions raised by our own employees, 3) the thirteen driving issues, 4) input from the public meetings, and 5) our planning objectives.

Our most recent round of 54 letters, for the most part, supports these as a reasonable range of alternatives. A few people or groups argue in favor of additional alternatives that emphasize non-commodity/ amenity values, while a few others argue that some of these alternatives are already so non-commodity oriented as to be unconstitutional.

We have decided to keep this range, but to continue refining the alternatives to remedy inconsistencies and to be sure each alternative precisely reflects the intent of its overriding philosophy.

- B. Should we offer different alternatives for different management situations?

We have decided not to do this. Instead, during our implementation training, we will concentrate on helping our people understand how to apply the selected alternative in a variety of different management situations.

Having different alternatives for different management situations would, in a sense, mean having no plan. It either leaves our managers in the position of having to decide which plan applies in which situation, or it requires us to very precisely prescribe which plan applies in which situations. The former choice would require application of some sort of management philosophy which, in effect, would be an implicit "plan". The latter course invites the pitfalls of making site-specific decisions at a programmatic level and it denies our managers the informed flexibility we believe they need to be effective. It also would require us to have extraordinary foresight and information in order to know exactly which plan should apply under what circumstances.

FORESTRY DIVISION

PROGRAMMATIC PLAN

- C. Should we develop a super alternative by blending the "best" features of all the others?

The alternatives have been carefully formulated through integration of public input with our own legal obligations. Attempting to blend alternatives creates several problems.

First, it presumes we know which features are the correct ones to blend, yet, if we knew that, much of the planning process would be unnecessary. Different interests have substantially different views as to which blend is the right one. We believe our current approach is best for approaching consensus among a wide range of public interests.

Second, blending to create one or more "super alternatives" would have the effect of devaluing the existing array of alternatives without full consideration. By presuming ahead of time that certain viable options were acceptable while others were not, we would have violated the intent of MEPA.

We are continuing to refine the alternatives to make each one clearly reflect a unique, implementable management philosophy. We feel strongly that any further blending of alternatives should take place during the decision making process and not before each alternative has been subjected to an unbiased assessment of its expected environmental effects.

IV. THE DECISION MAKING PROCESS

Our recommendation is that the selection of an alternative proceed something like this. The Forestry Division will identify its preferred alternative in the Draft EIS. Before public release of the DEIS we will explain our choice to the Commissioner and other members of the Land Board so that they can be prepared to respond to public inquiries.

Based on public response to the DEIS, we will make appropriate modifications and adopt the preferred alternative, choose a different alternative from the existing array, or develop one or more new alternatives. We would hope to draw on Land Board members and staff for consultation regarding our response to public feedback on the DEIS.

FORESTRY DIVISION

PROGRAMMATIC PLAN

Forestry Division will make a final alternative selection and forward that selection to the Commissioner. The Commissioner, in consultation with ~~other~~ Board members will either approve our selection or direct us to make changes.

At this point, it may be appropriate for the Board to do a certain amount of blending; however, there would be associated risks as well as benefits. One benefit is that Land Board members represent a wider viewpoint than a single agency and may be able to use that broader perspective to create a "best" alternative. An associated risk is that, in blending features with the intent of creating an improved hybrid, we may lose other features whose importance had been underestimated and/or we may unwittingly introduce inconsistencies and contradictions.

To comply with MEPA, any new or substantially altered alternatives would have to be subjected to the same level of effects assessment as the original ones.

APPENDIX SCN

PLAUSIBLE OUTPUT SCENARIOS

INTRODUCTION

This appendix contains the output scenarios used as a basis for the environmental effects assessment contained in Chapter IV of the Draft Environmental Impact Statement. These scenarios have been developed for the purpose of providing some tangible basis for our resource and economics effects assessments. They are not accomplishment targets. They are simply estimates of probable ranges of activity, given the management philosophy we would adopt under each alternative.

GRAZING SCENARIOS

The following pages present plausible grazing management scenarios, under each of the six Plan alternatives. This section includes:

- 1) Grazing narratives for each alternative.
- 2) An AUM summary for all alternatives.
- 3) A table of High and Low AUMs for bracketing each alternative.

ALPHA ALTERNATIVE - GRAZING LEASES/LICENSES

The Department issues leases or licenses for grazing on its forested lands. By statute, these are for either five or ten year periods. Leases are used for classified grazing lands, while licenses are issued on classified forest lands. The terms contained in a lease and license are similar, with one primary difference: season or period of use is dictated on grazing licenses (typically July 1 through October 1), while on grazing leases, the lessee determines when the forage is used.

DSL field personnel are responsible for setting the carrying capacity on state lands. This is accomplished using the "ecological site method" with guides developed by the Soil Conservation Service (SCS). This method uses geographical areas, existing plant composition, potential climax communities, range sites (soils), and precipitation to determine available forage in terms of animal unit months (AUMs). An animal unit month is defined as the amount of forage need by an "animal unit" grazing for one month. An "animal unit" is considered a 1000 pound cow with a calf less than four months old. Typical carrying capacities on forested lands would average from .05 to .1 AUM/Acre (20 to 10 Acres/AUM). On the 661,529 acres of classified forest and forested classified grazing state lands, an estimated 30,837 to 61,675 AUMs could be supported, with a potential income, at the \$4.09 minimum lease rate, of approximately \$126,133 to \$252,250. However, there were only an estimated 26,776 AUMs leased on those forested lands in 1994, resulting in an approximate income of \$109,515.

BETA ALTERNATIVE - GRAZING LEASES/LICENSES

On classified forest lands, DSL would issue grazing licenses for five or ten year periods that specify the number of animal unit months, season or period of use, and type of livestock. DSL field personnel would evaluate each licensed tract every five years to determine streambank disturbance, measure the utilization of riparian vegetation, assess form class of riparian shrubs and to ocularly assess the condition of each tract. Riparian areas would be used as the primary indicator of range condition. If riparian areas are considered functional-at risk or non-functional because of livestock use, DSL would require changes to the management of the tract. Those changes might include reduction of AUMs, reduced stocking levels, reduced length of use, or changing the season of use. Fencing or other management techniques might also be required to limit livestock use in riparian areas.

On forested classified grazing lands, DSL would generally issue grazing leases for ten year periods. The carrying capacity would be determined by field personnel during an evaluation at the time of lease renewal. The "Ecological Site Method" and guides developed by the SCS would be used. Grazing

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

activities on forested classified grazing lands are not expected to substantially change under the Beta Alternative.

It is anticipated that the total number of AUMs licensed on classified forest lands would be reduced by approximately 35 percent due to the increased emphasis on riparian management. It is estimated that approximately 21,192 AUMs would be leased or licensed on classified forest lands and forested classified grazing lands. The potential income from the grazing program on those lands at the 1994 minimum grazing rate (\$4.09) would be approximately \$86,675.

GAMMA ALTERNATIVE - GRAZING LEASES/LICENSES

On classified forest lands, DSL would issue grazing licenses for five or ten year periods that specify the number of animal unit months, season or period of use, and type of livestock. DSL field personnel would evaluate each licensed tract every two years to determine streambank disturbance, measure the utilization of riparian vegetation, assess form class of riparian shrubs, and to ocularly assess the condition of each tract. Riparian areas would be used as the primary indicator of range condition. If riparian areas are considered functional-at risk or non-functional because of livestock use, DSL would require changes to the management of the tract. Those changes might include reduction of AUMs, reduced stocking levels, reduced length of use, or changing the season of use. Fencing or other management techniques might also be required to limit livestock use in riparian areas.

On forested classified grazing lands, DSL would generally issue grazing leases for ten year periods. The carrying capacity would be determined by field personnel during an evaluation at the time of lease renewal. The "Ecological Site Method" and guides developed by the SCS would be used. Grazing activities on forested classified grazing lands are not expected to substantially change under the Gamma Alternative.

It is anticipated that the total number of AUMs licensed on classified forest lands would be reduced by approximately 50 percent due to the increased emphasis on riparian management. We estimate that approximately 18,799 AUMs would be leased or licensed on classified forest lands and forested classified grazing lands. The potential income from the grazing program on those lands at the 1994 minimum grazing rate (\$4.09) would be approximately \$76,888.

DELTA ALTERNATIVE - GRAZING LEASES/LICENSES

On classified forest lands, grazing licenses would be issued for five or ten year periods and would specify the number of animal unit months and period of use. DSL field personnel would evaluate each licensed tract at the time of renewal to determine range condition. Riparian areas would be used as the primary indicator of overall range condition. If riparian areas are considered functional-at risk or non-functional because of livestock use, DSL would require changes to the management of the tract. Those changes might include reduction of AUMs, reduced stocking levels, reduced length of use, or changing the season of use. Fencing or other management techniques might also be required to limit livestock use in riparian areas.

On forested classified grazing lands, DSL would generally issue grazing leases for ten year periods. The carrying capacity would be determined by DSL field personnel at the time of renewal by using the "Ecological Site Method" and SCS guides. Riparian sites would not be the primary indicator of range condition but would be considered equally with other range site conditions.

Leases and licenses would be modified as needed to accommodate other income producing activities, resulting in a decrease in leased AUMs. We anticipate that the total number of AUMs licensed on classified forest lands would be reduced due to the emphasis on riparian management. Additional reductions that might occur on forested classified grazing lands and classified forest lands as a result of conflicts with other uses are somewhat speculative. Grazing use is compatible with a variety of uses but

conflicts may occur with commercial uses such as leased camping sites, cabin sites, intensive timber management and some leased recreational activities.

It is anticipated that the number of AUMs licensed on classified forest lands would be reduced by approximately 20 percent due to the increased emphasis on riparian management. Additional reductions of leased and licensed AUMs resulting from other conflicting commercial uses on forested classified grazing and classified forest lands would be approximately 20 percent. The estimated total AUM's leased and licensed on forested classified grazing and classified forest lands is approximately 18,230. The potential income at the 1994 minimum grazing rate would be \$74,561.

EPSILON ALTERNATIVE - GRAZING LEASES/LICENSES

On classified forest lands, grazing licenses would be issued for five or ten year periods when grazing activities would not conflict with the timber management program. Licenses would generally be issued on non-commercial forest sites and primarily in the mid to later stages of the rotation of stands managed for timber. Grazing activities on sites that have had recent regeneration harvests might be restricted to protect tree seedlings. Licenses would specify the season or period of use (typically July 1 through October 1) and the type of livestock. Riparian areas would be used as the primary indicator of overall range condition. If riparian areas are considered functional-at risk or non-functional because of livestock use, DSL would require changes to the management of the tract. Those changes might include reduction of AUMs, reduced stocking levels, reduced length of use, or changing the season of use. Fencing or other management techniques might also be required to limit livestock use in riparian areas.

On forested classified grazing lands, DSL would generally issue grazing leases for ten year periods. The carrying capacity would be determined by DSL field personnel at the time of renewal by using the "Ecological Site Method" and SCS guides. Riparian sites would not be the primary indicator of range condition but considered equally with other range site conditions. Grazing activities on classified grazing lands are not expected to change substantially under the Epsilon alternative.

It is anticipated that the total number of AUMs licensed on classified forest lands would be reduced by approximately 15 percent due to the increased emphasis on riparian management. Additional reductions in grazing licenses could result from conflicts with forest management activities. This is expected to reduce the licensed AUMs by an additional 15 percent. The estimated total AUMs leased and licensed on forested classified grazing and classified lands is approximately 21,990. The potential income at the 1994 minimum grazing rate would be \$89,939.

ZETA ALTERNATIVE - GRAZING LEASES/LICENSES

On classified forest lands, grazing licenses would be issued for five or ten year periods when grazing activities would not conflict with wildlife or recreational management activities. Grazing would be restricted on sites that have substantial deer and elk use or that have been leased for conflicting uses such as campgrounds or cabinsites.

The Department's field personnel would be responsible for setting the carrying capacity on state lands. The Ecological Site method and Guides developed by the SCS would be used; however, riparian areas would be the primary indicator of grazing condition on classified forest lands. If riparian areas are being over-utilized at the prescribed levels of use then the AUMs would be reduced or the lessee would be required to limit livestock use in the riparian areas by fencing or other management techniques.

On classified grazing lands, DSL field personnel would monitor each tract every ten years, at the time of lease renewal. Riparian management concerns would be addressed on a case-by-case basis. Grazing activities on classified grazing lands would not be expected to substantially change under the Zeta alternative.

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We anticipate that the number of AUMs licensed on classified forest lands would be reduced by approximately 20 percent due to the increased emphasis on riparian management. Additional reductions of leased and licensed AUMs resulting from conflicting recreational uses on forested classified grazing and classified forest lands would be approximately 20 percent. The estimated total AUMs leased and licensed on forested classified grazing and classified forest lands is approximately 18,230. The potential income at the 1994 minimum grazing rate would be \$74,561.

GRAZING SCENARIOS

POTENTIAL AUMS

Forested grazing:	162,334 acres ÷ 15 acres/AUM =	10,822 AUMs
Classified forest:	499,195 acres ÷ 15 acres/AUM =	<u>33,280 AUMs</u>
	TOTAL	44,102 AUMs

LEASED/LICENSED AUMS

ALPHA

Forested grazing lands =	10,822 AUMs
Classified forest lands =	<u>15,954 AUMs</u>
TOTAL	26,776 AUMs

ESTIMATED LEASED/LICENSED AUMs BY ALTERNATIVE

BETA

Forested Grazing Lands =		10,822 AUMs
Classified Forest Lands =	15,954 x .65 =	<u>10,370 AUMs</u>
	TOTAL	21,192 AUMs

GAMMA

Forested Grazing Lands =		10,822 AUMs
Classified Forest Lands =	15,954 x .50 =	<u>7,977 AUMs</u>
	TOTAL	18,799 AUMs

DELTA

Forested Grazing Lands =	10,822 x .80 =	8,658 AUMs
Classified Forest Lands =	15,954 x .60 =	<u>9,572 AUMs</u>
	TOTAL	18,230 AUMs

EPSILON

Forested Grazing Lands =		10,822 AUMs
Classified Forest Lands =	15,954 x .70 =	<u>11,168 AUMs</u>
	TOTAL	21,990 AUMs

ZETA

Forested Grazing Lands =	10,822 x .80 =	8,658 AUMs
Classified Forest Lands =	15,954 x .60 =	<u>9,572 AUMs</u>
	TOTAL	18,230 AUMs

ESTIMATED GRAZING USE SCHEDULE
(Max. adjustment from 1995 level = 1000 AUM/yr)

<u>SCENARIO</u>		<u>1995</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
HIGH	ALPHA	26776	30765	34753	34753	34753	34753
	BETA	26776	26577	26377	26377	26377	26377
	GAMMA	26776	24782	22788	22788	22788	22788
	DELTA	26776	24896	23016	23016	23016	23016
	EPSLN	26776	27175	27574	27574	27574	27574
	ZETA	26776	24896	23016	23016	23016	23016
LOW	ALPHA	26776	22788	18799	18799	18799	18799
	BETA	26776	21392	16007	16007	16007	16007
	GAMMA	26776	21776	16776	14811	14811	14811
	DELTA	26776	21776	16776	13444	13444	13444
	EPSLN	26776	21591	16406	16406	16406	16406
	ZETA	26776	21776	16776	13444	13444	13444

RECREATION AND NON-RECREATION SPECIAL USES SCENARIOS

The following pages present the basis for our plausible scenarios of recreation use, and non-recreation special uses. This section should be looked at in concert with Appendix SCN - Economics, which details the procedure we used to develop our estimates of current and future recreation use levels. The Recreation and Non-Recreation Special Uses Scenarios section includes:

- 1) A listing of three recreation use groups, and one non-recreation special uses group, and associated activities within each group.
- 2) Profiles which describe the nature of environmental impacts associated with each group.

Those wishing to see more of the underlying data that support our recreation scenarios and economic analysis are referred to the Project Record, file page 1799, which includes:

- 1) A table of data on current recreation, and non-recreation special use, leases and licenses ("Jeanne's Table").
- 2) Tables showing estimated current Group II and Group III dispersed recreation use levels.
- 3) A table showing our assumed growth trend rates for all four groups.
- 4) A table showing estimated current use levels, projected use, and trend rates, for each group, by Land Office and alternative.
- 5) Six tables (one for each alternative) showing our estimated High and Low recreation use levels by Group, by Land Office, for each alternative. These brackets were created by going 50 percent above and 50 percent below the actual projections from the previous table.

RECREATION AND NON-RECREATION SPECIAL USE GROUPS

Recreation Use Groups

GROUP I

VISITING MUSEUMS, HISTORIC SITES, OR INFORMATION CENTERS
CAMPING IN DEVELOPED CAMPGROUNDS
DOWNHILL SKIING
ORGANIZATION CAMPS
HOME SITES AND CABIN SITES
COMMERCIAL LODGES

GROUP II

CAMPING IN PRIMITIVE CAMPGROUNDS
BICYCLE RIDING
PICNICKING
COMMUNITY RECREATION SITES
HUNTING
COMMERCIAL OUTFITTER LICENSES
FISHING
FISHING ACCESS SITES
HORSEBACK RIDING
SHOOTING SPORT SITES
COLLECTING FIREWOOD

GROUP II CONTINUED

VISITING PREHISTORIC SITES
DRIVING VEHICLES OR MOTORCYCLES OFF-ROAD
SNOWMOBILING

GROUP III

WILDLIFE OBSERVATION, PHOTOGRAPHY, AND NATURE STUDY
WALKING, RUNNING
DAY HIKING
BACKPACKING
COLLECTING BERRIES OR MUSHROOMS
CANOEING, KAYAKING, OR RAFTING
CROSS-COUNTRY SKIING AND SNOWSHOEING
DRIVING FOR PLEASURE AND SIGHTSEEING

Non-Recreation Special Uses

GROUP IV

PRIVATE WATER, SEPTIC, AND OTHER UTILITY LEASES
PUBLIC COMMUNICATION SITES AND OTHER UTILITIES
COMMERCIAL RESTAURANTS, PARKING LOTS, AND MISCELLANEOUS

IMPACT PROFILES

These Impact Profiles represent the environmental impacts of each of the four groups. Our projections of future use, revenues, and environmental consequences are based on each Group as a whole, rather than on separate assessments for each individual activity.

Group I Profile

These activities tend to require well developed sites with permanent structures, and on-site managers during the season of use. They may require more than a half-mile of new road construction and repeated in-season road maintenance. Roads are open all season and are used, not only for site access, but also for additional pleasure driving connected with use of the site.

Use tends to be concentrated within a quarter-mile of the site, which may be the point of origin for a dense network of short trails which receive daily use in season. Sewage and garbage are removed from the site at least once weekly. Sites involving water require use-control and engineered facilities to protect riparian zones. Recovery of the site to near-natural conditions can be expected to take ten years or more from the time use is discontinued.

Group II Profile

Activities in this group tend to be dispersed, usually within one to two miles of distinct entry points. Either the activities themselves, or the facilities or equipment they require tend to have a noticeable impact on the environment. For example, bicycles leave tracks and move relatively fast, snowmobiles make noise and travel fast, hunting and fishing directly deplete populations, horses leave heavy tracks, firewood cutting removes dead and down material, and off-road vehicle use causes noise, erosion, and human intrusion away from roads.

Recreation use may require up to a half-mile of new road construction and existing roads would be maintained, on average, once every one to two years. Roads might be seasonally closed. They would be used, on average, at least half the days they were open.

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New trails would be built, and existing trails maintained, for distances up to three miles, usually as access to popular destinations. Trails would also be used on at least half the days of the normal use season.

Sewage and garbage removal or on-site processing would be done as needed, usually at least several times per season. Riparian damage would tend to be concentrated at entry points, stream crossings, wet places in trails, and small sites popular for waterside use, such as campsites or fishing spots. Adverse environmental effects from these activities could be expected to last from two to seven years after the use was discontinued.

Group III Profile

These uses tend to be more widely dispersed, usually along trail, road, or river corridors of three to ten miles on state ownership and continuing across adjoining non-state lands; and they tend to be quiet and light on the land. In the case of the activity, "Driving for Pleasure, and Sightseeing", the impacts are minimal to the degree that participants stay on established roads and do not get out of their vehicles.

These activities would not normally involve new road construction or additional road maintenance for their support. Roads would generally be closed, or used only to reach the activity entry point, or used for pleasure driving in which the participants did not leave their vehicles.

Existing trails would be maintained and would experience intermittent use spaced by long periods of relative quiet. Human waste and garbage would be user-managed with occasional state cleanup as necessary, perhaps every few years.

Riparian damage would tend to be concentrated at entry points, stream crossings, wet places in trails, and small sites popular for waterside use, such as campsites or fishing spots. Because of more widely dispersed use and a generally lighter impact on the ground of activities in this group, adverse environmental effects could be expected to heal in one to three years of non-use.

Group IV Profile

This Group includes a mixture of public, private, and commercial uses. Public uses include communication sites look outs, county facilities, and landfills. Private uses include domestic sewer and water developments, and outbuilding sites. Commercial uses include restaurants, lumber mills, parking lots, and signs for advertising.

Public and commercial uses tend to require well-developed sites with permanent structures. All categories may require new road construction and repeated in-season and year round road maintenance. Roads are open all season and are used in connection with use of the site.

Use tends to be concentrated within the perimeter of the actual lease/licensed site. Sewage and garbage are removed from the site at least once weekly. Sites involving water require use-control and engineered facilities to protect riparian zones. Recovery of the site to near natural conditions can be expected to take ten years or more from the time use is discontinued.

TIMBER SCENARIOS

The following pages present plausible timber management scenarios under each of the six Plan alternatives. Each alternative scenario is described in terms of the following four parameters:

- 1) Timber Harvest Level.
- 2) Spatial/Temporal Scheduling Factors.
- 3) Silvicultural Treatment Methods.
- 4) Level of Silvicultural Investment.

Our timber sale contract data summary is an important adjunct to these scenarios. It is compiled as a separate document.

TIMBER HARVEST LEVEL

Alpha: By reasoning that our recent past output probably represents a lower limit of probable future harvest levels, and that our recent six-year average probably approaches an upper limit, we assume that harvest levels under Alpha could range between 20 and 40 MMBF per year. These estimates are within a range that includes recent harvest levels and our managers' estimates of feasible harvest levels.

Beta: Under this alternative, we would use intensive management to create diversity of stand structures and patterns. Timber management would be instrumental in achieving this diversity and timber harvest would be an important output. This emphasis, plus a reduced emphasis on protection of big game habitat, would favor increased timber harvest levels.

However, higher levels of protection for old growth, fisheries, water and riparian zone quality, and wildlife species other than big game, would put downward pressure on harvest levels. For purposes of analysis, we estimate a slight reduction from Alpha harvest levels to a low of 15 MMBF and a high of 35 MMBF.

Gamma: Our output emphasis under Gamma would be a diverse array of small annual yields harvested in ways intended to simulate conditions that would occur as a result of natural processes. We would expect a substantial reduction in old growth harvest. Our commitments to mitigating adverse cumulative effects, even when the causal actions were taken by other landowners, and to modifying our own activities when they conflicted with uses on adjoining lands, would act to constrain timber harvest levels.

We would support recovery of threatened and endangered species, rather than simply avoid "takings"; We would accept a lower level of risk to water quality than under Alpha; clearcutting would seldom be used; timber salvage would be limited to volume in excess of that needed to simulate natural occurrences of dead and dying material; and we would not attempt to maintain a steady annual offering of timber sales.

For purposes of analysis, we estimate that the net effect of these influences would be timber harvests averaging between 5 MMBF and 10 MMBF per year.

Delta: Because Delta would bring us a market-driven strategy, it is possible we would have a wide range of annual timber harvest levels. Our positions on cumulative effects mitigation, threatened and endangered species and other wildlife protection, old growth protection, watershed and SMZ protection, and biodiversity, would all favor a higher level of timber harvest than under Alpha.

However, market conditions may favor directing our budgets and staffing toward other activities beside timber management, such as fee hunting, cabinsite leasing, or other fee recreation. Consequently, timber harvest levels could be quite variable. We estimate a low level of 15 MMBF per year and a high equal to about 10 MMBF less per year than our biological sustained yield estimate.

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Epsilon: Under Epsilon, our environmental management policies would exert pretty much the same positive effect on timber harvest levels as under Delta. However, in this case, timber management would be our primary business so annual harvests would be more stable and consistently high. We estimate a low average harvest of 35 MMBF, and a high level equal to our biological sustained yield estimate.

Zeta: Under Zeta, our primary focus would be on generating income from management of recreation and wildlife; consequently, our environmental management policies would favor those resources and tend to constrain timber harvest to lower levels than under Alpha. Because of the substantially reduced role of timber harvest and a higher level of old growth protection, as well as higher levels of protection for watershed, fisheries, and wildlife, we estimate that average harvests under this alternative will range from a low of 10 MMBF per year to a high of 20 MMBF.

Table T-1
RANGE OF TIMBER HARVEST LEVELS FOR EFFECTS ASSESSMENT PURPOSES
(MMBF)

	<u>ALPHA</u>	<u>BETA</u>	<u>GAMMA</u>	<u>DELTA</u>	<u>EPSILON</u>	<u>ZETA</u>
HIGH	40	35	10	45	55	20
LOW	20	15	5	15	35	10

SPATIAL/TEMPORAL SCHEDULING FACTORS

Alpha: Selection of timber sale locations for three-year listings is based on a number of factors. Specific application of these factors depends on the judgement of Unit Managers, and varies considerably over time and from Unit to Unit. However, these factors generally include the following:

- Values at risk: The highest priorities for harvest are generally locations with high levels of mortality due to insects, disease, blowdown or other causes. High-risk stands with the highest volume and economic value are most likely to be targeted.
- Stand growth rates: Stands with slow growth are a high priority for harvest. This includes old stands where regeneration harvests are indicated, and overstocked younger stands which are generally thinned commercially.
- Accessibility: Harvests of the highest-priority stands are often constrained by access limitations. This includes physical inaccessibility, where considerable road construction expense would be necessary to access the stands and parcels; and difficulties obtaining rights-of-way for new or existing roads at reasonable costs.
- Resource concerns: Selection of harvest locations is further constrained by resource concerns, including cumulative watershed effects, big-game standards and guidelines, grizzly bear standards, proximity to residential areas, visual considerations, and other local concerns.
- Because of various resource concerns, harvest locations are generally somewhat dispersed within a parcel or drainage, with only a limited acreage or basal area removed per entry.
- We generally harvest less in parcels where surrounding ownerships have been heavily harvested, because of watershed and wildlife habitat impacts.
- Harvest in streamside management zones (SMZs) and wetlands will meet BMPs, and will be more conservative than the maximum level of harvest allowed under the SMZ rules.

Beta: Under this alternative, harvest locations would be chosen primarily for their contribution toward maintaining a balance of structural stages and spatial patterns appropriate for the forest types involved. An appropriate balance of these factors would be determined in part from natural stand dynamics and disturbance regimes, but would also be based on maintenance of a sustainable timber harvest level.

Compared with Alpha, the following would characterize selection of harvest locations under Beta:

- We would retain or restore some proportion of old-growth stands, based on their size, spatial distribution, current or potential old-growth qualities, and the presence of other concerns that tend to preclude harvest.
- In drier forest types, we would place more emphasis on stocking reduction treatments over larger areas. This may include both commercial thinnings and selection harvests.
- Accessibility would continue to influence harvest locations, but priorities for obtaining or developing access may change based on the emphases of this alternative.
- We would place less emphasis on habitat suitability for featured species such as deer and elk.
- We would place less emphasis on dispersal of harvest locations within a parcel or drainage and try to emulate more closely the spatial patterns favored by natural processes. This would generally lead to maintenance of larger patches of relatively mature forest and less abrupt edge.
- We would continue to harvest less in areas where surrounding ownerships have been heavily harvested.
- Harvest in streamside management zones (SMZs) and wetlands would be more conservative than under Alpha.

Gamma: Under this alternative, harvest locations would be chosen primarily for their contribution to maintaining natural amounts and distribution of stand structures. Harvests would be further limited largely to locations that avoided public concern. Compared with Alpha, the following would characterize harvest locations under Gamma:

- We would tend to avoid harvest of any old-growth stands or likely replacements, unless there was broad public agreement that the existing condition of these stands was "unnatural" and should be modified.
- We would tend to avoid harvest in any area in which adjacent landowners had harvested their lands heavily, except under the circumstances described above for old-growth stands.
- We would place more emphasis on stocking reduction treatments over larger areas. This may include both commercial thinnings and selection harvests.
- Accessibility would continue to influence harvest locations. Areas requiring new road construction for harvest would generally be avoided.
- We would place less emphasis on habitat suitability for featured species such as deer and elk. Threatened, endangered and sensitive species would receive greater emphasis.
- The acreage or intensity of harvest in a particular parcel or drainage per entry would be strongly limited. We would attempt to emulate the spatial patterns favored by natural processes. This would generally lead to maintenance of larger patches of relatively mature forest and less abrupt edge.

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- We would further reduce harvests in areas where surrounding ownerships have been heavily harvested.
- Harvest in streamside management zones (SMZs) and wetlands would be substantially more restrictive than under Alpha.

Delta: Under this alternative, we would tend to place the greatest emphasis on harvesting in areas with the largest existing net values, and where values at risk of imminent loss were greatest. However, we would compare these values against the values of other potential uses and avoid timber sales that would conflict with higher-value uses. The following would characterize selection of harvest locations under Delta:

- We would continue to place the highest priority on harvest in high-value stands with high levels of mortality, if other resources did not have greater trust income potential.
- Harvest and regeneration of slow-growing mature stands would continue to be a priority, but low-volume commercial thinnings would receive less emphasis.
- Accessibility would continue to influence harvest locations, although priorities may shift for access development to areas with high income potential.
- Resource concerns such as wildlife habitat would continue to influence harvest locations but to a lesser degree. We would do less harvesting in areas where other resources provided important sources of trust income, and more harvesting where these resources did not demonstrate major revenue potential.
- We would place less emphasis on dispersal of harvest units throughout a parcel or drainage. Existing values and values at risk in individual stands would have more influence than their spatial distribution in locating harvest units.
- Harvest levels on adjacent ownerships would have slightly less influence on our harvests.
- Harvest in streamside management zones (SMZs) and wetlands would be less restrictive than under Alpha, but will comply with BMPs and SMZ rules.

Epsilon: Under this alternative, harvests would be located to develop and maintain a regulated age class distribution that optimized sustainable timber production. The goal would be a balance of stand age classes, with stands managed on rotations or cutting cycles that provided a maximum sustained trust income from timber. The following would characterize selection of harvest locations under Epsilon:

- Stands with high rates of mortality would continue to be the highest priority for harvest.
- Mature stands with slow growth rates and younger overstocked stands would continue to be high priority for regeneration harvests and commercial thinnings, respectively.
- Accessibility would continue to constrain harvest locations, but a higher priority might be placed on developing or acquiring access in areas with high timber production potential.
- Resource concerns such as wildlife habitat would continue to influence harvest locations but to a lesser degree.
- We would place less emphasis on dispersal of harvest units throughout a parcel or drainage. The growth and mortality characteristics of individual stands would have more influence than their spatial distribution in locating harvest units.

- Harvest levels on adjacent ownerships would have slightly less influence on our harvests.
- Harvest in streamside management zones (SMZs) and wetlands would be less restrictive than under Alpha, but will comply with BMPs and SMZ rules.

Zeta: Under this alternative, timber harvests would be largely incidental to recreational uses. Because Zeta places a strong emphasis on wildlife-related recreational income, maintaining wildlife habitat for its trust income potential would be a major consideration when harvests are planned. The following would characterize selection of harvest locations under Zeta:

- We would retain or restore some proportion of old-growth stands, based on their size, spatial distribution, current or potential old-growth qualities, and the presence of other concerns that tend to preclude harvest.
- Harvests would generally be planned where they would improve wildlife habitat or recreational values. We may also plan timber harvests where there were substantial timber values at risk, such as stands with high levels of mortality, provided this did not adversely impact wildlife habitat values.
- Accessibility would continue to constrain harvest locations. We would seldom acquire or develop access specifically to provide for timber harvest.
- Specific resource concerns related to wildlife habitat and recreation would become the major consideration in determining harvest locations.
- We would continue to limit the acreage or intensity of harvest in a particular parcel or drainage per entry. We would generally avoid large openings, but would locate subsequent entries to maintain larger patches of relatively mature forest and reduce the amount of abrupt edge.
- We would further reduce harvests in areas where surrounding ownerships have been heavily harvested.
- Harvest in streamside management zones (SMZs) and wetlands would be more conservative than under Alpha.

SILVICULTURAL TREATMENT METHODS

The silvicultural treatment methods are separated into the following categories, based on the silvicultural objectives they are designed to achieve, the intensity of harvest, and visual objectives.

Treatment Methods

Clearcut: The entire stand is harvested in order to regenerate and grow a new stand. Some snags and reserve trees may be left to provide wildlife habitat, structural diversity or visual mitigation, but are not intended as a seed source and do not provide appreciable shelter. Regeneration may be established after harvest or may consist in part of advance regeneration.

Seed tree: A stand is harvested in order to regenerate and grow a new stand. Some live trees are left to provide a seed source but do not provide appreciable shelter. These trees may be removed when the new stand is established, or may be left as reserve trees to provide wildlife habitat, structural diversity or visual mitigation. If seed trees are subsequently removed, removal cuttings are included in this category.

Shelterwood: A stand is harvested in stages, in order to regenerate and grow a new stand. A substantial portion of the existing stand (overwood) is left to provide shelter for the regenerating stand as well as seed. The overwood may be removed when the new stand is established, or some of it may be left as

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reserve trees to provide wildlife habitat, structural diversity or visual mitigation. If overwood is subsequently removed, removal cuttings are included in this category.

Selection: A stand is partially cut in order to regenerate and grow new trees as well as manage the remaining stand. Harvests in the stand are generally made at regular intervals, and result in a stand with a number of age classes.

Intermediate cutting: A stand is partially cut to enhance the growth, quality, vigor or composition of the remaining stand. Regenerating new trees is not an objective. This category includes thinning, improvement cutting, sanitation and salvage.

Alternatives

Alpha: The choice of silvicultural treatments is a site-specific decision based on site attributes, stand conditions, and on treatment objectives. Depending on project issues and the nature of sites and stands chosen for harvest, the proportion of different methods used may vary considerably over time.

Data from DSL timber sales from FY90 through FY94 were used to estimate the proportion of acres harvested by silvicultural treatment method. Estimates for Alpha were based on these proportions, rounded to the nearest five percent, shown in the table below.

	<u>Actual FY 90-94</u>	<u>Alpha Estimates</u>
Clearcut	9%	10%
Seed tree	30%	30%
Shelterwood	6%	5%
Selection	33%	35%
Intermediate	22%	20%

Beta: The choice of silvicultural treatments would continue to be a site-specific decision based on site attributes, stand conditions, and treatment objectives. Changes from Alpha would probably be related primarily to changes in harvest locations rather than treatment philosophies. However, there would probably be less removal of overwood from seed tree and shelterwood cuts, and more tendency to leave some reserve trees in clearcuts.

Old-growth management would probably reduce slightly the proportion of regeneration cutting and salvage in mature stands. A proportionate increase would probably occur in thinning and selection harvests on drier sites. This would probably cause little net change in intermediate cutting, a slight increase in selection cutting, and a slight reduction in other regeneration harvests.

Gamma: While the choice of silvicultural treatments would continue to be a site-specific decision, visual appearance and public perceptions about harvest methods would have considerably more effect on the choice of treatments. Consequently, clearcutting would be avoided almost entirely, and seed tree cuts reduced in extent. Selection systems, and to a lesser extent shelterwood cuts with reserve trees, would increase proportionately. Thinning would increase proportionately as long-rotation management is favored, but this would be partially offset by a reduction in salvage cutting.

Delta: The choice of silvicultural treatments would continue to be a site specific decision. The strongly market-driven approach to management would probably result in some change in treatment methods. This would be related primarily to changes in how harvest locations are chosen.

A greater overall emphasis on recovering values at risk in high-volume, high-mortality stands would increase the amount of salvage and sanitation harvest. Commercial thinning in immature stands would be

emphasized in order to generate current income and improve volume growth, in areas where timber management is the highest-value use.

Epsilon: The choice of silvicultural treatments would continue to be a site-specific decision. Efficiency in timber production would be the primary criterion in selection of treatments, and would be less influenced by non-timber objectives.

Harvesting would be concentrated where the greatest potential exists to improve growth, and in stands with the greatest mortality. Compared with Delta, there would be more emphasis on regenerating rather than salvaging older stands. Commercial thinning of immature stands would be emphasized in order to improve volume growth. There would be greater use of seed tree and shelterwood rather than selection methods in winter range areas, as timber production rather than big game habitat would be the primary consideration.

Zeta: As with the other alternatives, the choice of silvicultural treatments would be a site-specific decision. Aesthetics and wildlife habitat would be the primary objectives, rather than timber production. Consequently, a reduction in clearcut and seed tree harvests would be expected. The major harvest types would probably be intermediate treatments and some selection cutting in areas with high recreation value, and extensive group selection in big game winter ranges.

The estimated percentages of acres harvested, by method and alternative, are as follows:

Table T-2
SILVICULTURAL TREATMENT METHODS

	<u>ALPHA</u>	<u>BETA</u>	<u>GAMMA</u>	<u>DELTA</u>	<u>EPSILON</u>	<u>ZETA</u>
Clearcut	10%	10%	0%	10%	10%	5%
Seed tree	30%	25%	5%	25%	30%	15%
Shelterwood	5%	5%	10%	5%	10%	5%
Selection	35%	40%	55%	35%	30%	50%
Intermediate	20%	20%	30%	25%	20%	25%

LEVEL OF SILVICULTURAL INVESTMENT

Silvicultural investments are expenditures designed to enhance long-term trust income potential of forested state lands. These include but are not necessarily limited to: site preparation by prescribed fire, mechanical or chemical means; planting; direct seeding; genetic tree improvement; and precommercial thinning. These investments are generally designed to increase the present value of stands for timber production, but other future income sources related to stand conditions could also be considerations.

Actual levels of investment are difficult to characterize because funding and/or spending authorization have been severely limiting in most recent years. Current procedures are designed to eliminate or at least reduce the extent of this problem. The following characterization is based on the assumption that funding will be adequate in the future to achieve our current objectives.

Alpha: Current objectives are to invest in treatments expected to produce a positive net present value by enhancing future timber yields and value. Future benefits may be achieved through greater merchantable timber volumes, shorter rotations, reduced risk of loss to insects, disease, wildfire or other disturbances, or reduced constraints on timber harvest from other resource concerns.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

The currently-projected level of silvicultural investments can be characterized as follows:

Site preparation: Treat all regeneration harvests as needed to prepare site for reforestation, as soon as feasible after harvest. Methods are mechanical (90 percent of harvested acres) and prescribed fire (ten percent). In addition, treat all acres as needed prior to follow-up reforestation efforts, where initial reforestation attempts fail. This includes primarily mechanical, hand scalping or chemical methods.

Planting: Plant or interplant approximately 33 percent of regeneration harvest acres, the first spring or fall following site preparation. In addition, plant as soon as feasible all areas in which initial reforestation attempts (natural or planting) fail, unless it is determined not to be cost-effective and MEPA commitments would not be violated. Protect planted seedlings from animal browsing, as necessary to maintain survival and vigorous growth.

Genetic tree improvement: Participate in Inland Empire Tree Improvement Cooperative, including ponderosa pine, western larch, Douglas-fir and white pine species groups. Establish and manage seed orchards for western larch, ponderosa pine and Douglas-fir. Use surplus seed to trade for seed of other species as needed. Obtain adequate rust-resistant white pine seed to meet all prescribed objectives for white pine planting. Ultimately, most planting would be with genetically-improved stock.

Precommercial thinning: Thin all overstocked stands where predicted to be cost-effective, prior to reductions in diameter growth and vigor. In the near future, 2400 acres per year will need thinning.

Beta: There would be no essential change in the silvicultural investment philosophy from Alpha. Some aspects of the alternative, however, may affect future returns from investment and thereby affect investment decisions. Managing some stands for longer rotations or for structural diversity will reduce present values of stands, and thereby reduce the level of investment that would be cost-effective in these stands.

This would be offset in cases where increased non-timber values could be identified. Also, we may be more likely to accept a lower rate of investment return under this alternative. There is less risk that future changes in management regimes would lead to reductions from predicted timber output, because substantial non-timber values would already be incorporated.

Gamma: The sharp reduction in planned timber harvest would substantially reduce the range of cost-effective investments. Exceptions would occur primarily where sufficient non-timber financial values could be identified to justify investment. However, we may be more likely to accept a substantially lower rate of investment return under this alternative, as any future changes in management regimes would likely lead to higher-than-predicted timber output.

Delta: Prior to making silvicultural investments, market analyses would be done to determine whether timber or other uses are to be favored. Silvicultural investments would be limited primarily to sites where timber production was expected to be the primary long-term use. However, investments may also be used to enhance identified non-timber values such as recreation potential.

Epsilon: The overall investment philosophy would not change essentially from Alpha. The more straightforward timber-management objective would be expected to lead to a higher level of investment in treatments perceived as cost-effective.

We may need to require a higher rate of return on silvicultural investments under this alternative. Any future changes in management regimes would be likely to lead to reductions from predicted timber output, which increases the investment risk.

Zeta: The level of silvicultural investment would substantially decrease, as management of trust lands would be primarily for values not associated with timber. However, silvicultural investments may be used

to enhance identified non-timber values associated with recreational opportunities. We may be more likely to accept a substantially lower rate of investment return under this alternative, as any future changes in management regimes would likely lead to higher-than-predicted timber output.

ROAD DENSITY SCENARIOS

Our road density estimates were based on the following assumptions.

- All estimates include existing road density (miles/sq. mile): NWLO-2.7; SWLO-2.4; CLO-1.1; NELO, SLO, and ELO-0.4; Total-2.0.
- We assumed that timber harvest affects road construction at the following rates (miles/MMBF): NWLO-1; SWLO-1; CLO-2; NELO, SLO, ELO-3; Total-1.
- The "high" and "low" road density estimates are a function of the "high" and "low" timber harvest estimates for each alternative.
- The following factors were applied to the timber harvest-induced roads to account for the "roading philosophy" of each alternative: Alpha-1.0; Beta-0.75; Gamma-0.6; Delta-1.0; Epsilon-1.0; Zeta-0.75.
- Open road density was based on the existing proportion of open roads multiplied by the "roading philosophy" correction factors described above.
- We assumed that recreation affects road construction at the following rates (miles/site): Group I-0.0725; Group IV-0.0956.
- These estimates assume that no new roads will be built to serve grazing.
- The Timber and Recreation Scenarios, the timber sale contract data base, and current road density information provided the basis for these calculations.
- Road density in the CLO and eastern land offices is based on all roads, including roads on the forested and non-forested portions of the tracts.

Using these assumptions and data, we developed the estimates of road densities shown in Table RD-1.

Table RD-1
ESTIMATED ROAD DENSITIES FOR ASSESSMENT PURPOSES
YEAR 2020

<u>ALTERNATIVE</u> EXISTING	NWLO		SWLO		CLO		SLO,ELO,NELO		TOTAL	
	<u>Tot</u>	<u>Open</u>	<u>Tot</u>	<u>Open</u>	<u>Tot</u>	<u>Open</u>	<u>Tot</u>	<u>Open</u>	<u>Tot</u>	<u>Open</u>
	2.7	1.4	2.4	0.6	1.1	0.2	1.1	0.2	2.0	0.8
ALPHA										
High	4.1	2.1	3.6	0.9	1.5	0.2	1.8	0.4	3.0	1.2
Low	3.4	1.7	3.0	0.8	1.3	0.2	1.4	0.3	2.5	1.0
BETA										
High	3.7	1.4	3.3	0.6	1.3	0.1	1.6	0.2	2.8	0.8
Low	3.1	1.2	2.7	0.5	1.2	0.1	1.3	0.2	2.3	0.7
GAMMA										
High	2.9	0.9	2.6	0.4	1.2	0.1	1.2	0.1	2.1	0.5
Low	2.8	0.8	2.4	0.4	1.1	0.1	1.2	0.1	2.0	0.5
DELTA										
High	4.4	2.2	3.8	1.0	1.5	0.2	1.8	0.4	3.2	1.3
Low	3.2	1.6	2.8	0.7	1.2	0.2	1.4	0.3	2.4	1.0
EPSILON										
High	4.6	2.3	4.0	1.0	1.6	0.2	2.0	0.4	3.3	1.3
Low	3.9	2.0	3.4	0.9	1.4	0.2	1.7	0.3	2.9	1.1
ZETA										
High	3.3	1.2	3.1	0.6	1.3	0.1	1.3	0.2	2.5	0.7
Low	3.0	1.1	2.6	0.5	1.2	0.1	1.3	0.2	2.2	0.7

APPENDIX RMS

WORKING DRAFT RESOURCE MANAGEMENT STANDARDS (Organized by Resource)

CONTENTS

Big Game	RMS-1
Sensitive Species	RMS-7
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Fisheries	RMS-18
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Weed Management	RMS-64
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BIG GAME

ALPHA ALTERNATIVE

Standards

- 1) DSL would manage big game habitats as a potential source of income to the school trust. To accomplish this, DSL would keep winter ranges, and all other seasonally important big game habitats (such as summer ranges, calving areas, hiding cover, security areas, etc.), in a condition capable of supporting big game populations, unless the decision-maker determines such measures are not compatible with annual program objectives. In such cases of conflict, the State Forester would determine appropriate levels of habitat protection.
- 2) DSL would implement the elk winter habitat management standards and guidelines and the white-tailed deer winter range management standards and guidelines drafted November 1989. Elk standards and guidelines apply to forested bunchgrass winter ranges typical of East-side conifer forests. White-tailed deer standards and guidelines apply to deep snow winter ranges typical of Western Montana conifer forests.
- 3) DSL would consult with the Department of Fish, Wildlife and Parks (DFWP) to determine if seasonally important big game habitat exists within each proposed project area and, if so, to determine which habitat values may be affected by the proposed action. More detailed analyses would be necessary if DFWP determines that a proposed action might conflict with maintenance of big game habitat. When big game needs are not compatible with other management objectives, conflicts would be addressed by the decision maker on a case-by-case basis.

Monitoring

- 4) Mitigation efforts described in the project MEPA document, or other record, would be incorporated in sale or lease contracts. Contract administrators would monitor compliance with contract requirements. Deficiencies would be corrected or mitigated by the contractor, under DSL's supervision.

References

Department of State Lands. 1989. Interim elk winter habitat management standards and guidelines.

Department of State Lands. 1989. Interim white-tailed deer winter range management standards and guidelines.

DSL, DFWP and other wildlife biologists, along with other forest management guidelines, would be used as sources of information when determining mitigation measures or when analyzing existing habitat conditions and consequences of management proposals not covered above.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

BETA ALTERNATIVE

Standards

- 1) DSL would promote a diversity of stand structures and landscape patterns, and rely on them to provide good habitat for native wildlife populations.
- 2) Big game habitat needs would not be a primary consideration in management decisions. However, measures to mitigate potential impacts would be implemented if they are consistent with overall management objectives, and with the Biodiversity Resource Management Standards.
- 3) The current elk and white-tailed deer management standards and guidelines drafted November 1989 would no longer be adopted as Department policy.
- 4) DSL would consult with DFWP to determine which big game habitat values are most likely to be affected by proposed management actions.

Monitoring

- 5) Mitigation efforts described in the project MEPA document, or other record, would be incorporated in sale or lease contracts. Contract administrators would monitor compliance with contract requirements related to big game habitats, as described in environmental documents. Deficiencies would be corrected or mitigated by the contractor, under DSL supervision.
- 6) Biodiversity monitoring procedures, described in the Biodiversity Resource Management Standards, would be used to track the health of forest ecosystems. This process would be used as the primary indicator of the health of wildlife populations using these ecosystems. When necessary, corrective actions would be taken as described in the monitoring section of the Biodiversity Resource Management Standards.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands unpublished paper.

GAMMA ALTERNATIVE

Standards

- 1) DSL would promote a diversity of stand structures and landscape patterns, and rely on them to provide good habitat for native wildlife populations.
- 2) Big game habitat needs would not be a primary consideration in management decisions. However, measures to mitigate potential impacts would be implemented if they are consistent with overall management objectives, and with the Biodiversity Resource Management Standards.
- 3) The current elk and white-tailed deer management standards and guidelines drafted November 1989 would no longer be adopted as Department policy.
- 4) DSL would consult with DFWP to determine which big game habitat values are most likely to be affected by proposed management actions.

Monitoring

- 5) Mitigation efforts described in the project MEPA document, or other record, would be incorporated in sale or lease contracts. Contract administrators would monitor compliance with contract requirements related to big game habitats as described in environmental documents. Deficiencies would be corrected or mitigated by the contractor, under DSL supervision.
- 6) Biodiversity monitoring procedures, described in the Biodiversity Resource Management Standards, would be used to track the health of forest ecosystems. This process would be used as the primary indicator of the health of wildlife populations using these ecosystems. When necessary, corrective actions would be taken as described in the monitoring section of the Biodiversity Resource Management Standards.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands unpublished paper.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

DELTA ALTERNATIVE

Standards

- 1) DSL would manage aggressively to produce revenue from available forest resources. On some lands, management of big game species, either exclusively or in combination with other resources, would represent the best way to maximize trust income. In these situations, management of other resources would only be used to complement that combination of big game and other resource management that maximizes trust income. Habitat manipulations could be designed to maintain or improve current and future revenue opportunities from fee-based hunting, wildlife viewing, conservation leases or easements to interested parties.
- 2) Big game habitat needs would be given low priority in situations where revenue potential is greater from management of other resources. Mitigation measures would be implemented to insure that big game species and their essential habitats are likely to remain in each third-order watershed following any proposed DSL action.
- 3) The current elk and white-tailed deer management standards and guidelines drafted November 1989 would no longer be adopted as Department policy.
- 4) DSL would consult with DFWP to determine which big game habitat values are most likely to be affected by proposed management actions.

Monitoring

- 5) Contract administrators would monitor compliance with contract requirements related to big game habitats. Deficiencies would be corrected or mitigated by the contractor, under DSL supervision.

References

DSL, DFWP and other wildlife biologists, along with other forest management guidelines, would be used as sources of information when determining mitigation measures or when analyzing existing habitat conditions and consequences of management proposals not covered above.

EPSILON ALTERNATIVE

Standards

- 1) DSL would manage forest lands to produce trust income through a sustained annual timber sale level, while attempting to incorporate big game habitat needs consistent with primary timber management objectives. To accomplish this, DSL would keep winter ranges and all other seasonal ranges (such as summer ranges, calving areas, hiding cover, security areas, etc.) in a condition capable of supporting big game populations, unless the decision maker determines this is not compatible with timber harvest objectives.
- 2) DSL would implement the elk winter habitat management standards and guidelines and the white-tailed deer winter range management standards and guidelines drafted November 1989, where they are compatible with timber management goals. The elk standards and guidelines apply specifically to forested bunchgrass winter ranges typical of East-side conifer forests. The white-tailed deer standards and guidelines apply specifically to deep snow winter ranges typical of Western Montana conifer forests.
- 3) DSL would consult with the DFWP to determine if important big game habitat exists within each proposed timber sale and, if so, to determine which habitat values are most likely to be affected by the proposed harvest. More detailed analyses would be done if DFWP determines that a proposed sale might conflict with maintenance of big game habitat. Mitigation measures would be implemented to insure that big game species and their essential habitats are likely to remain in each third-order watershed following any proposed DSL action.

Monitoring

- 4) Mitigation efforts described in the project MEPA document, or other decision record, would be incorporated in sale or lease contracts. Contract administrators would monitor compliance with contract requirements related to big game habitats. Deficiencies would be corrected or mitigated by the contractor, under DSL supervision.

References

Department of State Lands. 1989. Interim elk winter habitat management standards and guidelines.

Department of State Lands. 1989. Interim white-tailed deer winter range management standards and guidelines.

DSL, DFWP and other wildlife biologists, along with other forest management guidelines, would be used as sources of information when determining mitigation measures or when analyzing existing habitat conditions and consequences of management proposals not covered above.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

ZETA ALTERNATIVE

Standards

- 1) DSL would emphasize revenue production from recreational development and wildlife management. On some lands, big game management would represent the best way to maximize trust income. In these situations, other resource uses would be limited to that combination of big game and other uses that would maximize trust income. Big game habitat manipulations could be designed to maintain or improve current and future revenue opportunities from fee-based hunting, wildlife viewing, conservation leases or easements.
- 2) Big game habitat needs would be secondary in situations where revenue potential from management of recreation developments or other resources is clearly higher. When managing other resources, wildlife mitigation measures would be designed to maintain at least 50 to 60 percent of the potential wildlife habitat value.
- 3) The current elk and white-tailed deer management standards and guidelines drafted November 1989 would no longer be adopted as Department policy.
- 4) DSL would consult with DFWP to determine how best to enhance big game and other wildlife habitat values in situations where big game management is a priority. In areas managed for recreation developments or other resources, consultations with wildlife biologists would be used to develop appropriate mitigation measures.

Monitoring

- 5) Contract administrators would monitor compliance with contract requirements related to big game habitats. Deficiencies would be corrected or mitigated by the contractor, under DSL supervision.

References

DSL, DFWP and other wildlife biologists, along with other forest management guidelines, would be used as sources of information when determining mitigation measures or when analyzing existing habitat conditions and consequences of management proposals not covered above.

SENSITIVE SPECIES

ALPHA, DELTA, EPSILON & ZETA ALTERNATIVES

Standards

- 1) DSL recognizes sensitive plant and animal species, both terrestrial and aquatic, may be adversely impacted by land management practices which may lead to their listing as threatened or endangered. Consequently, DSL would consider sensitive species in project planning through the MEPA process in an attempt to identify and mitigate project effects to sensitive species.
- 2) For proposed actions, DSL would contact the Montana Natural Heritage Program for information on species of special concern within the project area. Sensitive species and their habitats identified in the project area by the Montana Natural Heritage Program, concerned public, or DSL field personnel would be given consideration during project planning in an attempt to mitigate potential adverse impacts.
- 3) Sensitive species and their habitats would not be a primary consideration in management decisions. Measures to protect sensitive species would be implemented if they can be reconciled with other management goals as determined by the decision-maker.
- 4) Where management of sensitive species is deemed compatible with other management goals, we would maintain site characteristics generally recognized as important so long as this would not substantially reduce trust revenue. Efforts could include limitations on activity, buffer areas of no action, special precautions to limit disturbance, seasonal restrictions, or other measures suggested by specialists.
- 5) In areas where sensitive species are suspected to occur and may be impacted by project actions, a field survey by qualified professionals might be required to determine the presence and location of sensitive species. In addition, existing site conditions that might affect the continued maintenance of the local population would be documented.

Monitoring

- 6) DSL specialists and field staff would continue to report all sightings of sensitive species to the Montana Heritage Program.
- 7) On DSL projects, selected sites would be monitored for implementation of the mitigation measures for protection of sensitive species. Deficiencies would be corrected and used to guide future management actions and mitigation efforts.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

BETA AND GAMMA ALTERNATIVES

Standards

- 1) DSL recognizes sensitive plant and animal species, both terrestrial and aquatic, may be adversely impacted by land management practices which may lead to their listing as threatened or endangered. Consequently, DSL would manage so as to support, and enhance where appropriate, populations of sensitive species on state land.
- 2) For proposed actions, DSL would contact the Montana Natural Heritage Program for information on species of special concern within the project area. Sensitive species and their habitats identified in the project area by the Montana Natural Heritage Program, concerned public, or DSL field personnel would be conserved.
- 3) Sensitive species would be protected by maintaining the site characteristics generally recognized as important. Localized impacts may be allowed only to promote conditions that sustain long-term viability of plant communities and animal populations.

A landscape-level analysis would be used to identify critical forest cover conditions that might be impacted by a proposed activity. These conditions would be compared against the habitat needs of sensitive species. Other elements, such as human disturbance, soil disturbance, and road density and use patterns, also would be considered in the protection of sensitive species and their habitats. Appropriate measures would be taken to ensure adequate conditions to support these species or contribute to their habitats.

- 4) If sensitive species were suspected to occur in the project area, then a field survey would be required by qualified specialists to determine the presence and location of sensitive species. In addition, existing site conditions that might affect the continued maintenance of the local populations would be documented.

Monitoring

- 5) DSL specialists and field staff would continue to report all sightings of sensitive species to the Montana Heritage Program.
- 6) On DSL projects, all sites where sensitive species have been identified would be monitored for implementation of protective measures for sensitive species. Deficiencies would be corrected and used to guide future management actions and mitigation efforts. The goal would be to monitor trends in species coverage on selected sites to guide management.

References for all Alternatives

Project field staff may reference the Montana Heritage Program, and other agency botanists for information on plant occupancy, life cycle and habitat requirements.

Remington, D. 1993. Biological diversity strategies for forest type groups, landscape planning process. Montana Department of State Lands.

USDA Forest Service. 1989. Caring for the land. USDA Forest Service Region One Threatened, Endangered, and Sensitive Species Program.

THREATENED AND ENDANGERED SPECIES

ALPHA ALTERNATIVE

Standards

- 1) The Department of State Lands would implement the DSL 1993 grizzly bear management standards and guidelines for the west side of the Northern Continental Divide. These would be regularly updated to reflect the latest scientific information.
- 2) DSL would participate on interagency working groups established to develop guidelines and implement recovery plans for grizzly bear, bald eagle, and wolf. We might participate in new working groups if additional species with habitat on state forest land were declared threatened or endangered.
- 3) DSL might modify activities to promote the recovery of threatened and endangered species, when consistent with producing revenue through sustained harvest of forest products. DSL would comply with Section 9 of the Endangered Species Act, which prohibits any actions that may be considered a "taking", but would not unilaterally promote recovery.

Monitoring

- 4) Contract administrators would monitor compliance with all standards and guidelines indicated in project environmental analyses. Deficiencies would be corrected by the contractor, under DSL supervision.
- 5) DSL specialists and field staff would report all sightings of T&E species, except bald eagles, to the DSL wildlife biologist, who then would forward the information to the respective working groups for inclusion in a cooperative data base. For bald eagles, only new nest locations would be reported because the Montana Bald Eagle Working Group monitors nesting success of all nests in the state each year.

References

Department of State Lands. 1993. Grizzly bear management standards and guidelines for the west side of the Northern Continental Divide.

The following guidelines developed by interagency working groups or Federal agencies, in coordination with the U.S. Fish and Wildlife Service, would serve as the primary references for complying with recovery plans. The Forestry Division Wildlife Biologist would provide any additional guidance needed to implement these guidelines.

Montana Bald Eagle Working Group. 1986. Montana bald eagle management plan. BLM-MT-GI-86-001-4352.

U.S. Fish and Wildlife Service. 1990. Grizzly bear recovery plan. Missoula, MT.

Paige, C., B. Madden, and B. Ruediger. 1991. Habitat management guide for bald eagles in Northwestern Montana. Montana Bald Eagle Working Group.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. Fish and Wildlife Enhancement Office, Helena, MT.

U.S. Fish and Wildlife Service. 1984. American peregrine falcon recovery plan (Rocky Mountain/Southwest populations). Prepared in cooperation with the American peregrine falcon recovery team. U.S. Fish and Wildlife Service, Denver, CO.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

U.S. Forest Service standards and guidelines detailed in various Forest Plans would be used as appropriate for site-specific guidance.

BETA ALTERNATIVE

Standards

- 1) DSL would either adopt and implement Federal and working group standards and guidelines for grizzly bear management in each recovery area, or develop our own standards for application on state lands. Our own standards would be developed through consultation with the U.S. Fish and Wildlife Service. They might differ from Federal management guidelines, but would be equivalent in their conservation effect.

DSL would work with the U.S. Fish and Wildlife Service to develop or amend our standards when, in the judgement of the State Forester, they were inconsistent with trust management obligations. Management standards would be periodically updated to implement new biological information and legal interpretations as warranted.

- 2) DSL would participate on interagency working groups established to develop guidelines and implement recovery plans for grizzly bear, bald eagle, and wolf. If additional species with habitat on state forest land were declared threatened or endangered, we would participate in working groups for those species as well.

- 3) DSL would promote recovery of threatened and endangered species by implementing Federal standards and guidelines and recovery plans, or by developing our own standards through consultation with the U.S. Fish and Wildlife Service. Our own standards might differ from Federal management guidelines, but would be equivalent in their conservation effect.

DSL would work with the U.S. Fish and Wildlife Service to develop or amend our standards when, in the judgement of the State Forester, they were inconsistent with trust management obligations. Management standards would be periodically updated to implement new biological information and legal interpretations as warranted.

Monitoring

- 4) Contract administrators would monitor compliance with all requirements all standards and guidelines indicated in project environmental analyses. Deficiencies would be corrected by the contractor, under DSL supervision.
- 5) DSL specialists and field staff would report all sightings of T&E species, except bald eagles, to the DSL wildlife biologist, who would then forward the information to the respective working groups for inclusion in a cooperative data base. For bald eagles, only new nest locations need be reported because the Montana Bald Eagle Working Group monitors nesting success of all nests in the state each year.

References

The following guidelines developed by interagency working groups or Federal agencies, in coordination with the U.S. Fish and Wildlife Service, would serve as the primary references for protecting threatened and endangered species. The Forestry Division Wildlife Biologist would provide any additional guidance needed to implement these guidelines.

U.S. Fish and Wildlife Service. 1990. Grizzly bear recovery plan. Missoula, MT.

Montana Bald Eagle Working Group. 1986. Montana bald eagle management plan. BLM-MT-GI-86-001-4352.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Paige, C., B. Madden, and B. Ruediger. 1991. Habitat management guide for bald eagles in Northwestern Montana. Montana Bald Eagle Working Group.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. Fish and Wildlife Enhancement Office, Helena, MT.

U.S. Fish and Wildlife Service. 1984. American peregrine falcon recovery plan (Rocky Mountain/Southwest populations). Prepared in cooperation with the American peregrine falcon recovery team. U.S. Fish and Wildlife Service, Denver, CO.

U.S. Forest Service standards and guidelines detailed in various Forest Plans would be used as appropriate for site-specific guidance.

GAMMA ALTERNATIVE

Standards

- 1) We would promote recovery of grizzly bears on state lands. DSL would adopt and implement Federal and working group standards and guidelines for grizzly bear management on state lands in each designated recovery area. We would incorporate revisions of these guidelines into our management as they occur.
- 2) DSL would participate on interagency working groups established to develop guidelines and implement recovery plans for grizzly bear, bald eagle, and wolf. If additional species with habitat on state forest land were declared threatened or endangered, we would participate in working groups for those species as well.
- 3) DSL would promote recovery of all threatened and endangered species on state lands by fully implementing recommendations from Federal standards and guidelines, recovery plans, and the latest scientific information that would most rapidly result in species recovery.

Monitoring

- 4) Contract administrators would monitor compliance with all standards and guidelines indicated in environmental analyses completed for each project proposal. Deficiencies would be corrected by the contractor, under DSL's supervision.
- 5) DSL specialists and field staff would report all sightings of T&E species, except bald eagles, to the DSL wildlife biologist, who would then forward the information to the respective working groups for inclusion in a cooperative data base. For bald eagles, only new nest locations need be reported because the Montana Bald Eagle Working Group monitors nesting success of all nests in the state each year.

References

The following guidelines developed by interagency working groups or Federal agencies, in coordination with the U.S. Fish and Wildlife Service, would serve as the primary references for complying with recovery plans. The Forestry Division Wildlife Biologist would provide any additional guidance needed to implement these guidelines.

U.S. Fish and Wildlife Service. 1990. Grizzly bear recovery plan. Missoula, MT.

Montana Bald Eagle Working Group. 1986. Montana bald eagle management plan. BLM-MT-GI-86-001-4352.

Paige, C., B. Madden, and B. Ruediger. 1991. Habitat management guide for bald eagles in Northwestern Montana. Montana Bald Eagle Working Group.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. Fish and Wildlife Enhancement Office, Helena, MT.

U.S. Fish and Wildlife Service. 1984. American peregrine falcon recovery plan (Rocky Mountain/Southwest populations). Prepared in cooperation with the American peregrine falcon recovery team. U.S. Fish and Wildlife Service, Denver, CO.

U.S. Forest Service standards and guidelines detailed in various Forest Plans would be used as appropriate for site-specific guidance.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

DELTA ALTERNATIVE

Standards

- 1) The Department of State Lands would no longer implement the 1988 DSL interim grizzly bear management standards and guidelines for the west side of the Northern Continental Divide.
- 2) DSL would review information from interagency working groups established to develop guidelines and implement recovery plans for threatened and endangered species to remain current on their management.
- 3) DSL would comply with Section 9 of the Endangered Species Act, which prohibits any actions that may be considered a "taking". We would adopt and implement all U.S. Fish and Wildlife Service guidelines that are designed to avoid "taking" of threatened or endangered species or their habitat. However, DSL would not routinely implement Federal and working group guidelines to promote recovery of threatened and endangered species.

Monitoring

- 4) Contract administrators would monitor compliance with standards and guidelines. Deficiencies would be corrected by the contractor, under DSL supervision.
- 5) DSL specialists and field staff would report all sightings of T&E species, except bald eagles, to the DSL wildlife biologist, who would then forward the information to the respective working groups for inclusion in a cooperative data base. For bald eagles, only new nest locations need be reported because the Montana Bald Eagle Working Group monitors nesting success of all nests in the state each year.

References

Guidelines developed by interagency working groups or Federal agencies, in coordination with the U.S. Fish and Wildlife Service, would serve as references for assessing impacts of proposed actions to the extent required by MEPA. The Forestry Division Wildlife Biologist would provide any additional guidance needed to use these guidelines in environmental evaluations.

Plum Creek Timber Company, L.P. 1993. Grizzly bear best management practices.

EPSILON ALTERNATIVE

Standards

- 1) The Department of State Lands would no longer implement the 1988 DSL interim grizzly bear management standards and guidelines for the west side of the Northern Continental Divide.
- 2) DSL would review information from interagency working groups established to develop guidelines and implement recovery plans for threatened and endangered species to remain current on their management.
- 3) DSL would comply with Section 9 of the Endangered Species Act, which prohibits any actions that may be considered a "taking". We would adopt and implement all U.S. Fish and Wildlife Service guidelines that are designed to avoid "taking" of threatened or endangered species or their habitat. However, DSL would not routinely implement Federal and working group guidelines to promote recovery of threatened and endangered species.

Monitoring

- 4) Contract administrators would monitor compliance with standards and guidelines. Deficiencies would be corrected by the contractor, under DSL supervision.
- 5) DSL specialists and field staff would report all sightings of T&E species, except bald eagles, to the DSL wildlife biologist, who would then forward the information to the respective working groups for inclusion in a cooperative data base. For bald eagles, only new nest locations need be reported because the Montana Bald Eagle Working Group monitors nesting success of all nests in the state each year.

References

Guidelines developed by interagency working groups or Federal agencies, in coordination with the U.S. Fish and Wildlife Service, would serve as references for assessing impacts of proposed actions to the extent required by MEPA. The Forestry Division Wildlife Biologist would provide any additional guidance needed to use these guidelines in environmental evaluations.

Plum Creek Timber Company, L.P. 1993. Grizzly bear best management practices.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

ZETA ALTERNATIVE

Standards

- 1) DSL would either adopt and implement Federal and working group standards and guidelines for grizzly bear management, or develop our own standards for application on state lands in each designated recovery area, to the extent that doing so would not conflict with trust management policy. We would incorporate revisions of these guidelines into our management as they occur.
- 2) DSL would participate on interagency working groups established to develop guidelines and implement recovery plans for grizzly bear, bald eagle, and wolf. If additional species with habitat on state forest land were declared threatened or endangered, we would participate in working groups for those species as well.
- 3) DSL might modify activities to promote the recovery of threatened and endangered species, when doing so was consistent with producing trust revenue. We would comply with Section 9 of the Endangered Species Act, which prohibits any actions that may be considered a "taking", but we would not unilaterally promote recovery.

Monitoring

- 4) Contract administrators would monitor compliance with all requirements, standards, and guidelines indicated in project environmental analyses. Deficiencies would be corrected by the contractor, under DSL supervision.
- 5) DSL specialists and field staff would report all sightings of T&E species, except bald eagles, to the DSL wildlife biologist, who would then forward the information to the respective working groups for inclusion in a cooperative data base. For bald eagles, only new nest locations need be reported because the Montana Bald Eagle Working Group monitors nesting success of all nests in the state each year.

References

The following guidelines developed by interagency working groups or Federal agencies, in coordination with the U.S. Fish and Wildlife Service, would serve as the primary references for protecting threatened and endangered species. The Forestry Division Wildlife Biologist would provide any additional guidance needed to implement these guidelines.

U.S. Fish and Wildlife Service. 1990. Grizzly bear recovery plan. Missoula, MT.

Montana Bald Eagle Working Group. 1986. Montana bald eagle management plan. BLM-MT-GI-86-001-4352.

Paige, C., B. Madden, and B. Ruediger. 1991. Habitat management guide for bald eagles in Northwestern Montana. Montana Bald Eagle Working Group.

U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. Fish and Wildlife Enhancement Office, Helena, MT.

U.S. Fish and Wildlife Service. 1984. American peregrine falcon recovery plan (Rocky Mountain/Southwest populations). Prepared in cooperation with the American peregrine falcon recovery team. U.S. Fish and Wildlife Service, Denver, CO.

U.S. Forest Service standards and guidelines detailed in various Forest Plans would be used as appropriate for site-specific guidance.

FISHERIES

ALPHA ALTERNATIVE

Standards

- 1) DSL would coordinate with DFWP in the design and implementation of projects that might affect fisheries resources through compliance with the Stream Protection Act (87-5-501 MCA).
- 2) Land management activities in the Flathead Basin would be designed to protect bull trout and westslope cutthroat trout habitat by meeting the fisheries recommendations of the Flathead Basin Cooperative Study. See "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report" Recommendation #17.
- 3) Impacts to fisheries habitat would be minimized by implementing Resource Management Standards and Forestry Best Management Practices (BMPs), and by complying with the Streamside Management Zone Law and other laws and regulations.
- 4) DSL would implement the Immediate Actions described in Pat Flowers' memo of 12/5/94 to NWLO and SWLO area managers as interim measures to protect bull trout habitat, as recommended by the Governor's Bull Trout Restoration Team.

Monitoring

- 5) In conjunction with land management activities, DSL would monitor fisheries habitat conditions in areas identified as critical bull trout and westslope cutthroat trout habitat in the Flathead Basin as prescribed in the "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report," Recommendation #17.
- 6) Contract administration would be the primary form of project monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected by the contractor, as they are observed, under supervision of DSL.

GAMMA ALTERNATIVE

Standards

- 1) DSL would coordinate with DFWP in the design and implementation of projects that might affect fisheries resources through compliance with the Stream Protection Act (87-5-501 MCA).
- 2) Land management activities in the Flathead Basin would be designed to protect bull trout and westslope cutthroat trout habitat by meeting the recommendations of the Flathead Basin Cooperative Study. See "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report" Recommendation #17. Land management activities in areas outside of the Flathead Basin would be managed to sustain and enhance bull trout, westslope and Yellowstone cutthroat trout, and all other designated "sensitive" species and Species of Special Concern, where applicable.
- 3) Impacts to fisheries habitat would be minimized by implementing Resource Management Standards and Forestry Best Management Practices (BMPs), and by complying with the Streamside Management Zone Law and other laws and regulations.
- 4) DSL would construct, reconstruct, and maintain road crossing structures on existing and historic fish-bearing streams to provide for fish passage.
- 5) Silvicultural treatments adjacent to fish bearing streams would prescribe for steady entry of pool-forming trees into the stream system. The number and type of trees would depend on specific site conditions and the needs of the individual fisheries.
- 6) Fisheries designated as "sensitive" or Species of Special Concern (SOSC) would be managed so as to comply with any additional, and possibly more restrictive, direction specified in the Sensitive Species Resource Management Standards.
- 7) DSL would cooperate with other agencies to prevent stocking of non-native fish species, over-fishing, and poaching.
- 8) DSL would implement the Immediate Actions described in Pat Flowers' memo of 12/5/94 to NWLO and SWLO area managers as interim measures to protect bull trout habitat, as recommended by the Governor's Bull Trout Restoration Team.

Monitoring

- 9) In conjunction with land management activities, DSL would monitor fisheries habitat conditions in areas identified as bull trout and westslope cutthroat trout habitat and habitat for other "sensitive species" or Species of Special Concern, using appropriate parameters for the area and fisheries.
- 10) Contract administration would be an important form of project monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected, by the contractor, as they are observed, under supervision of DSL.
- 11) Compliance with Watershed and Grazing RMSs would be treated as important indicators of fisheries protection.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

DELTA AND EPSILON ALTERNATIVES

Standards

- 1) DSL would coordinate with DFWP in the design and implementation of projects that might affect fisheries resources through compliance with the Stream Protection Act (87-5-501 MCA).
- 2) Land management activities in the Flathead Basin would be designed to protect bull trout and westslope cutthroat trout by meeting the recommendations of the Flathead Basin Cooperative Study. See "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report" Recommendation #17.
- 3) Impacts to fisheries habitat would be minimized by implementing Resource Management Standards and Forestry Best Management Practices (BMPs), and by complying with the Streamside Management Zone Law and other laws and regulations.
- 4) DSL would construct and maintain road crossing structures on existing and historic fish-bearing streams to provide for fish passage.
- 5) Fisheries designated as Species of Special Concern (SOSC) would be managed so as to comply with any additional, and possibly more restrictive, direction as specified in Sensitive Species Resource Management Standards.
- 6) DSL would implement the Immediate Actions described in Pat Flowers' memo of 12/5/94 to NWLO and SWLO area managers as interim measures to protect bull trout habitat, as recommended by the Governor's Bull Trout Restoration Team.

Monitoring

- 7) In conjunction with land management activities, DSL would monitor fisheries habitat conditions in areas identified as critical bull trout and westslope cutthroat trout habitat in the Flathead Basin, as prescribed in the "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report," Recommendation #17.
- 8) Contract administration would be the primary form of project monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected by the contractor, as they were observed, under supervision of DSL.
- 9) Compliance with Watershed and Grazing RMSs would be treated as important indicators of fisheries protection.

BETA AND ZETA ALTERNATIVES

Standards

- 1) DSL would coordinate with DFWP in the design and implementation of projects that might affect fisheries resources through compliance with the Stream Preservation Act (87-5-501 MCA).
- 2) Land management activities in the Flathead Basin would be designed to protect bull trout and westslope cutthroat trout habitat by meeting the recommendations of the Flathead Basin Cooperative Study. See "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report" Recommendation #17. Land management activities in areas outside of the Flathead Basin would be managed to sustain and enhance bull trout, westslope and Yellowstone cutthroat trout, and all other designated "sensitive" species and Species of Special Concern, where applicable.
- 3) Impacts to fisheries habitat would be minimized by implementing Resource Management Standards and Forestry Best Management Practices (BMPs), and by complying with the Streamside Management Zone Law and other laws and regulations.
- 4) DSL would construct, reconstruct, and maintain road crossing structures on existing and historic fish-bearing streams to provide for fish passage.
- 5) Silvicultural treatments adjacent to fish bearing streams would prescribe for steady entry of pool-forming trees into the stream system. The number and type of trees would depend on specific site conditions and the needs of the individual fisheries.
- 6) Fisheries designated as "sensitive" or Species of Special Concern (SOSC) would be managed so as to comply with any additional, and possibly more restrictive, direction as specified in the Sensitive Species Resource Management Standards.
- 7) DSL would cooperate with other agencies to eliminate non-native fish stocking, over fishing, and poaching.
- 8) DSL would implement the Immediate Actions described in Pat Flowers' memo of 12/5/94 to NWLO and SWLO area managers as interim measures to protect bull trout habitat, as recommended by the Governor's Bull Trout Restoration Team.

Monitoring

- 9) In conjunction with land management activities, DSL would monitor fisheries habitat conditions in areas identified as critical bull trout and westslope cutthroat trout habitat in the Flathead Basin as prescribed in the "Flathead Basin Forest Practices and Fisheries Cooperative Program Final Report," Recommendation #17.
- 10) Contract administration would be the primary form of project monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected by the contractor, as they are observed, under supervision of DSL.
- 11) Compliance with Watershed and Grazing RMSs would be treated as important indicators of fisheries protection.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

References for all Alternatives

Flathead Basin Commission. 1991. Flathead Basin forest practices water quality and fisheries cooperative program final report. Kalispell, MT.

Thomas, Jack W., M.G. Raphael, et al. 1993. Viability assessments and management considerations for species associated with late-successional and old-growth forest of the Pacific Northwest. In: The scientific analysis team report.

WATERSHED

ALPHA ALTERNATIVE

Standards

General

- 1) DSL would manage watersheds, soil resources, and streams, lakes, wetlands, and other bodies of water to maintain high quality water that meets or exceeds state water quality standards, and to protect designated beneficial water uses.
- 2) DSL would comply with all laws and regulations pertaining to water resources when conducting or permitting activities on state-owned forest lands.

Best Management Practices

- 3) Forest management activities would incorporate Best Management Practices (BMPs) into project design and implementation. BMPs appropriate for a given project or situation would be determined during project development and environmental analysis. The source document for minimum standard BMPs would be "Best Management Practices For Forestry In Montana".

Cumulative Watershed Effects

- 4) Projects involving substantial vegetation removal or ground disturbance would require an assessment of cumulative watershed effects. The analysis would ensure that the project, considered with other existing and proposed activities, would not increase impacts beyond the physical limits imposed by the stream ecosystem for supporting its most restrictive beneficial use. The analysis would identify opportunities, if any existed, for mitigating adverse effects on beneficial water uses.
- 5) The level of cumulative watershed effects analysis would depend on the extent of the proposal, the level of past activity, and the watershed values at risk. Watersheds would be screened in a step-wise process, which would include three levels.

Level 1 -- Screening is a broad evaluation of physical parameters, beneficial uses, and potential for impacts. Based on the information assembled, the analysis would stop at the first level, or proceed to the next level. Except for small-scale projects with very low potential for impacts, additional analysis would be required.

Level 2 -- Preliminary Watershed Analysis would involve documenting history of past activities through the use of maps, aerial photography, and harvest records; developing indices of watershed disturbance, such as area harvested, length of road, and number of stream crossings; and conducting field evaluations of stream channels and watershed condition. Based on these results and the values at risk, the analysis might stop or proceed to the third level.

Level 3 -- Detailed Watershed Analysis would include model simulation of watershed response to watershed disturbance. This might include water yield increase, sediment yield increase, or other indicators of watershed response.

- 6) Threshold values for cumulative effects would be established by DSL on a watershed basis, taking into account such items as stream channel stability, beneficial water uses, and watershed condition. Threshold values would be set at a level to ensure protection of beneficial water uses with a low to moderate degree of risk.
- 7) DSL would cooperate with other landowners in watersheds with mixed ownership to manage cumulative watershed effects within prescribed thresholds.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Streamside and Riparian Management Standards

- 8) DSL would manage Streamside Management Zones (SMZs), riparian areas, and wetlands in a manner that complies with appropriate laws and regulations and protects and maintains water quality and beneficial water uses. Adequate measures for protecting water values would be of primary importance.
- 9) SMZ width would depend on erosion potential, level of disturbance proposed, and beneficial uses of the stream. One hundred feet would be the maximum width SMZ in all but exceptional cases of steep slopes, erosive soils, and sensitive streams.
- 10) Trees would be retained in the SMZ as prescribed in the SMZ rules. Multiple entries that would result in less than 50 percent of the pre-harvest stand would not be allowed except in salvage situations.
- 11) DSL would use plant species composition, soil characteristics, or depth of water table to identify wetlands. A 25 ft. wide SMZ would be maintained around isolated wetlands greater than one-half acre. Equipment would not be operated in wetlands unless the operation would not cause rutting or displacement of soil and shrubs, and submerchantable trees would be protected.
- 12) Existing roads in SMZs would be used if potential water quality impacts were adequately mitigated. The economic and watershed implications of relocating roads outside the SMZ would be primary considerations.

Rehabilitation

- 13) DSL would rehabilitate or mitigate the adverse effects of fire, flood, and other natural or management-related events, as funds were available. We would apply erosion control to damage incurred as a part of fire suppression. The DSL Wildfire Rehabilitation Policy would provide guidance.

Monitoring

- 14) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected as they were observed by the contractor, under supervision of DSL.
- 15) Qualitative assessments, such as BMP audits, would be conducted as time allowed and appropriate sites were available. Problems noted would be remedied by DSL. BMPs that fail to provide adequate protection would be revised for future application.
- 16) Water quality monitoring would be conducted on a representative sample of streams in areas of contiguous ownership to track trends in water quality. The data collected is generally not of adequate resolution to be used for cause and effect relationships of specific land management activities. As suitable projects became available, monitoring of individual projects would be considered. If monitoring indicated watershed impacts from management activities, problems would be corrected.
- 17) The impacts of timber management on the physical soil properties would be evaluated using quantitative methods on a limited number of sites as time allowed. The information collected would be used to identify the need for mitigation measures and the need to modify future activities to avoid similar impacts.

BETA ALTERNATIVE

Standards

General

- 1) DSL would manage watersheds, soil resources, and streams, lakes, wetlands, and other bodies of water to maintain high quality water that meets or exceeds state water quality standards, and to protect designated beneficial water uses.
- 2) DSL would comply with all laws and regulations pertaining to water resources when conducting or permitting activities on state-owned forest lands.
- 3) An inventory and analysis of watershed impacts would be conducted on state-owned forest land as funding allowed. The analysis would be sufficient to identify causes of watershed degradation and set priorities for watershed restoration. DSL would emphasize mitigation of water quality impacts in order to provide greater opportunities to produce trust income while maintaining beneficial uses.

Best Management Practices

- 4) All management activities would incorporate Best Management Practices (BMPs) into the project design and implementation. BMPs appropriate for a given project or situation would be determined during project development and environmental analysis. The source document for minimum standard BMPs would be "Best Management Practices For Forestry In Montana".

Cumulative Watershed Effects

- 5) Projects involving substantial vegetation removal or ground disturbance would require an assessment of cumulative watershed effects. The analysis would ensure that the project, considered with other existing and proposed activities, would not increase impacts beyond the physical limits imposed by the stream system for supporting its most restrictive beneficial use. The analysis would identify opportunities, if any existed, for mitigating adverse effects on beneficial water uses.
- 6) The level of cumulative watershed effects analysis would be dependent on the extent of the proposal, the level of past activity, and the watershed values at risk. Watersheds would be screened in a step-wise process, which would include three levels.

Level 1 -- Screening is a broad evaluation of physical parameters, beneficial uses, and potential for impacts. Based on the information assembled, the analysis would stop at the first level, or proceed to the next level. Except for small-scale projects with very low potential for impacts, additional analysis would be required.

Level 2 -- Preliminary Watershed Analysis would involve documenting history of past activities through the use of maps, aerial photography, and harvest records; developing indices of watershed disturbance, such as area harvested, length of road, and number of stream crossings; and conducting field evaluations of stream channels and watershed condition. Based on these results and the values at risk, the analysis might stop or proceed to the third level.

Level 3 -- Detailed Watershed Analysis would include model simulation of watershed response to watershed disturbance. This might include water yield increase, sediment yield increase, or other indicators of watershed response.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

- 7) Threshold values for cumulative effects would be established by DSL on a watershed basis, taking into account such items as stream channel stability, beneficial water uses, and watershed condition. Threshold values would be set at a level to ensure protection of beneficial water uses with a low to moderate degree of risk.
- 8) DSL would cooperate with other landowners in watersheds with mixed ownership to manage cumulative watershed effects within prescribed thresholds.

Streamside and Riparian Management Standards

- 9) DSL would manage Streamside Management Zones (SMZs), riparian areas, and wetlands in a manner that complied with appropriate laws and regulations and protected and maintained water quality and beneficial water uses. Adequate measures for protecting water values would be of primary importance.
- 10) SMZ width would be dependent on erosion potential, level of disturbance proposed, and beneficial uses of the stream. We would use the following table as a guide for determining SMZ width.

TABLE 1
Guide For Minimum Recommended SMZ Width
(slope distance each side of stream)

SLOPE	SOIL ERODIBILITY CLASS		
	HIGH (4X)	MEDIUM (3X)	LOW (2X)
5%	50 FT.*	50 FT.*	50 FT.*
15%	90 FT.	50 FT.*	50 FT.*
30%	120 FT.	90 FT.	60 FT.
50%	200 FT.	150 FT.	100 FT.

*Use minimum width when formula results equal < 50 ft.

Modify SMZ width based on topographic breaks.

- 11) Trees would be retained in the SMZ as prescribed in the SMZ rules. Multiple entries that would result in less than 50 percent of the pre-harvest stand would not be allowed except in salvage situations.
- 12) DSL would use plant species composition, soil characteristics, or depth of water table to identify wetlands. A 50 ft. wide SMZ would be maintained around isolated wetlands greater than one-quarter acre. Equipment would not be operated in wetlands unless the operation would not cause rutting or displacement of soil and shrubs and submerchantable trees would be protected.
- 13) Existing roads in SMZs would be used if potential water quality impacts are adequately mitigated. The economic and watershed implications of relocating roads outside the SMZ would be primary considerations.

Rehabilitation

- 14) DSL would rehabilitate or mitigate the adverse effects of fire, flood, and other natural or management-related events, as funds were available. We would apply erosion control to damage incurred as a part of fire suppression. The DSL Wildfire Rehabilitation Policy would provide guidance.
- 15) For development activities, DSL would ensure that adequate reclamation plans and bonds are included in approved plans of operation. Such plans and bonds would have to address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-disturbance topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and preparing seedbed and revegetating.

Fire Management

- 16) DSL would locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of the SMZ.
- 17) DSL would use suppression methods that result in the least disturbance possible in the SMZ. We would consider the potential adverse effects of fire suppression and the potential adverse effects of wildfire damage to determine appropriate suppression activities.

Monitoring

- 18) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected as they were observed by the contractor, under supervision of DSL.
- 19) Qualitative assessments, such as BMP audits, would be conducted on most projects with a substantial amount of soil disturbance. Problems noted would be remedied by DSL. BMPs that failed to provide adequate protection would be revised for future application.
- 20) Water quality monitoring would be conducted on a representative sample of streams in areas of contiguous ownership to track trends in water quality. The data collected is generally not of adequate resolution to be used for cause and effect relationships of specific land management activities. As suitable projects became available, monitoring of individual projects would be considered. If monitoring indicated watershed impacts from management activities, problems would be corrected.
- 21) The impacts of land management on the physical soil properties would be evaluated using quantitative methods on a representative sample of sites. The information collected would be used to identify the need for mitigation measures and the need to modify future activities to avoid similar impacts.
- 22) Qualitative and quantitative monitoring would be extended to other land uses, such as grazing, mining, cabin sites, and other uses of state lands. If problems were identified, they would be remedied by the lessee, contractor, or DSL.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

GAMMA ALTERNATIVE

Standards

General

- 1) DSL would manage watersheds, soil resources, and streams, lakes, wetlands, and other bodies of water to maintain high quality water that meets or exceeds state water quality standards, and to protect designated beneficial water uses.
- 2) DSL would comply with all laws and regulations pertaining to water resources when conducting or permitting activities on state-owned forest lands.
- 3) An inventory and analysis of watershed impacts would be conducted on state-owned forest land as funding allowed. The analysis would be sufficient to identify causes of watershed degradation and set priorities for watershed restoration. DSL would emphasize an aggressive program of mitigation to remedy water quality impacts caused by past activities. DSL would use restoration methods that promote long-term ecological integrity of the restored ecosystem.

Best Management Practices

- 4) All management activities would incorporate Best Management Practices (BMPs) into the project design and implementation. BMPs appropriate for a given project or situation would be determined during project development and environmental analysis. The source document for minimum standard BMPs would be "Best Management Practices For Forestry In Montana".

Cumulative Watershed Effects

- 5) Projects involving substantial vegetation removal or ground disturbance would require an assessment of cumulative watershed effects. The analysis would ensure that the project, considered with other existing and proposed activities, would not increase impacts beyond the physical limits imposed by the stream system for supporting its most restrictive beneficial use. The analysis would identify opportunities, if any existed, for mitigating adverse effects on beneficial water uses.
- 6) The level of cumulative watershed effects analysis would be dependent on the extent of the proposal, the level of past activity, and the watershed values at risk. Watersheds would be screened in a step-wise process, which would include three levels.

Level 1 -- Screening is a broad evaluation of physical parameters, beneficial uses, and potential for impacts. Based on the information assembled, the analysis would stop at the first level, or proceed to the next level. Except for small-scale projects with very low potential for impacts, additional analysis would be required.

Level 2 -- Preliminary Watershed Analysis would involve documenting history of past activities through the use of maps, aerial photography, and harvest records; developing indices of watershed disturbance, such as area harvested, length of road, and number of stream crossings; and conducting field evaluations of stream channels and watershed condition. Based on these results and the values at risk, the analysis might stop or proceed to the third level.

Level 3 -- Detailed Watershed Analysis would include model simulation of watershed response to watershed disturbance. This might include water yield increase, sediment yield increase, or other indicators of watershed response.

- 7) Threshold values for cumulative effects would be established by DSL on a watershed basis, taking into account such items as stream channel stability, beneficial water uses, and watershed condition. Threshold values would be set at a level to ensure protection of beneficial water uses with a low degree of risk.
- 8) DSL would cooperate with other landowners in watersheds with mixed ownership to manage cumulative watershed effects within prescribed thresholds.

Streamside and Riparian Management Standards

- 9) DSL would manage Streamside Management Zones (SMZs), riparian areas, and wetlands in a manner that complied with appropriate laws and regulations and protected and maintained water quality and beneficial water uses. Timber harvest in the SMZ would be conducted only for salvage of timber that is not essential to SMZ function. Adequate measures for protecting water values would be of primary importance.

- 10) SMZ width would depend on type of waterbody.

Fish-bearing streams would have an SMZ 300 feet horizontal distance in width on each side of the stream.

Permanently flowing non-fish-bearing streams would have an SMZ 150 feet horizontal distance in width on each side of the stream.

Lakes would have an SMZ 300 feet horizontal distance in width.

Seasonally flowing or intermittent streams would have an SMZ 100 feet horizontal distance in width on each side of the stream.

- 11) Trees would be retained in the SMZ as prescribed in the SMZ rules. Multiple entries that would result in less than 50 percent of the pre-harvest stand would not be allowed.
- 12) DSL would use plant species composition, soil characteristics, or depth of water table to identify wetlands. A 100 ft. wide SMZ would be maintained around isolated wetlands greater than one-quarter acre. Equipment would not be operated in wetlands unless the operation would not cause rutting or displacement of soil and shrubs and submerchantable trees would be protected.
- 13) Existing roads in SMZs would be abandoned and rehabilitated where possible. Where there are no reasonable alternative routes, we would apply the most effective mitigation measures possible.

Rehabilitation

- 14) DSL would rehabilitate or mitigate the adverse effects of fire, flood, and other natural or management-related events, as funds were available. We would apply erosion control to damage incurred as a part of fire suppression. The DSL Wildfire Rehabilitation Policy would provide guidance.
- 15) For development activities, DSL would ensure that adequate reclamation plans and bonds are included in approved plans of operation. Such plans and bonds would have to address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-disturbance topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and preparing seedbed and revegetating.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Fire Management

- 16) DSL would locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of the SMZ.
- 17) DSL would use suppression methods that would result in the least soil disturbance possible in the SMZ. We would consider the potential adverse effects of fire suppression and the potential adverse effects of wildfire damage to determine appropriate suppression activities.

Monitoring

- 18) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected as they were observed by the contractor, under supervision of DSL.
- 19) Qualitative assessments, such as BMP audits, would be conducted on most projects with a substantial amount of soil disturbance. Problems noted would be remedied by DSL. BMPs that failed to provide adequate protection would be revised for future application.
- 20) Water quality monitoring would be conducted on a limited number of streams in areas of contiguous ownership to track trends in water quality. The data collected is generally not of adequate resolution to be used for cause and effect relationships of specific land management activities. As suitable projects became available, monitoring of individual projects would be considered. If monitoring indicated watershed impacts from management activities, problems would be corrected.
- 21) The impacts of land management on the physical soil properties would be evaluated using quantitative methods on most sites. The information collected would be used to identify the need for mitigation measures and the need to modify future activities to avoid similar impacts.
- 22) Qualitative and quantitative monitoring would be extended to other land uses, such as grazing, mining, cabin sites, and other uses of state lands. If problems were identified, they would be remedied by the lessee, contractor, or DSL.

EPSILON AND DELTA ALTERNATIVES

Standards

General

- 1) DSL would manage watersheds, soil resources, and streams, lakes, wetlands, and other bodies of water to maintain high quality water that meets or exceeds state water quality standards, and to protect designated beneficial water uses.
- 2) DSL would comply with all laws and regulations pertaining to water resources when conducting or permitting activities on state-owned forest lands.
- 3) An inventory and analysis of watershed impacts would be conducted on state-owned forest land as funding allowed. The analysis would be sufficient to identify causes of watershed degradation and set priorities for watershed restoration. DSL would emphasize mitigation of water quality impacts in order to provide greater opportunities to produce trust income.

Best Management Practices

- 4) All management activities would incorporate Best Management Practices (BMPs) into the project design and implementation. BMPs appropriate for a given project or situation would be determined during project development and environmental analysis. The source document for minimum standard BMPs would be "Best Management Practices For Forestry In Montana".

Cumulative Watershed Effects

- 5) Projects involving substantial vegetation removal or ground disturbance would require an assessment of cumulative watershed effects. The analysis would ensure that the project, considered with other existing and proposed activities, would not increase impacts beyond the physical limits imposed by the stream system for supporting its most restrictive beneficial use. The analysis would identify opportunities, if any existed, for mitigating adverse effects on beneficial water uses.
- 6) The level of cumulative watershed effects analysis would be dependent on the extent of the proposal, the level of past activity, and the watershed values at risk. Watersheds would be screened in a step-wise process, which would include three levels.

Level 1 -- Screening is a broad evaluation of physical parameters, beneficial uses, and potential for impacts. Based on the information assembled, the analysis would stop at the first level, or proceed to the next level. Except for small-scale projects with very low potential for impacts, additional analysis would be required.

Level 2 -- Preliminary Watershed Analysis would involve documenting history of past activities through the use of maps, aerial photography, and harvest records; developing indices of watershed disturbance, such as area harvested, length of road, and number of stream crossings; and conducting field evaluations of stream channels and watershed condition. Based on these results and the values at risk, the analysis might stop or proceed to the third level.

Level 3 -- Detailed Watershed Analysis would include model simulation of watershed response to watershed disturbance. This might include water yield increase, sediment yield increase, or other indicators of watershed response.

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- 7) Threshold values for cumulative effects would be established by DSL on a watershed basis, taking into account such items as stream channel stability, beneficial water uses, and watershed condition. Threshold values would be set at a level to ensure protection of beneficial water uses with a moderate to high degree of risk.
- 8) DSL would cooperate with other landowners in watersheds with mixed ownership to manage cumulative watershed effects within prescribed thresholds. DSL would mitigate for other owners' current and past activities, as well as our own, only to the extent necessary to comply with requirements for water quality protection.

Streamside and Riparian Management Standards

- 9) DSL would manage Streamside Management Zones (SMZs), riparian areas, and wetlands in a manner that complied with appropriate laws and regulations and protected and maintained water quality and beneficial water uses.
- 10) SMZ width would be set according to SMZ rules, with exceptions for wider SMZs in sensitive locations.
- 11) Trees would be retained in the SMZ as prescribed in the SMZ rules.
- 12) DSL would use plant species composition, soil characteristics, or depth of water table to identify wetlands. A 25 ft. wide SMZ would be maintained around isolated wetlands greater than one-half acre. Equipment would not be operated in wetlands unless the operation would not cause rutting or displacement of soil and shrubs and submerchantable trees would be protected.
- 13) Existing roads in SMZs would be used if potential water quality impacts were adequately mitigated. The economic and watershed implications of relocating roads outside the SMZ would be primary considerations.

Rehabilitation

- 14) DSL would rehabilitate or mitigate the adverse effects of fire, flood, and other natural or management-related events, as funds were available. We would apply erosion control to damage incurred as a part of fire suppression. The DSL Wildfire Rehabilitation Policy would provide guidance.
- 15) For development activities, DSL would ensure that adequate reclamation plans and bonds were included in approved plans of operation. Such plans and bonds would have to address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-disturbance topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and preparing seedbed and revegetating.

Fire Management

- 16) DSL would locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of the SMZ.
- 17) DSL would use suppression methods that resulted in the least soil disturbance possible in the SMZ. We would consider the potential adverse effects of fire suppression and the potential adverse effects of wildfire damage to determine appropriate suppression activities.

Monitoring

- 18) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected as they were observed by the contractor, under supervision of DSL.
- 19) Qualitative assessments, such as BMP audits, would be conducted as time allowed and appropriate sites were available. Problems noted would be remedied by DSL. BMPs that didn't provide adequate protection would be revised for future application.
- 20) Water quality monitoring would be conducted on a limited number of streams in areas of contiguous ownership to track trends in water quality. The data collected is generally not of adequate resolution to be used for cause and effect relationships of specific land management activities. As suitable projects became available, monitoring of individual projects would be considered. If monitoring indicates watershed impacts from management activities, problems would be corrected.
- 21) The impacts of land management on the physical soil properties would be evaluated using quantitative methods on a limited number of sites as time allows. The information collected would be used to identify the need for mitigation measures and the need to modify future activities to avoid similar impacts.
- 22) Qualitative and quantitative monitoring would be extended to other land uses, such as grazing, mining, cabin sites, and other uses of state lands. If problems were identified, they would be remedied by the lessee, contractor, or DSL.

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ZETA ALTERNATIVE

Standards

General

- 1) DSL would manage watersheds, soil resources, and streams, lakes, wetlands, and other bodies of water to maintain high quality water that meets or exceeds state water quality standards, and to protect designated beneficial water uses.
- 2) DSL would comply with all laws and regulations pertaining to water resources when conducting or permitting activities on state-owned forest lands.
- 3) An inventory and analysis of watershed impacts would be conducted on state-owned forest land as funding allowed. The analysis would be sufficient to identify causes of watershed degradation and set priorities for watershed restoration. DSL would emphasize an aggressive program of mitigation to remedy water quality impacts caused by past activities. Rehabilitation efforts that enhance fisheries or recreation would be given priority.

Best Management Practices

- 4) All management activities would incorporate Best Management Practices (BMPs) into the project design and implementation. BMPs appropriate for a given project or situation would be determined during project development and environmental analysis. The source document for minimum standard BMPs would be "Best Management Practices For Forestry In Montana".

Cumulative Watershed Effects

- 5) Projects involving substantial vegetation removal or ground disturbance would require an assessment of cumulative watershed effects. The analysis would ensure that the project, considered with other existing and proposed activities, would not increase impacts beyond the physical limits imposed by the stream system for supporting its most restrictive beneficial use. The analysis would identify opportunities, if any existed, for mitigating adverse effects on beneficial water uses.
- 6) The level of cumulative watershed effects analysis would be dependent on the extent of the proposal, the level of past activity, and the watershed values at risk. Watersheds would be screened in a step-wise process, which would include three levels.

Level 1 -- Screening is a broad evaluation of physical parameters, beneficial uses, and potential for impacts. Based on the information assembled, the analysis would stop at the first level, or proceed to the next level. Except for small-scale projects with very low potential for impacts, additional analysis would be required.

Level 2 -- Preliminary Watershed Analysis would involve documenting history of past activities through the use of maps, aerial photography, and harvest records; developing indices of watershed disturbance, such as area harvested, length of road, and number of stream crossings; and conducting field evaluations of stream channels and watershed condition. Based on these results and the values at risk, the analysis might stop or proceed to the third level.

Level 3 -- Detailed Watershed Analysis would include model simulation of watershed response to watershed disturbance. This might include water yield increase, sediment yield increase, or other indicators of watershed response.

- 7) Threshold values for cumulative effects would be established by DSL on a watershed basis, taking into account such items as stream channel stability, beneficial water uses, and watershed condition. Threshold values would be set at a level to ensure protection of beneficial water uses with a low to moderate degree of risk.
- 8) DSL would cooperate with other landowners in watersheds with mixed ownership to manage cumulative watershed effects within prescribed thresholds.

Streamside and Riparian Management Standards

- 9) DSL would manage Streamside Management Zones (SMZs), riparian areas, and wetlands in a manner that complied with appropriate laws and regulations and protected and maintained water quality and beneficial water uses. Adequate measures for protecting water values would be of primary importance.
- 10) SMZ width would be dependent on erosion potential, level of disturbance proposed, and beneficial uses of the stream. The following table would be used as a guide for determining SMZ width.

TABLE 1
Guide For Minimum Recommended SMZ Width
(slope distance each side of stream)

SLOPE	SOIL ERODIBILITY CLASS		
	HIGH (4X)	MEDIUM (3X)	LOW (2X)
5%	50 FT.*	50 FT.*	50 FT.*
15%	60 FT.	50 FT.*	50 FT.*
30%	120 FT.	90 FT.	60 FT.
50%	200 FT.	150 FT.	100 FT.

*Use minimum width when formula results equal < 50 ft.

Modify SMZ width based on topographic breaks.

- 11) Trees would be retained in the SMZ as prescribed in the SMZ rules. Multiple entries that would result in less than 50 percent of the pre-harvest stand would not be allowed except in salvage situations. Re-entry into SMZs would be evaluated with an interdisciplinary approach.
- 12) DSL would use plant species composition, soil characteristics, or depth of water table to identify wetlands. A 50 ft. wide SMZ would be maintained around isolated wetlands greater than one-quarter acre. Equipment would not be operated in wetlands unless the operation would not cause rutting or displacement of soil and shrubs and submerchantable trees would be protected.
- 13) Existing roads in SMZs would be used if potential water quality impacts were adequately mitigated. The economic and watershed implications of relocating roads outside the SMZ would be primary considerations.

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Rehabilitation

- 14) DSL would rehabilitate or mitigate the adverse effects of fire, flood, and other natural or management-related events, as funds were available. We would apply erosion control to damage incurred as a part of fire suppression. The DSL Wildfire Rehabilitation Policy would provide guidance.
- 15) For development activities, DSL would ensure that adequate reclamation plans and bonds were included in approved plans of operation. Such plans and bonds would have to address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-disturbance topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvaging and replacing topsoil; and preparing seedbed and revegetating.

Fire Management

- 16) DSL would locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of the SMZ.
- 17) DSL would use suppression methods that resulted in the least soil disturbance possible in the SMZ. We would consider the potential adverse effects of fire suppression and the potential adverse effects of wildfire damage to determine appropriate suppression activities.

Monitoring

- 18) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments and project contracts would be periodically evaluated by contract administrators. Deficiencies would be corrected as they were observed by the contractor, under supervision of DSL.
- 19) Qualitative assessments, such as BMP audits, would be conducted on most projects with a substantial amount of soil disturbance. Problems noted would be remedied by DSL. BMPs that failed to provide adequate protection would be revised for future application.
- 20) Water quality monitoring would be conducted on a representative number of streams in areas of contiguous ownership to track trends in water quality. The data collected is generally not of adequate resolution to be used for cause and effect relationships of specific land management activities. As suitable projects became available, monitoring of individual projects would be considered. If monitoring indicated watershed impacts from management activities, problems would be corrected.
- 21) The impacts of land management on the physical soil properties would be evaluated using quantitative methods on a representative number of sites as time allowed. The information collected would be used to identify the need for mitigation measures and the need to modify future activities to avoid similar impacts.
- 22) Qualitative and quantitative monitoring would be extended to other land uses, such as grazing, mining, cabin sites, and other uses of state lands. If problems were identified, they would be remedied by the lessee, contractor, or DSL.

References for all Alternatives

- Cline, Richard, G.Cole, W.Megahan, R.Patton, J.Potyondy. 1980. Guidelines for predicting sediment yields. USFS R-1 & R-4.
- Flathead Basin Commission. 1991. Flathead Basin forest practices water quality and fisheries cooperative program final report. Kalispell, MT.
- Hansen, Paul L., S.W. Chadde, and R.D. Pfister. 1988. Miscellaneous publication No. 49: Riparian dominance types of Montana. University of Montana School of Forestry Forest and Range Experiment Station.
- Kootenai National Forest Plan. 1991. Riparian area guidelines - timber harvest guidelines within streamside management zones. USDA Forest Service Kootenai National Forest Appendix 26. Libby, MT.
- Montana Department of State Lands. 1991. Wildfire rehabilitation policy. Revised June 1991.
- Montana Environmental Quality Council. 1989. Best management practices for forestry in Montana. July 1989.
- Pfister, Robert D., K.Sherwood, D.F.Potts, and P.L.Hansen. 1991. Delineating streamside management zones for Montana forests. In: Flathead Basin forest practices water quality and fisheries study cooperative. Flathead Basin Commission. Kalispell, MT.
- Thomas, Jack W., M.G. Raphael, et al. 1993. Viability assessments and management considerations for species associated with late-successional and old-growth forest of the Pacific Northwest. The Scientific Analysis Team Report.
- USDA Forest Service. 1974. Forest hydrology part II - hydrologic effects of vegetative manipulation. Missoula, MT.

BIODIVERSITY

WE ADOPT THE FOLLOWING DEFINITION OF BIODIVERSITY (BIOLOGICAL DIVERSITY):

In the simplest of terms, biological diversity is the variety of life, and its processes. It includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.¹

ALPHA ALTERNATIVE

Standards

- 1) DSL would normally use management practices that sustain site productivity and reduce the risk of losses to damaging agents. Some of these practices might help promote certain elements of biodiversity, but promoting biodiversity in itself would not be a primary goal.
- 2) On projects where elements of biodiversity were identified as issues, DSL would evaluate these elements at a landscape level, such as a third-order drainage or other appropriate area. These evaluations would have to consider all ownerships and identify opportunities to mitigate impacts while meeting project objectives. Procedures such as those described in the Landscape Planning section of "Biological Diversity Strategies for Forest Type Groups" or other technical references would be used for these evaluations.
- 3) Where landscape evaluations identified opportunities to mitigate biodiversity impacts, DSL might incorporate such measures into management activities if there were a known connection to long-term timber productivity, or if it would prevent significant environmental impacts.
- 4) DSL would not initiate cooperative ecosystem management planning with adjoining landowners, but could participate in such planning when initiated by others where it promoted long-term trust revenue opportunities.
- 5) Interim old-growth standards for the Stillwater, Coal Creek, and Swan River State Forests would no longer be in force upon Plan adoption. In locations where old growth is an environmental issue, retention of old growth would be addressed on a case-by-case basis.
- 6) "Biological Diversity Strategies for Forest Type Groups" or other current references would be used for guidance to resolve biodiversity-related issues on a project-specific basis.

Monitoring

- 7,8,9) There would be no regular monitoring of timber sale areas after sale completion for effects on biological diversity.
- 10) Prospective old-growth stands identified using Stand-level Inventory criteria or other data would be field checked as needed to ensure accuracy.

References

Department of State Lands. 1991. Interim old-growth standards for state lands.

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands, unpublished paper.

¹ Biological Diversity on Federal Lands: Report of a Keystone Policy Dialogue. 1991. The Keystone Center, P.O. Box 606, Keystone, CO 80435.

BETA ALTERNATIVE

Standards

- 1) DSL would promote biodiversity by favoring a variety of stand structures and patterns on state lands, thus maintaining representation of habitats for native plant and animal species. Appropriate stand structures and spatial arrangement would be based on the ecological characteristics of the forest types that are represented. This would be done with a goal of providing opportunities for a broad range of current and prospective trust revenue opportunities, and promoting long-term health and productivity of state forests.
- 2) When considering land management activities, DSL would evaluate the distribution and arrangement of stand structures at a landscape level, such as a third-order drainage or other appropriate area. These evaluations would have to consider all ownerships and identify opportunities to promote a desirable distribution of stand structures and patterns. Procedures such as those described in the Landscape Planning section of "Biological Diversity Strategies for Forest Type Groups" or other technical references would be used for these evaluations.
- 3) DSL would use information from landscape evaluations to design management activities so that they would maintain or promote a favorable distribution of stand conditions. Timber harvests would be designed to promote the long-term diversity and balanced representation of forest conditions across the landscape.
- 4) DSL would make reasonable attempts to develop cooperative ecosystem management planning with major adjoining landowners. The objectives of cooperative planning would be to: (a) maintain appropriate amounts and distribution of stand structures and species mixtures to promote biodiversity at a landscape level; and (b) equitably maintain or promote trust revenue opportunities over the long term.
- 5) Within an appropriate ecosystem analysis area, DSL would seek to maintain or restore old-growth forest in amounts of at least half the average proportion that would be expected to occur with natural processes in similar forest types. Old-growth conditions would be developed or maintained on enough additional acres to provide for replacement of existing old growth over time. However, DSL would not maintain additional old growth to compensate for loss of old growth on adjoining ownerships, unless this is agreed upon as part of a cooperative ecosystem management plan. Procedures such as those described in "Biological Diversity Strategies for Forest Type Groups" or other technical references would be used for designating and managing old-growth blocks and replacement areas.
- 6) "Biological Diversity Strategies for Forest Type Groups" or other current references would be used as guidance for landscape-level biodiversity evaluations, old-growth protection, and design of timber harvests to promote biodiversity. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed.
- 6a) Additional guidance would be developed as needed for maintaining biodiversity in conjunction with major activities other than timber harvest, such as recreational development.

Monitoring

- 7) A subset of revenue-generating activities would be field reviewed by specialists after project completion, or every five years for ongoing projects, to evaluate the application and effectiveness of biological diversity measures at a stand and landscape level. This review would include all management activities done to maintain or develop old-growth values in old-growth retention and replacement blocks.

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- 8) Landscape evaluations would be checked as needed, to compare actual effects of management activities and natural processes against desired or predicted effects. Trends in forest cover characteristics, habitat values, insect and disease activity, and other natural disturbances would be evaluated.
- 9) Cooperative ecosystem management plans would also be evaluated as needed, to monitor how successfully they are being implemented, and how effective they are at maintaining desired ecosystem features.
- 10) Prospective old-growth stands identified using Stand-level Inventory criteria or other data would be field checked as needed to ensure accuracy.
- 11) Results of monitoring would be used to help plan follow-up and future activities in the evaluation area, and to improve our ability to predict the effects of activities in similar situations elsewhere. Monitoring should be frequent enough to accomplish these purposes effectively.
- 12) Monitoring results would also be used to identify potential improvements in biological diversity strategies and cooperative ecosystem management plans.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands, unpublished paper.

GAMMA ALTERNATIVE

Standards

- 1) DSL would promote biodiversity by carrying out management activities that maintain and restore natural ecological characteristics.
- 2) When considering land management activities, DSL would prepare biodiversity plans at a landscape level, such as a third-order drainage or other appropriate area. These plans would have to evaluate the distribution and arrangement of stand structures on all ownerships. Procedures such as those described in the Landscape Planning section of "Biological Diversity Strategies for Forest Type Groups" or other technical references should be used to develop these plans. The biodiversity plans would describe specific actions on state lands that would promote natural ecological characteristics that provide for biodiversity.
- 3) All management activities must be consistent with actions identified in the landscape-level biodiversity plans.
- 4) DSL would attempt to develop cooperative ecosystem management planning with adjoining landowners. The objectives of cooperative planning would be to maintain appropriate amounts and distribution of stand structures and species mixtures to promote biodiversity at a landscape level.
- 5) DSL would seek to maintain old growth in the landscape in amounts consistent with natural processes in similar forest types. Old-growth conditions would be developed or maintained on enough additional acres to provide for replacement of existing old growth over time. Procedures such as those described in "Biological Diversity Strategies for Forest Type Groups" or other technical references should be used for designating and managing old-growth blocks and replacement areas.
- 6) "Biological Diversity Strategies for Forest Type Groups" or other current references should be used as guidance for development of landscape-level biodiversity plans, old-growth protection, and design of timber harvests to promote biodiversity. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed.
- 6a) Additional guidance would be developed as needed for maintaining biodiversity in conjunction with major activities other than timber harvest, such as recreational development.

Monitoring

- 7) A subset of revenue-generating activities would be field reviewed by specialists after project completion, or every five years for ongoing projects, to evaluate the application and effectiveness of biological diversity measures at a stand and landscape level. This review would include all management activities done to maintain or develop old-growth values in old-growth retention and replacement blocks.
- 8) Landscape-level biodiversity plans would be reviewed as needed, to evaluate the effectiveness of prescribed management activities at promoting natural ecological characteristics, as addressed in the biodiversity plan. Trends in forest cover characteristics, habitat values, insect and disease activity, and other natural disturbances would be evaluated.
- 9) Cooperative ecosystem management plans would also be evaluated as needed, to monitor how successfully they are being implemented, and how effective they are at maintaining desired ecosystem features.

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- 10) Prospective old-growth stands identified using Stand-level Inventory criteria or other data would be field checked as needed to ensure accuracy.
- 11) Results of monitoring would be used to help plan follow-up and future activities in the evaluation area, and to improve our ability to predict the effects of comparable activities elsewhere. Monitoring should be frequent enough to accomplish these purposes effectively.
- 12) Monitoring results would also be used to identify potential improvements in biological diversity strategies, landscape-level biodiversity plans and cooperative ecosystem management plans.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands, unpublished paper.

DELTA ALTERNATIVE

Standards

- 1) DSL would normally use management practices that sustain site productivity and reduce the risk of losses to damaging agents. Some of these practices might help promote certain elements of biodiversity. However, promoting biodiversity in itself would not be a primary goal except where it provided direct trust income by means such as conservation easements or leases, wildlife viewing areas, or nature trail development.
- 2) On projects where elements of biodiversity are identified as issues, DSL would evaluate these elements at a landscape level, such as a third-order drainage or other appropriate area. These evaluations would have to consider all ownerships and identify opportunities to mitigate impacts while meeting project objectives. Procedures such as those described in the Landscape Planning section of "Biological Diversity Strategies for Forest Type Groups" or other technical references should be used for these evaluations.
- 3) Where landscape evaluations identify opportunities to mitigate biodiversity impacts, DSL may incorporate such measures into management activities if there were a known connection to trust revenue opportunities, or if trust revenue would not be diminished.
- 4) In situations where cumulative impacts to biodiversity limit DSL's income-producing capability, DSL would make reasonable attempts to develop cooperative ecosystem management planning with major adjoining landowners. The objectives of cooperative planning would be to: (a) maintain appropriate amounts and distribution of stand structures and species mixtures to promote biodiversity at a landscape level; and (b) equitably maintain or promote trust revenue opportunities over the long term.
- 5) Old growth would not be specifically protected from harvest, unless the trust were compensated or protection were agreed upon as part of a cooperative ecosystem management plan. However, if trust revenue would not be reduced, DSL would attempt to locate and design harvests or other activities to minimize impacts on old growth.
- 6) "Biological Diversity Strategies for Forest Type Groups" or other current references should be used as guidance to resolve biodiversity-related issues on a project-specific basis, and to promote biodiversity where it would provide direct trust income. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed.
- 6a) Additional guidance would be developed as needed for maintaining biodiversity in conjunction with major activities other than timber harvest. Such activities may include recreational development and hunting leases.

Monitoring

- 7) A subset of revenue-generating activities would be field reviewed by specialists after project completion, or every five years for ongoing projects, to evaluate the application and effectiveness of biological diversity measures applied to provide trust revenue or mitigate environmental impacts.
- 8) Landscape evaluations would be checked as needed, to compare actual effects of management activities and natural processes against desired or predicted effects. Trends in forest cover characteristics, habitat values, insect and disease activity, and other natural disturbances would be evaluated.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

- 9) Cooperative ecosystem management plans would also be evaluated as needed, to monitor how successfully they are being implemented, and how effective they are at maintaining desired ecosystem features.
- 10) Prospective old-growth stands identified using Stand-level Inventory criteria or other data would be field checked as needed to ensure accuracy.
- 11) Results of monitoring would be used to help plan follow-up and future activities in the evaluation area, and to improve our ability to predict the effects of comparable activities elsewhere. Monitoring should be frequent enough to accomplish these purposes effectively.
- 12) Monitoring results would also be used to identify potential improvements in biological diversity strategies and cooperative ecosystem management plans.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands, unpublished paper.

EPSILON ALTERNATIVE

Standards

- 1) DSL would normally use management practices that sustain site productivity and reduce the risk of losses to damaging agents. Some of these practices might help promote certain elements of biodiversity. However, promoting biodiversity in itself would not be a primary goal except where it provided direct trust income by means such as conservation easements or leases.
- 2) On projects where elements of biodiversity were identified as issues, DSL would evaluate these elements at a landscape level, such as a third-order drainage or other appropriate area. These evaluations would have to consider all ownerships and identify opportunities to mitigate impacts while meeting project objectives. Procedures such as those described in the Landscape Planning section of "Biological Diversity Strategies for Forest Type Groups" or other technical references should be used for these evaluations.
- 3) Where landscape evaluations identify opportunities to mitigate biodiversity impacts, DSL may incorporate such measures into management activities if there were a known connection to trust revenue opportunities, or if trust revenue would not be diminished.
- 4) In situations where cumulative impacts to biodiversity limit DSL's potential timber harvests, DSL would make reasonable attempts to develop cooperative ecosystem management planning with major adjoining landowners. The objectives of cooperative planning would be to: (a) maintain appropriate amounts and distribution of stand structures and species mixtures to promote biodiversity at a landscape level; and (b) equitably maintain or promote trust revenue opportunities over the long term.
- 5) Old growth would not be specifically protected from harvest, unless the trust is compensated or protection is agreed upon as part of a cooperative ecosystem management plan. However, if trust revenue would not be reduced, DSL would attempt to locate and design harvests or other activities to minimize impacts on old growth.
- 6) "Biological Diversity Strategies for Forest Type Groups" or other current references should be used as guidance to resolve biodiversity-related issues on a project-specific basis, and to promote biodiversity where it would provide direct trust income. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed.

Monitoring

- 7) A subset of timber sale units would be field reviewed by specialists after sale completion, to evaluate the application and effectiveness of biological diversity measures applied to provide trust revenue or mitigate environmental impacts.
- 8) Landscape evaluations would be checked as needed, to compare actual effects of management activities and natural processes against desired or predicted effects. Trends in forest cover characteristics, habitat values, insect and disease activity, and other natural disturbances would be evaluated.
- 9) Cooperative ecosystem management plans would also be evaluated as needed, to monitor how successfully they are being implemented, and how effective they are at maintaining desired ecosystem features.
- 10) Prospective old-growth stands identified using Stand-level Inventory criteria or other data would be field checked as needed to ensure accuracy.

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- 11) Results of monitoring would be used to help plan follow-up and future activities in the evaluation area, and to improve our ability to predict the effects of comparable activities elsewhere. Monitoring should be frequent enough to accomplish these purposes effectively.
- 12) Monitoring results would also be used to identify potential improvements in biological diversity strategies and cooperative ecosystem management plans.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands, unpublished paper.

ZETA ALTERNATIVE

Standards

- 1) DSL would promote biodiversity to the extent that it supported income opportunities based on wildlife and recreation, by providing diverse wildlife habitats and visual quality, and by minimizing impacts of recreational developments on riparian and aquatic ecosystems. Promoting biodiversity might also be a primary goal where it provided direct trust income by means such as conservation easements or leases, wildlife viewing areas, or nature trail development.
- 2) On projects where elements of biodiversity were identified as issues, DSL would evaluate these elements at an appropriate spatial scale. These evaluations would have to consider all ownerships and identify opportunities to mitigate impacts while meeting project objectives. Procedures such as those described in the Landscape Planning section of "Biological Diversity Strategies for Forest Type Groups" or other technical references should be used for these evaluations.
- 3) Where landscape evaluations identify opportunities to mitigate biodiversity impacts, DSL may incorporate such measures into management activities if they appear to promote or directly provide trust revenue opportunities.
- 4) In situations where cumulative impacts to biodiversity limit DSL's income-producing opportunities, DSL would make reasonable attempts to develop cooperative ecosystem management planning with major adjoining landowners. The objectives of cooperative planning would be to: (a) maintain appropriate amounts and distribution of stand structures and species mixtures to promote biodiversity at a landscape level; and (b) equitably maintain or promote trust revenue opportunities over the long term.
- 5) Within an appropriate ecosystem analysis area, DSL would seek to maintain or restore old-growth forest in amounts of at least half the average proportion that would be expected to occur with natural processes in similar forest types. Old-growth conditions would be developed or maintained on enough additional acres to provide for replacement of existing old growth over time. However, DSL would not maintain additional old growth to compensate for loss of old growth on adjoining ownerships, unless this is agreed upon as part of a cooperative ecosystem management plan. Procedures such as those described in "Biological Diversity Strategies for Forest Type Groups" or other technical references should be used for designating and managing old-growth blocks and replacement areas.
- 6) "Biological Diversity Strategies for Forest Type Groups" or other current references should be used as guidance for landscape-level biodiversity evaluations, old-growth protection, and design of timber harvests to maintain biodiversity. The Biological Diversity Strategies would be updated periodically, with professional review, as new information and concepts are developed.
- 6a) Additional guidance would be developed for maintaining biodiversity in conjunction with major activities other than timber harvest, such as recreational development and hunting leases.

Monitoring

- 7) A subset of revenue-generating activities would be field reviewed by specialists after project completion, or every five years for ongoing projects, to evaluate the application and effectiveness of biological diversity measures on a stand and landscape level. This review would include all management activities done to maintain or develop old-growth values in old-growth retention and replacement blocks, and all intensive recreational developments.

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- 8) Landscape evaluations would be checked as needed, to compare actual effects of management activities and natural processes against desired or predicted effects. Trends in forest cover characteristics, habitat values, insect and disease activity, and other natural disturbances would be evaluated.
- 9) Cooperative ecosystem management plans would also be evaluated as needed, to monitor how successfully they were being implemented, and how effective they were at maintaining desired ecosystem features.
- 10) Identification of prospective old-growth stands using Stand-level Inventory criteria or other data would be field checked as needed to ensure the accuracy of old-growth identification.
- 11) Results of monitoring would be used to help plan follow-up and future activities in the evaluation area, and to improve our ability to predict the effects of comparable activities elsewhere. Monitoring should be frequent enough to accomplish these purposes effectively.
- 12) Monitoring results would also be used to identify potential improvements in biological diversity strategies and cooperative ecosystem management plans.

References

Remington, D. 1993. Biological diversity strategies for forest type groups. Montana Department of State Lands, unpublished paper.

SILVICULTURE

ALPHA, BETA, DELTA and ZETA ALTERNATIVES

Standards

Biological

- 1) All prescribed silvicultural treatments would maintain the long-term productivity of the soil and site in order to ensure the long-term capability to produce trust revenue and maintain soil hydrologic function.
- 2) Ecological characteristics of the site would be evaluated and used to develop stand management regimes that are compatible with the site. Management regimes would address stand structures and development, species mixtures, silvicultural systems, and time periods for reforestation. Suitable management regimes are those which can be expected to realize the productive capability of the site for producing desired products and benefits. They also minimize the risk of losses to biotic or abiotic agents (e.g., wind-throw, micro-climate changes, etc.) which would prevent achievement of these benefits.
- 3) The long-term quality of the genetic base would be maintained or improved in terms of growth, form and adaptation of tree species.
- 4) Diversity of species, ages, and structure would be maintained within or between stands, in order to maintain a complex and stable ecosystem that would be buffered against losses to insects, disease, wildfire, and climatic elements.

Silvicultural Prescriptions

- 5) Silvicultural prescriptions would be prepared for all planned treatments. These prescriptions would be written to accomplish the following objectives in a clear and organized manner:
 - a) Guide DSL personnel in the correct implementation of the prescribed treatments.
 - b) Provide a record of the objectives and details of prescribed treatments for future reference.
 - c) Document conformity of the prescribed silvicultural treatments with requirements of the State Forest Land Management Plan and relevant DSL Resource Management Standards.

Financial

- 6) A financial evaluation would be done for all proposed silvicultural treatment(s) using an appropriate combination of the following procedures:
 - a) The use of FAST or similar software approved by the Forest Management Bureau to estimate the treatment net present value (NPV) and land expectation value (LEV). This would be done on at least one stand per administrative Unit per year, and when proposed activities represent a questionable investment.
 - b) The foresters use their best professional judgement to rank the financial merit of treatment alternatives.
- 7) All recommended silvicultural treatment regimes would have to produce a net return for the combined current and future stands (i.e., LEV) that was higher than the net return for the "no action" alternative. These financial comparisons would need to consider effects of the prescribed

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treatments on future harvest opportunities in other stands in the vicinity, as well as discounted costs and returns at the stand level.

- 8) The discount rate for evaluating silvicultural treatment investments would be based on the returns from AAA corporate bonds and an estimate of risk. The discount rate is currently 3.75 percent, and would be updated periodically.

Integration with Other Resource Management Standards

- 9) Prescribed silvicultural treatments would meet other resource management standards and comply with all appropriate statutes and regulations, in a manner consistent with the above standards. This would require coordination of treatments between stands in order to achieve parcel or drainage-wide goals for distribution of age, size, stocking, and structure characteristics.
- 10) Until updated references are developed, the guidelines from DSL Silvicultural Treatment Standards and Guidelines (draft dated 2/91), or other appropriate technical references, would be used as needed for guidance to implement these standards.

Monitoring

- 11) Monitoring procedures and information would be used to:
 - monitor the effectiveness of completed silvicultural treatments at meeting treatment objectives;
 - identify promptly the need for follow-up treatments in order to meet treatment objectives and environmental commitments;
 - provide information for improving the effectiveness of future silvicultural practices; and
 - identify potential improvements to the Silvicultural Treatment Guidelines.
- 12) A regeneration survey would be completed promptly enough to ensure that treatment objectives and environmental commitments were met, in all stands where a regeneration cut has been applied.
- 13) In all planted stands, a survival survey would be completed the first fall after planting.
- 14) Stand evaluations would be scheduled and conducted prior to each scheduled entry and after each completed treatment. Evaluation methods and intensity would be sufficient to provide information necessary for developing appropriate silvicultural prescriptions and for determining treatment results in terms of the prescribed objectives.
- 15) Information on the dates and types of completed treatments and activities would be maintained for each stand.
- 16) Information on revenues and costs would be maintained for all treatments.
- 17) A record would be maintained of all conditions and events that occur during the course of treatment that have a significant potential to affect the treatment outcome.
- 18) On selected sites, soils effects would be monitored for implementation of mitigation measures and effectiveness to guide future harvest practices.

GAMMA ALTERNATIVE

Standards

Biological

- 1) All prescribed silvicultural treatments would maintain the long-term productivity of the soil and site in order to ensure the long-term capability to produce trust revenue and maintain soil hydrologic function.
- 2) Ecological characteristics of the site would be evaluated and used to develop stand management regimes that are compatible with the site. Management regimes would address stand structures and development, species mixtures, silvicultural systems, and time periods for reforestation. Suitable management regimes are those which can be expected to realize the productive capability of the site for producing desired products and benefits. They also minimize the risk of losses to biotic or abiotic agents (e.g., wind-throw, micro-climate changes, etc.) which would prevent achievement of these benefits.
- 3) The long-term quality of the genetic base would be maintained or improved in terms of growth, form, and adaptation of tree species.
- 4) Diversity of species, ages, and structure would be maintained within or between stands, in order to maintain a complex and stable ecosystem that would be buffered against losses to insects, disease, wildfire, and climatic elements.

Silvicultural Prescriptions

- 5) Silvicultural prescriptions would be prepared for all planned treatments. These prescriptions would be written to accomplish the following objectives in a clear and organized manner:
 - a) Guide DSL personnel in the correct implementation of the prescribed treatments.
 - b) Provide a record of the objectives and details of prescribed treatments for future reference.
 - c) Document conformity of the prescribed silvicultural treatments with requirements of the State Forest Land Management Plan and relevant DSL Resource Management Standards.

Financial

- 6) A financial evaluation would be done for all proposed silvicultural treatment(s) using an appropriate combination of the following procedures:
 - a) The use of FAST or similar software approved by the Forest Management Bureau to estimate the treatment net present value (NPV) and land expectation value (LEV). This would be done on at least one stand per administrative Unit per year, and when proposed activities represent a questionable investment.
 - b) The foresters use their best professional judgement to rank the financial merit of treatment alternatives.
- 7) All recommended silvicultural treatment regimes, except those done specifically for ecosystem rehabilitation, would have to produce a net return for the combined current and future stands (i.e., LEV) that was higher than the net return for the "no action" alternative. Projects whose specific purpose was rehabilitation of impacted ecosystems would be exempt from this requirement. These

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financial comparisons would need to consider effects of the prescribed treatments on future harvest opportunities in other stands in the vicinity, as well as discounted costs and returns at the stand level.

- 8) The discount rate for evaluating silvicultural treatment investments would be based on the returns from AAA corporate bonds and an estimate of risk. The discount rate is currently 3.75 percent, and would be updated periodically.

Integration with Other Resource Management Standards

- 9) Prescribed silvicultural treatments would have to meet other resource management standards and comply with all appropriate statutes and regulations, in a manner consistent with the above standards. This would require coordination of treatments between stands in order to achieve parcel or drainage-wide goals for distribution of age, size, stocking, and structure characteristics.
- 10) Until updated references are developed, the guidelines from DSL Silvicultural Treatment Standards and Guidelines (draft dated 2/91), or other appropriate technical references, would be used as needed for guidance to implement these standards.

Monitoring

- 11) Monitoring procedures and information would be used to:
 - monitor the effectiveness of completed silvicultural treatments at meeting treatment objectives;
 - identify promptly the need for follow-up treatments in order to meet treatment objectives and environmental commitments;
 - provide information for improving the effectiveness of future silvicultural practices; and
 - identify potential improvements to the Silvicultural Treatment Guidelines.
- 12) A regeneration survey would be completed promptly enough to ensure that treatment objectives and environmental commitments were met, in all stands where a regeneration cut has been applied.
- 13) In all planted stands, a survival survey would be completed the first fall after planting.
- 14) Stand evaluations would be scheduled and conducted prior to each scheduled entry and after each completed treatment. Evaluation methods and intensity would be sufficient to provide information necessary for developing appropriate silvicultural prescriptions and for determining treatment results in terms of the prescribed objectives.
- 15) Information on the dates and types of completed treatments and activities would be maintained for each stand.
- 16) Information on revenues and costs would be maintained for all treatments.
- 17) A record would be maintained of all conditions and events that occur during the course of treatment that have a significant potential to affect the treatment outcome.
- 18) On selected sites, soils effects would be monitored for implementation of mitigation measures and effectiveness to guide future harvest practices.

EPSILON ALTERNATIVE

Standards

Biological

- 1) All prescribed silvicultural treatments would maintain the long-term productivity of the soil and site in order to ensure the long-term capability to produce trust revenue and maintain soil hydrologic function.
- 2) Ecological characteristics of the site would be evaluated and used to develop stand management regimes that are compatible with the site. Management regimes would address stand structures and development, species mixtures, and silvicultural systems. Suitable management regimes are those which can be expected to realize the productive capability of the site for producing desired products and benefits. They also minimize the risk of losses to biotic or abiotic agents (e.g., wind-throw, micro-climate changes, etc.) which would prevent achievement of these benefits.
- 2a) All regeneration harvest units would be reforested to prescribed stocking levels as rapidly as site conditions allow.
- 3) The long-term quality of the genetic base would be maintained or improved in terms of growth, form, and adaptation of tree species.
- 4) Diversity of species, ages, and structure would be maintained within or between stands, in order to maintain a complex and stable ecosystem that would be buffered against losses to insects, disease, wildfire and climatic elements.

Silvicultural Prescriptions

- 5) Silvicultural prescriptions would be prepared for all planned treatments. These prescriptions would be written to accomplish the following objectives in a clear and organized manner:
 - a) Guide DSL personnel in the correct implementation of the prescribed treatments.
 - b) Provide a record of the objectives and details of prescribed treatments for future reference.
 - c) Document conformity of the prescribed silvicultural treatments with requirements of the State Forest Land Management Plan and relevant DSL Resource Management Standards.

Financial

- 6) A financial evaluation would be done for all proposed silvicultural treatment(s) using an appropriate combination of the following procedures:
 - a) The use of FAST or similar software approved by the Forest Management Bureau to estimate the treatment net present value (NPV) and land expectation value (LEV). This would be done on at least one stand per administrative Unit per year, and when proposed activities represent a questionable investment.
 - b) The foresters use their best professional judgement to rank the financial merit of treatment alternatives.
- 7) All recommended silvicultural treatment regimes would have to produce a net return for the combined current and future stands (i.e., LEV) that is higher than the net return for the "no action"

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alternative. These financial comparisons would need to consider effects of the prescribed treatments on future harvest opportunities in other stands in the vicinity, as well as discounted costs and returns at the stand level.

- 8) The discount rate for evaluating silvicultural treatment investments would be based on the returns from AAA corporate bonds and an estimate of risk. The discount rate is currently 3.75 percent, and would be updated periodically.

Integration with Other Resource Management Standards

- 9) Prescribed silvicultural treatments would meet other resource management standards and comply with all appropriate statutes and regulations, in a manner consistent with the above standards. This would require coordination of treatments between stands in order to achieve parcel or drainage-wide goals for distribution of age, size, stocking and structure characteristics.
- 10) Until updated references are developed, the guidelines from DSL Silvicultural Treatment Standards and Guidelines (draft dated 2/91), or other appropriate technical references, would be used as needed for guidance to implement these standards.

Monitoring

- 11) Monitoring procedures and information would be used to:
 - monitor the effectiveness of completed silvicultural treatments at meeting treatment objectives;
 - identify promptly the need for follow-up treatments in order to meet treatment objectives and environmental commitments;
 - provide information for improving the effectiveness of future silvicultural practices; and
 - identify potential improvements to the Silvicultural Treatment Guidelines.
- 12) A regeneration survey would be completed promptly enough to ensure that treatment objectives and environmental commitments were met, in all stands where a regeneration cut has been applied.
- 13) In all planted stands, a survival survey would be completed the first fall after planting.
- 14) Stand evaluations would be scheduled and conducted prior to each scheduled entry and after each completed treatment. Evaluation methods and intensity would be sufficient to provide information necessary for developing appropriate silvicultural prescriptions and for determining treatment results in terms of the prescribed objectives.
- 15) Information on the dates and types of completed treatments and activities would be maintained for each stand.
- 16) Information on revenues and costs would be maintained for all treatments.
- 17) A record would be maintained of all conditions and events that occur during the course of treatment that have a significant potential to affect the treatment outcome.
- 18) On selected sites, soils effects would be monitored for implementation of mitigation measures and effectiveness to guide future harvest practices.

References for All Alternatives

Department of State Lands. 1991. Silvicultural treatment standards and guidelines. Draft Feb. 1991.

GRAZING ON CLASSIFIED FOREST LANDS

ALPHA ALTERNATIVE

Standards

- 1) State Forest Land Use Authorization for a grazing license on classified Forest lands would indicate the number of animal unit months (AUMs) and grazing period of use. Grazing leases (forested classified Grazing lands) would specify the number of AUMs but not the grazing period of use.
- 2) Lessees and licensees would have primary responsibility for developing and maintaining rangeland improvements. They would also be responsible for maintaining or improving range condition by managing livestock grazing in a manner that produces a stable or upward trend in existing range condition.
- 3) Stocking rates would be estimated by visual assessment of existing vegetative plant species composition. Estimated species composition by weight per range site would be compared to potential (climax range condition) for a specific range sites. The following references, published by the USDA Soil Conservation Service, would serve as technical guides: "Guides for Determining Range Condition and Initial Stocking Rates"; Range Site Criteria; and "Guides to Determine Forest Understory Vegetation Condition and Recommended Stocking Rates". Range site would be determined by soil characteristics, topography, climate, and professional judgement.
- 4) Riparian management concerns, such as utilization of riparian vegetation and mechanical damage to stream channels, would be given consideration only in isolated instances, primarily in conjunction with mixed ownership allotments.

Monitoring

- 5) Grazing leases and licenses would be evaluated by DSL field personnel once within the 10 year lease/license term. This evaluation could be supplemented by other on-site reviews to address management concerns, requests to place improvements on state land, or during scheduled reviews by the lessee or licensee.
- 6) During the once-every-ten-year review a stocking rate for each lease or license scheduled for renewal in the upcoming calendar year would be determined. Improvements, livestock distribution patterns, management concerns, and range condition would be documented on a field evaluation form.
- 7) Follow-up contact with the lessee or licensee would be accomplished, if deemed appropriate due to management concerns noted during on-site review. Contacts would vary in depth from a simple letter that would notify the lessee/licensee of the problem, problem location, lessee/licensee contract responsibilities, and required action to address the problem. More difficult problems might involve development and agreement to a written long-term management plan and a Supplemental Lease Agreement (SLA).

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BETA ALTERNATIVE

Standards

- 1) Grazing licenses (classified Forest lands) and grazing leases (forested classified Grazing lands) would specify the number of animal unit months (AUMs), kinds of livestock, and grazing period of use. Lease/license stipulations would be set at the time of lease/license renewal.
- 2) Lessees and licensees would have primary responsibility for developing and maintaining range land improvements. They would also be responsible for maintaining or improving range sites by managing livestock grazing and utilization in a manner that would produce a stable or upward trend in range condition. DSL would support rangeland improvements through technical and financial assistance, as workload and budget allowed. Rangeland improvements could include riparian management, weed control, prescribed burning, water developments, grazing management systems, fencing, and conversion of forest edge ecotones to grassland. Cost-sharing for improvements between the lessee/licensee and the state would be accomplished through an addendum to the lease/license. The addendum would stipulate terms and conditions by which the lessee/licensee may be required to reimburse the state for improvement expenses incurred.
- 3) Stocking rates would be estimated by visual assessment of existing vegetative plant species composition. Estimated species composition by weight per range site would be compared to potential (climax range condition) for a specific range sites. The following references, published by the USDA Soil Conservation Service, would serve as technical guides: "Guides for Determining Range Condition and Initial Stocking Rates"; Range Site Criteria; and "Guides to Determine Forest Understory Vegetation Condition and Recommended Stocking Rates". Range site would be determined by soil characteristics, topography, climate, and professional judgement.
- 4) Livestock management practices would be designed to prevent unacceptable loss of streambank vegetation and structural damage to streambanks that results in nonpoint source pollution. Practices would be designed to: (1) improve or restore both herbaceous and woody species to a healthy and vigorous condition and facilitate the ability of vegetation to reproduce and maintain different age classes in the desired riparian-wetland plant communities; and (2) leave sufficient vegetation biomass and plant residue (including woody debris) to provide for adequate sediment filtering and dissipation of stream energy for bank protection.
- 5) Mineral, protein, and other supplements would be placed so as to maximize animal distribution away from riparian areas. Holding facilities would be placed outside of riparian areas.
- 6) Continuous season-long grazing would be authorized with the level of forage utilization not to exceed 60 percent and healthy riparian function maintained.

Monitoring

- 7)
 - a) At renewal (every 10 years), leases/licenses would be evaluated for the following: range condition; plant species composition; riparian browse utilization; and streambank disturbance.
 - b) Leases/licenses would be evaluated at mid-term (every 5th year) for the following: riparian browse utilization; streambank disturbance; and an ocular assessment of tract condition with notations for potential concerns or problems.
 - c) Range condition would be evaluated using standard USDA Soil Conservation Service methods and recorded on a DSL Field Evaluation Form. Browse utilization would be measured using standardized survey methods, such as the Cole Browse Survey Method (Patton and Hall, 1966) or a modified version of Evaluating Health of Riparian Areas on the Charles M. Russell National

Wildlife Refuge (Cook, et al., 1993) to measure form class of shrubs or percent riparian vegetation utilization, respectively. No shrubs would be in the heavily hedged form class and less than 25 percent of the shrubs would be in the moderately hedged form class. In addition, streambank disturbance induced by livestock trampling would be limited to less than 10 percent alteration per 500 feet of streambank.

- d) Areas that showed resource damage greater than the prescribed limits would be mitigated or rehabilitated by the lessee, with technical assistance from DSL. If improved management did not resolve the damage, adjustments in the license or lease would be used to facilitate rehabilitation efforts.

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GAMMA ALTERNATIVE

Standards

- 1) Grazing licenses (classified Forest lands) and grazing leases (forested classified Grazing lands) would specify the number of animal unit months (AUMs), kinds of livestock, and grazing period of use. Lease/license stipulations would be set at the time of lease/license renewal.
- 2) Lessees and licensees would have primary responsibility for developing and maintaining range land improvements. They would also be responsible for maintaining or improving range sites by managing livestock grazing and utilization in a manner that produces a stable or upward trend in range condition. DSL would support rangeland improvements through technical and financial assistance, as workload and budget allowed. Rangeland improvements might include riparian management, weed control, prescribed burning, water developments, grazing management systems, fencing, and conversion of forest edge ecotones to grassland. Cost-sharing for improvements between the lessee/licensee and the state would be accomplished through an addendum to the lease/license. The addendum would stipulate terms and conditions by which the lessee/licensee may be required to reimburse the state for improvement expenses incurred.
- 3) Stocking rates would be estimated by visual assessment of existing vegetative plant species composition. Estimated species composition by weight per range site would be compared to potential (climax range condition) for specific range sites. The following references, published by the USDA Soil Conservation Service, would serve as technical guides: "Guides for Determining Range Condition and Initial Stocking Rates"; Range Site Criteria; and "Guides to Determine Forest Understory Vegetation Condition and Recommended Stocking Rates". Range site would be determined by soil characteristics, topography, climate, and professional judgement.
- 4) Livestock management practices would be designed to prevent unacceptable loss of streambank vegetation and structural damage to streambanks that results in nonpoint source pollution. Practices would be designed to: (1) improve or restore both herbaceous and woody species to a healthy and vigorous condition and facilitate the ability of vegetation to reproduce and maintain different age classes in the desired riparian-wetland plant communities; and (2) leave sufficient vegetation biomass and plant residue (including woody debris) to provide for adequate sediment filtering and dissipation of stream energy for bank protection.
- 5) Mineral, protein, and other supplements would be placed so as to maximize animal distribution away from riparian areas. Holding facilities would be placed outside of riparian areas.
- 6) Continuous season-long grazing would not be allowed. A grazing system would be developed by the lessee/licensee.

Monitoring

- 7)
 - a) At renewal (every 10 years), leases/licenses would be evaluated for the following: range condition; plant species composition; riparian browse utilization; and streambank disturbance.
 - b) Leases/licenses would also be evaluated every two years for the following: riparian browse utilization; streambank disturbance; and an ocular assessment of tract condition with notations for potential concerns or problems.
 - c) Range condition would be evaluated using standard USDA Soil Conservation Service methods and recorded on a DSL Field Evaluation Form. Browse utilization would be measured using standardized survey methods, such as the Cole Browse Survey Method (Patton and Hall, 1966) or a modified version of Evaluating Health of Riparian Areas on the Charles M. Russell National

CLASSIFIED FOREST LANDS GRAZING RMS

Wildlife Refuge (Cook, et al., 1993) to measure form class of shrubs or percent riparian vegetation utilization, respectively. No shrubs would be in the heavily hedged form class and less than 10 percent of the shrubs would be in the moderately hedged form class. In addition, streambank disturbance induced by livestock trampling would be limited to less than five percent alteration per 500 feet of streambank.

- d) Areas that show resource damage greater than the prescribed limits would be mitigated or rehabilitated by the lessee, with technical assistance from DSL. If improved management did not resolve the damage, adjustments in the license or lease would be used to facilitate rehabilitation efforts.

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DELTA AND EPSILON ALTERNATIVES

Standards

- 1) Grazing licenses (classified Forest lands) and grazing leases (forested classified Grazing lands) would specify the number of animal unit months (AUMs), and grazing period of use. Lease/license stipulations would be set at the time of lease/license renewal.
- 2) Lessees and licensees would have primary responsibility for developing and maintaining range land improvements. They would also be responsible for maintaining or improving range sites by managing livestock grazing and utilization in a manner that produces a stable or upward trend in range condition. DSL would support rangeland improvements through technical assistance, as workload and budget allowed. Rangeland improvements may include riparian management, weed control, prescribed burning, water developments, grazing management systems, fencing, and conversion of forest edge ecotones to grassland. Cost-sharing for improvements between the lessee/licensee and the state would be accomplished through an addendum to the lease/license. The addendum would stipulate terms and conditions by which the lessee/licensee may be required to reimburse the state for improvement expenses incurred.
- 3) Stocking rates would be estimated by visual assessment of existing vegetative plant species composition. Estimated species composition by weight per range site would be compared to potential (climax range condition) for specific range sites. The following references, published by the USDA Soil Conservation Service, would serve as technical guides: "Guides for Determining Range Condition and Initial Stocking Rates"; Range Site Criteria; and "Guides to Determine Forest Understory Vegetation Condition and Recommended Stocking Rates". Range site would be determined by soil characteristics, topography, climate, and professional judgement.
- 4) Livestock management practices would be designed to prevent unacceptable loss of streambank vegetation and structural damage to streambanks that results in nonpoint source pollution. Practices would be designed to: (1) improve or restore both herbaceous and woody species to a healthy and vigorous condition and facilitate the ability of vegetation to reproduce and maintain different age classes in the desired riparian-wetland plant communities; and (2) leave sufficient vegetation biomass and plant residue (including woody debris) to provide for adequate sediment filtering and dissipation of stream energy for bank protection.
- 5) Mineral, protein, and other supplements would be placed so as to maximize animal distribution away from riparian areas. Holding facilities would be placed outside of riparian areas.
- 6) Continuous season-long grazing would be authorized only when it has been demonstrated to be consistent with achieving properly functioning range condition, including healthy riparian areas.

Monitoring

- 7)
 - a) At renewal (every 10 years), leases/licenses would be evaluated for the following: range condition; plant species composition; riparian browse utilization; and streambank disturbance.
 - b) Leases/licenses would be evaluated at mid-term (every 5th year) for the following: riparian browse utilization; streambank disturbance; and an ocular assessment of tract condition with notations for potential concerns or problems.
 - c) Range condition would be evaluated using standard USDA Soil Conservation Service methods and recorded on a DSL Field Evaluation Form. Browse utilization would be measured using standardized survey methods, such as the Cole Browse Survey Method (Patton and Hall, 1966) or a modified version of Evaluating Health of Riparian Areas on the Charles M. Russell National

CLASSIFIED FOREST LANDS GRAZING RMS

Wildlife Refuge (Cook, et al., 1993) to measure form class of shrubs or percent riparian vegetation utilization, respectively. No shrubs would be in the heavily hedged form class and less than 50 percent of the shrubs would be in the moderately hedged form class. In addition, streambank disturbance induced by livestock trampling would be limited to less than 20 percent alteration per 500 feet of streambank.

- d) Areas that show resource damage greater than the prescribed limits would be mitigated or rehabilitated by the lessee, with technical assistance from DSL. If improved management did not resolve the damage, adjustments in the license or lease would be used to facilitate rehabilitation efforts.

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ZETA ALTERNATIVE

Standards

- 1) Grazing licenses (classified Forest lands) and grazing leases (forested classified Grazing lands) would specify the number of animal unit months (AUMs), kinds of livestock, and grazing period of use. Lease/license stipulations would be set at the time of lease/license renewal.
- 2) Lessees and licensees would have primary responsibility for developing and maintaining range land improvements. They would also be responsible for maintaining or improving range sites by managing livestock grazing and utilization in a manner that produces a stable or upward trend in range condition. DSL would support rangeland improvements through technical and financial assistance, as workload and budget allowed. Rangeland improvements might include riparian management, weed control, prescribed burning, water developments, grazing management systems, fencing, and conversion of forest edge ecotones to grassland. Cost-sharing for improvements between the lessee/licensee and the state would be accomplished through an addendum to the lease/license. The addendum would stipulate terms and conditions by which the lessee/licensee may be required to reimburse the state for improvement expenses incurred.
- 3) Stocking rates would be estimated by visual assessment of existing vegetative plant species composition. Estimated species composition by weight per range site would be compared to potential (climax range condition) for a specific range sites. The following references, published by the USDA Soil Conservation Service, would serve as technical guides: "Guides for Determining Range Condition and Initial Stocking Rates"; Range Site Criteria; and "Guides to Determine Forest Understory Vegetation Condition and Recommended Stocking Rates". Range site would be determined by soil characteristics, topography, climate, and professional judgement.
- 4) Livestock management practices would be designed to prevent unacceptable loss of streambank vegetation and structural damage to streambanks that results in nonpoint source pollution. Practices would be designed to: (1) improve or restore both herbaceous and woody species to a healthy and vigorous condition and facilitate the ability of vegetation to reproduce and maintain different age classes in the desired riparian-wetland plant communities; (2) leave sufficient vegetation biomass and plant residue (including woody debris) to provide for adequate sediment filtering and dissipation of stream energy for bank protection; (3) develop grazing management systems; and (4) manage water developments to distribute livestock grazing outside of riparian areas.
- 5) Mineral, protein, and other supplements would be placed so as to maximize animal distribution away from riparian areas. Holding facilities would be placed outside of riparian areas.
- 6) Continuous season-long grazing would be authorized with the level of forage utilization not to exceed 30 percent and riparian function maintained.

Monitoring

- 7)
 - a) At renewal (every 10 years), leases/licenses would be evaluated for the following: range condition; plant species composition; riparian browse utilization; and streambank disturbance.
 - b) Leases/licenses would be evaluated at mid-term (every 5th year) for the following: riparian browse utilization; streambank disturbance; and an ocular assessment of tract condition with notations for potential concerns or problems.
 - c) Range condition would be evaluated using standard USDA Soil Conservation Service methods and recorded on a DSL Field Evaluation Form. Browse utilization would be measured using

standardized survey methods, such as the Cole Browse Survey Method (Patton and Hall, 1966) or a modified version of Evaluating Health of Riparian Areas on the Charles M. Russell National Wildlife Refuge (Cook, et al., 1993) to measure form class of shrubs or percent riparian vegetation utilization, respectively. No shrubs would be in the heavily hedged form class and less than 25 percent of the shrubs would be in the moderately hedged form class. In addition, streambank disturbance induced by livestock trampling would be limited to less than 10 percent alteration per 500 feet of streambank.

- d) Areas that showed resource damage greater than the prescribed limits would be mitigated or rehabilitated by the lessee, with technical assistance from DSL. If improved management did not resolve the damage, adjustments in the license or lease would be used to facilitate rehabilitation efforts.

References for all Alternatives

- Cook, B.J., R.C. Ehrhart, P.C. Hansen, and B. Thompson. 1993. Riparian and wetland areas of the Charles M. Russell National Wildlife Refuge. Riparian and Wetland Research Program. University of Montana, Missoula, MT.
- Chaney, Ed, W. Elmore, and W.S. Platts. 1990. Livestock grazing on western riparian areas. Northwest Resource Information Center for U.S. EPA.
- Clary, Warren P. and B. F. Webster. 1989. Managing grazing of riparian areas in the intermountain region. USDA-Forest Service General Technical Report INT-263.
- Kinch, Gene. 1989. Riparian area management -- grazing management in riparian areas. USDI-Bureau of Land Management Technical Reference 1734-4.
- Lacey, J. and J. E. Taylor. 1985. Montana guide to range site, condition and initial stocking rates. MSU Cooperative Extension Service, MT 8515 A.
- Patton, David R. and Hall, John M. 1966. Evaluating key areas by browse age and form class. Journal of Wildlife Management 30(3):476-480.
- USDA Forest Service. Wildlife Survey Handbook 2609.
- Zacek, J. C. Date Unknown. Montana grazing guide. USDA Soil Conservation Service.

WEED MANAGEMENT

ALPHA ALTERNATIVE

Standards

- 1) Forested state lands would be managed to prevent or control the spread of noxious weeds. We would comply with the weed management law, through revegetation plans and agreements with county weed boards.
- 2) DSL would submit general revegetation plans to county weed boards for their review of land-disturbing projects such as road construction associated with timber harvest.
- 3) In areas where weeds are widespread across state and adjacent ownerships DSL would cooperate with weed districts for control projects across all ownerships.
- 4) We would promote prevention of weed spread by requiring a combination of measures such as cleaning road construction and harvest equipment, prompt revegetation of roads, and reducing ground disturbance.
- 5) Stipulations and control measures to limit the spread of weeds would be included in timber sale contracts.
- 6) Herbicide treatments would be limited to areas where herbicides offer the most cost effective means of control and funds were available. New outbreaks of noxious weeds would have first priority for control. Weed management of large areas of weed infestation might be limited to perimeter weed containment.
- 7) On unleased and unlicensed state lands, DSL would be responsible for weed control and would implement control as funds were available.
- 8) A lessee or licensee of state land would be responsible for weed control as outlined in Surface Management Rules 26.3.156. The lessee or licensee must provide weed control at their cost and must comply with the Montana County Weed Management Act.
- 9) All right of way agreements would require the permittee to control weed problems along the right of way associated with the permittee's use.
- 10) On sites where weeds are introduced by recreation use, a portion of recreational access fees would be used, as available, for weed control.

Monitoring

- 11) On selected DSL projects, field staff and specialists would review implementation of noxious weed control and mitigation measures. Deficiencies would be remedied if project contract is not completed.

BETA & ZETA ALTERNATIVES

Standards

- 1) Forested state lands would be managed to prevent or control the spread of noxious weed. We would comply with the weed management law by inventorying noxious weed occurrences, developing management plans, and allocating funds for weed control projects.
- 2) DSL would submit general revegetation plans to county weed boards for their review of land-disturbing projects such as road construction associated with timber harvest. We would promptly revegetate with site-adapted grasses that emphasize native species.
- 3) In areas where weeds are widespread across state and adjacent ownerships DSL would cooperate with weed districts for control projects across all ownerships.
- 3a) We would use an integrated pest management approach for noxious weed control including cultural, biological and chemical methods as appropriate.
- 4) We would promote prevention of weed spread by requiring a combination of measures such as, use of weed-free equipment, prompt revegetation of roads, and reduction of ground disturbance.
- 5) Stipulations and control measures to limit the spread of weeds would be attached to timber sale contracts. Where specified, contractors would be responsible for weed control the two years following land disturbance.
- 6) Herbicide treatments would be limited to areas where herbicide offers the most cost effective means of control, and where biological and mechanical control measures are ineffective. New outbreaks of noxious weeds and locations where native plant communities are threatened by noxious weed encroachment would have first priority for control. Large areas of weed infestation may be limited to perimeter weed containment.
- 7) On unleased lands, DSL would be responsible for weed control.
- 8) A lessee or licensee of state land would be responsible for weed control as outlined in Surface Management Rules 26.3.156. The lessee or licensee must provide weed control at his cost and must comply with the Montana County Weed Management Act.
- 9) All right of way and special use agreements would require the permittee to control weeds in association with the permittee's use. This may include fees charged for weed control.
- 10) On sites where weeds are introduced by recreation use, a portion of recreational access fees would be available for weed control.

Monitoring

- 11) On DSL projects where weeds were a concern, field staff and specialists would review implementation of noxious weed control and mitigation measures. Deficiencies would be remedied.
- 12) Whenever field reviews were made, DSL staff would inventory and map all infestations of noxious weeds on grazing leases/licenses. Lessees/ Licensees would be notified of the weeds and could be required to enter into a supplemental lease agreement (SLA) which outlines specific control measures. In order to ensure an integrated approach, county weed staff may be contacted to assist in developing these weed control measures.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

- 13) On sites where a SLA outlines weed control remedies, DSL would make follow-up reviews as necessary, to ensure the control measures are completed. Failure by the lessee to perform any of the terms stipulated in the SLA would result in cancellation of the lease.

GAMMA ALTERNATIVE

Standards

- 1) Forested state lands would be managed to prevent or control the spread of noxious weeds and action taken to re-establish natural plant communities. We would comply with the weed management law by inventorying noxious weed occurrences, developing management plans, and allocating funds for weed control projects.
- 2) DSL would submit revegetation plans to county weed boards for their review of land-disturbing projects such as road construction associated with timber harvest.
- 2a) We would promptly revegetate roads, landings, and disturbed areas with site adapted grasses that emphasize native species.
- 3) In areas where weeds are widespread across state and adjacent ownerships, DSL would cooperate with weed districts for control projects across all ownerships.
- 3a) We would promote an integrated pest management approach for noxious weed control including cultural and biological methods.
- 4) We would promote prevention of weed spread by requiring road construction and harvest equipment to be cleaned prior to moving equipment into a project area.
- 5) Stipulations and control measures to limit the spread of weeds would be attached to timber sale contracts. On weed free areas, contractors would be responsible for weed control for two years following land disturbance.
- 6) Herbicide treatments would be very limited, to areas where herbicide control is most effective, and native plant communities are threatened by noxious weed encroachment. Herbicide treatments would focus on narrow spectrum/site specific applications.
- 7) On unleased or unlicensed lands, DSL would be responsible for weed control and would fund control measures.
- 8) A lessee or licensee of state land would be responsible for weed control as outlined in Surface Management Rules 26.3.156. The lessee or licensee must provide weed control at his cost and must comply with the Montana County Weed Management Act.
- 9) All right of way and special use agreements would require the permittee to control weed problems along the right of way associated with the permittee's use. This may include fees charged for weed control. Vehicle restrictions to reduce the spread of weeds would be integrated into road management plans and right of ways.
- 10) On sites where weeds are introduced by recreation use, a portion of recreational access fees would be used for weed control. If recreational use funds were not available, and weeds increased, then DSL would supplement weed control.

Monitoring

- 11) On DSL projects where weeds are a concern, field staff and specialists would review implementation of noxious weed control and mitigation measures. Deficiencies would be remedied.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

- 12) Whenever field reviews were made, DSL staff would inventory and map all infestations of noxious weeds on grazing leases/licenses. Lessees/ Licensees would be notified of the weeds and could be required to enter into a Supplemental Lease Agreement (SLA) which outlines specific control measures. In order to ensure an integrated approach, county weed staff may be contacted to assist in developing these weed control measures.
- 13) On sites where a SLA outlined weed control remedies, DSL would make follow-up reviews as necessary to ensure the control measures are completed. Failure by the lessee to perform any of the terms stipulated in the SLA would result in cancellation of the lease, or fees would be charged for contract weed control.

DELTA ALTERNATIVE

Standards

- 1) Forested state lands would be managed to prevent or control the spread of noxious weeds and improve the economic return from those lands. We would comply with the weed management law through revegetation plans and agreements with county weed boards.
- 2) DSL would submit general revegetation plans to county weed boards for their review of land-disturbing projects such as road construction associated with timber harvest.
- 3) In areas where weeds are widespread across state and adjacent ownerships DSL would cooperate with weed districts for control projects across all ownerships.
- 4) We would promote prevention of weed spread by requiring road construction and harvest equipment to be cleaned prior to moving equipment into a project area.
- 5) Stipulations and control measures to limit the spread of weeds would be attached to timber sale contracts.
- 6) Herbicide treatments would be limited to areas where herbicide control is most effective, where biological and mechanical control measures are less effective, and where improved forage would increase income potential. New outbreaks of noxious weeds would have first priority for control. Weed management of large areas of weed infestation may be limited to perimeter weed containment.
- 7) On unleased state lands, DSL would be responsible for weed control.
- 8) A lessee or licensee of state land would be responsible for weed control as outlined in Surface Management Rules 26.3.156. The lessee or licensee must provide weed control at his cost and must comply with the Montana County Weed Management Act.
- 9) All right of way and special use agreements would require the permittee to control weeds in association with the permittee's use. This may include fees charged for weed control.
- 10) On sites where weeds were introduced by recreation use, a portion of recreational access fees would be used as available for weed control.

Monitoring

- 11) On selected DSL projects where weeds were a concern, field staff and specialists would review implementation of noxious weed control and mitigation measures.
- 12) Whenever field reviews were made, DSL staff would inventory and map all infestations of noxious weeds on grazing leases/licenses. Lessees/ Licensees would be notified of the weeds and could be required to enter into a supplemental lease agreement (SLA) which outlines specific control measures. To ensure an integrated approach, county weed staff may be contacted to assist in developing these weed control measures.
- 13) On sites where a SLA outlined weed control remedies, DSL would make follow-up reviews as necessary, to ensure the control measures are completed. Failure by the lessee to perform any of the terms stipulated in the SLA would result in cancellation of the lease or fees would be charged to contract weed control.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

EPSILON ALTERNATIVE

Standards

- 1) Forested state lands would be managed to prevent or control the spread of noxious weeds. We would comply with the weed management law, through revegetation plans and agreements with county weed boards.
- 2) DSL would submit general revegetation plans to county weed boards for their review of land-disturbing projects such as road construction associated with timber harvest.
- 3) In areas where weeds were widespread across state and adjacent ownerships DSL would cooperate with weed districts for control projects across all ownerships.
- 4) We would promote prevention of weed spread by requiring road construction and harvest equipment to be cleaned prior to moving equipment into a project area.
- 5) Stipulations and control measures to limit the spread of weeds would be attached to timber sale contracts.
- 6) Herbicide treatments would be limited to areas where herbicide offer the most cost effective means of control, and where biological and mechanical control measures are ineffective. New outbreaks of noxious weeds would have first priority for control. Large areas of weed infestation may be limited to perimeter weed containment.
- 7) On unleased or unlicensed lands, DSL would be responsible for weed control.
- 8) A lessee or licensee of state land would be responsible for weed control as outlined in Surface Management Rules 26.3.156. The lessee or licensee must provide weed control at his cost and must comply with the Montana County Weed Management Act.
- 9) All right of way agreements require the permittee to control weeds along the right of way in association with the permittee's use. This may include fees charged for weed control.
- 10) On sites where weeds are introduced by recreation use, a portion of recreational access fees would be used as available for weed control.

Monitoring

- 11) On selected DSL projects, field staff and specialists would review implementation of noxious weed control and mitigation measures. Deficiencies could be remedied if project contract is not completed.
- 12) Whenever field reviews were made, DSL staff would inventory and map all infestations of noxious weeds on grazing leases/licenses. Lessees/ Licensees would be notified of the weeds and could be required to enter into a supplemental lease agreement (SLA) which outlines specific control measures. In order to ensure an integrated approach, county weed staff may be contacted to assist in developing these weed control measures.
- 13) On sites where a SLA outlines weed control remedies, DSL would make follow-up reviews as necessary, to ensure the control measures are completed. Failure by the lessee to perform any of the terms stipulated in the SLA would result in cancellation of the lease.

ROAD MANAGEMENT

ALPHA ALTERNATIVE

Standards

General

- 1) The location, design, construction and maintenance of all roads would be consistent with Best Management Practices (BMPs), Streamside Management Zone (SMZ) rules, Watershed Standards, other State Land Resource Standards, and the conditions of all appropriate permits.
- 2) Road management activities would comply with applicable DSL weed management plans for prevention, revegetation, and management.

Transportation Planning

- 3) Transportation planning would be conducted in the early stages of project level planning. An evaluation of existing and possible future transportation systems would be conducted prior to road location and design. These items would be considered:
 - a) The relationship of access routes and road systems on adjacent sections (regardless of ownership). Managers should plan systems cooperatively with adjacent landowners to minimize road construction.
 - b) Existing and probable future management needs of the tributary area, such as coordination of state needs with adjacent ownership needs, public access, cable vs. tractor logging, TSI activities, fire protection, and wildlife habitat protection.
 - c) Value(s) of resources being accessed for the proposed project as well as resources to be accessed from future roading or extension of transportation system.
- 4) DSL would plan the transportation system to minimize road miles and associated adverse impacts and to best meet current and future management needs and objectives.

Road Location and Design

- 5) DSL would determine the appropriate classification for the roads being designed. Roads would be classified as primary, secondary, spur, or temporary spur, as shown in the draft Road Management Standards and Guidelines. Wherever practical, location and design should follow the guidelines for the chosen classification.
- 6) For roads outside Streamside Management Zones, we would locate and design new roads if reconstruction and use of existing roads would produce greater undesirable impacts than new construction. For roads inside SMZ's, we would refer to the Watershed Resource Management Standards.
- 7) DSL would locate and design roads to minimize maintenance needs.

Road Construction

- 8) Contract specifications and administration of construction projects would be sufficient to ensure roads are built as designed to the intended road class description, and meet resource protection requirements.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Road Maintenance

- 9) Maintenance would be adequate to ensure continued road use and resource protection as described in the road classification description.
- 10) Adequate maintenance requirements, proportional to road use, would be included in all agreements for granting and acquiring right-of-way, and those requirements would be enforced on the ground.

Road Closures

- 11) When overall closure management is needed, road density in miles per square mile (open, closed or total) would be used as the criterion.
- 12) DSL would plan road density at the Unit or Land Office level to meet Threatened and Endangered Species requirements, wildlife protection requirements, road surface protection and other resource needs.

Monitoring

- 13) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments would be incorporated into contracts and enforced by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions.
- 14) Qualitative assessments, such as BMP audits, would include an assessment of roads, and would be conducted as time allows and appropriate sites were available. Findings of the audits would be incorporated into future project planning and contracting.
- 15) Road maintenance would be monitored by contract administrators in connection with timber sales or repair contracts. Deficiencies would be corrected using standard contract enforcement provisions.
- 16) Existing road systems would be inspected by DSL specialists when they review proposed timber sales and other projects. This would provide monitoring for road planning, construction and maintenance and give an opportunity for correction of problem areas by incorporating corrective measures into future project plans.

BETA ALTERNATIVE

Standards

General

- 1) The location, design, construction and maintenance of all roads would be consistent with Best Management Practices (BMPs), Streamside Management Zone (SMZ) rules, Watershed Standards, other State Land Resource Standards, and the conditions of all appropriate permits.
- 2) Road management activities would comply with applicable DSL weed management plans for prevention, revegetation, and management.

Transportation Planning

- 3) Transportation planning would be conducted in the early stages of project level planning. An evaluation of existing and possible future transportation systems would be conducted prior to road location and design. These items would be considered:
 - a) The relationship of access routes and road systems on adjacent sections (regardless of ownership). Managers would plan systems cooperatively with adjacent landowners to minimize road construction.
 - b) Existing and probable future management needs of the tributary area, such as coordination of state needs with adjacent ownership needs, public access, cable vs. tractor logging, TSI activities, fire protection, and wildlife habitat protection.
 - c) Value(s) of resources being accessed for the proposed project as well as resources to be accessed from future roading or extension of transportation system.
- 4) DSL would plan the transportation system for the minimum number of road miles with minimum associated adverse impacts that would best meet current and future management needs and objectives. We would evaluate and use alternative transportation systems that do not require roads whenever possible.

Road Location and Design

- 5) DSL would determine the appropriate classification for the roads being designed. Roads would be classified as primary, secondary, spur, or temporary spur as shown in the draft Road Management Standards and Guidelines. Whenever practical, location and design would follow the guidelines for the chosen classification.
- 6) For roads outside Streamside Management Zones, we would locate and design new roads if reconstruction and use of existing roads would produce greater undesirable impacts than new construction. For roads inside SMZ's, we would refer to the Watershed Resource Management Standards.
- 7) DSL would locate and design roads to minimize maintenance needs.

Road Construction

- 8) Contract specifications and administration of construction projects would be sufficient to ensure roads were built as designed to the intended road class description, and met resource protection requirements.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Road Maintenance

- 9) Maintenance would be scheduled and funded to ensure continued road use and resource protection as described in the road classification description. Drainage structures and other resource protection measures would be maintained on closed as well as open roads.
- 10) Adequate maintenance requirements, proportional to road use, would be included in all agreements for granting and acquiring right-of-way, and those requirements would be enforced on the ground.

Road Closures

- 11) When overall closure management was needed, road density in miles per square mile (open, closed or total) would be used as the criterion.
- 12) DSL would plan road density to minimize open roads on state land. Only those roads that could be regularly maintained and provided planned public or permanent administrative access would remain open. Roads built for single purpose activities such as timber sales would be closed. Wildlife protection requirements, road surface protection, and other resource protection would be used to determine which system roads should remain open.

Monitoring

- 13) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments would be incorporated into contracts and enforced by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions.
- 14) Qualitative assessments, such as BMP audits, would include an assessment of roads, and would be conducted as time allowed and appropriate sites were available. Findings of the audits would be incorporated into future project planning and contracting.
- 15) Road maintenance would be monitored by contract administrators in connection with timber sales or repair contracts. Deficiencies would be corrected using standard contract enforcement provisions.
- 15a) Road maintenance would be monitored by direct inspections of road and drainage condition of both open and closed roads every five years. Maintenance operations would be scheduled based on the results of the inspections.
- 16) Existing road systems would be inspected by DSL specialists when they review proposed timber sales and other projects. This would provide monitoring for road planning, construction, and maintenance, and give an opportunity for correction of problem areas by incorporating corrective measures into future project plans.

GAMMA ALTERNATIVE

Standards

General

- 1) The location, design, construction and maintenance of all roads would be consistent with Best Management Practices (BMPs), Streamside Management Zone (SMZ) rules, Watershed Standards, other State Land Resource Standards, and the conditions of all appropriate permits.
- 2) Road management activities would comply with applicable DSL weed management plans for prevention, revegetation, and management.

Transportation Planning

- 3) Transportation planning would be conducted as a part of comprehensive landscape-level ecosystem planning. An evaluation of existing transportation systems would be conducted to determine which roads could be closed or obliterated to restore more natural conditions. Any new proposals for expanding or replacing roads would consider the following elements:
 - a) The relationship of access routes and transportation systems on adjacent sections, regardless of ownership. Managers would plan systems cooperatively with adjacent landowners to minimize road construction and remove existing roads.
 - b) Existing and probable future management needs of the tributary area, such as consideration of state needs versus adjacent ownership needs, public access, recreation trail and biking routes, cable versus tractor logging, TSI activities, fire protection, and wildlife habitat protection.
 - c) Value(s) of resources being accessed by the overall system.
- 4) DSL would plan the transportation system to reduce current road miles, obliterate and rehabilitate unnecessary roads, and develop a more balanced transportation system that meets a variety of current and future management needs and objectives.

Road Location and Design

- 5) DSL would determine the appropriate classification for the roads being designed. Roads would be classified as primary, secondary, spur, or temporary spur as shown in the draft Road Management Standards and Guidelines. Wherever practical, location and design would follow the guidelines for the chosen classification.
- 6) For roads outside Streamside Management Zones, we would locate and design new roads if reconstruction and use of existing roads would produce greater undesirable impacts than new construction. For roads inside SMZ's, we would refer to the Watershed Resource Management Standards.
- 7) DSL would locate and design roads to limit the amount of required maintenance.

Road Construction

- 8) Contract specifications and administration of construction projects would be sufficient to ensure roads were built as designed to the intended road class description, and met resource protection requirements.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Road Maintenance

- 9) Maintenance would be scheduled and funded to ensure continued road use and resource protection as described in the road classification description. Drainage structures and other resource protection measures would be maintained on closed as well as open roads.
- 10) Adequate maintenance requirements, proportional to road use, would be included in all agreements for granting and acquiring right-of-way, and those requirements would be enforced on the ground.

Road Closures

- 11) When overall closure management was needed, road density in miles per square mile (open, closed or total) would be used as the criterion.
- 12) DSL would plan road density to meet landscape level ecosystem plans and other Resource Management Standards. Threatened and Endangered Species requirements, wildlife protection requirements, road surface protection, and other resource needs would be used to determine road density levels.

Monitoring

- 13) Contract administration would be an important form of monitoring. Stipulations and requirements contained in Environmental Assessments would be incorporated into contracts and enforced by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions.
- 14) BMP audits would be conducted by DSL resource specialists annually, covering all new road construction projects completed each year. Identified deficiencies would be corrected using maintenance funds and recommendations would be incorporated into future project planning and contracting.
- 15) Required road maintenance would be monitored by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions. Unit managers would be responsible for monitoring state maintenance crews.
- 15a) Road maintenance would be monitored by direct inspections of road and drainage condition of both open and closed roads every year. Maintenance operations would be based on inspection results.
- 16) Existing road systems would be inspected by DSL specialists when they review proposed timber sales and other projects. This would provide monitoring for road planning, construction and maintenance and give an opportunity for correction of problem areas by incorporating corrective measures into project plans.

**DELTA ALTERNATIVE
Standards**

General

- 1) The location, design, construction, and maintenance of all roads would be consistent with Best Management Practices (BMPs), Streamside Management Zone (SMZ) rules, Watershed Standards, other State Land Resource Standards, and the conditions of all appropriate permits.
- 2) Road management activities would comply with applicable DSL weed management plans for prevention, revegetation, and management.

Transportation Planning

- 3) Transportation planning would be conducted to provide for efficient access for the variety of uses proposed for each tract. An evaluation of existing and possible future transportation systems would be conducted prior to road location and design. These items would be considered:
 - a) The relationship of access routes and road systems on adjacent sections (regardless of ownership). Managers would plan systems cooperatively with adjacent landowners to minimize road construction and capitalize on cooperative use and maintenance.
 - b) Existing and probable future management needs of the tributary area, such as coordinating state needs with adjacent ownership needs, providing for a variety of paying uses, public access, cable vs. tractor logging, TSI activities, fire protection, and wildlife habitat protection.
 - c) Value(s) of resources being accessed for the current planning period as well as resources to be accessed from future roading or extension of transportation system.
- 4) DSL would plan the transportation system to minimize road miles and associated adverse impacts and to best meet current and future management needs and objectives.

Road Location and Design

- 5) DSL would determine the appropriate classification for the roads being designed. Roads would be classified as primary, secondary, spur, or temporary spur as shown in the draft Road Management Standards and Guidelines. Wherever practical, location and design would follow the guidelines for the chosen classification.
- 6) For roads outside Streamside Management Zones, we would locate and design new roads if reconstruction and use of existing roads would produce greater undesirable impacts than new construction. For roads inside SMZ's, we would refer to the Watershed Resource Management Standards.
- 7) DSL would locate and design roads to minimize maintenance needs.

Road Construction

- 8) The contract specifications and administration of construction projects would be sufficient to ensure roads were built as designed to the intended road class description, and met resource protection requirements.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Road Maintenance

- 9) Maintenance would be scheduled and funded to ensure continued road use and resource protection as described in the road classification description. Drainage structures and other resource protection measures must be maintained on closed as well as open roads.
- 10) Adequate maintenance requirements, proportional to road use, would be included in all agreements for granting and acquiring right-of-way, and those requirements would be enforced on the ground.

Road Closures

- 11) When overall closure management was needed, road density in miles per square mile (open, closed, or total) would be used as the criterion.
- 12) DSL would plan road density to meet minimum resource protection requirements. Threatened and Endangered Species requirements, wildlife protection requirements, road surface protection, and other resource needs would be used to determine open road densities.

Monitoring

- 13) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments would be incorporated into contracts and enforced by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions.
- 14) Qualitative assessments, such as BMP audits, would include an assessment of roads, and would be conducted as time allowed and appropriate sites were available. Findings of the audits would be incorporated into future project planning and contracting.
- 15) Required road maintenance would be monitored by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions. Unit managers would be responsible for monitoring state maintenance crews.
- 16) Existing road systems would be inspected by DSL specialists when they review proposed timber sales and other projects. This would provide monitoring for road planning, construction, and maintenance, and give an opportunity for correction of problem areas by incorporating corrective measures into project plans.

EPSILON ALTERNATIVE

Standards

General

- 1) The location, design, construction and maintenance of all roads would be consistent with Best Management Practices (BMPs), Streamside Management Zone (SMZ) rules, Watershed Standards, other State Land Resource Standards, and the conditions of all appropriate permits.
- 2) Road management activities would comply with applicable DSL weed management plans for prevention, revegetation, and management.

Transportation Planning

- 3) Transportation planning would be conducted in the early stages of project level planning. An evaluation of existing and possible future transportation systems would be conducted prior to road location and design. These items would be considered:
 - a) The relationship of access routes and road systems on adjacent sections, regardless of ownership. Managers would plan systems cooperatively with adjacent landowners to minimize road construction.
 - b) Existing and probable future management needs of the tributary area, such as coordinating state needs with adjacent ownership needs, public access, cable vs. tractor logging, TSI activities, fire protection, and wildlife habitat protection.
 - c) Value(s) of resources being accessed for the proposed project as well as resources to be accessed from future roading or extension of transportation system.
- 4) DSL would plan the transportation system to minimize road miles and associated adverse impacts and to best meet current and future management needs and objectives.

Road Location and Design

- 5) DSL would determine the appropriate classification for the roads being designed. Roads would be classified as primary, secondary, spur, or temporary spur as shown in Appendix A and the draft Road Management Standards and Guidelines. Wherever practical, location and design would follow the guidelines for the chosen classification.
- 6) For roads outside Streamside Management Zones, we would locate and design new roads if reconstruction and use of existing roads would produce greater undesirable impacts than new construction. For roads inside SMZ's, we would refer to the Watershed Resource Management Standards.
- 7) DSL would locate and design roads to minimize maintenance needs.

Road Construction

- 8) The contract specifications and administration of construction projects would be sufficient to ensure roads were built as designed to the intended road class description, and met resource protection requirements.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Road Maintenance

- 9) Maintenance would be scheduled and funded to ensure continued road use and resource protection as described in the road classification description. Drainage structures and other resource protection measures would be maintained on closed as well as open roads.
- 10) Adequate maintenance requirements, proportional to road use, would be included in all agreements for granting and acquiring right-of-way, and those requirements would be enforced on the ground.

Road Closures

- 11) When overall closure management was needed, road density in miles per square mile (open, closed or total) would be used as the criterion.
- 12) DSL would plan road density to meet timber harvesting schedules. Threatened and Endangered Species requirements, wildlife protection requirements, road surface protection, and other resource needs would be used to determine maximum allowable open road densities. Closure locations and the choice of roads to be opened and closed would be adjusted to facilitate timber harvesting plans.

Monitoring

- 13) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments would be incorporated into contracts and enforced by contract administrators. Deficiencies would be corrected as they were observed using standard contract enforcement provisions.
- 14) Qualitative assessments, such as BMP audits, would include an assessment of roads, and would be conducted as time allowed and appropriate sites were available. Findings of the audits would be incorporated into future project planning and contracting.
- 15) Required road maintenance would be monitored by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions.
- 16) Existing road systems would be inspected by DSL specialists when they review proposed timber sales and other projects. This would provide monitoring for road planning, construction, and maintenance, and give an opportunity for correction of problem areas by incorporating corrective measures into project plans.

ZETA ALTERNATIVE

Standards

General

- 1) The location, design, construction, and maintenance of all roads would be consistent with Best Management Practices (BMPs), Streamside Management Zone (SMZ) rules, Watershed Standards, other State Land Resource Standards, and the conditions of all appropriate permits.
- 2) Road management activities would comply with applicable DSL weed management plans for prevention, revegetation, and management.

Transportation Planning

- 3) Transportation planning would be conducted in connection with wildlife and recreational value inventories. An evaluation of existing and possible future transportation systems and how they relate to accessing recreational and wildlife values would be conducted. These items would be considered:
 - a) The relationship of access routes and road systems on adjacent sections, regardless of ownership. Managers would plan systems cooperatively with adjacent landowners to minimize road construction.
 - b) Existing and probable future management needs of the tributary area, such as access to existing and potential recreation areas, state needs vs. adjacent ownership needs, public access, fire protection, and wildlife habitat protection.
 - c) Value(s) of resources being accessed for the proposed project as well as resources to be accessed from future roading or extension of transportation system.
- 4) DSL would plan the transportation system to minimize road miles, close and rehabilitate unnecessary roads, and develop a more balanced transportation system that focuses on access for recreation and wildlife management needs and objectives.

Road Location and Design

- 5) DSL would determine the appropriate classification for the roads being designed. Roads would be classified as primary, secondary, spur, or temporary spur as shown in the draft Road Management Standards and Guidelines. Wherever practical, location and design would follow the guidelines for the chosen classification.
- 6) For roads outside Streamside Management Zones, we would locate and design new roads if reconstruction and use of existing roads would produce greater undesirable impacts than new construction. For roads inside SMZ's, we would refer to the Watershed Resource Management Standards.
- 7) DSL would locate and design roads to minimize maintenance needs.
- 7a) DSL would locate and design roads and other transportation systems to take advantage of scenic views, properly approach wildlife areas, and provide recreational opportunities consistent with inventory results.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Road Construction

- 8) Contract specifications and administration of construction projects would be sufficient to ensure roads are built as designed to the intended road class description, and meet resource protection requirements.

Road Maintenance

- 9) Maintenance would be scheduled and funded to ensure continued road use and resource protection as described in the road classification description. Drainage structures and other resource protection measures would be maintained on closed as well as open roads.
- 10) Adequate maintenance requirements, proportional to road use, would be included in all agreements for granting and acquiring right-of-way, and those requirements would be enforced on the ground.

Road Closures

- 11) When overall closure management was needed, road density in miles per square mile (open, closed, or total) would be used as the criterion.
- 12) DSL would plan road density to meet recreation and wildlife management needs and other Resource Management Standards. Threatened and Endangered Species requirements, wildlife protection requirements, recreational plans, road surface protection, and other resource needs would be used to determine open road density levels.

Monitoring

- 13) Contract administration would be the primary form of monitoring. The stipulations and requirements contained in Environmental Assessments would be incorporated into contracts and enforced by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions.
- 14) Qualitative assessments, such as BMP audits, would include an assessment of roads, and would be conducted as time allowed and appropriate sites were available. Findings of the audits would be incorporated into future project planning and contracting.
- 15) Required road maintenance would be monitored by contract administrators. Deficiencies would be corrected using standard contract enforcement provisions. Unit managers would be responsible for monitoring state maintenance crews.
- 15a) Road maintenance would be monitored by direct inspections of road and drainage condition of both open and closed roads every five years. Maintenance operations would be based on inspection results.
- 16) Existing road systems would be inspected by DSL specialists when they review proposed timber sales and other projects. This would provide monitoring for road planning, construction, and maintenance, and give an opportunity for correction of problem areas by incorporating corrective measures into future project plans.

References for All Alternatives

Road Management Standards and Guidelines, review draft #5, provides guidelines for meeting these standards and the specifications for road activities.

Streamside Management Zone Law and Rules, and Best Management Practices for Forestry in Montana provide the primary resource protection information for implementation of these standards.

APPENDIX VEG

FOREST VEGETATION TECHNICAL APPENDIX

INTRODUCTION

This appendix contains supporting documentation for the Forest Vegetation discussion contained in Chapters III and IV. Included in this appendix are explanations of the analysis procedures used to predict the effects on each descriptor of implementing each management alternative, and a discussion of the concept of "forest health."

ANALYSIS PROCEDURES FOR EFFECTS ASSESSMENT BY DESCRIPTOR

In this section we describe the procedures we developed to predict the direct and indirect effects on each descriptor of implementing each management alternative. This section also includes more detailed figures to supplement the figures found in the Chapter IV discussion of predicted effects by descriptor.

1. STAND SIZE CLASSES

We developed relationships between existing stand size classes and stand age distributions for each Land Office. With the assumption that these relationships will remain relatively constant over time, we estimated stand size classes for the year 2020 for each alternative from predicted stand age distributions (see subsequent discussion of stand age distribution).

The procedure used to estimate stand age distributions assumes all harvests would temporarily create a nonstocked patch, and does not make any predictions for non-harvest disturbances such as wildfire. Some harvest methods will merely reduce the stocking of existing patches rather than create nonstocked openings. Consequently, the future acreage in nonstocked and seedling/sapling stands may be overestimated unless stand-replacing wildfires burn a substantial acreage.

Using this procedure, we developed the Figure VEG-1 estimates of stand size class distribution on state lands in 2020.

Figure VEG-1
PREDICTED STAND SIZE CLASS DISTRIBUTION
ON STATE LANDS IN 2020
 Percent of forest acreage

NWLO:

	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO
NONSTOCKED	0.6%	3.1%	1.6%	2.7%	1.2%	0.8%	0.4%	3.5%	1.2%	4.3%	2.7%	1.6%	0.8%
SEED./SAP.	13.8	22.3	14.6	20.3	12.7	10.8	8.9	24.2	12.7	28.1	20.3	14.6	10.8
POLETIMBER	14.4	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
SAWTIMBER	71.2	69.9	79.1	72.3	81.4	83.7	86.0	67.6	81.4	62.9	72.3	79.1	83.7

SWLO:

	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO
NONSTOCKED	0.4%	4.0%	2.0%	3.5%	1.5%	1.0%	0.5%	4.4%	1.5%	5.4%	3.5%	2.0%	1.0%
SEED./SAP.	8.2	24.3	13.8	23.6	11.2	8.5	6.0	26.9	11.2	32.5	23.6	13.8	8.5
POLETIMBER	12.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
SAWTIMBER	78.5	67.8	80.3	69.0	83.4	86.6	89.6	64.8	83.4	58.2	69.0	80.3	86.6

CLO:

	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO
NONSTOCKED	1.5%	0.7%	0.4%	0.7%	0.3%	0.2%	0.1%	0.8%	0.3%	1.0%	0.7%	0.4%	0.2%
SEED./SAP.	10.2	10.3	8.2	9.8	7.8	7.3	6.8	10.7	7.8	11.7	9.8	8.2	7.3
POLETIMBER	18.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
SAWTIMBER	69.9	83.6	86.0	84.1	86.5	87.1	87.7	83.1	86.5	81.9	84.1	86.0	87.1

NE/E/SLOs:

	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO
NONSTOCKED	13.5%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%
SEED./SAP.	5.2	0.3	0.2	0.3	0.1	0.1	0.0	0.3	0.1	0.4	0.3	0.2	0.1
POLETIMBER	23.6	20.7	20.6	20.6	20.6	20.6	20.5	20.7	20.6	20.7	20.6	20.6	20.6
SAWTIMBER	57.7	78.9	79.2	79.0	79.3	79.3	79.5	78.9	79.3	78.8	79.0	79.2	79.3

TOTALS:

	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		HI	LO	HI	LO	HI	LO	HI	LO	HI	LO	HI	LO
NONSTOCKED	2.5%	2.5%	1.3%	2.2%	1.0%	0.6%	0.3%	2.8%	1.0%	3.5%	2.2%	1.3%	0.6%
SEED./SAP.	10.7	17.8	11.4	16.7	9.8	8.2	6.6	19.4	9.8	22.8	16.7	11.4	8.2
POLETIMBER	15.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
SAWTIMBER	70.9	72.7	80.5	74.2	82.4	84.3	86.2	70.9	82.4	66.9	74.2	80.5	84.3

2. STAND AGE DISTRIBUTION

We projected existing stand age distributions ahead to the year 2020 for unharvested forest area. We assumed that harvest areas would become nonstocked for a five-year regeneration period, and then enter the 1-to-20 year age class. We also assumed that harvests would come from the oldest age classes first, but only on the percentage of the forest area that would need to be managed to produce the harvest levels we estimated under each alternative.

This procedure may overestimate the future acreage in young age classes, as most stands or patches harvested with intermediate cutting or selection systems would not revert to a non-stocked condition. However, we also made no allowances for stand-replacing wildfires, which would cause additional nonstocked and young stands. Accordingly, these errors will tend to compensate for each other to a degree, depending on future wildfire acreage.

We developed the numbers in Figure VEG-2 using this analysis procedure.

Figure VEG-2
PREDICTED STAND AGE DISTRIBUTION
ON FORESTED STATE LANDS IN 2020
 Percent of Forest Acres by Stand Age Class

LO/AGE CLASS	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		hi	lo	hi	lo	hi	lo	hi	lo	hi	lo	hi	lo
NWLO:													
Nonstocked	0.5%	3.1%	1.6%	2.7%	1.2%	0.8%	0.4%	3.5%	1.2%	4.3%	2.7%	1.6%	0.8%
1-20	6.9	12.6	6.3	11.0	4.7	3.2	1.6	14.2	4.7	17.4	11.0	6.3	3.2
21-40	3.5	6.7	5.3	6.3	5.0	4.6	4.3	7.0	5.0	7.7	6.3	5.3	4.6
41-60	6.3	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
61-80	22.6	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
81-100	17.4	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
101-120	15.3	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
121-140	13.5	14.5	15.4	14.7	15.6	15.9	16.1	14.2	15.6	13.7	14.7	15.4	15.9
141-160	4.0	8.9	11.6	9.6	12.3	13.0	13.7	8.2	12.3	6.8	9.6	11.6	13.0
161-180	3.3	4.1	6.4	4.7	7.0	7.6	8.2	3.5	7.0	2.3	4.7	6.4	7.6
181-200	3.1	1.7	2.7	1.9	2.9	3.2	3.4	1.5	2.9	1.0	1.9	2.7	3.2
201+	3.6	3.9	6.1	4.4	6.6	7.2	7.8	3.3	6.6	2.2	4.4	6.1	7.2
SWLO:	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		hi	lo	hi	lo	hi	lo	hi	lo	hi	lo	hi	lo
Nonstocked	0.4%	4.0%	2.0%	3.5%	1.5%	1.0%	0.5%	4.4%	1.5%	5.4%	3.5%	2.0%	1.0%
1-20	2.6	17.0	8.5	14.9	6.4	4.2	2.1	19.1	6.4	23.4	14.9	8.5	4.2
21-40	3.1	5.6	3.6	5.1	3.1	2.6	2.2	6.1	3.1	7.1	5.1	3.6	2.6
41-60	4.2	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
61-80	14.4	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
81-100	27.7	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3	9.3
101-120	19.3	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
121-140	10.1	19.5	21.5	20.0	22.0	22.5	23.0	19.0	22.0	18.1	20.0	21.5	22.5
141-160	6.5	7.7	11.2	8.6	12.1	13.0	13.9	6.9	12.1	5.1	8.6	11.2	13.0
161-180	9.9	3.4	5.9	4.0	6.5	7.1	7.7	2.7	6.5	1.5	4.0	5.9	7.1
181-200	1.8	3.3	5.8	3.9	6.4	7.0	7.6	2.7	6.4	1.5	3.9	5.8	7.0
201+	0.0	2.7	4.8	3.2	5.3	5.8	6.3	2.2	5.3	1.2	3.2	4.8	5.8
CLO:	CURRENT	ALPHA		BETA		GAMMA		DELTA		EPSILON		ZETA	
		hi	lo	hi	lo	hi	lo	hi	lo	hi	lo	hi	lo
Nonstocked	1.5%	0.7%	0.4%	0.7%	0.3%	0.2%	0.1%	0.8%	0.3%	1.0%	0.7%	0.4%	0.2%
1-20	9.7	3.3	1.6	2.9	1.2	0.8	0.4	3.7	1.2	4.5	2.9	1.6	0.8
21-40	0.2	7.0	6.6	6.9	6.6	6.5	6.4	7.0	6.6	7.2	6.9	6.6	6.5
41-60	0.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
61-80	1.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
81-100	45.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
101-120	16.9	23.3	23.4	23.3	23.4	23.4	23.5	23.3	23.4	23.3	23.3	23.4	23.4
121-140	8.2	30.2	30.7	30.3	30.9	31.0	31.1	30.1	30.9	29.8	30.3	30.7	31.0
141-160	8.3	11.2	11.9	11.4	12.1	12.2	12.4	11.1	12.1	10.8	11.4	11.9	12.2
161-180	0.0	7.4	7.8	7.5	7.9	8.0	8.1	7.3	7.9	7.1	7.5	7.8	8.0
181-200	8.1	3.7	3.9	3.8	4.0	4.1	4.1	3.7	4.0	3.6	3.8	3.9	4.1
201+	0.0	7.3	7.7	7.4	7.8	7.9	8.0	7.2	7.8	7.0	7.4	7.7	7.9

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	<u>CURRENT</u>	<u>ALPHA</u>		<u>BETA</u>		<u>GAMMA</u>		<u>DELTA</u>		<u>EPSILON</u>		<u>ZETA</u>	
		<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>
NE/E/SLOs:													
Nonstocked	15.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%
1-20	5.5	0.3	0.2	0.3	0.1	0.1	0.0	0.3	0.1	0.4	0.3	0.2	0.1
21-40	0.0	17.9	17.8	17.8	17.8	17.8	17.7	17.9	17.8	17.9	17.8	17.8	17.7
41-60	0.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
61-80	25.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.7	2.7	2.7	2.7
81-100	38.5	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
101-120	13.5	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9
121-140	0.5	25.8	25.9	25.8	25.9	26.0	26.0	25.8	25.9	25.7	25.8	25.9	26.0
141-160	0.7	6.8	6.9	6.8	6.9	7.0	7.0	6.8	6.9	6.7	6.8	6.9	7.0
161-180	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
181-200	0.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
201+	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

	<u>CURRENT</u>	<u>ALPHA</u>		<u>BETA</u>		<u>GAMMA</u>		<u>DELTA</u>		<u>EPSILON</u>		<u>ZETA</u>	
		<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>	<u>hi</u>	<u>lo</u>
TOTAL ALL LOs:													
Nonstocked	2.4%	2.6%	1.3%	2.3%	1.0%	0.6%	0.3%	2.9%	1.0%	3.5%	2.3%	1.3%	0.6%
1-20	6.1	10.7	5.3	9.4	4.0	2.7	1.3	12.1	4.0	14.8	9.4	5.3	2.7
21-40	2.5	7.9	6.7	7.6	6.4	6.1	5.8	8.2	6.4	8.8	7.6	6.7	6.1
41-60	4.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
61-80	17.7	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
81-100	26.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
101-120	16.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
121-140	10.2	19.6	20.6	19.8	20.9	21.1	21.4	19.3	20.9	18.8	19.8	20.6	21.1
141-160	4.9	8.7	11.0	9.3	11.6	12.1	12.7	8.1	11.6	7.0	9.3	11.0	12.1
161-180	4.1	4.0	5.8	4.4	6.2	6.6	7.1	3.5	6.2	2.6	4.4	5.8	6.6
181-200	3.1	2.3	3.4	2.5	3.7	3.9	4.2	2.0	3.7	1.4	2.5	3.4	3.9
201+	1.7	3.6	5.3	4.0	5.7	6.1	6.5	3.2	5.7	2.4	4.0	5.3	6.1

3. FOREST TYPES

We predicted relative trends for each alternative by forest type. We compared these predictions to ecological group descriptions and past conditions from the 1949 inventory in order to evaluate cumulative effects.

The primary factors in each alternative that may influence forest type trends are: the level of timber harvest; silvicultural treatment methods; where and when harvests are done; the level of silvicultural investment including prescribed burning practices; and fire suppression. Figure Veg-3 is the result of our analysis of forest type trends.

Figure VEG-3
PREDICTED TRENDS IN FOREST TYPE ACREAGE
ON FORESTED STATE TRUST LANDS

ALPHA:

<u>Forest type:</u>	Predicted trend (X = historic level) from present levels (<--> = predicted range)		
	<u><-decrease</u>	<u>increase-></u>	
Douglas-fir	X	<- ->	
Western hemlock	X	<-->	
Ponderosa pine		<- ->	X
Western white pine		<>	X
Lodgepole pine		< >	X
Western larch		<-- >	X
Western redcedar		< >	X
Limber pine		<X>	
Grand fir	X	<-->	
Spruce/subalpine fir	X	<-->	
Hardwoods		<-->	X

BETA:

<u>Forest type</u>	Predicted trend (X = historic level) from present levels (<--> = predicted range)		
	<u><-decrease</u>	<u>increase-></u>	
Douglas-fir	X	<-- >	
Western hemlock	X	<-->	
Ponderosa pine		< -->	X
Western white pine		<>	X
Lodgepole pine		< >	X
Western larch		<- ->	X
Western redcedar		< >	X
Limber pine		<X>	
Grand fir	X	<-->	
Spruce/subalpine fir	X	<-->	
Hardwoods		<-->	X

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GAMMA:		Predicted trend (X = historic level) from present levels (<--> = predicted range)	
<u>Forest type</u>		<u><-decrease</u>	<u>increase-></u>
Douglas-fir	X		<-->
Western hemlock	X		<->
Ponderosa pine		<-->	X
Western white pine		<->	X
Lodgepole pine		<->	X
Western larch		<-->	X
Western redcedar		< >	X
Limber pine		<X>	
Grand fir	X		<->
Spruce/subalpine fir	X		<-->
Hardwoods		<->	X

DELTA:		Predicted trend (X = historic level) from present levels (<--> = predicted range)	
<u>Forest type</u>		<u><-decrease</u>	<u>increase-></u>
Douglas-fir	X	<-	>
Western hemlock	X		<->
Ponderosa pine		<-->	X
Western white pine		<>	X
Lodgepole pine		< >	X
Western larch		<-	-> X
Western redcedar		< >	X
Limber pine		<X>	
Grand fir	X	< -->	
Spruce/subalpine fir	X	< -->	
Hardwoods		<->	X

EPSILON:		Predicted trend (X = historic level) from present levels (<--> = predicted range)	
<u>Forest type</u>		<u><-decrease</u>	<u>increase-></u>
Douglas-fir	X	<-->	
Western hemlock	X	< >	
Ponderosa pine		<-->	X
Western white pine		<>	X
Lodgepole pine		<->	X
Western larch		<->	X
Western redcedar		< >	X
Limber pine		<X>	
Grand fir	X	<-	>
Spruce/subalpine fir	X	<-	>
Hardwoods		<->	X

ZETA:	Predicted trend (X = historic level) from present levels (<--> = predicted range)		
	<-decrease	increase->	
<u>Forest type</u>			
Douglas-fir	X		<-->
Western hemlock	X		<-->
Ponderosa pine			X
Western white pine			X
Lodgepole pine		X	
Western larch			X
Western redcedar		X	
Limber pine		<X>	
Grand fir	X		<-->
Spruce/subalpine fir	X		<-->
Hardwoods		X	

4. STOCKING LEVELS

We predicted relative effects for each alternative, using historic conditions as a baseline for evaluating cumulative trends. The primary factors expected to influence stocking trends are level of timber harvest, silvicultural treatment methods, and fire suppression. Locations and timing of timber harvests, and level of silvicultural investment may have some effect also.

It is difficult to quantify estimates of future stocking level distributions. However it is reasonable to assume that the amount of area with low to medium stocking levels would be largely proportional to timber harvest levels. Since harvest levels for the past several decades on state land have averaged 40 MMBF per year, and growing stock volumes appear to have increased if anything over this period, any harvest level less than 40 MMBF per year should result in a net increase in stocking levels.

A given harvest level will reduce stocking on more acreage, but to a lesser extent and for a shorter duration, where intermediate or selection cutting is done. Emphasizing stocking reduction treatments in forest environments that typically had open forest structures (e.g. ecological group A) will do proportionately more to restore historic conditions than would similar treatments in environments that typically supported denser forests.

The results of our analysis of stocking level trends are shown in Figure Veg-4.

Figure VEG-4
PREDICTED TRENDS IN ACREAGE BY STOCKING LEVEL
ON FORESTED STATE TRUST LANDS

ALPHA:	Predicted trend (<--> = predicted range)		
	<-decrease	increase->	
<u>Stocking level</u>			
Nonstocked			< >
Poorly stocked	<-->		
Medium stocked	<-->		
Well stocked			<-->

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BETA:	Predicted trend from present levels	
<u>Stocking level</u>	<u><-decrease</u>	<u>increase-></u>
Nonstocked	< >	
Poorly stocked	<->	
Medium stocked	<- >	
Well stocked	< -->	

GAMMA:	Predicted trend from present levels	
<u>Stocking level</u>	<u><-decrease</u>	<u>increase-></u>
Nonstocked	<->	
Poorly stocked	<->	
Medium stocked	<->	
Well stocked	<->	

DELTA:	Predicted trend from present levels	
<u>Stocking level</u>	<u><-decrease</u>	<u>increase-></u>
Nonstocked	< -->	
Poorly stocked	<- >	
Medium stocked	<- >	
Well stocked	< -->	

EPSILON:	Predicted trend from present levels	
<u>Stocking level</u>	<u><-decrease</u>	<u>increase-></u>
Nonstocked	<->	
Poorly stocked	< -->	
Medium stocked	< >	
Well stocked	<- >	

ZETA:	Predicted trend from present levels	
<u>Stocking level</u>	<u><-decrease</u>	<u>increase-></u>
Nonstocked	<->	
Poorly stocked	<->	
Medium stocked	<->	
Well stocked	<->	

5. OLD GROWTH

We can quantitatively predict future old growth amounts only in an indirect manner from stand age distributions. Existing estimates of old growth acreage correspond to the acreage in stands older than 140 years on the average for NWLO and SWLO lands. Therefore, relative trends in acreage in stands older

than 140 years may correspond at least roughly to future old-growth acreage. (NOTE: Because recorded stand ages may not reflect the oldest age classes in uneven-aged stands, they may be younger than the length of time since stand origin. Thus, recorded stand ages of old-growth stands may legitimately be much younger than the 200 years or so generally required for development of old-growth conditions.)

The proportion of older forest that will actually be old growth in 2020 will depend in part on the development of stands that are currently between 115 and 140 years old, as well as on how much current old growth would be left. Most of these stands are currently well-stocked. Densely-stocked stands will not develop large trees and old-growth structure for many decades if ever, and may be lost to natural disturbances without ever attaining old-growth qualities. Stocking levels of the current young to mature stands will be an important determinant of future old-growth amounts (Franklin et al. 1981, Oliver and Larson 1990). For this reason, we also use the expected level of intermediate or selection cuts in such stands to predict long-term old growth development.

The distribution of future old growth, spatially and by forest types or ecological groups, will depend to a large degree on how harvest locations are chosen. We used the harvest location and timing scenarios for each alternative to predict the future distribution of old growth. Our predictions for future old growth amounts are shown in Figures Veg-5 and Veg-6.

Figure VEG-5
PERCENT OF FORESTED ACRES ON STATE LANDS
PREDICTED TO CONSIST OF EXISTING OLD GROWTH IN 2020

Alternative and <u>Harvest Level</u>		NE/E/S				<u>AVERAGE</u>
CURRENT		<u>NWLO</u>	<u>SWLO</u>	<u>CLO</u>	<u>LOs</u>	
		18.5%	14.3%	16.1%	1.0%	14.6%
ALPHA	high	9.0	5.7	14.7	1.0	8.1
	low	14.2	10.0	15.6	1.0	11.7
BETA	high	10.3	6.8	14.9	1.0	9.0
	low	15.5	11.0	15.8	1.0	12.6
GAMMA	high	16.8	12.1	16.0	1.0	13.5
	low	18.1	13.1	16.2	1.0	14.4
DELTA	high	7.7	4.6	14.5	1.0	7.2
	low	15.5	11.0	15.8	1.0	12.6
EPSILON	high	5.2	2.5	14.1	0.9	5.3
	low	10.3	6.8	14.9	1.0	9.0
ZETA	high	14.2	10.0	15.6	1.0	11.7
	low	16.8	12.1	16.0	1.0	13.5

**Figure VEG-6
PREDICTED FUTURE AMOUNTS OF OLDER FOREST
(>140 YEARS) ON STATE LANDS
AND POTENTIAL FOR OLD-GROWTH DEVELOPMENT FROM YOUNGER FOREST**

Alternative and <u>Harvest Level</u>		Predicted percentages of older forest in 2020					Potential for old-growth development from <u>younger forest</u>
		<u>NWLO</u>	<u>SWLO</u>	<u>CLO</u>	<u>LOs</u>	<u>AVERAGE</u>	
CURRENT		13.8%	18.3%	16.1%	1.0%	13.4%	
ALPHA	high	18.6	17.1	29.6	8.2	18.6	moderate
	low	26.8	27.7	31.3	8.3	25.5	low-moderate
BETA	high	20.6	19.7	30.1	8.2	20.2	moderate-high
	low	28.8	30.3	31.8	8.3	27.2	moderate
GAMMA	high	31.0	32.9	32.2	8.4	28.7	low
	low	33.1	35.5	32.6	8.4	30.5	low
DELTA	high	16.5	14.5	29.3	8.2	16.8	moderate
	low	28.8	30.3	31.8	8.3	27.2	low-moderate
EPSILON	high	12.3	9.3	28.5	8.1	13.4	moderate
	low	20.6	19.7	30.1	8.2	20.2	moderate
ZETA	high	26.8	27.7	31.3	8.3	25.5	low-moderate
	low	31.0	32.9	32.2	8.4	28.7	low

6. SNAG ABUNDANCE

We predicted relative trends in numbers and sizes of snags across alternatives. Factors that may influence snag abundance are: level of timber harvest; silvicultural treatment methods; other silvicultural practices targeted at providing snags; amount of open road (providing access to firewood); and fire suppression. Our predicted trends in snag abundance are shown in Figure VEG-7.

Figure VEG-7
PREDICTED TRENDS IN SNAG ABUNDANCE
ON FORESTED STATE TRUST LANDS

<u>Alternative and item</u>		Predicted trend (---> = predicted from present levels range)	
		<u><-decrease</u>	<u>increase-></u>
ALPHA	small snags (<=15")		<--->
	large snags (>15")	<--->	
BETA	small snags	<-	->
	large snags		<->
GAMMA	small snags		<--->
	large snags		<--->
DELTA	small snags		<--->
	large snags	<--->	
EPSILON	small snags	<--->	
	large snags	<--->	
ZETA	small snags		<--->
	large snags		<->

7. PATCH SIZES AND SHAPES

We predict relative trends in patch characteristics for each alternative. The major influences will be those that have affected the current environment as discussed in Chapter 3: fire suppression; silvicultural treatment methods, including details of harvest layout intended to produce particular patch characteristics; and the timing and location of timber harvests. Figure VEG-8 shows the result of our analysis of trends in patch characteristics.

Figure VEG-8
PREDICTED TRENDS IN PATCH CHARACTERISTICS
ON FORESTED STATE LANDS

Alternative and patchiness scale*	Predicted trend from present levels		(X = historic status)
	<-decrease	increase->	
ALPHA:			
small scale		X	
medium scale	X	<-->	
large scale		X	
BETA:			
small scale		X	
medium scale	X	<- ->	
large scale		X	
GAMMA:			
small scale		X	
medium scale	X	<- ->	
large scale		X	
DELTA:			
small scale		X	
medium scale	X	< -->	
large scale		X	
EPSILON:			
small scale		X	
medium scale	X	<-->	
large scale		X	
ZETA:			
small scale		X	
medium scale	X	<- ->	
large scale		X	

- * Scale: small scale - variation between patches less than 5 ac.
medium scale - variation between patches 5-100 ac.
large scale - variation between patches larger than 100 ac.

REVIEW OF THE FOREST HEALTH ISSUE AND OPPORTUNITIES FOR ECOLOGICAL RESTORATION

INTRODUCTION

The effects of fire suppression and forest management on "forest health" have received a great deal of scientific and public attention in recent years. The record-setting 1994 fire season has drawn further attention to these issues, and there has been a great deal of public debate over the causes of and suggested solutions to the problems. Some forest industry spokespersons have seemed to imply that our forests would be virtually free of wildfires and insect outbreaks if they were healthy. Meanwhile, some environmental groups have charged that the whole forest health issue is just another excuse to continue unsustainable logging practices.

The forest vegetation analysis for the Department of State Lands' State Forest Land Management Plan attempts to describe predicted future forest characteristics in terms of forest health. The visibility of the forest health issue and public debate make it especially important to describe thoroughly what is meant by "forest health" in this context. A credible analysis must be based on current scientific understanding of forest ecology, and not on common misunderstandings surrounding the subject.

It must be understood from the outset that our state of knowledge about forest ecosystems is not complete or perfect. Conceptual models and theories are always subject to further testing, and to substantial refinement as new findings are made. In the meantime, a number of concepts remain subjects of considerable scientific debate. In order to treat the emerging understanding of Inland West forest ecology in a reasonably balanced fashion, I have drawn on a number of sources that address various facets of the forest health issue.

Where appropriate, I have attempted to make my own interpretations of ecological processes, based on my own observations and ecological understanding. Interpretations of forest inventory data have been made with extensive consultation with Brian Long, DSL Inventory Section Supervisor. Much of my interpretation of the forest ecology of the Inland West is summarized in an unpublished manuscript (Remington 1993), of which earlier drafts have received substantial expert review.

NATURAL ECOLOGICAL PROCESSES

Forest ecosystems are not static, unchanging entities. Plant communities undergo somewhat predictable patterns of development and disturbance over time, and form rather predictable patterns of distribution in the overall landscape. These patterns, along with the composition of plant communities, are shaped by their physical environment of soil characteristics, moisture and temperature, and the interactions between individuals and species (Oliver and Larson 1990).

It can be useful to view these ecosystem patterns in terms of the cycles in which carbon and other elements accumulate and move. As plants grow, carbon from the atmosphere accumulates in their tissues; when they die, it is released through decomposition or combustion. In dry temperate forests such as those of the Inland West, microbial decomposition cannot keep pace with accumulation of dead material, and fire becomes essential for release of this stored carbon to the atmosphere (Harvey et al. 1992, Oliver et al. 1994).

In addition to recycling carbon from dead plant material, wildfire, insects and microbes have important functions in limiting the amount of live plant material as well. In harsh environments especially, densely-stocked trees compete excessively for limited moisture and nutrients and are under considerable stress.

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Fire and pathogens often serve to reduce stocking, or the amount of carbon stored in live biomass, and thus maintain lower levels of stress in these environments (Harvey et al 1992).

The cycle of carbon accumulation and loss in forest ecosystem provides an overall framework for understanding the critical functions of wildfires, insects and pathogens in Inland Northwest forests.

Wildfires: Wildfire has been a potent natural force in shaping Inland West ecosystems (Arno 1976, Arno and Brown 1989, Agee 1990, Habeck 1990, Mutch et al. 1993, Covington et al. 1994). Scientific observations of the extent of fire in western Montana forests date back at least to those of Whitford (1905), who noted both the pervasiveness of wildfire in forests in the Flathead River basin and the great variation in fire intensity. Whitford noted that "there is scarcely a section of land that has not been more or less burned over." He also put much of the blame on early white settlers, stating, "It is also very evident that the fires are more numerous since the settling of the country by civilized man than before." Ayres, in his reconnaissance of the turn-of-the-century Flathead and the Lewis and Clarke Forest Reserves (1900a,b) made similar comments.

More recent studies have attempted to quantify the frequency of fire, using analysis of fire scars (e.g. Arno 1976, Freedman and Habeck 1985, Habeck 1990) and stand age distributions (Antos 1977, Antos and Habeck 1981). These methodologies allow evaluation of fire intervals going back as far as the 1500s in some cases (Arno 1976, Habeck 1990), thus minimizing the confounding influence of early white settlers on estimated fire frequencies.

Fire intervals and patterns vary substantially by forest type and moisture regime. These intervals are shaped by the frequency of conditions favorable to fire ignition and spread, and by the relative rates of carbon accumulation, decomposition, and stress levels as described above. Because of these factors, wildfires tend to occur most frequently in severe environments (Harvey et al. 1992, Mutch et al. 1993). Agee (1990) provides an excellent overview, dividing fire regimes into three broad groups and giving a few examples of each.

Fires in warm, dry forest types such as ponderosa pine were very frequent. Arno (1976) reported average intervals of 6 to 19 years in the Bitterroot drainage, Freedman and Habeck (1985) found 17-year average intervals in the upper Swan Valley, and Habeck (1990) reported 7-year intervals near Missoula. Native Americans as well as lightning may have been responsible for many of these ignitions (Arno 1976, Habeck 1990, Mutch et al. 1993, Covington et al. 1994). These fires were typically of low intensity because of the lack of time for fuels to accumulate.

In slightly moister forests, fire intervals tended to be somewhat longer. Arno (1976) found fire intervals of 17 to 28 years in warm moist to lower subalpine habitat types in the Bitterroot National Forest. Freedman and Habeck (1985) reported intervals averaging 30 years for the moister portion of their Swan Valley study area.

According to Agee (1990), these moderate fire regimes are the most complex to typify. Areas of low-intensity underburns are commonly interspersed with patches of high-severity replacement burning, resulting in a patchy forest mosaic (Freedman and Habeck 1985, Agee 1990, Mutch et al. 1993, Harvey et al. in press). A number of early photos in Ayres (1900b) and Whitford (1905) taken in these environments appear to suggest two-storied stands, typically with scattered overstories dominated by fire-resistant larch over mixed-species understory patches of various ages.

Still moister environments experienced fire only infrequently, and fires were typically intense and stand-replacing when they did occur (Agee 1990). Studies by Antos in humid environments in the Swan Valley suggest that stand-replacing fires occurred on an average interval of 100-200 years. Some of Antos'

study sites showed evidence of understory fires in the intervening periods as well (Antos 1977, Antos and Habeck 1981). Many lodgepole pine forests also experience infrequent intense fires at intervals of less than 100 years to as long as 350 years (Monnig and Byler 1992).

Wildfires have had major impacts on tree species composition. Fire-resistant species such as ponderosa pine and western larch will persist and generally dominate forests when wildfires are frequent (Habeck 1990, Mutch et al. 1993). Western larch, lodgepole pine and western white pine are especially able to regenerate and grow rapidly following disturbances, and tend to dominate forests with less frequent and more intense fires. Later-successional species do not usually predominate except in the prolonged absence of fire, or in cases where fire-adapted species fail to reestablish themselves promptly (Antos and Habeck 1981, Moeur 1992).

Different fire regimes had contrasting effects on ecological "stability." Agee (1990) describes frequent low-intensity fire regimes as agents of stability, while infrequent intense fires caused great instability over vast areas. Ponderosa pine forests were often maintained in a stable open, park-like condition by frequent fires (Arno 1976, Freedman and Habeck 1985, Habeck 1988, 1990, Mutch et al. 1993). On the other hand, lodgepole pine forests (Monnig and Byler 1992), and mixed-conifer forests on grand fir, western redcedar and hemlock climax sites (Antos and Habeck 1981, Habeck 1988, 1990) experienced major fluctuations in forest cover over large areas due to large intense fires.

The different fire regimes also resulted in substantially different amounts of old-growth forest in different environments. Losensky (1993) used early-twentieth-century forest inventory data to estimate the percentage of forest acreage in different age classes in 1900. He estimated that more than half of the area in ponderosa pine forest types in western Montana was in age classes typical of old growth. These old growth forests would have been maintained in that state by the frequent low-intensity fires (Habeck 1990). Losensky estimated that white pine and larch/Douglas-fir forest types averaged 20 to 30 percent old-growth age classes. In contrast with the ponderosa pine type, these mesic old-growth forests were commonly a function of a prolonged absence of fires (Habeck 1988).

Losensky's data suggests that old growth in lodgepole pine forests and pure Douglas-fir forest types was rare, with old-growth age classes occupying only 3 to 7 percent of the area in these types. Perhaps wildfires in these forests were too intense to maintain savanna-like old-growth stands, given the lower fire resistance of these species, while intervals were too short to allow old growth to develop in the absence of fire. The relatively short lifespan of lodgepole pine and its susceptibility to bark beetle attacks are also major factors (Monnig and Byler 1992).

Insects and pathogens: Various insects and pathogens are likewise natural forces in Inland Northwest forests. Their functions in forest ecosystems include accelerating decomposition, regulation of stand dynamics, creation and maintenance of habitats, and maintenance of landscape diversity (Covington et al. 1994, Harvey 1994a).

Outbreaks of bark beetles such as mountain pine beetle occurred naturally when favored by an abundance of host tree species and stress conditions (Covington et al. 1994). At the turn of the century, Ayres (1900a) noted high levels of mortality in western white pine stands along the north side of the Flathead Valley, apparently caused by mountain pine beetle. Epidemics of mountain pine beetle are an important natural force in the dynamics of lodgepole pine forests as well. Outbreaks occur when trees reach a large enough diameter, creating fuels that help set the stage for the next stand-replacement wildfire (Monnig and Byler 1992).

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Periodic defoliation by insects such as the western spruce budworm is a natural occurrence in Inland Northwest forests as well. Evidence exists for periodic budworm outbreaks in pre-settlement forests (Covington et al. 1994).

Root diseases tended historically to be present at endemic levels. Root pathogens may serve to thin forests in moist environments, helping maintain dominance of less-susceptible species such as western white pine and western larch (Byler and Zimmer-Grove 1991, Monnig and Byler 1992). Patches of root disease infection also helped maintain structural and species diversity within stands (Covington et al. 1994, Harvey 1994a). Pathogens may regulate stress levels in severe environments by selectively killing weaker trees. As a consequence, one of their functions may be to select against genotypes poorly adapted to local environments, contributing to development of local genetic adaptation in populations in susceptible species (Harvey et al. 1992).

EFFECTS OF FIRE SUPPRESSION AND FOREST MANAGEMENT

Conservation efforts in western forests began in the late nineteenth and early twentieth centuries. Comments by Ayres (1900b) probably typify early attitudes toward the protection and management of Montana forests. Ayres decried the pervasive evidence of wildfire and the associated waste of resources, which he probably blamed too much on human carelessness. He also articulated a management philosophy under which the scattered large overstory pine and larch would be harvested, and replaced by the ready-made understories present in many forested areas.

Covington et al. (1994) summarize the history of timber harvest in the Inland West. The first major demands for timber were related to the explosion in mining in the late 1800s. Shortly thereafter, timber harvest for building materials became extensive, much of it for export to other regions. Railroads were constructed into accessible forest areas, and logs were yarded to rail lines with oxen, horses and flumes. Early harvests tended to remove the large pines and western larch, leaving behind the true firs, Douglas-fir and spruce.

Examples of turn-of-the-century logging can be seen in extensive second-growth forests and old railroad grades in the lower Clark Fork and Blackfoot valleys west and east of Missoula. Old cruise information in DSL files indicates that less than 1,000 board feet per acre were left after logging in some old-growth ponderosa pine forests in the lower Blackfoot. An interesting set of photos in the University of Montana Library Archives documents extensive logging in the French Gulch area near Deer Lodge, in which lengthy flumes were constructed to yard logs to massive landings and portable mill sites.

Wildfire suppression began in earnest in the early 1900s, and became increasingly effective after the 1930s (Antos and Habeck 1981, Freedman and Habeck 1985, Mutch et al. 1993). With fire suppression, the major function of wildfire in regulating carbon accumulation in both live and dead vegetation has been interrupted. This results in an increase in stand densities and associated stress levels, as well as a buildup of dead fuels including litter and down logs (Oliver et al. 1994, Harvey et al. in press). Major changes in tree species composition have also occurred as more poorly fire-adapted species have increased in abundance (Habeck 1990, Monnig and Byler 1992).

Much of the responsibility for fire-exclusion policies falls on natural resource professionals, whose European attitudes toward fire were, unfortunately, ill-suited to the Inland West (Mutch et al. 1993). In a broader sense, however, the disdain for fire has been a feature of the overall American culture. Evidence for this ranges from the unsurpassed success of the Smokey Bear advertising campaign to the portrayal of fire as an evil menace in the movie, "Bambi" (Hackett 1989). It is hard to say whether the early foresters shaped or merely reflected public attitudes toward fire.

The shifts in species composition toward dominance of late-successional species have been exacerbated by the selective logging of valuable early-successional species. The combined influences of fire suppression and selective logging have also converted the naturally patchy mosaics favored by moderate fire regimes into much more homogeneous forests, reducing landscape diversity (Harvey et al. in press). The introduction of the white pine blister rust fungus from Europe has led to drastic reductions in the extent of white pine forests in northern Idaho and northwest Montana, also helping to increase the dominance of late-successional species (Byler and Zimmer-Grove 1991, Monnig and Byler 1992).

The advent of even-age timber management in the 1940s and 1950s is typically attributed to a shift to an agricultural model of forest management (see Covington et al. 1994, for example), and the postwar economic boom (Flowers et al. 1993). However, there was a strong ecological basis for this change as well that should not be overlooked. The selective harvests being practiced with species such as western larch were producing stand conditions that prevented their replacement. Even-age management was instituted in large measure to ensure perpetuation of shade-intolerant species (Schmidt et al. 1976). Hall and Thomas (1979) had similar concerns related to the wildlife habitat values of early successional stages, and expressed the opinion that uneven-age management was unlikely to meet goals for species richness.

Nevertheless, concerns about the adverse effects of even-age management have become increasingly strident. Many young even-age stands have not been thinned, and contribute further to unnaturally dense stand conditions (Covington et al. 1994). The typical sizes and homogeneity of even-age harvest units also interrupt natural landscapes, both in areas where fine-textured mosaics naturally prevailed (Freedman and Habeck 1985), and where vast continuous areas of mature "forest interior" habitats used to predominate (Harris 1984, Hansen et al. 1991).

In evaluating the effects of fire suppression and forest management practices, it is important to consider the historic frequency and intensity of wildfires in different environments. Where fire intervals were naturally long, existing conditions may still be within the natural range of variability (Oliver et al. 1994). The effect of fire suppression in these forests has been to delay some occurrences of stand-replacement fires, rather than to make major changes in stand structure.

Nevertheless, the effects of partial cutting and the introduction of white pine blister rust are still having major effects in these environments (Schmidt et al. 1976, Byler and Zimmer-Grove 1991, Monnig and Byler 1992). For example, a comparison of Montana forest inventory data from 1949 (Hutchison and Kemp 1952) and 1989 (Conner and O'Brien 1993) indicates that the acreage in western larch forest types may have declined by as much as seventy percent in the intervening time period. Similar trends can be seen for western white pine forests in Idaho (O'Laughlin et al. 1993).

More profound changes in composition and structure within stands have occurred throughout forests with historically frequent fires. With fire exclusion, populations of later-successional tree species have exploded (Covington et al. 1994, Harvey et al. in press). This has resulted in amounts of living and dead biomass that are clearly outside the range of natural variability (Oliver et al. 1994, Harvey et al. in press).

These changes in Inland West forests have resulted in heightened levels of insect and pathogen activity. In the absence of wildfire, increased tree densities have predisposed stands to large outbreaks of stress-sensitive insects and pathogens. Furthermore, late-successional tree species tend to be more susceptible to many of these agents (Harvey et al. 1992, Harvey et al. in press). These effects are particularly evident in drier forests, where dramatic losses have occurred in eastern Oregon and Washington (Johnson et al. 1991, Mutch et al. 1993), and in southwest Idaho (O'Laughlin et al. 1993).

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In moister forests, insect and pathogen activity is also showing signs of increasing (Monnig and Byler 1992, O'Laughlin et al. 1993). In particular, north Idaho forests are showing greatly elevated losses to root disease since the mid-1980s, related to the shift from white pine and other early-successional forest types to dominance of late-successional species (Byler and Zimmer-Grove 1991, Monnig and Byler 1992). Similar increases should probably be expected in selectively harvested western larch forests in western Montana, as the relatively insect- and disease-resistant larch is replaced by more susceptible late-successional species (Harvey et al. 1992, Harvey 1994a).

Stress-related forest mortality can be worsened by genetic degradation of tree species. Degradation can be caused by the use of seed sources poorly adapted to local environments in reforestation, or by "high-grading" cutting methods that remove the most successfully growing trees (Millar and Libby 1989, Harvey et al. 1992).

Increases in dead fuels, exacerbated by mortality from insects and diseases, and density of tree crowns, are resulting in wildfires of increasing severity (Mutch et al. 1993, Harvey 1994a). Covington et al. (1994) summarize these changes as follows: (a) forests formerly typified by infrequent, high-intensity fires are experiencing increasingly large crown fires; and (b) forests that formerly experienced frequent low-intensity fires are now experiencing more stand-replacement fires as well as larger fires.

This increasingly severe fire behavior is likely to have a number of adverse environmental effects. Excess carbon accumulations may be rapidly reversed with extreme wildfires, resulting in excessive loss of carbon from forests (Oliver et al. 1994a). Nutrients that have been excessively tied up in organic material would be lost from the site, productivity would be reduced, and soil erosion may increase (Oliver et al. 1994a, Harvey et al. in press). Net accumulation of carbon in northern forests already appears to have been reversed due to increases in wildfire extent, and these carbon releases could contribute to global climate changes (Harvey 1994b). Severe fires could threaten remnant old-growth forests which already have been greatly depleted by timber harvest (Habeck 1990). Valuable timber, ranches, and homes are also increasingly at risk (Arno and Brown 1989, Mutch et al. 1993).

THE "FOREST HEALTH" CONCEPT

Over the past several years, the concept of "forest health" has been widely used to describe the effects of human activities on forest ecosystems. The concept dates back at least to Aldo Leopold (1949), who stated, "Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity."

Attempts to define forest health have proved elusive. O'Laughlin et al. (1993) observe, "As is true in other health contexts, it may be easier to identify when a forest is unhealthy than it is to define exactly what healthy means." They go on to suggest that judgments about forest health are inevitably at least somewhat subjective. Not surprisingly, the concept has drawn fire from some environmentalists and politicians who perceive it as just another excuse to harvest trees. Nevertheless, according to O'Laughlin et al., the concept persists and the health analogy has proved useful if less than perfect for diagnosing forest ecosystems.

Monnig and Byler (1992) suggest two alternate but complementary approaches for judging forest health. One is based on management objectives. In this context, a healthy forest is one in which physical or biological factors do not threaten achievement of reasonable current or potential future objectives. Such objectives may include commodity production as well as amenities such as wildlife habitat or clean water.

The other set of criteria suggested by Monnig and Byler is based on ecological function. A healthy forest in this context is one in which the ecosystem (i.e. the community of plants and animals along with their

physical environment) retains all of its functions. This concept appears to be close to what Leopold (1949) iterated, as quoted above.

O'Laughlin et al. (1993) used both of these approaches to develop their definition: "Forest health is a condition of forest ecosystems that sustains their complexity while providing for human needs." They further characterize a healthy forest as "resilient" (able to respond to disturbances and recover in a characteristic time period), and "sustainable" (capable of meeting current societal needs and desires without jeopardizing those of the future).

Harvey et al. (in press) have described healthy forests as follows:

- 1) Biophysical environments with predictable site potentials, plant assemblages, and climate and disturbance regimes;
- 2) Having structure and composition patterned by disturbances and environmental conditions;
- 3) Moderately productive and diverse, with productivity and diversity varying predictably according to the pattern of successional (structural) stages and disturbance regimes;
- 4) Resilient within normal climatic and disturbance regimes.

O'Laughlin et al. (1993) suggest that measurable criteria need to be developed to measure forest health, but arriving at the most suitable criteria is not a simple process. Pre-settlement ranges of variability may be a useful baseline where they can be determined, and where deviations can be associated with undesirable results.

Norris et al. (1993) suggested that "forests can be considered healthy when there is an appropriate balance between growth and mortality." O'Laughlin et al. (1993) used this concept in their forest health evaluation for Idaho, and reported dramatic increases in mortality levels in much of the state in recent years. They report that annual mortality levels have actually exceeded total annual growth on the Boise and Payette National Forests.

Similar comparisons of Montana forest inventory data shows that total mortality as a percentage of gross growth increased only slightly, from 18 percent to 23 percent (Conner and O'Brien 1993). Interpreting these changes to reflect any real trends in forest health would be highly questionable; they may simply reflect cycles in bark beetle activity (B. Long, personal communication).

Other measurable indicators of poor forest health used in Idaho include major shifts in tree species composition (O'Laughlin et al. 1993). A comparison of forest inventory data from 1949 (Hutchison and Kemp 1952) and 1989 (Conner and O'Brien 1993) shows very similar changes in Montana's forests. Thus, while accelerated mortality has not been documented yet for Montana's forests, the changes in forest condition that may be its precursor are ample cause for concern, as described by Monnig and Byler (1992) and Covington et al. (1994).

Comparisons of the 1949 and 1989 inventory data for Montana also indicate increased stocking levels. In spite of heavy timber harvesting of high-volume old-growth forests in this time period, overall cubic-foot growing stock has remained steady or increased (Flowers et al. 1993). This indicates substantial increases in the density and stocking levels of young and immature stands, and in associated levels of stress and fire hazard.

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physical environment) retains all of its functions. This concept appears to be close to what Leopold (1949) iterated, as quoted above.

O'Laughlin et al. (1993) used both of these approaches to develop their definition: "Forest health is a condition of forest ecosystems that sustains their complexity while providing for human needs." They further characterize a healthy forest as "resilient" (able to respond to disturbances and recover in a characteristic time period), and "sustainable" (capable of meeting current societal needs and desires without jeopardizing those of the future).

Harvey et al. (in press) have described healthy forests as follows:

- 1) Biophysical environments with predictable site potentials, plant assemblages, and climate and disturbance regimes;
- 2) Having structure and composition patterned by disturbances and environmental conditions;
- 3) Moderately productive and diverse, with productivity and diversity varying predictably according to the pattern of successional (structural) stages and disturbance regimes;
- 4) Resilient within normal climatic and disturbance regimes.

O'Laughlin et al. (1993) suggest that measurable criteria need to be developed to measure forest health, but arriving at the most suitable criteria is not a simple process. Pre-settlement ranges of variability may be a useful baseline where they can be determined, and where deviations can be associated with undesirable results.

Norris et al. (1993) suggested that "forests can be considered healthy when there is an appropriate balance between growth and mortality." O'Laughlin et al. (1993) used this concept in their forest health evaluation for Idaho, and reported dramatic increases in mortality levels in much of the state in recent years. They report that annual mortality levels have actually exceeded total annual growth on the Boise and Payette National Forests.

Similar comparisons of Montana forest inventory data shows that total mortality as a percentage of gross growth increased only slightly, from 18 percent to 23 percent (Conner and O'Brien 1993). Interpreting these changes to reflect any real trends in forest health would be highly questionable; they may simply reflect cycles in bark beetle activity (B. Long, personal communication).

Other measurable indicators of poor forest health used in Idaho include major shifts in tree species composition (O'Laughlin et al. 1993). A comparison of forest inventory data from 1949 (Hutchison and Kemp 1952) and 1989 (Conner and O'Brien 1993) shows very similar changes in Montana's forests. Thus, while accelerated mortality has not been documented yet for Montana's forests, the changes in forest condition that may be its precursor are ample cause for concern, as described by Monnig and Byler (1992) and Covington et al. (1994).

Comparisons of the 1949 and 1989 inventory data for Montana also indicate increased stocking levels. In spite of heavy timber harvesting of high-volume old-growth forests in this time period, overall cubic-foot growing stock has remained steady or increased (Flowers et al. 1993). This indicates substantial increases in the density and stocking levels of young and immature stands, and in associated levels of stress and fire hazard.

In using the concept of forest health, some caveats are in order. First of all, forest health is expressly not a state in which trees never die of natural causes. In fact, the relatively high levels of snags and decadence associated with old-growth forests may be integral facets of complete forest ecosystems (Habeck 1988, Crow 1990). In a more general sense, dead organic material on the forest floor, in various forms, serves a number of functions such as nutrient cycling, providing mycorrhizal substrate, and moisture retention, which may have major implications for the long-term productivity of the forest (Harvey et al. 1986, Jurgensen et al. 1992, Graham et al. 1994).

A second warning is that a healthy forest should not be portrayed as fireproof. In fact, such a notion would be completely inconsistent with the conclusion that wildfire suppression is a major cause of the decline in forest health in the first place. As described above, the increased fire hazards are related to increased fire intensity, and to attendant changes in fire effects, difficulty of control, and threats to values such as formerly fire-maintained old-growth forests, timber, and homes (Arno and Brown 1989, Habeck 1990, Mutch et al. 1993). Moreover, recent harvest areas may burn with a higher, rather than lower, intensity if an appropriate level of slash disposal is not done.

A final caution relates to the notion of ecosystem stability. It is common, even in recent literature, to find nature interpreted as inherently stable, and to see the changes wrought by disturbance as being mere cycles in a greater "balance of nature" (e.g. Byler and Zimmer-Grove 1991). Natural ecosystems are described as "shifting-mosaic steady-state" (Freedman and Habeck 1985, Habeck 1988), and there is often an implicit sense that entire plant and animal communities are largely symbiotic and mutually-dependent entities. These concepts have been long-standing in ecological theory, and may derive in part from philosophies of nature dating back to the 18th century (Oliver and Larson 1990, Oliver et al. 1992).

However, these concepts are being called into question by a number of scientists, based in part on studies of vegetation dynamics (Oliver and Larson 1990), genetics (Namkoong 1991, Fins 1993) and paleoecology (Hunter et al. 1988). Research in forest stand dynamics suggests that forests do not develop toward a single, deterministic climax condition following disturbance. Rather, the nature of a natural or man-made disturbance, and its timing in the development of the previous stand, may direct stand development in very different directions from those of the previous stand. Change due to large natural disturbances is the predominant characteristic of forest ecosystems, and the notion of a stable climax is seldom relevant (Oliver et al. 1992).

Competition, rather than mutual dependency, is now seen as the major factor in interaction among tree species. Evidence for this is seen in the resilient behavior of disturbed forests, the response of plant communities to elimination of species and introduction of exotics, and detailed study of stand development (Oliver and Larson 1990).

From a genetic standpoint, trees in particular do not usually possess a finely-tuned adaptation to their local environment. Adaptations tend to occur across a broad scale, and may represent a buffering against environmental variation rather than an optimal adaptation to local conditions (Fins 1993). Genetic diversity is not typically a simple and consistent response to environmental gradients. Genetic variation is often the result of a combination of past migrations, fluctuations in population size, and interactions among species. Instability and constant change may be natural features of evolution, and stability may be unnatural (Namkoong 1992, Stettler and Bradshaw 1994).

Finally, studies of paleoecology indicate that plant species have responded to climatic changes in a very individualistic fashion. As a result, present communities are not merely relocations of past communities, but represent assemblages of species different from any that are known to have existed in the past. Major changes have occurred even in the past 6,000 years or so. This means that relationships within plant

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communities are not significantly coevolved or interdependent (Hunter et al. 1988, Oliver and Larson 1990).

All of this should probably be taken to suggest that a single optimum set of natural conditions, or even processes and cycles, does not exist for any forest environment (Oliver et al. 1992). Current ecosystems are as much the result of historical accident as they are of stabilizing adaptations. However, this should not lead us to an "anything goes" approach to nature either, in which forest management becomes a mere exercise in engineering genes and forests to suit our economic wishes (Namkoong 1992). Rather, it requires that we see forest management as an active choice between various options. We need to use our best understanding of natural processes to develop these options, but must also acknowledge that any return to past "pristine" conditions is impossible and probably not even desirable (Monnig and Byler 1992, Oliver et al. 1992, O'Laughlin et al. 1993).

THE USE OF SILVICULTURE IN ECOLOGICAL RESTORATION

This all leads inevitably to a consideration of the available options, whether or not we find the concept of forest health compelling or even valid. Oliver et al. (1992, 1994) suggest that there are two overall approaches to forest landscape management: natural regulation, where natural processes are allowed to operate unimpeded by human intervention; or actively managing ecosystems to regulate disturbance frequency and intensity, carbon accumulation, and forest structure. While intense debate often revolves around these two approaches, they are not mutually exclusive and both may play an important role in maintaining biodiversity (Oliver 1992, Hutto et al. 1993).

Many people strongly believe that only preservation and natural regulation of ecosystems can maintain ecological integrity. In some cases this is due to the notion, discussed above, that nature is inherently stable and precisely balanced. In this view, human interventions are inevitably harmful because they upset this balance (Namkoong 1992, Oliver et al. 1992). Others point to the mistakes of the past - many of them made by supposedly-knowledgeable professionals - as evidence that proposed actions to "cure" forest health may be worse than the disease (Mutch et al. 1993, O'Laughlin et al. 1993).

Some conservation biologists also hold the conviction that only extensive reserves can maintain biodiversity. For example, Noss (1993) reasons that cumulative effects on wildlife viability include not only vegetative changes, but also roads and direct contact with humans. He suggests that an average of as much as 50 percent of a region must be protected in reserves to maintain complete ecosystems that include large carnivores and other species sensitive to human disturbance. Noss does not exclude the use of active restoration in the reserve system he proposes for the Oregon Coast Range, but reestablishment of natural regulation would be the primary focus.

In Yellowstone National Park, a natural-regulation philosophy began to arise with the 1963 "Leopold Report," which advocated the "maintenance of naturalness" as the overriding goal of Park management. A prescribed natural wildfire policy was adopted in 1972. In this context, while the 1988 Yellowstone fires provoked controversy, they were viewed by Park Service ecologists as both inevitable and ecologically beneficial (Hackett 1989).

Other scientists, however, identify problems with the concept of natural regulation, even when applied to preserves such as National Parks and wilderness areas. Catastrophic fires even in remote areas often end up threatening ranches, homes and towns; fire does not stay within human-established boundaries where it is deemed acceptable (Mutch et al. 1993).

Ecologist Thomas Bonnicksen (1989) issued a scathing denunciation of the natural regulation philosophies that have been applied in Yellowstone and other National Parks. He insists that the 1988

Yellowstone fires were no more "natural" than the decades of fire suppression that led up to them. Furthermore, he argued, Native Americans had made extensive and active use of fire in the area for millennia; eliminating this use is in itself artificial.

Arno and Brown (1989) argue the futility of ever expecting "prescribed natural fires" to function in their former role even in wilderness. Such fires can only be allowed under relatively low fire-danger conditions; otherwise they threaten human developments outside the wilderness, as happened in Montana in 1988. Furthermore, fires that naturally would have started outside wilderness areas and burned into the wilderness are suppressed before they ever get there. They recommend active use of prescribed fire in these environments. O'Laughlin et al. (1993) similarly argue for active intervention to restore forest health in wilderness areas.

Arno and Brown go on to suggest the use of appropriately-designed timber harvest as the primary tool to reduce fuels in forests managed for multiple uses or timber production, and in forested residential areas. As discussed above, the intent is not to fireproof the forest but rather to ensure that fires will be controllable surface fires rather than high-intensity crown fires.

Arno and Brown's advocacy of silvicultural practices and prescribed fire to fill the role of natural wildfire is shared by other fire ecologists in the West (Habeck 1990, Mutch et al. 1993, Covington et al. 1994). Habeck (1990), and Oliver et al. (1994) each declare that we cannot afford to wait for the results of further research before inaugurating such management. They assert that we already have ample knowledge to begin carrying out these practices, and need to do so for both public-safety and ecological reasons. In addition, human demands on ecosystems for forest products are seen as inevitable. Active management involving timber harvest may be more environmentally friendly than alternatives that involve substitutes for wood products (Bowyer 1991, Oliver 1992). Implementing such a strategy, however, requires that we address two questions. First, what kinds of silvicultural practices are appropriate? Secondly, how do these practices compare with the natural processes they are designed to replace?

I have attempted elsewhere to describe silvicultural practices that can be used to promote ecological diversity and health in various environments (Remington 1993), and will not elaborate here in detail. However, several major points should be borne in mind:

- There is not a single set of "correct" practices in any particular environment. Reestablishing natural variability at a landscape level will require a variety of practices in individual stands (Oliver et al. 1994).
- While public sentiment favors the use of "selective" logging to enhance forest health, such practices need to be completely different from the kinds of partial cutting that have been practiced in the past. As discussed above, past selective logging has helped create many of the conditions that contribute to poor forest health in the first place, in both frequent-fire and infrequent-fire environments (Schmidt et al. 1976, Byler and Zimmer-Grove 1991, Monnig and Byler 1992, Mutch et al. 1993, Covington et al. 1994).

At a minimum, partial cutting practices to improve forest health must increase the proportion of early-successional species, both in the residual stand and in regeneration, and maintain more open forest conditions where fires were naturally frequent (Habeck 1990, Monnig and Byler 1992, Mutch et al. 1993). This will generally require removal of the smaller, rather than the larger, trees from stands.

- In evaluating the use of clearcutting and even-age management it is necessary to consider the reasons for their adoption in the first place, which included perpetuation of early-successional species (Smith 1962, Schmidt et al. 1976). It is also essential to address the long-term as well as short-term

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effects of clearcutting. Avian biologists Hutto et al. (1993) emphasize that, in spite of the severe short-term impacts of clearcutting, it may come the closest to emulating natural patterns and processes in many environments over the long term. They recommend using management practices that have harsh short-term effects if that is what natural processes did in analogous circumstances.

- Greater use of prescribed fire may be an important adjunct to silvicultural practices. While it may be possible and in some cases necessary to avoid the use of fire completely, there are some risks involved. We cannot be sure that silvicultural techniques alone can fulfill all the essential functions of fire, including nutrient cycling and maintenance of fire-associated plant species (Mutch et al. 1993).
- It may be necessary to use prescribed fire without silvicultural treatments in situations where harvesting is not allowable or is infeasible. However, the unnatural buildups of fuel that are present in many areas must be considered. It will be difficult if not impossible to use fire alone to achieve its previously-characteristic effects in these situations (Mutch et al. 1993).
- Increased use of prescribed fire will tend to have adverse impacts on air quality. This creates a dilemma if we are to provide both clean air and ecosystem integrity, which are both key public environmental concerns. However, as fire hazards in Inland West forests increase, episodes of poor air quality may be inevitable anyway (Mutch et al. 1993, Covington et al. 1994).

The comparability of silvicultural methods and natural disturbances is a complex issue. It is a truism among foresters that clearcutting imitates the results of stand-replacing fires. Antos and Shearer (1980) discussed some of the differences as well as similarities they observed in studies in the Swan Valley. In both situations the live above-ground vegetation is largely eliminated and mineral soil is usually exposed. However, harvests are substantially different from wildfires in the lack of large numbers of snags, the effects of mechanical scarification on root systems, and the extreme intensity of fires in slash piles.

Freedman and Habeck (1985), and Franklin et al. (1986) emphasize the tendency of forest management practices to homogenize the environment, in contrast with the diversity of disturbance intensity and forest structure that typically result from natural disturbances. Changes in landscape patterns, such as the size distribution of openings and the location and abruptness of boundaries, need to be considered as well as the level of within-stand variation.

The differences in post-fire and post-harvest habitats are especially important to a number of bird species. Many of these species make extensive use of the snags in recent stand-replacement burns, and are virtually absent in recent harvests as well as low-intensity burns (Hutto et al. 1993). The authors suggest that natural disturbance regimes need to be maintained in some areas to provide the habitats that cannot be maintained by silvicultural methods.

In their comprehensive text on forest stand dynamics, Oliver and Larson (1990) discuss in detail the various disturbance types that shape forests worldwide (pp. 89-139). Differences among kinds of natural disturbances, or within a particular type of disturbance in terms of intensity and pre-disturbance stand characteristics, may be greater than their differences from human-caused disturbances. They conclude that it is necessary for the forest manager to predict the effects of various disturbances on the composition and structure of forest stands, in order to manage in ways that will achieve desired effects.

Hutto et al. (1993) articulate a similar principle in their discussion of the effects of silvicultural treatments on forest birds. They warn that relatively benign harvest methods that reduce the likelihood of natural disturbances may be more harmful than severe treatments such as clearcuts, which may simulate at least some of the long-term effects of stand-replacement fires.

Finally, from the standpoint of carbon cycling, timber harvest within appropriate parameters is a useful means for restoring a more desirable balance between carbon fixation and release. Excess carbon accumulation can be removed in the form of wood products, in which form it can remain sequestered as organic material rather than released into the atmosphere (Harvey 1994a, Oliver et al. 1994). It is still important to maintain adequate organic reserves in the forest to provide for its ecological functions (Harvey 1994a).

In contrast, "natural regulation" is likely to result in a continued net release of carbon into the atmosphere as wildfires become more extensive and intense, contributing to the potential for global climate change (Harvey 1994b). Furthermore, the lost wood production would ultimately involve shifting timber harvest and associated environmental impacts to other parts of the world, and substitution of other materials for wood. Production of substitute materials such as metals, plastics, and concrete requires more energy, and thus releases more carbon dioxide into the atmosphere, than manufacture of wood products (Bowyer 1991, Oliver 1992, Oliver et al. 1994).

In summary, from the standpoint of vegetation ecology and its implications, it appears that a "natural regulation" strategy poses greater ecological risks than appropriately-designed active management. At the same time, the potential ecological benefits of active ecosystem management come with their own adverse consequences such as increased roading and reduction in early post-fire habitats. However, practices are available for reducing the level of these impacts (Oliver et al. 1994).

This is not to say that the impacts of active forest management on biodiversity addressed by conservation biologists such as Noss (1993) should be dismissed. Nevertheless, it is essential to consider the ecological impacts involved in a "hands-off" strategy as well. In the words of ecologist Daniel Botkin (quoted in O'Laughlin et al. 1993), "When you do nothing, you'll get something you didn't expect."

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APPENDIX WLD

WILDLIFE

This appendix includes three parts. Part one is a detailed explanation of the procedure we used to analyze the effects of each alternative on the nine wildlife habitat descriptors. Part II contains lists of wildlife species used in the Chapter III and IV wildlife analyses. These lists describe the existing environment of various species in Montana (Figures WLD-1 - WLD-12). Part III contains the complete lists of projected effects on wildlife species under each alternative for each descriptor.

The wildlife discussion presented in Chapters III and IV was based on wildlife-habitat matrices developed by the U.S. Forest Service and databases maintained by the Montana Natural Heritage Program (MNHP), a joint effort of The Nature Conservancy and Montana State Library. The MNHP data provided current information on wildlife species found in the state, seasonal residency, migratory status, special or legal designations, general habitat associations, use of specialized habitat features, and presence in each DSL Land Office area. The U.S. Forest Service data provided older, but more detailed information associating wildlife species with specific vegetative communities and structural attributes of plant communities.

PART I: METHODS USED IN ANALYSIS OF ENVIRONMENTAL CONSEQUENCES ON WILDLIFE

DETAILED METHODOLOGY: ENVIRONMENTAL CONSEQUENCES FOR EACH DESCRIPTOR

Descriptor Successional Stage

The list of species associated with six successional stages (grass/forb, seedling/sapling, pole timber, young, mature, old growth) was based on information from Prather and Burbridge (1979), manipulated by SAS programs into file SUCC.LST, as described in the description of computer files, found in the Project File.

Projected successional stages for each alternative were based on Figures IV-V5, IV-V8, IV-V18, and IV-V19 from the vegetation section. Figure IV-V5 projected stand sizes in four classes (nonstocked, seedling/sapling, poletimber, and sawtimber). Our data on wildlife habitat affinities distinguished six classes: the first three above, plus "young sawtimber", "mature sawtimber", and "old growth". We used the following algorithm to sub-divide the existing "sawtimber" class (from Figure IV-V5) into "young", "mature", and "old growth":

- 1) We first projected proportions in the old growth class. Figures IV-V18 and IV-V19 project old growth amounts using two independent methods; V18 probably underestimates old growth amounts, V19 probably overestimates old growth amounts. We selected the coefficient 0.4 as most nearly representing the likely compromise between the two, and used the following algorithm to project a single old growth estimate:

$$OG_i = V18_i + (0.4 * (V19_i - OG_c))$$

where:

OG_i = best estimate of proportion old growth in year 2020 for alternative i (i = Alpha...Zeta)

OG_c = estimate of existing (current) old growth proportion, Table IV-V18

$V18_i$ = projection of old growth from Table IV-V18 for alternative i (i = Alpha...Zeta)

$V19_i$ = projection of old growth from Table IV-V19 for alternative i (i = Alpha...Zeta)

- 2) We assumed that "young sawtimber" would be less than 100 years old. Thus we subtracted the proportions in age-classes 100+ (from Table IV-V8) from the sawtimber proportions (from Table IV-V5) for each alternative to generate the class "sawtimber, but less than 100 years age-class".
- 3) The "mature sawtimber" class was then calculated as the remainder of the proportion in sawtimber (from Table IV-V5) after old growth and "young sawtimber" had been subtracted.

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Having thus apportioned the sawtimber class into "young", "mature", and "old growth", the resulting projections in year 2020, by successional stage, were as follows:

	Current	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
		High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Nonstocked	2.5	2.5	1.3	2.2	1.0	0.6	0.3	2.8	1.0	3.5	2.2	1.3	0.6
Seed/Sap.	10.7	17.8	11.4	16.7	9.8	8.2	6.6	19.4	9.8	22.8	16.7	11.4	8.2
Poletimber	15.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Young	30.6	12.2	12.1	11.9	12.0	12.1	12.0	12.5	12.0	12.4	11.9	12.1	12.2
Mature	25.7	50.3	51.9	50.6	52.3	52.6	53.0	49.8	52.3	49.2	50.6	51.9	52.5
Old Growth	14.6	10.2	16.5	11.7	18.1	19.6	21.2	8.6	18.1	5.3	11.7	16.5	19.6

These proportions, expressed as percent change from current conditions, were as follows:

	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Nonstocked	0	-48	-12	-60	-76	-88	12	-60	40	-12	-48	-76
Seed/Sap.	66	7	56	-8	-23	-38	81	-8	113	56	7	-23
Poletimber	-57	-57	-57	-57	-57	-57	-57	-57	-57	-57	-57	-57
Young	-60	-60	-61	-61	-60	-61	-59	-61	-59	-61	-60	-60
Mature	96	102	97	104	105	106	94	104	91	97	102	104
Old Growth	-30	13	-20	24	34	45	-41	24	-64	-20	13	34

The resulting matrix of projected directional changes appears in the text as Figure IV-W5, and is reprinted here.

Successional Stage	Alternative					
	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
Grass/Forb	?	?	-	?	?	-
Seedling/Sapling	?	?	-	?	+	?
Poletimber	-	-	-	-	-	-
Young	-	-	-	-	-	-
Mature	+	+	+	+	+	+
Old Growth	?	?	+	?	-	+

To categorize each species as being beneficially affected, adversely affected, or affected in an uncertain way, we applied the following logical rules:

- 1) IF a primary feeding association is with a stage projected to increase, AND a primary breeding association is with a stage projected to increase, AND there is no primary feeding or breeding association with a stage projected to decrease, THEN categorize as BENEFICIALLY AFFECTED (+).
- 2) IF a primary feeding association is with a stage projected to decrease, AND a primary breeding association is with a stage projected to decrease, AND there is no primary feeding or breeding association with a stage projected to increase, THEN categorize as ADVERSELY AFFECTED (-).
- 3) IF none of the above conditions hold (i.e., primary associations exist with stages of opposite signs, or are only with those categorized as uncertain), THEN categorize as UNCERTAIN (?).

Here are three examples:

- 1) Species A has primary feeding affinity for the grass/forb stage and primary breeding habitat affinity for the seedling/sapling stage. Under alternative GAMMA, the species is categorized ADVERSELY affected; it is categorized UNCERTAIN under all other alternatives.

- ii) Species B has both primary feeding and breeding habitat affinities for the sawtimber: old growth stage. Under alternative GAMMA, the species is categorized as BENEFICIALLY affected, under alternative EPSILON it is categorized as ADVERSELY affected, and under all others, it is categorized as UNCERTAIN.
- iii) Species C has primary feeding affinity for the grass/forb stage and primary breeding affinity for the sawtimber: mature stage. It is categorized as UNCERTAIN under all alternatives.

Descriptor Forest Type

The list of species associated with seven forest types (hardwoods, Douglas fir, ponderosa pine/western larch, grand fir, lodgepole pine, spruce/subalpine fir, cedar/hemlock) was based on information obtained from Prather and Burbridge (1979), manipulated by SAS programs into file TREE.LST, as described in the description of computer files found in the Project File.

As described in the text, we used Figure IV-V14 as the basis for projecting changes in individual forest types. We categorized forest types as increasing and decreasing only if the entire range of projections from Figure IV-V14 suggested increases or decrease (i.e., did not overlap 'no change'). When projections for changes in acreage of forest type were symmetrical about the center line, we categorized that type as either unchanging (if the range was narrow, e.g., Lodgepole Pine under alternative Alpha, Figure IV-V14), or uncertain (if the range was wide, e.g., Ponderosa Pine under alternative Alpha, Figure IV-V14). We included two additional categories to most nearly reflect our projections of forest type: "uncertain as to direction, but somewhat more likely to increase than decrease" (which we denote with the symbol "?+"), and "uncertain, but somewhat more likely to decrease than increase" ("?-"). The resulting matrix of projected directional changes in forest types is presented here:

Forest Type	Alternative			DELTA	EPSILON	ZETA
	ALPHA	BETA	GAMMA			
Hardwood	-	-	-	-	-	-
Douglas Fir	?	?-	+	?-	-	+
Ponderosa/Larch	?	?+	-	?+	+	-
Grand Fir	+	+	+	?+	?-	+
Lodgepole Pine	0	0	-	0	+	-
Spruce/Fir	+	+	+	?+	?-	+
Cedar/Hemlock	?+	?+	?+	?+	0	?+

To categorize each species, we applied the following logical rules, similar in structure to those used for successional stages:

- 1) IF a primary feeding association is with a forest type projected to increase, AND a primary breeding association is with a forest type projected to increase, AND there is no primary feeding or breeding association with a type projected to decrease, THEN categorize as BENEFICIALLY AFFECTED (+).
- 2) IF a primary feeding association is with a forest type projected to decrease, AND a primary breeding association is with a type projected to decrease, AND there is no primary feeding or breeding association with a type projected to increase, THEN categorize as ADVERSELY AFFECTED (-).
- 3) IF a primary feeding association is with a forest type projected to be uncertain but somewhat more likely to increase than to decrease, AND a primary breeding association is with a forest type projected to be uncertain but somewhat more likely to increase than to decrease, AND there is no primary

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feeding or breeding association with any other type, THEN categorize as LIKELY TO BE BENEFICIALLY AFFECTED (?+).

- 4) IF a primary feeding association is with a forest type projected to be uncertain but somewhat more likely to decrease than to increase, AND a primary breeding association is with a forest type projected to be uncertain but somewhat more likely to decrease than to increase, AND there is no primary feeding or breeding association with any other type, THEN categorize as LIKELY TO BE ADVERSELY AFFECTED (?-).
- 5) IF a primary foraging association is with a type projected to be unchanged, AND a primary breeding association is with a forest type projected to be unchanged, AND there are no other primary habitat affinities, THEN categorizes as NEUTRAL EFFECT (0).
- 6) IF none of the above conditions hold (i.e., primary associations exist with types of opposite signs, or are only with those categorized as uncertain), THEN categorize as UNCERTAIN (?).

Descriptor Stocking Level (Canopy Density)

The list of species associated with three stocking rates (closed [>70 percent], moderate [30-70 percent], and open [<30 percent]) was based on information obtained from Prather and Burbridge (1979), manipulated by SAS programs into file VEG_CC.LST, as described in the description of computer files found in the Project File.

As described in the text, we used Figure IV-V18 as the basis for projecting changes in stocking level. We categorized stocking level as increasing and decreasing only if the entire range of projections from Figure IV-V18 suggested increases or decrease (i.e., did not overlap both zones). When projections for changes in acreage of stocking level were symmetrical about the center line, we categorized that rate as unchanging (e.g., "Medium stocked" under alternative Epsilon, Figure IV-V18). As in the Forest Types descriptor, we included two categories to most nearly reflect our projections of stocking rate: "uncertain as to direction, but somewhat more likely to increase than decrease" (which we denote with the symbol "?+"), and "uncertain, but somewhat more likely to decrease than increase" ("?-").

The resulting matrix of projected directional changes in stocking rates is presented here:

Stocking Rate	Alternative					
	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
Well stocked	+	?+	+	?+	?-	+
Medium stocked	-	?-	-	?-	0	-
Poorly stocked	-	-	-	?	?+	-

To categorize each species, we applied the following logical rules, similar in structure to those used for successional stages and forest types:

- 1) IF a primary feeding association is with a stocking rate projected to increase, AND a primary breeding association is with a stocking rate projected to increase, AND there is no primary feeding or breeding association with a rate projected to decrease, THEN categorize as BENEFICIALLY AFFECTED (+).
- 2) IF a primary feeding association is with a stocking rate projected to decrease, AND a primary breeding association is with a rate projected to decrease, AND there is no primary feeding or breeding association with a rate projected to increase, THEN categorize as ADVERSELY AFFECTED (-).

- 3) IF a primary feeding association is with a stocking rate projected to be uncertain but somewhat more likely to increase than to decrease, AND a primary breeding association is with a stocking rate projected to be uncertain but somewhat more likely to increase than to decrease, AND there is no primary feeding or breeding association with any other rate, THEN categorize as LIKELY TO BE BENEFICIALLY AFFECTED (?+).
- 4) IF a primary feeding association is with a stocking rate projected to be uncertain but somewhat more likely to decrease than to increase, AND a primary breeding association is with a stocking rate projected to be uncertain but somewhat more likely to decrease than to increase, AND there is no primary feeding or breeding association with any other rate, THEN categorize as LIKELY TO BE ADVERSELY AFFECTED (?-).
- 5) IF a primary foraging association is with a rate projected to be unchanged, AND a primary breeding association is with a stocking rate projected to be unchanged, AND there are no other primary habitat affinities, THEN categorizes as NEUTRAL EFFECT (0).
- 6) IF none of the above conditions hold (i.e., primary associations exist with rates of opposite signs, or are only with those categorized as uncertain), THEN categorize as UNCERTAIN (?).

Descriptor Snag Abundance

The list of species associated with two types of snags (< 15" diameter, > 15" diameter) was based on information obtained from Prather and Burbridge (1979), manipulated by SAS programs into file SPEC_HAB.LST, as described in the description of computer files found in the Project File. II.

As described in the text, this analysis followed Figure IV-V20 in the Vegetation section. Species associated with snags were projected to be beneficially affected when arrows in Figure IV-V20 showed increases in snag abundance; they were assumed to be adversely affected when arrows showed declines.

Descriptor Large Woody Debris

The list of species associated with logs on the ground was based on information obtained from Prather and Burbridge (1979), manipulated by SAS programs into file SNAG.LST, as described in the description of computer files found in the Project File.

Analysis for this descriptor largely followed that for snags (with the rationale that most large woody debris originates as snags), except that we could not confidently project effects for log-associated species in cases where trends in small and large snag abundance were in opposite directions.

Descriptor Riparian And Wetland Areas Conditions

The list of species associated with riparian and wetland habitat types was based on information (classified as river, lacustrine, and palustrine) obtained from Prather and Burbridge (1979), manipulated by SAS programs into file HABITAT.LST, as described in the description of computer files found in the Project File.

As described in the text, this analysis was based primarily on results of the Environmental Consequences - Watershed section, in which grazing standards were discussed. Riparian conditions were assumed to continue worsening under current standards, but were assumed to improve under standards applied in western land offices under all alternatives except Alpha.

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Descriptor Recreation Use Levels

The list of species associated with seclusion from human activity was based on information obtained from Prather and Burbridge (1979), manipulated by SAS programs into file SECL.LST, as described in the description of computer files found in the Project File.

As an initial assessment, we reviewed trends in recreational use on forest lands for each of the alternatives, projected in Appendix ECN. With the exception of recreation Groups I, II, and IV under alternative Gamma, use by all recreation groups under all alternatives was projected to increase. For alternative Gamma, recreation Group III was projected to increase substantially over current levels (2.92 percent per annum), and recreation Group II (which includes hunting) was projected to decrease by only 0.5 percent per annum. Thus, based solely on projected increases in recreational use (with attendant disturbance), sensitive species should be adversely affected under all alternatives. However, in addition to projections of recreational use, we believed it appropriate to consider Resource Management Standards for Big Game, Sensitive Species, and Biodiversity. Standards for Beta and Gamma specify that "...human disturbance...must be considered in the protection of sensitive species and their habitats. Appropriate measures will be taken to ensure adequate conditions to support these species...". Thus, despite increasing recreational use, these alternatives were assumed to benefit species of special concern that require seclusion from humans, i.e., humans will be managed effectively so that disturbance will be reduced, rather than increased. However, it could not be assumed that species given no particular priority would similarly benefit; instead, increased recreational use was assumed to adversely affect these.

Because alternative Zeta prioritizes revenue production from wildlife management (of which big game management will often represent the best way to maximize trust income), we assumed that the Standards calling for "...appropriate mitigation measures" would ensure that disturbance to big game is reduced, despite overall increasing recreational use. However, it could not be assumed that species given no particular priority would similarly benefit; instead, increased recreational use was assumed to adversely affect these.

Descriptor Road Density

Species selected for consideration under the effects of road density included those associated with seclusion from human activity (SECL.LST, above), those requiring snags or down woody debris (SNAG.LST, LOG.LST), and those currently categorized as game, upland bird, migratory bird, and/or fur-bearing species (GAME.LST), as described in the description of computer files found in the Project File.

Thus, for this analysis, road density was assumed to affect equally species that: (1) Are shot or trapped (game/upland bird/migratory bird/furbearer species), (2) Are dependent on snags, (3) Are dependent on down, woody material, or (4) Are otherwise sensitive to human disturbance.

As an initial assessment, we reviewed densities of total and open roads under high and low harvest scenarios for each of the alternatives, projected in Appendix SCN. These projections used 40 percent of estimates of total road densities to project open road densities. We then further modified our projections of open road density under the various alternatives to reflect "road philosophies" implied by each. To do this, we multiplied projected open road densities by the following coefficients to obtain a projection of "effectively open" roads:

Alpha	1.00
Beta	0.75
Gamma	0.60
Delta	1.00
Epsilon	1.00
Zeta	0.75

The resulting matrix of projected percent changes from current conditions in road density was as follows:

	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Total Roads						
High	+50	+40	+5	+60	+65	+25
Low	+25	+15	0	+20	+45	+10
Open Roads						
High	+50	0	-37	+62	+62	-12
Low	+25	-12	-37	+25	+37	-12

Thus, assessed from proportional change in road densities alone, alternatives Alpha, Delta, and Epsilon should adversely affect wildlife sensitive to roads, alternative Gamma should beneficially affect such wildlife, and the effects of alternatives Beta and Zeta should be unclear.

However, in addition to projections of road densities, we believed it appropriate to consider Resource Management Standards for Big Game, Sensitive Species, and Biodiversity. RMS's for Alpha and Epsilon do not prioritize wildlife in considering roads, thus no adjustments from projected road densities were necessary. Alternative Gamma prioritizes sensitive wildlife, so the RMS' reinforce the largely positive effect of reduced open road density. alternative Beta includes standards to protect sensitive species, although not to protect big game. Thus, species of special concern should be benefitted by Beta, and other adverse effects of roading possibly also mitigated (resulting in the "?-" categorization). Standards under alternative Delta may or may not prioritize security for big game, depending on economic values, thus the effects of roads are uncertain. Alternative Zeta prioritizes big game security, thus it should benefit big game, even if the overall road density projected remains unclear.

PART II: EXISTING ENVIRONMENT OF SPECIES USED IN WILDLIFE ANALYSIS

**Figure WLD-1
BIRD SPECIES THAT OCCUR ACCIDENTALLY, OCCASIONALLY, OR ARE
ONLY SUSPECTED TO OCCUR IN MONTANA**

Obs	Scientific name	Common name	Resident/Migrant ^a		
			SUM	WIN	MIG
1	GAVIA STELLATA	RED-THROATED LOON			Y
2	GAVIA ARCTICA	ARCTIC LOON			Y
3	IXOBRYCHUS EXILIS	LEAST BITTERN			N
4	CASMERODIUS ALBUS	GREAT EGRET			N
5	EGRETTA THULA	SNOWY EGRET	Y		Y
6	EGRETTA CAERULEA	LITTLE BLUE HERON			Y
7	BUBULCUS IBIS	CATTLE EGRET			Y
8	BUTORIDES STRIATUS	GREEN-BACKED HERON			Y
9	NYCTANASSA VIOLACEA	YELLOW-CROWNED NIGHT-HERON			Y
10	MYCTERIA AMERICANA	WOOD STORK			Y
11	BRANTA BERNICLA	BRANT			Y
12	ANAS RUBRIPES	AMERICAN BLACK DUCK			Y
13	ANAS QUERQUEDULA	GARGANEY			Y
14	AYTHYA MARILA	GREATER SCAUP			Y
15	CLANGULA HYEMALIS	OLDSQUAW			Y
16	MELANITTA NIGRA	BLACK SCOTER			Y
17	MELANITTA PERSPICILLATA	SURF SCOTER			Y
18	MELANITTA FUSCA	WHITE-WINGED SCOTER			Y
19	BUTEO LINEATUS	RED-SHOULDERED HAWK			Y
20	LAGOPUS LAGOPUS	WILLOW PTARMIGAN			N
21	TYMPANUCHUS CUPIDO	GREATER PRAIRIE-CHICKEN			N
22	COTURNICOPS NOVEBORACENSIS	YELLOW RAIL			N
23	GALLINULA CHLOROPUS	COMMON MOORHEN			N
24	CHARADRIUS ALEXANDRINUS	SNOWY PLOVER			N
25	LIMOSA HAEMASTICA	HUDSONIAN GODWIT			Y
26	ARENARIA MELANOCEPHALA	BLACK TURNSTONE			Y
27	CALIDRIS CANUTUS	RED KNOT			Y
28	CALIDRIS FUSCICOLLIS	WHITE-RUMPED SANDPIPER			Y
29	CALIDRIS FERRUGINEA	CURLEW SANDPIPER			Y
30	TRYNGITES SUBRUFICOLLIS	BUFF-BREASTED SANDPIPER			Y
31	LIMNODROMUS GRISEUS	SHORT-BILLED DOWITCHER			Y
32	SCOLOPAX MINOR	AMERICAN WOODCOCK			N
33	PHALAROPUS FULICARIA	RED PHALAROPE			Y
34	STERCORARIUS POMARINUS	POMARINE JAEGER			Y
35	STERCORARIUS PARASITICUS	PARASITIC JAEGER			Y
36	STERCORARIUS LONGICAUDUS	LONG-TAILED JAEGER			Y
37	LARUS ATRICILLA	LAUGHING GULL			Y
38	LARUS CANUS	MEW GULL			Y
39	LARUS ARGENTATUS	HERRING GULL			Y
40	LARUS THAYERI	THAYER'S GULL			Y
41	LARUS GLAUCOIDES	ICELAND GULL			Y
42	LARUS HYPERBOREUS	GLAUCOUS GULL			Y
43	LARUS MARINUS	GREAT BLACK-BACKED GULL			Y
44	RISSA TRIDACTYLA	BLACK-LEGGED KITTIWAKE			Y

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Obs	Scientific name	Common name	Resident/Migrant ^a		
			SUM	WIN	MIG
45	XEMA SABINI	SABINE'S GULL			Y
46	PAGOPHILA EBURNEA	IVORY GULL			Y
47	SYNTHLIBORAMPHUS ANTIQUUS	ANCIENT MURRELET			Y
48	COLUMBA FASCIATA	BAND-TAILED PIGEON			Y
49	ZENAIDA ASIATICA	WHITE-WINGED DOVE			Y
50	TYTO ALBA	COMMON BARN-OWL			Y
51	SURNIA ULULA	NORTHERN HAWK-OWL		Y	N
52	ARCHILOCHUS COLUBRIS	RUBY-THROATED HUMMINGBIRD	Y		N
53	CALYPTE ANNA	ANNA'S HUMMINGBIRD			Y
54	SELASPHORUS PLATYCERCUS	BROAD-TAILED HUMMINGBIRD			N
55	MELANERPES CAROLINUS	RED-BELLIED WOODPECKER			Y
56	PICOIDES ALBOLARVATUS	WHITE-HEADED WOODPECKER			N
57	CONTOPUS VIRENS	EASTERN WOOD-PEWEE			N
58	EMPIDONAX ALNORUM	ALDER FLYCATCHER			N
59	SAYORNIS PHOEBE	EASTERN PHOEBE			N
60	MYIARCHUS CINERASCENS	ASH-THROATED FLYCATCHER			Y
61	MYIARCHUS CRINITUS	GREAT CRESTED FLYCATCHER			N
62	TYRANNUS FORFICATUS	SCISSOR-TAILED FLYCATCHER			N
63	PROGNE SUBIS	PURPLE MARTIN			Y
64	CYANOCITTA CRISTATA	BLUE JAY	Y		Y
65	CISTOTHORUS PLATENSIS	SEDGE WREN			N
66	POLIOPTILA CAERULEA	BLUE-GRAY GNATCATCHER			Y
67	CATHARUS MINIMUS	GRAY-CHEEKED THRUSH			Y
68	HYLOCICHLA MUSTELINA	WOOD THRUSH			Y
69	MIMUS POLYGLOTTOS	NORTHERN MOCKINGBIRD			Y
70	VIREO PHILADELPHICUS	PHILADELPHIA VIREO			Y
71	PARULA AMERICANA	NORTHERN PARULA			Y
72	DENDROICA PENNSYLVANICA	CHESTNUT-SIDED WARBLER			Y
73	DENDROICA MAGNOLIA	MAGNOLIA WARBLER			Y
74	DENDROICA TIGRINA	CAPE MAY WARBLER			Y
75	DENDROICA CAERULESCENS	BLACK-THROATED BLUE WARBLER			Y
76	DENDROICA NIGRESCENS	BLACK-THROATED GRAY WARBLER			Y
77	DENDROICA VIRENS	BLACK-THROATED GREEN WARBLER			Y
78	DENDROICA FUSCA	BLACKBURNIAN WARBLER			Y
79	DENDROICA DOMINICA	YELLOW-THROATED WARBLER			Y
80	DENDROICA PINUS	PINE WARBLER			Y
81	DENDROICA DISCOLOR	PRAIRIE WARBLER			Y
82	DENDROICA PALMARUM	PALM WARBLER			Y
83	DENDROICA CASTANEA	BAY-BREASTED WARBLER			Y
84	OPORORNIS FORMOSUS	KENTUCKY WARBLER			Y
85	OPORORNIS AGILIS	CONNECTICUT WARBLER			Y
86	OPORORNIS PHILADELPHIA	MOURNING WARBLER			Y
87	WILSONIA CANADENSIS	CANADA WARBLER			Y
88	PIRANGA RUBRA	SUMMER TANAGER			Y
89	PIRANGA OLIVACEA	SCARLET TANAGER			Y
90	PHEUCTICUS LUDOVICIANUS	ROSE-BREASTED GROSBEAK			Y
91	GUIRACA CAERULEA	BLUE GROSBEAK			Y
92	AMPHISPIZA BILINEATA	BLACK-THROATED SPARROW			Y
93	AMPHISPIZA BELLI	SAGE SPARROW			Y
94	AMMODRAMUS CAUDACUTUS	SHARP-TAILED SPARROW			Y
95	MELOSPIZA GEORGIANA	SWAMP SPARROW			Y

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Obs	Scientific name	Common name	Resident/Migrant ^a		
			SUM	WIN	MIG
96	ZONOTRICHIA ATRICAPILLA	GOLDEN-CROWNED SPARROW			Y
97	CALCARIUS PICTUS	SMITH'S LONGSPUR			Y
98	FRINGILLA MONTIFRINGILLA	BRAMBLING			Y
99	CARPODACUS PURPUREUS	PURPLE FINCH			Y

Residency or migratory status: SUM=summer resident breeding within the state,
WIN= winter resident, MIG= migrates through the state.

Figure WLD-2
WILDLIFE SPECIES LIKELY TO OCCUR IN MONTANA
AND USED IN ALL ANALYSES

			Resident/Migrant ^a		
OBS	Scientific Name	Common Name	SUM	WIN	MIG
AMPHIBIANS					
1	AMBYSTOMA MACRODACTYLUM	LONG-TOED SALAMANDER	Y	Y	N
2	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	Y	Y	N
3	PLETHODON IDAHOENSIS	COEUR D'ALENE SALAMANDER (VD)	Y	Y	N
4	TARICHA GRANULOSA	ROUGHSKIN NEWT	Y	Y	N
5	DICAMPTODON ATERRIMUS	IDAHO GIANT SALAMANDER			
6	ASCAPHUS TRUEI	TAILED FROG	Y	Y	N
7	BUFO BOREAS	WESTERN TOAD	Y	Y	N
8	BUFO COGNATUS	GREAT PLAINS TOAD	Y	Y	N
9	BUFO HEMIOPHRYUS	CANADIAN TOAD	Y	Y	N
10	BUFO WOODHOUSII	WOODHOUSE'S TOAD	Y	Y	N
11	PSEUDACRIS TRISERIATA	WESTERN CHORUS FROG	Y	Y	N
12	PSEUDACRIS REGILLA	PACIFIC CHORUS FROG	Y	Y	N
13	SCAPHIOPUS BOMBIFRONS	PLAINS SPADEFOOT	Y	Y	N
14	RANA CATESBEIANA	BULLFROG	Y	Y	N
15	RANA PIPIENS	LEOPARD FROG	Y	Y	N
16	RANA PRETIOSA	SPOTTED FROG	Y	Y	N
17	RANA SYLVATICA	WOOD FROG			
BIRDS					
18	GAVIA IMMER	COMMON LOON	Y		N
19	PODILYMBUS PODICEPS	PIED-BILLED GREBE	Y		N
20	PODICEPS AURITUS	HORNED GREBE	Y		N
21	PODICEPS GRISEGENA	RED-NECKED GREBE	Y		N
22	PODICEPS NIGRICOLLIS	EARED GREBE	Y		N
23	AECHMOPHORUS OCCIDENTALIS	WESTERN GREBE (CLARK'S)	Y		N
24	PELECANUS ERYTHORHYNCHOS	WHITE PELICAN	Y		N
25	PHALACROCORAX AURITUS	DOUBLE-CRESTED CORMORANT	Y		N
26	BOTAURUS LENTIGINOSUS	AMERICAN BITTERN	Y		N
27	ARDEA HERODIAS	GREAT BLUE HERON	Y	Y	N
28	NYCTICORAX NYCTICORAX	BLACK-CROWNED NIGHT HERON	Y		N
29	PLEGADIS CHIHI	WHITE-FACED IBIS	Y		Y
30	CYGNUS COLUMBIANUS	TUNDRA SWAN			Y
31	CYGNUS BUCCINATOR	TRUMPETER SWAN	Y	Y	N
32	CYGNUS OLOR	MUTE SWAN	Y	Y	N
33	ANSER ALBIFRONS	GREATER WHITE-FRONTED GOOSE			Y
34	CHEN CAERULESCENS	SNOW GOOSE			Y
35	CHEN ROSSII	ROSS' GOOSE			Y
36	BRANTA CANADENSIS	CANADA GOOSE	Y	Y	N
37	AIX SPONSA	WOOD DUCK	Y	Y	N
38	ANAS CRECCA	GREEN-WINGED TEAL	Y	Y	N
39	ANAS PLATYRHYNCHOS	MALLARD	Y	Y	N
40	ANAS ACUTA	NORTHERN PINTAIL	Y	Y	N
41	ANAS DISCORS	BLUE-WINGED TEAL	Y		N
42	ANAS CYANOPTERA	CINNAMON TEAL	Y		N
43	ANAS CLYPEATA	NORTHERN SHOVELER	Y		N
44	ANAS STREPERA	GADWALL	Y	Y	N

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
45	ANAS PENELOPE	EURASIAN WIGEON			Y
46	ANAS AMERICANA	AMERICAN WIGEON	Y	Y	N
47	AYTHYA VALISINERIA	CANVASBACK	Y	Y	N
48	AYTHYA AMERICANA	REDHEAD	Y	Y	N
49	AYTHYA COLLARIS	RING-NECKED DUCK	Y		N
50	AYTHYA AFFINIS	LESSER SCAUP	Y	Y	N
51	HISTRIONICUS HISTRIONICUS	HARLEQUIN DUCK	Y		N
52	BUCEPHALA CLANGULA	COMMON GOLDENEYE	Y	Y	N
53	BUCEPHALA ISLANDICA	BARROW'S GOLDENEYE	Y	Y	N
54	BUCEPHALA ALBEOLA	BUFFLEHEAD	Y	Y	N
55	LOPHODYTES CUCULLATUS	HOODED MERGANSER	Y	Y	N
56	MERGUS MERGANSER	COMMON MERGANSER	Y	Y	N
57	MERGUS SERRATOR	RED-BREADED MERGANSER			Y
58	OXYURA JAMAICENSIS	RUDDY DUCK	Y		N
59	CATHARTES AURA	TURKEY VULTURE	Y		N
60	PANDION HALIAETUS	OSPREY	Y		N
61	HALIAETUS LEUCOCEPHALUS	BALD EAGLE	Y	Y	N
62	CIRCUS CYANEUS	NORTHERN HARRIER (MARSH HAWK)	Y	Y	N
63	ACCIPITER STRIATUS	SHARP-SHINNED HAWK	Y	Y	N
64	ACCIPITER COOPERII	COOPER'S HAWK	Y	Y	N
65	ACCIPITER GENTILIS	NORTHERN GOSHAWK	Y	Y	N
66	BUTEO PLATYPTERUS	BROAD-WINGED HAWK			Y
67	BUTEO SWAINSONI	SWAINSON'S HAWK			
68	BUTEO JAMAICENSIS	RED-TAILED HAWK	Y	Y	N
69	BUTEO REGALIS	FERRUGINOUS HAWK	Y		N
70	BUTEO LAGOPUS	ROUGH-LEGGED HAWK		Y	N
71	AQUILA CHRYSAETOS	GOLDEN EAGLE	Y	Y	N
72	FALCO SPARVERIUS	AMERICAN KESTREL	Y	Y	N
73	FALCO COLUMBARIUS	MERLIN	Y	Y	N
74	FALCO PEREGRINUS	PEREGRINE FALCON	Y	Y	N
75	FALCO RUSTICOLUS	GYRFALCON		Y	N
76	FALCO MEXICANUS	PRAIRIE FALCON	Y	Y	N
77	PERDIX PERDIX	GRAY PARTRIDGE	Y	Y	N
78	ALECTORIS CHUKAR	CHUKAR	Y	Y	N
79	PHASIANUS COLCHICUS	RING-NECKED PHEASANT	Y	Y	N
80	DENDRAGAPUS CANADENSIS	SPRUCE GROUSE	Y	Y	N
81	DENDRAGAPUS OBSCURUS	BLUE GROUSE	Y	Y	N
82	LAGOPUS LEUCURUS	WHITE-TAILED PTARMIGAN	Y	Y	N
83	BONASA UMBELLUS	RUFFED GROUSE	Y	Y	N
84	CENTROCERCUS UROPHASIANUS	SAGE GROUSE	Y	Y	N
85	TYMPANUCHUS PHASIANELLUS	SHARP-TAILED GROUSE (COL.)	Y	Y	N
86	MELEAGRIS GALLOPAVO	WILD TURKEY	Y	Y	N
87	COLINUS VIRGINIANUS	NORTHERN BOBWHITE	Y	Y	N
88	RALLUS LIMICOLA	VIRGINIA RAIL	Y		N
89	PORZANA CAROLINA	SORA	Y		N
90	FULICA AMERICANA	AMERICAN COOT	Y	Y	N
91	GRUS CANADENSIS	SANDHILL CRANE	Y		N
92	GRUS AMERICANA	WHOOING CRANE			Y
93	PLUVIALIS SQUATAROLA	BLACK-BELLIED PLOVER			Y
94	PLUVIALIS DOMINICA	LESSER GOLDEN PLOVER			Y
95	CHARADRIUS SEMIPALMATUS	SEMIPALMATED PLOVER			Y

APPENDIX WLD

OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
96	CHARADRIUS MELODUS	PIPING PLOVER	Y		Y
97	CHARADRIUS VOCIFERUS	KILLDEER	Y	Y	N
98	CHARADRIUS MONTANUS	MOUNTAIN PLOVER	Y		N
99	HIMANTOPUS MEXICANUS	BLACK-NECKED STILT	Y		N
100	RECURVIROSTRA AMERICANA	AMERICAN AVOCET	Y		N
101	TRINGA MELANOLEUCA	GREATER YELLOWLEGS			Y
102	TRINGA FLAVIPES	LESSER YELLOWLEGS			Y
103	TRINGA SOLITARIA	SOLITARY SANDPIPER			Y
104	CATOPTROPHORUS SEMIPALMATUS	WILLET	Y		N
105	ACTITIS MACULARIA	SPOTTED SANDPIPER	Y		N
106	BARTRAMIA LONGICAUDA	UPLAND SANDPIPER	Y		N
107	NUMENIUS PHAEOPUS	WHIMBREL			Y
108	NUMENIUS AMERICANUS	LONG-BILLED CURLEW	Y		N
109	LIMOSA FEDOA	MARBLED GODWIT	Y		N
110	ARENARIA INTERPRES	RUDDY TURNSTONE			Y
111	CALIDRIS ALBA	SANDERLING			Y
112	CALIDRIS PUSILLA	SEMIPALMATED SANDPIPER			Y
113	CALIDRIS MAURI	WESTERN SANDPIPER			Y
114	CALIDRIS MINUTILLA	LEAST SANDPIPER			Y
115	CALIDRIS BAIRDII	BAIRD'S SANDPIPER			Y
116	CALIDRIS MELANOTOS	PECTORAL SANDPIPER			Y
117	CALIDRIS ALPINA	DUNLIN			Y
118	CALIDRIS HIMANTOPUS	STILT SANDPIPER			Y
119	LIMNODROMUS SCOLOPACEUS	LONG-BILLED DOWITCHER			Y
120	GALLINAGO GALLINAGO	COMMON SNIPES	Y	Y	N
121	PHALAROPUS TRICOLOR	WILSON'S PHALAROPE	Y		N
122	PHALAROPUS LOBATUS	RED-NECKED PHALAROPE			Y
123	LARUS PIPIXCAN	FRANKLIN'S GULL	Y		N
124	LARUS PHILADELPHIA	BONAPARTE'S GULL			Y
125	LARUS DELAWARENSIS	RING-BILLED GULL	Y		N
126	LARUS CALIFORNICUS	CALIFORNIA GULL	Y		N
127	STERNA CASPIA	CASPIAN TERN			Y
128	STERNA HIRUNDO	COMMON TERN	Y		N
129	STERNA FORSTERI	FORSTER'S TERN	Y		Y
130	STERNA ANTILLARUM	LEAST TERN	Y		Y
131	CHLIDONIAS NIGER	BLACK TERN	Y		N
132	COLUMBA LIVIA	ROCK DOVE	Y	Y	N
133	ZENAIDA MACROURA	MOURNING DOVE	Y	Y	N
134	COCCYZUS ERYTHROPTALMUS	BLACK-BILLED CUCKOO	Y		N
135	COCCYZUS AMERICANUS	YELLOW-BILLED CUCKOO			Y
136	OTUS FLAMMEOLUS	FLAMMULATED OWL	Y		Y
137	OTUS ASIO	EASTERN SCREECH-OWL	Y	Y	N
138	OTUS KENNICOTTII	WESTERN SCREECH-OWL	Y	Y	N
139	BUBO VIRGINIANUS	GREAT HORNED OWL	Y	Y	N
140	NYCTEA SCANDIACA	SNOWY OWL		Y	N
141	GLAUCIDIDIUM GNOMA	NORTHERN PYGMY OWL	Y	Y	N
142	SPEOTYTO CUNICULARIA	BURROWING OWL	Y		N
143	STRIX VARIA	BARRED OWL	Y	Y	N
144	STRIX NEBULOSA	GREAT GRAY OWL	Y	Y	N
145	ASIO OTUS	LONG-EARED OWL	Y	Y	N
146	ASIO FLAMMEUS	SHORT-EARED OWL	Y	Y	N

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OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
147	AEGOLIUS FUNEREUS	BOREAL OWL	Y	Y	N
148	AEGOLIUS ACADICUS	SAW-WHET OWL	Y	Y	N
149	CHORDEILES MINOR	COMMON NIGHTHAWK	Y		N
150	PHALAELOPTILUS NUTTALLII	COMMON POORWILL	Y		N
151	CYPSELOIDES NIGER	BLACK SWIFT	Y		N
152	CHAETURA PELAGICA	CHIMNEY SWIFT	Y		N
153	CHAETURA VAUXI	VAUX'S SWIFT	Y		N
154	AERONAUTES SAXATALIS	WHITE-THROATED SWIFT	Y		N
155	ARCHILOCHUS ALEXANDRI	BLACK-CHINNED HUMMINGBIRD	Y		N
156	STELLULA CALLIOPE	CALLIOPE HUMMINGBIRD	Y		N
157	SELASPHORUS RUFUS	RUFIOUS HUMMINGBIRD	Y		N
158	CERYLE ALCYON	BELTED KINGFISHER	Y	Y	N
159	MELANERPES LEWIS	LEWIS' WOODPECKER	Y	Y	N
160	MELANERPES ERYTHROCEPHALUS	RED-HEADED WOODPECKER	Y		N
161	SPHYRAPICUS VARIUS	YELLOW-BELLIED (R-NAP) SAPSUCKER			
162	SPHYRAPICUS THYROIDEUS	WILLIAMSON'S SAPSUCKER	Y		N
163	PICOIDES PUBESCENS	DOWNY WOODPECKER	Y	Y	N
164	PICOIDES VILLOSUS	HAIRY WOODPECKER	Y	Y	N
165	PICOIDES TRIDACTYLUS	THREE-TOED WOODPECKER	Y	Y	N
166	PICOIDES ARCTICUS	BLACK-BACKED WOODPECKER	Y	Y	N
167	COLAPTES AURATUS	NORTHERN FLICKER	Y	Y	N
168	DRYOCOPUS PILEATUS	PILEATED WOODPECKER	Y	Y	N
169	CONTOPUS BOREALIS	OLIVE-SIDED FLYCATCHER	Y		N
170	CONTOPUS SORDIDULUS	WESTERN WOOD PEWEE	Y		N
171	EMPIDONAX TRAILLII	WILLOW FLYCATCHER	Y		N
172	EMPIDONAX MINIMUS	LEAST FLYCATCHER	Y		N
173	EMPIDONAX HAMMONDII	HAMMOND'S FLYCATCHER	Y		N
174	EMPIDONAX OBERHOLSERI	DUSKY FLYCATCHER	Y		N
175	EMPIDONAX OCCIDENTALIS	CORDILLERAN FLYCATCHER	Y		N
176	SAYORNIS SAYA	SAY'S PHOEBE	Y		N
177	TYRANNUS VOCIFERANS	CASSIN'S KINGBIRD	Y		N
178	TYRANNUS VERTICALIS	WESTERN KINGBIRD	Y		N
179	TYRANNUS TYRANNUS	EASTERN KINGBIRD	Y		N
180	EREMOPHILA ALPESTRIS	HORNED LARK	Y	Y	N
181	TACHYCINETA BICOLOR	TREE SWALLOW	Y		N
182	TACHYCINETA THALASSINA	VIOLET-GREEN SWALLOW	Y		N
183	STELGIDOPTERYX SERRIPENNIS	ROUGH-WINGED SWALLOW	Y		N
184	RIPARIA RIPARIA	BANK SWALLOW	Y		N
185	HIRUNDO PYRRHONOTA	CLIFF SWALLOW	Y		N
186	HIRUNDO RUSTICA	BARN SWALLOW	Y		N
187	PERISOREUS CANADENSIS	GRAY JAY	Y	Y	N
188	CYANOCITTA STELLERI	STELLER'S JAY	Y	Y	N
189	GYMNORHINUS CYANOCEPHALUS	PINYON JAY	Y	Y	N
190	NUCIFRAGA COLUMBIANA	CLARK'S NUTCRACKER	Y	Y	N
191	PICA PICA	BLACK-BILLED MAGPIE	Y	Y	N
192	CORVUS BRACHYRHYNCHOS	COMMON CROW	Y	Y	N
193	CORVUS CORAX	COMMON RAVEN	Y	Y	N
194	PARUS ATRICAPILLUS	BLACK-CAPPED CHICKADEE	Y	Y	N
195	PARUS GAMBELI	MOUNTAIN CHICKADEE	Y	Y	N
196	PARUS HUDSONICUS	BOREAL CHICKADEE	Y	Y	N
197	PARUS RUFESCENS	CHESTNUT-BACKED CHICKADEE	Y	Y	N

APPENDIX WLD

OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
198	SITTA CANADENSIS	RED-BREASTED NUTHATCH	Y	Y	N
199	SITTA CAROLINENSIS	WHITE-BREASTED NUTHATCH	Y	Y	N
200	SITTA PYGMAEA	PYGMY NUTHATCH	Y	Y	N
201	CERTHIA AMERICANA	BROWN CREEPER	Y	Y	N
202	SALPINCTES OBSOLETUS	ROCK WREN	Y		N
203	CATHERPES MEXICANUS	CANYON WREN	Y		N
204	TROGLODYTES AEDON	HOUSE WREN	Y		N
205	TROGLODYTES TROGLODYTES	WINTER WREN	Y	Y	N
206	CISTOTHORUS PALUSTRIS	MARSH WREN	Y	Y	N
207	CINCLUS MEXICANUS	DIPPER	Y	Y	N
208	REGULUS SATRAPA	GOLDEN-CROWNED KINGLET	Y	Y	N
209	REGULUS CALENDULA	RUBY-CROWNED KINGLET	Y		N
210	SIALIA SIALIS	EASTERN BLUEBIRD	Y		N
211	SIALIA MEXICANA	WESTERN BLUEBIRD	Y		N
212	SIALIA CURRUCOIDES	MOUNTAIN BLUEBIRD	Y		N
213	MYADESTES TOWNSENDI	TOWNSEND'S SOLITAIRE	Y	Y	N
214	CATHARUS FUSCESCENS	VEERY	Y		N
215	CATHARUS USTULATUS	SWAINSON'S THRUSH	Y		N
216	CATHARUS GUTTATUS	HERMIT THRUSH	Y		N
217	TURDUS MIGRATORIUS	AMERICAN ROBIN	Y	Y	N
218	IXOREUS NAEVIUS	VARIED THRUSH	Y		N
219	DUMETELLA CAROLINENSIS	GRAY CATBIRD	Y		N
220	OREOSCOPTES MONTANUS	SAGE THRASHER	Y		N
221	TOXOSTOMA RUFUM	BROWN THRASHER	Y		N
222	ANTHUS RUBESCENS	WATER PIPIT	Y		N
223	ANTHUS SPRAGUEII	SPRAGUE'S PIPIT	Y		N
224	BOMBYCILLA GARRULUS	BOHEMIAN WAXWING	Y	Y	N
225	BOMBYCILLA CEDRORUM	CEDAR WAXWING	Y	Y	N
226	LANIUS EXCUBITOR	NORTHERN SHRIKE		Y	N
227	LANIUS LUDOVICIANUS	LOGGERHEAD SHRIKE	Y		N
228	STURNUS VULGARIS	EUROPEAN STARLING	Y	Y	N
229	VIREO SOLITARIUS	SOLITARY VIREO	Y		N
230	VIREO GILVUS	WARBLING VIREO	Y		N
231	VIREO OLIVACEUS	RED-EYED VIREO	Y		N
232	VERMIVORA PEREGRINA	TENNESSEE WARBLER			Y
233	VERMIVORA CELATA	ORANGE-CROWNED WARBLER	Y		N
234	VERMIVORA RUFICAPILLA	NASHVILLE WARBLER	Y		N
235	DENDROICA PETECHIA	YELLOW WARBLER	Y		N
236	DENDROICA CORONATA	YELLOW-RUMPED WARBLER	Y		N
237	DENDROICA TOWNSENDI	TOWNSEND'S WARBLER	Y		N
238	DENDROICA STRIATA	BLACKPOLL WARBLER			Y
239	MNIOTILTA VARIA	BLACK-AND-WHITE WARBLER			Y
240	SETOPHAGA RUTICILLA	AMERICAN REDSTART	Y		N
241	SEIURUS AUROCAPILLUS	OVENBIRD	Y		N
242	SEIURUS NOVEBORACENSIS	NORTHERN WATERTHRUSH	Y		N
243	OPORORNIS TOLMIEI	MACGILLIVRAY'S WARBLER	Y		N
244	GEOTHLYPIS TRICHAS	COMMON YELLOWTHROAT	Y		N
245	WILSONIA PUSILLA	WILSON'S WARBLER	Y		N
246	ICTERIA VIRENS	YELLOW-BREASTED CHAT	Y		N
247	PIRANGA LUDOVICIANA	WESTERN TANAGER	Y		N

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OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
248	CARDINALIS CARDINALIS	NORTHERN CARDINAL			
249	PHEUCTICUS MELANOCEPHALUS	BLACK-HEADED GROSBEAK	Y		N
250	PASSERINA AMOENA	LAZULI BUNTING	Y		N
251	PASSERINA CYANEA	INDIGO BUNTING			Y
252	SPIZA AMERICANA	DICKCISSEL	Y		N
253	PIPILO CHLORURUS	GREEN-TAILED TOWHEE	Y		N
254	PIPILO ERYTHROPHthalmus	RUFous-SIDED TOWHEE	Y		N
255	SPIZELLA ARBOREA	TREE SPARROW		Y	N
256	SPIZELLA PASSERINA	CHIPPING SPARROW	Y		N
257	SPIZELLA PALLIDA	CLAY-COLORED SPARROW	Y		N
258	SPIZELLA BREWERI	BREWER'S SPARROW	Y		N
259	SPIZELLA PUSILLA	FIELD SPARROW	Y		N
260	POECETES GRAMINEUS	VESPER SPARROW	Y		N
261	CHONDESTES GRAMMACUS	LARK SPARROW	Y		N
262	CALAMOSPIZA MELANOCORYS	LARK BUNTING	Y		N
263	PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW	Y		N
264	AMMODRAMUS BAIRDII	BAIRD'S SPARROW	Y		N
265	AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW	Y		N
266	AMMODRAMUS LECONTEII	LE CONTE'S SPARROW	Y		N
267	PASSERELLA ILIACA	FOX SPARROW	Y		N
268	MELOSPIZA MELODIA	SONG SPARROW	Y	Y	N
269	MELOSPIZA LINCOLNII	LINCOLN'S SPARROW	Y		N
270	ZONOTRICHIA ALBICOLLIS	WHITE-THROATED SPARROW			Y
271	ZONOTRICHIA LEUCOPHRYS	WHITE-CROWNED SPARROW	Y		N
272	ZONOTRICHIA QUERULA	HARRIS' SPARROW		Y	Y
273	JUNCO HYEMALIS	DARK-EYED JUNCO	Y	Y	N
274	CALCARIUS MCCOWNII	MCCOWN'S LONGSPUR	Y		N
275	CALCARIUS LAPPONICUS	LAPLAND LONGSPUR		Y	N
276	CALCARIUS ORNATUS	CHESTNUT-COLLARED LONGSPUR	Y		N
277	PLECTROPHENAX NIVALIS	SNOW BUNTING		Y	N
278	DOLICHONYX ORYZIVORUS	BOBOLINK	Y		N
279	AGELAIUS PHOENICEUS	RED-WINGED BLACKBIRD	Y	Y	N
280	STURNELLA NEGLECTA	WESTERN MEADOWLARK	Y	Y	N
281	XANTHOCEPHALUS XANTHOCEPHALUS	YELLOW-HEADED BLACKBIRD	Y		N
282	EUPHAGUS CAROLINUS	RUSTY BLACKBIRD			Y
283	EUPHAGUS CYANOCEPHALUS	BREWER'S BLACKBIRD	Y	Y	N
284	QUISCALUS QUISCULA	COMMON GRACKLE	Y		N
285	MOLOTHRUS ATER	BROWN-HEADED COWBIRD	Y		N
286	ICTERUS SPURIUS	ORCHARD ORIOLE	Y		N
287	ICTERUS GALBULA	NORTHERN ORIOLE	Y		N
288	LEUCOSTICTE ATRATA	BLACK ROSY FINCH	Y	Y	N
289	LEUCOSTICTE TEPHROCOTIS	GRAY-CROWNED ROSY FINCH	Y	Y	Y
290	PINICOLA ENUCLEATOR	PINE GROSBEAK	Y	Y	N
291	CARPODACUS CASSINII	CASSIN'S FINCH	Y	Y	N
292	CARPODACUS MEXICANUS	HOUSE FINCH	Y	Y	N
293	LOXIA CURVIROSTRA	RED CROSSBILL	Y	Y	N
294	LOXIA LEUCOPTERA	WHITE-WINGED CROSSBILL			Y
295	CARDUELIS FLAMMEA	COMMON REDPOLL		Y	N
296	CARDUELIS HORNEMANNI	HOARY REDPOLL		Y	N
297	CARDUELIS PINUS	PINE SISKIN	Y	Y	N
298	CARDUELIS TRISTIS	AMERICAN GOLDFINCH	Y	Y	N

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OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
299	COCCOTHAUSTES VESPERTINUS	EVENING GROSBEEK	Y	Y	N
300	PASSER DOMESTICUS	HOUSE SPARROW	Y	Y	N
MAMMALS					
301	SOREX CINEREUS	MASKED SHREW	Y	Y	N
302	SOREX PREBLEI	PREBLE'S SHREW	Y	Y	N
303	SOREX VAGRANS	VAGRANT SHREW	Y	Y	N
304	SOREX NANUS	DWARF SHREW	Y	Y	N
305	SOREX PALUSTRIS	WATER SHREW	Y	Y	N
306	SOREX MERRIAM	MERRIAM'S SHREW	Y	Y	N
307	SOREX HOYI	PYGMY SHREW	Y	Y	N
308	MYOTIS LUCIFUGUS	LITTLE BROWN MYOTIS	Y		N
309	MYOTIS YUMANENSIS	YUMA MYOTIS	Y		N
310	MYOTIS EVOTIS	LONG-EARED MYOTIS	Y	Y	N
311	MYOTIS VOLANS	LONG-LEGGED MYOTIS	Y		N
312	MYOTIS CALIFORNICUS	CALIFORNIA MYOTIS	Y		N
313	MYOTIS CILIOLABRUM	WESTERN SMALL-FOOTED MYOTIS	Y		N
314	MYOTIS SEPTENTRIONALIS	NORTHERN MYOTIS (KEEN'S)	Y	Y	N
315	LASIONYCTERIS NOCTIVAGANS	SILVER-HAIRED BAT	Y		N
316	EPTESICUS FUSCUS	BIG BROWN BAT	Y		N
317	LASIURUS CINEREUS	HOARY BAT	Y		N
318	EUDERMA MACULATUM	SPOTTED BAT	Y		N
319	PLECOTUS TOWNSENDII	TOWNSEND'S BIG-EARED BAT	Y	Y	N
320	ANTROZOUS PALLIDUS	PALLID BAT	Y		N
321	OCHOTONA PRINCEPS	PIKA	Y	Y	N
322	SYLVILAGUS FLORIDANUS	EASTERN COTTONTAIL	Y	Y	N
323	SYLVILAGUS NUTTALLII	MOUNTAIN COTTONTAIL	Y	Y	N
324	SYLVILAGUS AUDUBONII	DESERT COTTONTAIL	Y	Y	N
325	LEPUS AMERICANUS	SNOWSHOE HARE	Y	Y	N
326	LEPUS TOWNSENDII	WHITE-TAILED JACK RABBIT	Y	Y	N
327	LEPUS CALIFORNICUS	BLACK-TAILED JACKRABBIT	Y	Y	N
328	BRACHYLAGUS IDAHOENSIS	PYGMY RABBIT	Y	Y	N
329	TAMIAS MINIMUS	LEAST CHIPMUNK	Y	Y	N
330	TAMIAS AMOENUS	YELLOW-PINE CHIPMUNK	Y	Y	N
331	TAMIAS RUFICAUDUS	RED-TAILED CHIPMUNK	Y	Y	N
332	TAMIAS UMBRINUS	UINTA CHIPMUNK	Y	Y	N
333	MARMOTA FLAVIVENTRIS	YELLOW-BELLIED MARMOT	Y	Y	N
334	MARMOTA CALIGATA	HOARY MARMOT	Y	Y	N
335	SPERMOPHILUS RICHARDSONII	RICHARDSON'S GROUND SQUIRREL	Y	Y	N
336	SPERMOPHILUS ARMATUS	UINTA GROUND SQUIRREL	Y	Y	N
337	SPERMOPHILUS COLUMBIANUS	COLUMBIAN GROUND SQUIRREL	Y	Y	N
338	SPERMOPHILUS TRIDECIMLINEATUS	THIRTEEN-LINED GROUND SQUIRREL	Y	Y	N
339	SPERMOPHILUS LATERALIS	GOLDEN-MANTLED GROUND SQUIRREL	Y	Y	N
340	CYNOMYS LUDOVICIANUS	BLACK-TAILED PRAIRIE DOG	Y	Y	N
341	CYNOMYS LEUCURUS	WHITE-TAILED PRAIRIE DOG	Y	Y	N
342	SCIURUS CAROLINENSIS	EASTERN GRAY SQUIRREL	Y	Y	N
343	SCIURUS NIGER	EASTERN FOX SQUIRREL	Y	Y	N
344	TAMIASCIURUS HUDSONICUS	RED SQUIRREL	Y	Y	N
345	GLAUCOMYS SABRINUS	NORTHERN FLYING SQUIRREL	Y	Y	N
346	THOMOMYS TALPOIDES	NORTHERN POCKET GOPHER	Y	Y	N
347	THOMOMYS IDAHOENSIS	IDAHO POCKET GOPHER	Y	Y	N

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
348	PEROGNATHUS FASCIATUS	OLIVE-BACKED POCKET MOUSE	Y	Y	N
349	PEROGNATHUS PARVUS	GREAT BASIN POCKET MOUSE	Y	Y	N
350	CHAETODIPUS HISPIDUS	HISPID POCKET MOUSE	Y	Y	N
351	DIPODOMYS ORDII	ORD'S KANGAROO RAT	Y	Y	N
352	CASTOR CANADENSIS	BEAVER	Y	Y	N
353	REITHRODONTOMYS MEGALOTIS	WESTERN HARVEST MOUSE	Y	Y	N
354	PEROMYSCUS MANICULATUS	DEER MOUSE	Y	Y	N
355	PEROMYSCUS LEUCOPUS	WHITE-FOOTED MOUSE	Y	Y	N
356	ONYCHOMYS LEUCOGASTER	NORTHERN GRASSHOPPER MOUSE	Y	Y	N
357	NEOTOMA CINEREA	BUSHY-TAILED WOODRAT	Y	Y	N
358	CLETHRIONOMYS GAPPERI	SOUTHERN RED-BACKED VOLE	Y	Y	N
359	PHENACOMYS INTERMEDIUS	HEATHER VOLE	Y	Y	N
360	MICROTUS PENNSYLVANICUS	MEADOW VOLE	Y	Y	N
361	MICROTUS MONTANUS	MONTANE VOLE	Y	Y	N
362	MICROTUS LONGICAUDUS	LONG-TAILED VOLE	Y	Y	N
363	MICROTUS OCHROGASTER	PRAIRIE VOLE	Y	Y	N
364	MICROTUS RICHARDSONI	WATER VOLE (RICHARDSON'S)	Y	Y	N
365	LAGURUS CURTATUS	SAGEBRUSH VOLE	Y	Y	N
366	ONDATRA ZIBETHICUS	MUSKRAT	Y	Y	N
367	SYNAPTOMYS BOREALIS	NORTHERN BOG LEMMING	Y	Y	N
368	RATTUS NORVEGICUS	NORWAY RAT	Y	Y	N
369	MUS MUSCULUS	HOUSE MOUSE	Y	Y	N
370	ZAPUS HUDSONIUS	MEADOW JUMPING MOUSE	Y	Y	N
371	ZAPUS PRINCEPS	WESTERN JUMPING MOUSE	Y	Y	N
372	ERETHIZON DORSATUM	PORCUPINE	Y	Y	N
373	CANIS LATRANS	COYOTE	Y	Y	N
374	CANIS LUPUS	GRAY WOLF	Y	Y	N
375	VULPES VULPES	RED FOX	Y	Y	N
376	VULPES VELOX	KIT OR SWIFT FOX	Y	Y	N
377	URSUS AMERICANUS	BLACK BEAR	Y	Y	N
378	URSUS ARCTOS HORRIBILIS	GRIZZLY BEAR			
379	PROCYON LOTOR	RACCOON	Y	Y	N
380	MARTES AMERICANA	MARTEN	Y	Y	N
381	MARTES PENNANTI	FISHER	Y	Y	N
382	MUSTELA ERMINEA	ERMINE	Y	Y	N
383	MUSTELA NIVALIS	LEAST WEASEL	Y	Y	N
384	MUSTELA FRENATA	LONG-TAILED WEASEL	Y	Y	N
385	MUSTELA NIGRIPES	BLACK-FOOTED FERRET			
386	MUSTELA VISON	MINK	Y	Y	N
387	GULO GULO	WOLVERINE	Y	Y	N
388	TAXIDEA TAXUS	BADGER	Y	Y	N
389	SPILOGALE GRACILIS	WESTERN SPOTTED SKUNK	Y	Y	N
390	MEPHITIS MEPHITIS	STRIPED SKUNK	Y	Y	N
391	LUTRA CANADENSIS	RIVER OTTER	Y	Y	N
392	FELIS CONCOLOR	MOUNTAIN LION	Y	Y	N
393	FELIS LYNX	LYNX	Y	Y	N
394	FELIS RUFUS	BOBCAT	Y	Y	N
395	CERVUS ELAPHUS	WAPITI OR ELK	Y	Y	N
396	ODOCOILEUS HEMIONUS	MULE DEER	Y	Y	N
397	ODOCOILEUS VIRGINIANUS	WHITE-TAILED DEER	Y	Y	N
398	ALCES ALCES	MOOSE	Y	Y	N

APPENDIX WLD

OBS	Scientific Name	Common Name	Resident/Migrant ^a		
			SUM	WIN	MIG
399	RANGIFER TARANDUS	CARIBOU			
400	ANTILOCAPRA AMERICANA	PRONGHORN	Y	Y	N
401	BOS BISON	BISON	Y	Y	N
402	OREAMNOS AMERICANUS	MOUNTAIN GOAT	Y	Y	N
403	OVIS CANADENSIS	BIGHORN SHEEP	Y	Y	N
REPTILES					
404	CHELYDRA SERPENTINA	SNAPPING TURTLE	Y	Y	N
405	CHRYSEMYS PICTA	PAINTED TURTLE	Y	Y	N
406	APALONE SPINIFERA	SPINY SOFTSHELL TURTLE	Y	Y	N
407	ELGARIA COERULEA	NORTHERN ALLIGATOR LIZARD	Y	Y	N
408	PHRYNOSOMA DOUGLASI	SHORT-HORNED LIZARD	Y	Y	N
409	SCELOPORUS GRACIOSUS	SAGEBRUSH LIZARD	Y	Y	N
410	EUMECES SKILTONIANUS	WESTERN SKINK	Y	Y	N
411	CHARINA BOTTAE	RUBBER BOA	Y	Y	N
412	COLUBER CONSTRICTOR	RACER	Y	Y	N
413	HETERODON NASICUS	WESTERN HOGNOSE SNAKE	Y	Y	N
414	LAMPROPELTIS TRIANGULUM	MILK SNAKE	Y	Y	N
415	PITUOPHIS MELANOLEUCUS	PINE OR GOPHER SNAKE	Y	Y	N
416	THAMNOPHIS ELEGANS	W. TERRESTRIAL GARTER SNAKE	Y	Y	N
417	THAMNOPHIS RADIX	PLAINS GARTER SNAKE	Y	Y	N
418	THAMNOPHIS SIRTALIS	COMMON GARTER SNAKE	Y	Y	N
419	CROTALUS VIRIDIS	WESTERN RATTLESNAKE	Y	Y	N

^aResidency or migratory status: SUM=summer resident breeding within the state, WIN= winter resident, MIG= migrates through the state.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Figure WLD-3
LIST OF SPECIES OF SPECIAL CONCERN AND OCCURENCE IN EACH LAND OFFICE AREA

(A value of 1 indicates presence, 0 absence, in the Land Office area)

OBS	Common Name	-----Special Status ^a -----				-----DSL Land Office-----					
		Global rank	State rank	USFWS ESA	Forest Service	NWLO	SWLO	CLO	NELO	SLO	ELO
1	COEUR D'ALENE SALAMANDER	G3	S2		SENSITIVE	1	1	0	0	0	0
2	IDAHO GIANT SALAMANDER	G4	S1			1	1	0	0	0	0
3	TAILED FROG	G3	S3			1	1	1	0	0	0
4	CANADIAN TOAD	G5	S1			0	0	1	1	0	0
5	COMMON LOON	G5	S3		SENSITIVE	1	1	1	1	1	1
6	CLARK'S GREBE	G5	S2			0	0	0	0	0	0
7	AMERICAN WHITE PELICAN	G3	S2			1	1	1	1	1	1
8	BLACK-CROWNED NIGHT-HERON	G5	S3			1	1	1	1	1	1
9	WHITE-FACED IBIS	G5	S2	C2		1	1	1	1	1	1
10	TRUMPETER SWAN	G4	S1	C2	SENSITIVE	1	1	1	1	1	1
11	HARLEQUIN DUCK	G5	S2	C2	SENSITIVE	1	1	1	1	1	0
12	BALD EAGLE	G3	S3	LE	ENDANGERED	1	1	1	1	1	1
13	NORTHERN GOSHAWK	G4	S4	C2		1	1	1	1	1	1
14	FERRUGINOUS HAWK	G4	S3	C2	SENSITIVE	1	1	1	1	1	1
15	PEREGRINE FALCON	G3	S1	LE	ENDANGERED	1	1	1	1	1	1
16	COLUMBIAN SHARP-TAILED GROUSE	G4	S1	C2	SENSITIVE	1	1	0	0	0	0
17	WHOOPIING CRANE	G1	S2	LE	ENDANGERED	0	0	1	1	1	1
18	PIPING PLOVER	G3	S2	LT	THREATENED	1	1	1	1	0	1
19	MOUNTAIN PLOVER	G3	S2	C2	SENSITIVE	1	1	1	1	1	1
20	BLACK-NECKED STILT	G5	S3			1	1	1	1	1	1
21	FRANKLIN'S GULL	G5	S3			1	1	1	1	1	1
22	CASPIAN TERN	G5	S3			1	1	1	1	1	1
23	COMMON TERN	G5	S3			1	1	1	1	1	1
24	FORSTER'S TERN	G5	S3			1	1	1	1	1	1
25	LEAST TERN	G4	S1	LE	THREATENED	0	0	1	1	0	1
26	BLACK TERN	G4	S3	C2		1	1	1	1	1	1
27	YELLOW-BILLED CUCKOO	G5	S3			1	1	1	1	1	1
28	FLAMMULATED OWL	G4	S1		SENSITIVE	1	1	1	0	0	0
29	BURROWING OWL	G4	S3			1	1	1	1	1	1
30	GREAT GRAY OWL	G5	S3			1	1	1	1	1	0
31	BOREAL OWL	G5	S3		SENSITIVE	1	1	1	0	1	0
32	BLACK SWIFT	G4	S3			1	1	1	0	0	0
33	BLACK-BACKED WOODPECKER	G5	S3		SENSITIVE	1	1	1	0	1	1
34	CASSIN'S KINGBIRD	G5	S1			0	0	0	1	1	1
35	LOGGERHEAD SHRIKE	G4	S4	C2		1	1	1	1	1	1
36	DICKCISSEL	G4	S1			0	1	0	1	1	1
37	BAIRD'S SPARROW	G3	S3	C2		1	1	1	1	1	1
38	LE CONTE'S SPARROW	G4	S1			1	1	0	1	1	1
39	PREBLE'S SHREW	G4	S3	C2		0	1	1	1	1	1
40	DWARF SHREW	G4	S3			0	0	1	1	1	1
41	MERRIAM'S SHREW	G5	S3			0	0	0	1	1	1
42	FRINGED MYOTIS	G5	S3			0	1	1	0	0	0
43	NORTHERN MYOTIS	G4	S2			0	0	0	0	0	1
44	SPOTTED BAT	G4	S1	C2	SENSITIVE	0	0	0	0	1	1
45	TOWNSEND'S BIG-EARED BAT	G4	S2		SENSITIVE	1	1	1	1	1	1
46	PALLID BAT	G5	S1		SENSITIVE	0	0	0	0	1	0
47	BLACK-TAILED JACK RABBIT	G5	S2			0	0	1	0	0	0
48	PYGMY RABBIT	G5	S3	C2		0	0	1	0	0	0
49	UINTA CHIPMUNK	G5	S3			0	0	1	0	1	0
50	WHITE-TAILED PRAIRIE DOG	G4	S2		SENSITIVE	0	0	0	0	1	0
51	GREAT BASIN POCKET MOUSE	G5	S2			0	0	1	0	0	0
52	HISPID POCKET MOUSE	G5	S1			0	0	0	0	0	1
53	NORTHERN BOG LEMMING	G5	S2		SENSITIVE	1	1	1	0	0	0
54	MEADOW JUMPING MOUSE	G5	S3			0	0	0	0	0	1
55	GRAY WOLF	G4	S1	LE	ENDANGERED	1	1	1	1	0	0
56	KIT OR SWIFT FOX	G4	SH	C2		0	0	0	1	0	1
57	GRIZZLY BEAR	G4	S1	LT	THREATENED	1	1	1	0	1	0
58	FISHER	G5	S2		SENSITIVE	1	1	1	0	0	0
59	BLACK-FOOTED FERRET	G1	SH	LE	ENDANGERED	0	0	0	0	0	0
60	WOLVERINE	G4	S3	C2	SENSITIVE	1	1	1	1	1	0

APPENDIX WLD

OBS	Common Name	-----Special Status ^a -----				-----DSL Land Office-----					
		Global rank	State rank	USFWS ESA	Forest Service	NWLO	SWLO	CLO	NELO	SLO	ELO
61	LYNX	G5	S3	C2	SENSITIVE	1	1	1	1	1	0
62	WOODLAND CARIBOU	G5	SX	C2	ENDANGERED	0	0	0	0	0	0
63	SNAPPING TURTLE	G5	S3			1	0	0	1	1	1
64	SPINY SOFTSHELL	G5	S3			0	0	0	1	1	1
65	WESTERN HOGNOSE SNAKE	G5	S3			0	0	1	1	1	1
66	SMOOTH GREEN SNAKE	G5	S3			0	0	0	1	0	0

^aSpecial status codes:

Global Rank and State Rank of abundance as determined by the Montana Natural Heritage Program (MHP) on a scale of 1 (critically imperiled) to 5 (demonstrably secure). SH=state historic, SX=believed to be extinct, historic records only, SZ=ranking not applicable.

U.S. Fish & Wildlife Service Endangered Species Act (USFWS ESA) classification, LE=endangered, LT=threatened, C1=substantial biological information to support listing as endangered or threatened, C2=current information indicated that listing may be appropriate but substantial biological information is not on file to support an immediate ruling.

U.S. Forest Service threatened, endangered or sensitive species list.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Figure WLD-4
MONTANA GAME AND FURBEARER SPECIES FOUND IN EACH LAND OFFICE AREA
 (A value of 1 indicates presence, 0 absence, in the Land Office area)

OBS	Common Name	State	-----DSL Land Office-----					
		class ^a	NWLO	SWLO	CLO	NELO	SLO	ELO
1	MARTEN	FB	1	1	1	1	1	0
2	ERMINE	FB	1	1	1	1	1	1
3	MINK	FB	1	1	1	1	1	1
4	RIVER OTTER	FB	1	1	1	1	1	1
5	BOBCAT	FB	1	1	1	1	1	1
6	MUSKRAT	FB	1	1	1	1	1	1
7	BEAVER	FB	1	1	1	1	1	1
8	KIT OR SWIFT FOX	FBCS	0	0	0	0	0	1
9	FISHER	FBRH	1	1	1	0	0	0
10	WOLVERINE	FBRH	1	1	1	1	1	0
11	LYNX	FBRH	1	1	1	1	1	0
12	BLACK BEAR	GA	1	1	1	1	1	0
13	MOUNTAIN LION	GA	1	1	1	1	1	1
14	WAPITI OR ELK	GA	1	1	1	1	1	0
15	MULE DEER	GA	1	1	1	1	1	1
16	WHITE-TAILED DEER	GA	1	1	1	1	1	1
17	MOOSE	GA	1	1	1	1	1	0
18	PRONGHORN	GA	1	1	1	1	1	1
19	MOUNTAIN GOAT	GA	1	1	1	1	1	0
20	BIGHORN SHEEP	GA	1	1	1	1	1	1
21	WOODLAND CARIBOU	GACS	0	0	0	0	0	0
22	GRIZZLY BEAR	GARH	0	0	1	0	1	0
23	BISON	GARH	1	0	1	0	0	0
24	TRUMPETER SWAN	MB	1	1	1	1	1	1
25	TUNDRA SWAN	MB	1	1	1	1	1	1
26	CANADA GOOSE	MB	1	1	1	1	1	1
27	GREATER WHITE-FRONTED GOOSE	MB	1	1	1	1	1	1
28	SNOW GOOSE	MB	1	1	1	1	1	1
29	ROSS' GOOSE	MB	1	1	1	1	1	1
30	NORTHERN PINTAIL	MB	1	1	1	1	1	1
31	GREEN-WINGED TEAL	MB	1	1	1	1	1	1
32	CINNAMON TEAL	MB	1	1	1	1	1	1
33	BLUE-WINGED TEAL	MB	1	1	1	1	1	1
34	MALLARD	MB	1	1	1	1	1	1
35	GADWALL	MB	1	1	1	1	1	1
36	AMERICAN WIGEON	MB	1	1	1	1	1	1
37	EURASIAN WIGEON	MB	0	0	0	0	0	0
38	NORTHERN SHOVELER	MB	1	1	1	1	1	1
39	WOOD DUCK	MB	1	1	1	1	1	1
40	LESSER SCAUP	MB	1	1	1	1	1	1
41	REDHEAD	MB	1	1	1	1	1	1
42	RING-NECKED DUCK	MB	1	1	1	1	1	1
43	CANVASBACK	MB	1	1	1	1	1	1
44	BUFFLEHEAD	MB	1	1	1	1	1	1
45	COMMON GOLDENEYE	MB	1	1	1	1	1	1
46	BARROW'S GOLDENEYE	MB	1	1	1	1	1	1
47	HARLEQUIN DUCK	MB	1	1	1	1	1	0

APPENDIX WLD

OBS	Common Name	State	-----DSL Land Office-----					
		class ^a	NWLO	SWLO	CLO	NELO	SLO	ELO
48	RUDDY DUCK	MB	1	1	1	1	1	1
49	HOODED MERGANSER	MB	1	1	1	1	1	1
50	COMMON MERGANSER	MB	1	1	1	1	1	1
51	RED-BREASTED MERGANSER	MB	1	1	1	1	1	1
52	SANDHILL CRANE	MB	1	1	1	1	1	1
53	AMERICAN COOT	MB	1	1	1	1	1	1
54	COMMON SNIFE	MB	1	1	1	1	1	1
55	MOURNING DOVE	MB	1	1	1	1	1	1
56	VIRGINIA RAIL	MBCS	1	1	1	1	1	1
57	SORA	MBCS	1	1	1	1	1	1
58	WILD TURKEY	UB	1	1	1	1	1	1
59	BLUE GROUSE	UB	1	1	1	1	1	0
60	SPRUCE GROUSE	UB	1	1	1	0	0	0
61	RUFFED GROUSE	UB	1	1	1	1	1	1
62	SHARP-TAILED GROUSE	UB	1	1	1	1	1	1
63	SAGE GROUSE	UB	0	1	1	1	1	1
64	CHUKAR	UB	1	1	1	1	1	1
65	RING-NECKED PHEASANT	UB	1	1	1	1	1	1
66	GRAY PARTRIDGE	UB	1	1	1	1	1	1
67	WHITE-TAILED PTARMIGAN	UBCS	1	1	1	0	0	0

^aState classification: FB=furbearer, GA=game animal, MB=migratory game bird, UB=upland game bird, CS=closed season, RH=restricted harvest.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Figure WLD-5
WILDLIFE SPECIES ASSOCIATED WITH GENERAL HABITATS IN MONTANA

(A value of 1 in the general habitat category indicates that the species is associated with that habitat. A value of 1 indicates presence, 0 absence, in the Land Office area.)

OBS Common Name	-----General habitat category ^a -----										-----DSL Land Office-----					
	RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO	1
1 LONG-TOED SALAMANDER	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0
2 TIGER SALAMANDER	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0
3 COEUR D'ALENE SALAMANDER	1	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0
4 ROUGHSKIN NEWT	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	0
5 IDAHO GIANT SALAMANDER	1	1	0	0	1	0	0	0	0	1	1	0	0	0	0	0
6 TAILED FROG	1	0	1	0	1	0	0	0	0	1	1	1	0	0	0	0
7 WESTERN TOAD	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
8 GREAT PLAINS TOAD	0	1	1	0	0	1	0	0	1	0	0	1	1	1	1	1
9 CANADIAN TOAD	1	1	1	1	0	0	0	0	1	0	0	1	1	0	0	0
10 WOODHOUSE'S TOAD	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1
11 WESTERN CHORUS FROG	0	1	1	1	1	0	0	0	1	0	0	1	1	1	1	1
12 PACIFIC CHORUS FROG	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0
13 PLAINS SPADEFOOT	0	1	1	0	0	1	1	0	1	0	0	1	1	1	1	1
14 BULLFROG	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0
15 LEOPARD FROG	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1
16 SPOTTED FROG	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0
17 WOOD FROG	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
18 COMMON LOON	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
19 PIED-BILLED GREBE	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
20 HORNED GREBE	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
21 RED-NECKED GREBE	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0
22 EARED GREBE	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
23 WESTERN GREBE (CLARK'S)	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
24 WHITE PELICAN	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1
25 DOUBLE-CRESTED CORMORANT	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
26 AMERICAN BITTERN	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1
27 GREAT BLUE HERON	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1
28 BLACK-CROWNED NIGHT HERON	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1
29 WHITE-FACED IBIS	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
30 TUNDRA SWAN	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	1
31 TRUMPETER SWAN	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
32 MUTE SWAN	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	0
33 GREATER WHITE-FRONTED GOOSE	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1
34 SNOW GOOSE	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1
35 ROSS' GOOSE	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1
36 CANADA GOOSE	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1
37 WOOD DUCK	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1
38 GREEN-WINGED TEAL	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
39 MALLARD	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
40 NORTHERN PINTAIL	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1
41 BLUE-WINGED TEAL	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1
42 CINNAMON TEAL	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
43 NORTHERN SHOVELER	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
44 GADWALL	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1
45 EURASIAN WIGEON	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0
46 AMERICAN WIGEON	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1
47 CANVASBACK	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
48 REDHEAD	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
49 RING-NECKED DUCK	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
50 LESSER SCAUP	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1
51 HARLEQUIN DUCK	1	0	1	0	0	0	0	0	0	1	1	1	1	1	1	0
52 COMMON GOLDENEYE	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1
53 BARROW'S GOLDENEYE	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	1
54 BUFFLEHEAD	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1
55 HOODED MERGANSER	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	1
56 COMMON MERGANSER	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	1
57 RED-BREASTED MERGANSER	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	1
58 RUDDY DUCK	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1

APPENDIX WLD

OBS Common Name	-----General habitat category ^a -----										-----DSL Land Office-----					
	RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO	
59 TURKEY VULTURE	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	
60 OSPREY	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	
61 BALD EAGLE	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	
62 NORTHERN HARRIER (MARSH HAWK)	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	
63 SHARP-SHINNED HAWK	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	
64 COOPER'S HAWK	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1	
65 NORTHERN GOSHAWK	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	
66 BROAD-WINGED HAWK	0	0	0	1	1	0	0	0	0	1	0	1	1	1	1	
67 SWAINSON'S HAWK	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	
68 RED-TAILED HAWK	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	
69 FERRUGINOUS HAWK	0	0	1	0	0	1	1	0	1	1	1	1	1	1	1	
70 ROUGH-LEGGED HAWK	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	
71 GOLDEN EAGLE	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	
72 AMERICAN KESTREL	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1	
73 MERLIN	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1	
74 PEREGRINE FALCON	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	
75 GYRFALCON	0	0	1	1	0	0	0	1	0	1	1	1	1	1	1	
76 PRAIRIE FALCON	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
77 GRAY PARTRIDGE	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	
78 CHUKAR	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	
79 RING-NECKED PHEASANT	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1	
80 SPRUCE GROUSE	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0	
81 BLUE GROUSE	0	0	0	1	1	1	0	0	1	1	1	1	1	1	0	
82 WHITE-TAILED PTARMIGAN	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	
83 RUFFED GROUSE	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	
84 SAGE GROUSE	0	0	0	1	0	1	0	0	1	0	1	1	1	1	1	
85 SHARP-TAILED GROUSE (COL.)	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1	
86 WILD TURKEY	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	
87 NORTHERN BOBWHITE	0	0	1	1	0	1	1	0	1	1	1	0	1	0	0	
88 VIRGINIA RAIL	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	
89 SORA	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	
90 AMERICAN COOT	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	
91 SANDHILL CRANE	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	
92 WHOOPING CRANE	0	1	1	0	0	0	0	0	1	0	0	1	1	1	1	
93 BLACK-BELLIED PLOVER	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	
94 LESSER GOLDEN PLOVER	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	
95 SEMIPALMATED PLOVER	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	
96 PIPING PLOVER	0	0	1	0	0	0	0	0	0	1	1	1	1	0	1	
97 KILLDEER	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	
98 MOUNTAIN PLOVER	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
99 BLACK-NECKED STILT	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1	
100 AMERICAN AVOCET	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	
101 GREATER YELLOWLEGS	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	
102 LESSER YELLOWLEGS	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	
103 SOLITARY SANDPIPER	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	
104 WILLET	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1	
105 SPOTTED SANDPIPER	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	
106 UPLAND SANDPIPER	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	
107 WHIMBREL	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	
108 LONG-BILLED CURLEW	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	
109 MARBLED GODWIT	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	
110 RUDDY TURNSTONE	0	0	1	0	0	0	0	1	0	1	1	1	1	1	1	
111 SANDERLING	0	0	1	0	0	0	0	1	0	1	1	1	1	1	1	
112 SEMIPALMATED SANDPIPER	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	
113 WESTERN SANDPIPER	0	0	1	0	0	0	0	1	0	1	1	1	1	1	1	
114 LEAST SANDPIPER	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	
115 BAIRD'S SANDPIPER	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	
116 PECTORAL SANDPIPER	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	
117 DUNLIN	0	0	1	0	0	0	0	1	0	1	1	1	1	1	1	
118 STILT SANDPIPER	0	1	1	0	0	0	0	1	0	1	1	1	1	1	1	
119 LONG-BILLED DOWITCHER	0	1	1	0	0	0	0	1	0	1	1	1	1	1	1	
120 COMMON SNIFE	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1	
121 WILSON'S PHALAROPE	0	1	1	0	0	0	0	0	1	1	1	1	1	1	1	
122 RED-NECKED PHALAROPE	0	1	1	0	0	0	0	1	0	1	1	1	1	1	1	

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

OBS	Common Name	-----General habitat category ² -----									-----DSL Land Office-----					
		RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO
123	FRANKLIN'S GULL	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
124	BONAPARTE'S GULL	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1
125	RING-BILLED GULL	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
126	CALIFORNIA GULL	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
127	CASPIAN TERN	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
128	COMMON TERN	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
129	FORSTER'S TERN	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
130	LEAST TERN	1	1	1	0	0	0	0	0	0	0	0	1	1	0	1
131	BLACK TERN	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1
132	ROCK DOVE	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
133	MOURNING DOVE	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
134	BLACK-BILLED CUCKOO	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
135	YELLOW-BILLED CUCKOO	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
136	FLAMMULATED OWL	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0
137	EASTERN SCREECH-OWL	0	0	1	1	1	0	0	0	1	0	0	1	1	1	1
138	WESTERN SCREECH-OWL	0	0	1	1	1	1	0	0	0	1	1	1	0	0	0
139	GREAT HORNED OWL	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
140	SNOWY OWL	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1
141	NORTHERN PYGMY OWL	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1
142	BURROWING OWL	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1
143	BARRED OWL	0	0	1	0	1	0	0	0	0	1	1	1	1	0	0
144	GREAT GRAY OWL	0	0	1	1	1	0	0	0	1	1	1	1	1	1	0
145	LONG-EARED OWL	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
146	SHORT-EARED OWL	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1
147	BOREAL OWL	0	0	1	0	1	0	0	0	0	1	1	1	0	1	0
148	SAW-WHET OWL	0	0	1	0	1	0	0	0	0	1	1	1	1	1	1
149	COMMON NIGHTHAWK	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1
150	COMMON POORWILL	0	0	0	1	0	1	1	0	1	1	1	1	1	1	1
151	BLACK SWIFT	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0
152	CHIMNEY SWIFT	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
153	VAUX'S SWIFT	0	0	1	0	1	0	0	0	0	1	1	1	0	0	0
154	WHITE-THROATED SWIFT	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
155	BLACK-CHINNED HUMMINGBIRD	0	0	1	1	0	1	0	0	0	1	1	1	1	1	0
156	CALLIOPE HUMMINGBIRD	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
157	RUFIOUS HUMMINGBIRD	0	0	1	1	1	1	0	1	1	1	1	1	1	1	0
158	BELTED KINGFISHER	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
159	LEWIS' WOODPECKER	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
160	RED-HEADED WOODPECKER	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1
161	YELLOW-BELLIED (R-NAP) SAPSUCKER	0	0	1	1	1	0	0	0	0	0	0	1	1	0	0
162	WILLIAMSON'S SAPSUCKER	0	0	1	1	1	0	0	0	0	1	1	1	0	1	0
163	DOWNY WOODPECKER	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1
164	HAIRY WOODPECKER	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
165	THREE-TOED WOODPECKER	0	0	1	0	1	0	0	0	0	1	1	1	1	1	0
166	BLACK-BACKED WOODPECKER	0	0	1	0	1	0	0	0	0	1	1	1	0	1	1
167	NORTHERN FLICKER	0	0	1	1	1	0	1	0	1	1	1	1	1	1	1
168	PILEATED WOODPECKER	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0
169	OLIVE-SIDED FLYCATCHER	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
170	WESTERN WOOD PEWEE	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
171	WILLOW FLYCATCHER	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
172	LEAST FLYCATCHER	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1
173	HAMMOND'S FLYCATCHER	0	0	0	1	1	1	0	0	0	1	1	1	1	1	0
174	DUSKY FLYCATCHER	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
175	CORDILLERAN FLYCATCHER	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0
176	SAY'S PHOEBE	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1
177	CASSIN'S KINGBIRD	0	0	1	1	0	1	1	0	1	0	0	0	1	1	1
178	WESTERN KINGBIRD	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1
179	EASTERN KINGBIRD	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1
180	HORNED LARK	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
181	TREE SWALLOW	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1
182	VIOLET-GREEN SWALLOW	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1
183	ROUGH-WINGED SWALLOW	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1
184	BANK SWALLOW	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1
185	CLIFF SWALLOW	1	1	1	0	0	1	1	0	1	1	1	1	1	1	1
186	BARN SWALLOW	1	1	1	0	0	0	1	0	1	1	1	1	1	1	1

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OBS	Common Name	-----General habitat category ^a -----									-----DSL Land Office-----					
		RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO
187	GRAY JAY	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0
188	STELLER'S JAY	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
189	PINYON JAY	0	0	0	1	0	1	0	0	0	1	1	1	1	1	1
190	CLARK'S NUTCRACKER	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
191	BLACK-BILLED MAGPIE	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
192	COMMON CROW	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1
193	COMMON RAVEN	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
194	BLACK-CAPPED CHICKADEE	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
195	MOUNTAIN CHICKADEE	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0
196	BOREAL CHICKADEE	0	0	1	0	1	0	0	0	0	1	1	1	0	0	0
197	CHESTNUT-BACKED CHICKADEE	0	0	1	1	1	0	0	0	0	1	1	1	0	0	0
198	RED-BREASTED NUTHATCH	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
199	WHITE-BREASTED NUTHATCH	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
200	PYGMY NUTHATCH	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
201	BROWN CREEPER	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
202	ROCK WREN	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1
203	CANYON WREN	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
204	HOUSE WREN	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
205	WINTER WREN	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
206	MARSH WREN	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1
207	DIPPER	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0
208	GOLDEN-CROWNED KINGLET	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
209	RUBY-CROWNED KINGLET	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
210	EASTERN BLUEBIRD	0	0	1	1	0	0	1	0	1	0	0	1	1	0	1
211	WESTERN BLUEBIRD	0	0	1	1	0	0	1	0	1	1	1	1	1	0	0
212	MOUNTAIN BLUEBIRD	0	0	0	1	0	1	1	0	1	1	1	1	1	1	1
213	TOWNSEND'S SOLITAIRE	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
214	VEERY	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
215	SWAINSON'S THRUSH	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
216	HERMIT THRUSH	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
217	AMERICAN ROBIN	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
218	VARIED THRUSH	0	0	1	1	1	1	0	0	0	1	1	1	1	1	0
219	GRAY CATBIRD	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
220	SAGE THRASHER	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1
221	BROWN THRASHER	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
222	WATER PIPIT	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1
223	SPRAGUE'S PIPIT	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
224	BOHEMIAN WAXWING	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
225	CEDAR WAXWING	0	0	1	1	1	0	0	0	1	1	1	1	1	1	1
226	NORTHERN SHRIKE	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
227	LOGGERHEAD SHRIKE	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1
228	EUROPEAN STARLING	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
229	SOLITARY VIREO	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
230	WARBLING VIREO	0	0	1	1	1	0	1	0	0	1	1	1	1	1	1
231	RED-EYED VIREO	0	0	1	0	1	1	1	0	0	1	1	1	1	1	1
232	TENNESSEE WARBLER	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1
233	ORANGE-CROWNED WARBLER	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
234	NASHVILLE WARBLER	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
235	YELLOW WARBLER	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
236	YELLOW-RUMPED WARBLER	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
237	TOWNSEND'S WARBLER	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
238	BLACKPOLL WARBLER	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
239	BLACK-AND-WHITE WARBLER	0	0	1	1	1	1	0	0	1	1	0	1	1	1	1
240	AMERICAN REDSTART	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
241	OVENBIRD	0	0	0	1	1	1	0	0	1	0	1	1	1	1	1
242	NORTHERN WATERTHRUSH	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
243	MACGILLIVRAY'S WARBLER	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
244	COMMON YELLOWTHROAT	0	0	1	0	1	1	0	0	1	1	1	1	1	1	1
245	WILSON'S WARBLER	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
246	YELLOW-BREASTED CHAT	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
247	WESTERN Tanager	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
248	NORTHERN CARDINAL	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0
249	BLACK-HEADED GROSBEAK	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
250	LAZULI BUNTING	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

BS Common Name	-----General habitat category ^a -----										-----DSL Land Office-----				
	RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO
251 INDIGO BUNTING	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
252 DICKCISSEL	0	0	0	0	0	0	1	0	1	0	1	0	1	1	1
253 GREEN-TAILED TOWHEE	0	0	1	0	0	1	0	0	0	1	1	1	1	1	0
254 RUFOUS-SIDED TOWHEE	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
255 TREE SPARROW	0	0	1	0	0	1	0	0	1	1	1	1	1	1	1
256 CHIPPING SPARROW	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1
257 CLAY-COLORED SPARROW	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
258 BREWER'S SPARROW	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1
259 FIELD SPARROW	0	0	0	1	0	1	0	0	1	1	0	1	1	1	1
260 VESPER SPARROW	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1
261 LARK SPARROW	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1
262 LARK BUNTING	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1
263 SAVANNAH SPARROW	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1
264 BAIRD'S SPARROW	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
265 GRASSHOPPER SPARROW	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1
266 LE CONTE'S SPARROW	0	0	1	0	0	0	0	0	1	1	1	0	1	1	1
267 FOX SPARROW	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1
268 SONG SPARROW	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
269 LINCOLN'S SPARROW	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
270 WHITE-THROATED SPARROW	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
271 WHITE-CROWNED SPARROW	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
272 HARRIS' SPARROW	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
273 DARK-EYED JUNCO	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
274 MCCOWN'S LONGSPUR	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
275 LAPLAND LONGSPUR	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
276 CHESTNUT-COLLARED LONGSPUR	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
277 SNOW BUNTING	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1
278 BOBOLINK	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1
279 RED-WINGED BLACKBIRD	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1
280 WESTERN MEADOWLARK	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1
281 YELLOW-HEADED BLACKBIRD	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1
282 RUSTY BLACKBIRD	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
283 BREWER'S BLACKBIRD	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
284 COMMON GRACKLE	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1
285 BROWN-HEADED COWBIRD	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
286 ORCHARD ORIOLE	0	0	1	1	0	1	1	0	0	0	0	0	1	1	1
287 NORTHERN ORIOLE	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1
288 BLACK ROSY FINCH	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1
289 GRAY-CROWNED ROSY FINCH	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0
290 PINE GROSBEAK	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
291 CASSIN'S FINCH	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
292 HOUSE FINCH	0	0	0	1	0	1	1	0	1	1	1	1	1	1	1
293 RED CROSSBILL	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
294 WHITE-WINGED CROSSBILL	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
295 COMMON REDPOLL	0	0	1	1	1	1	0	1	0	1	1	1	1	1	1
296 HOARY REDPOLL	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1
297 PINE SISKIN	0	0	0	1	1	0	1	0	1	1	1	1	1	1	1
298 AMERICAN GOLDFINCH	0	0	1	1	0	1	0	0	1	1	1	1	1	1	1
299 EVENING GROSBEAK	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
300 HOUSE SPARROW	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
301 MASKED SHREW	0	0	1	1	1	1	1	0	1	1	1	1	1	1	0
302 PREBLE'S SHREW	0	0	1	0	1	1	0	0	1	0	1	1	1	1	1
303 VAGRANT SHREW	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0
304 DWARF SHREW	0	0	1	0	1	1	0	1	1	0	0	1	1	1	1
305 WATER SHREW	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0
306 MERRIAM'S SHREW	0	0	0	1	0	1	0	0	1	0	0	0	1	1	1
307 PYGMY SHREW	0	0	1	0	1	1	0	0	1	1	0	0	1	0	0
308 LITTLE BROWN MYOTIS	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
309 YUMA MYOTIS	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0
310 LONG-EARED MYOTIS	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1
311 LONG-LEGGED MYOTIS	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1
312 CALIFORNIA MYOTIS	0	1	1	1	1	1	1	0	1	1	1	0	0	0	0
313 WESTERN SMALL-FOOTED MYOTIS	0	0	1	0	1	1	0	0	1	0	0	1	0	1	1

APPENDIX WLD

OBS	Common Name	-----General habitat category ^a -----								-----DSL Land Office-----						
		RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO
314	NORTHERN MYOTIS (KEEN'S)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
315	SILVER-HAIRED BAT	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1
316	BIG BROWN BAT	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1
317	HOARY BAT	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
318	SPOTTED BAT	0	0	1	1	1	1	0	0	1	0	0	0	0	1	1
319	TOWNSEND'S BIG-EARED BAT	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1
320	PALLID BAT	0	0	0	1	1	1	0	0	1	0	0	0	0	1	0
321	PIKA	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0
322	EASTERN COTTONTAIL	0	0	1	1	0	1	0	0	1	0	0	0	0	0	1
323	MOUNTAIN COTTONTAIL	0	0	1	1	0	1	0	0	0	1	1	1	1	1	1
324	DESERT COTTONTAIL	0	0	1	1	0	1	1	0	1	0	0	1	1	1	1
325	SNOWSHOE HARE	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
326	WHITE-TAILED JACKRABBIT	0	0	0	1	0	1	0	1	1	1	1	1	1	1	1
327	BLACK-TAILED JACKRABBIT	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0
328	PYGMY RABBIT	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
329	LEAST CHIPMUNK	0	0	1	1	1	1	0	1	0	1	1	1	1	1	1
330	YELLOW-PINE CHIPMUNK	0	0	0	1	0	1	0	0	0	1	1	1	1	1	0
331	RED-TAILED CHIPMUNK	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0
332	UINTA CHIPMUNK	0	0	0	1	1	1	0	0	0	0	0	1	0	1	0
333	YELLOW-BELLIED MARMOT	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
334	HOARY MARMOT	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0
335	RICHARDSON'S GROUND SQUIRREL	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1
336	UINTA GROUND SQUIRREL	0	0	0	0	0	1	0	0	1	0	0	1	0	1	0
337	COL. GROUND SQUIRREL	0	0	1	1	0	1	0	1	1	1	1	1	0	0	0
338	THIRTEEN-LINED GROUND SQUIRREL	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1
339	GOLDEN-MANTLED GROUND SQUIRREL	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1
340	BLACK-TAILED PRAIRIE DOG	0	0	0	0	0	0	1	0	1	0	0	1	1	1	1
341	WHITE-TAILED PRAIRIE DOG	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0
342	EASTERN GRAY SQUIRREL	0	0	1	1	1	0	0	0	0	0	0	1	1	0	1
343	EASTERN FOX SQUIRREL	0	0	1	1	1	1	0	0	0	0	1	1	0	1	1
344	RED SQUIRREL	0	0	1	0	1	0	0	0	0	1	1	1	1	1	1
345	NORTHERN FLYING SQUIRREL	0	0	1	0	1	0	0	0	0	1	1	1	0	1	0
346	NORTHERN POCKET GOPHER	0	0	1	1	0	1	0	1	1	1	1	1	1	1	1
347	IDAHO POCKET GOPHER	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0
348	OLIVE-BACKED POCKET MOUSE	0	0	1	0	0	1	0	0	1	0	0	0	1	1	1
349	GREAT BASIN POCKET MOUSE	0	0	0	1	0	1	0	0	1	0	0	1	0	0	0
350	HISPID POCKET MOUSE	0	0	0	1	0	1	1	0	1	0	0	0	0	0	1
351	ORD'S KANGAROO RAT	0	0	0	1	0	1	0	0	1	0	0	0	1	1	1
352	BEAVER	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
353	WESTERN HARVEST MOUSE	0	0	1	1	0	1	0	0	1	0	0	0	1	1	1
354	DEER MOUSE	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
355	WHITE-FOOTED MOUSE	0	0	1	1	1	1	0	0	1	0	0	0	1	1	1
356	NORTHERN GRASSHOPPER MOUSE	0	0	0	0	0	1	0	0	1	1	0	1	1	1	1
357	BUSHY-TAILED WOODRAT	0	0	0	1	1	1	0	1	0	1	1	1	1	1	1
358	SOUTHERN RED-BACKED VOLE	0	0	1	0	1	1	0	0	0	1	1	1	1	1	1
359	HEATHER VOLE	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0
360	MEADOW VOLE	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
361	MONTANE VOLE	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0
362	LONG-TAILED VOLE	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1
363	PRAIRIE VOLE	0	0	1	0	0	1	0	0	1	0	0	1	1	1	1
364	WATER VOLE (RICHARDSON'S)	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0
365	SAGEBRUSH VOLE	0	0	0	0	0	1	0	0	1	0	1	1	1	1	1
366	MUSKRAT	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

		-----General habitat category-----									-----DSL Land Office-----					
OBS	Common Name	RIVER	LACUST	PALUST	WOODLAND	FOREST	SHRUB	SAVANNAH	ALPINE	GRASS	NWLO	SWLO	CLO	NELO	SLO	ELO
367	NORTHERN BOG LEMMING	0	0	1	0	1	0	0	0	1	1	1	1	0	0	0
368	NORWAY RAT	0	0	0	1	0	0	1	0	1	1	1	1	1	0	1
369	HOUSE MOUSE	0	0	0	1	1	0	1	0	1	1	1	1	1	1	1
370	MEADOW JUMPING MOUSE	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1
371	WESTERN JUMPING MOUSE	0	0	1	0	0	0	0	0	1	1	1	1	1	1	0
372	PORCUPINE	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
373	COYOTE	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
374	GRAY WOLF	0	0	0	1	1	1	0	1	1	1	0	1	1	0	0
375	RED FOX	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1
376	KIT OR SWIFT FOX	0	0	0	1	0	1	1	0	1	0	0	0	0	0	1
377	BLACK BEAR	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0
378	GRIZZLY BEAR	0	0	1	1	1	1	0	1	1	0	0	1	0	1	0
379	RACCOON	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1
380	MARTEN	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0
381	FISHER	0	0	1	0	1	0	0	0	0	1	1	1	0	0	0
382	ERMINE	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1
383	LEAST WEASEL	0	0	1	1	0	1	0	0	1	0	0	1	1	1	1
384	LONG-TAILED WEASEL	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
385	BLACK-FOOTED FERRET	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
386	MINK	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1
387	WOLVERINE	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0
388	BADGER	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1
389	WESTERN SPOTTED SKUNK	0	0	1	1	0	1	0	0	1	0	1	1	0	0	0
390	STRIPED SKUNK	0	0	1	1	1	0	1	0	1	1	1	1	1	1	1
391	RIVER OTTER	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
392	MOUNTAIN LION	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1
393	LYNX	0	0	1	0	1	0	0	1	0	1	1	1	1	1	0
394	BOBCAT	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
395	WAPITI OR ELK	0	0	0	1	1	1	0	1	1	1	1	1	1	1	0
396	MULE DEER	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1
397	WHITE-TAILED DEER	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1
398	MOOSE	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0
399	WOODLAND CARIBOU	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
400	PRONGHORN	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1
401	BISON	0	0	0	1	0	0	0	0	1	1	0	1	0	0	0
402	MOUNTAIN GOAT	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0
403	BIGHORN SHEEP	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1
404	SNAPPING TURTLE	1	1	1	0	0	0	0	0	0	1	0	0	1	1	1
405	PAINTED TURTLE	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
406	SPINY SOFTSHELL TURTLE	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1
407	NORTHERN ALLIGATOR															
	LIZARD	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0
408	SHORT-HORNED LIZARD	0	0	0	1	1	1	0	0	1	0	0	1	1	1	1
409	SAGEBRUSH LIZARD	0	0	0	1	1	1	0	0	1	0	0	1	0	1	1
410	WESTERN SKINK	0	0	1	1	1	1	0	0	1	1	1	0	0	0	0
411	RUBBER BOA	0	0	1	1	1	1	0	0	1	1	1	1	0	1	0
412	RACER	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
413	WESTERN HOGNOSE SNAKE	0	0	1	1	0	1	0	0	1	0	0	1	1	1	1
414	MILK SNAKE	0	0	1	1	1	1	1	0	1	0	0	0	1	1	1
415	PINE OR GOPHER SNAKE	0	0	1	1	0	1	1	0	1	1	1	1	1	1	1
416	W. TERRESTRIAL GARTER															
	SNAKE	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
417	PLAINS GARTER SNAKE	1	1	1	0	0	0	0	0	1	0	0	1	1	1	1
418	COMMON GARTER SNAKE	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1
419	WESTERN RATTLESNAKE	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1

Figure WLD-6

WILDLIFE SPECIES ASSOCIATED WITH SEVEN FOREST COVER TYPES IN MONTANA

(A value of 1 in the forest cover type indicates that the species finds optimum feeding or breeding conditions in the class. A value of 0 indicates absence, in the Land Office area.)

Obs	Common Name	-----Forest Type-----							-----DSL Land Office-----					
		Hard wood	Doug fir	Pine Larch	Grand fir	Lodge pole	Subalp fir	Cedar Hemlk	NWLO	SWLO	CLO	NELO	SLO	ELO
1	GREAT BLUE HERON	1	0	0	0	0	1	1	1	1	1	1	1	1
2	BLACK-CROWNED NIGHT HERON	1	0	0	0	0	0	0	1	1	1	1	1	1
3	WOOD DUCK	1	1	1	0	0	1	1	1	1	1	1	1	1
4	BUFFLEHEAD	1	1	1	1	1	1	1	1	1	1	1	1	1
5	COMMON GOLDENEYE	1	0	0	0	0	0	0	1	1	1	1	1	1
6	BARROW'S GOLDENEYE	1	0	0	0	0	0	0	1	1	1	1	1	1
7	HOODED MERGANSER	1	1	1	0	0	0	0	1	1	1	1	1	1
8	COMMON MERGANSER	1	0	1	0	0	0	0	1	1	1	1	1	1
9	TURKEY VULTURE	1	1	1	0	0	0	0	1	1	1	1	1	1
10	COOPER'S HAWK	1	1	1	1	1	1	1	1	1	1	1	1	1
11	NORTHERN GOSHAWK	1	1	1	1	1	1	1	1	1	1	1	1	1
12	SHARP-SHINNED HAWK	0	1	1	1	1	1	1	1	1	1	1	1	1
13	RED-TAILED HAWK	1	1	1	1	1	1	1	1	1	1	1	1	1
14	ROUGH-LEGGED HAWK	1	0	0	0	0	0	0	1	1	1	1	1	1
15	BROAD-WINGED HAWK	1	0	0	0	0	0	0	1	0	1	1	1	1
16	FERRUGINOUS HAWK	1	0	1	0	0	0	0	1	1	1	1	1	1
17	SWAINSON'S HAWK	1	1	1	0	1	0	0	1	1	1	1	1	1
18	GOLDEN EAGLE	1	1	1	1	1	1	1	1	1	1	1	1	1
19	BALD EAGLE	1	1	1	0	0	1	1	1	1	1	1	1	1
20	OSPREY	1	1	1	1	1	1	1	1	1	1	1	1	1
21	MERLIN	0	1	1	1	1	1	1	1	1	1	1	1	1
22	AMERICAN KESTREL	1	1	1	1	1	1	1	1	1	1	1	1	1
23	WILD TURKEY	1	1	1	0	0	0	0	1	1	1	1	1	1
24	BLUE GROUSE	1	1	1	1	1	1	1	1	1	1	1	1	0
25	SPRUCE GROUSE	0	1	1	1	1	1	1	1	1	1	0	0	0
26	RUFFED GROUSE	1	1	1	1	1	1	1	1	1	1	1	1	1
27	NORTHERN BOBWHITE	1	0	0	0	0	0	0	1	1	0	1	0	0
28	RING-NECKED PHEASANT	1	0	0	0	0	0	0	1	1	1	1	1	1
29	GRAY PARTRIDGE	1	0	0	0	0	0	0	1	1	1	1	1	1
30	MOURNING DOVE	1	1	1	0	1	0	0	1	1	1	1	1	1
31	YELLOW-BILLED CUCKOO	1	1	1	0	0	0	0	1	1	1	1	1	1
32	BLACK-BILLED CUCKOO	1	1	1	0	0	0	0	1	1	1	1	1	1
33	WESTERN SCREECH-OWL	1	1	1	0	1	1	1	1	1	1	0	0	0
34	FLAMMULATED OWL	1	1	0	1	1	1	0	1	1	1	0	0	0
35	LONG-EARED OWL	1	1	1	1	1	1	0	1	1	1	1	1	1
36	GREAT HORNED OWL	1	1	1	1	1	1	1	1	1	1	1	1	1
37	GREAT GRAY OWL	1	1	1	1	1	1	0	1	1	1	1	1	0
38	BARRED OWL	1	1	1	1	1	1	1	1	1	1	1	0	0
39	SAW-WHET OWL	1	1	1	0	1	1	1	1	1	1	1	1	1
40	BOREAL OWL	1	1	1	1	1	1	1	1	1	1	0	1	0
41	NORTHERN PYGMY OWL	1	1	1	1	1	1	1	1	1	1	1	1	1
42	COMMON POORWILL	0	1	1	1	1	1	1	1	1	1	1	1	1
43	COMMON NIGHTHAWK	1	1	1	1	1	1	1	1	1	1	1	1	1
44	VAUX'S SWIFT	1	1	1	1	1	1	1	1	1	1	0	0	0
45	RUFOS HUMMINGBIRD	1	1	1	1	1	1	1	1	1	1	1	1	0
46	NORTHERN FLICKER	1	1	1	1	1	1	1	1	1	1	1	1	1
47	PILEATED WOODPECKER	1	0	1	1	1	1	1	1	1	1	0	0	0
48	RED-HEADED WOODPECKER	1	0	1	0	0	0	0	1	1	1	1	1	1
49	LEWIS' WOODPECKER	1	1	1	1	1	1	1	1	1	1	1	1	1
50	DOWNY WOODPECKER	1	1	1	1	1	1	1	1	1	1	1	1	1
51	HAIRY WOODPECKER	1	1	1	1	1	1	1	1	1	1	1	1	1
52	BLACK-BACKED WOODPECKER	1	1	1	1	1	1	1	1	1	1	0	1	1
53	THREE-TOED WOODPECKER	0	1	1	1	1	1	1	1	1	1	1	1	0
54	WILLIAMSON'S SAPSUCKER	1	1	1	1	1	1	1	1	1	1	0	1	0
55	YELLOW-BELLIED (R-NAP) SAPSUCKER	1	1	1	1	1	1	1	0	0	1	1	0	0
56	EASTERN KINGBIRD	1	1	1	0	0	0	0	1	1	1	1	1	1
57	WESTERN KINGBIRD	1	1	1	0	0	0	0	1	1	1	1	1	1
58	CORDILLERAN FLYCATCHER	1	1	1	1	1	1	1	1	1	1	1	1	0
59	CASSIN'S KINGBIRD	1	0	1	0	0	1	1	0	0	0	1	1	1
60	HAMMOND'S FLYCATCHER	1	1	1	1	1	1	1	1	1	1	1	1	0

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Obs	Common Name	-----Forest Type-----							-----DSL Land Office-----					
		Hard wood	Doug fir	Pine Larch	Grand fir	Lodge pole	Subalp fir	Cedar Hemlk	NWLO	SWLO	CLO	NELO	SLO	ELO
61	DUSKY FLYCATCHER	1	1	1	0	1	1	1	1	1	1	1	1	1
62	OLIVE-SIDED FLYCATCHER	1	1	1	1	1	1	1	1	1	1	1	1	1
63	WESTERN WOOD PEWEE	1	0	1	0	0	1	1	1	1	1	1	1	1
64	BARN SWALLOW	1	0	0	0	0	0	0	1	1	1	1	1	1
65	CLIFF SWALLOW	1	0	0	0	0	0	0	1	1	1	1	1	1
66	VIOLET-GREEN SWALLOW	1	1	1	1	1	1	1	1	1	1	1	1	1
67	TREE SWALLOW	1	1	1	0	0	1	1	1	1	1	1	1	1
68	BANK SWALLOW	1	1	1	0	0	0	0	1	1	1	1	1	1
69	ROUGH-WINGED SWALLOW	1	1	1	0	0	0	0	1	1	1	1	1	1
70	STELLER'S JAY	0	1	1	1	1	1	1	1	1	1	1	1	1
71	GRAY JAY	1	1	1	1	1	1	1	1	1	1	1	1	0
72	BLACK-BILLED MAGPIE	1	1	1	0	0	1	1	1	1	1	1	1	1
73	CLARK'S NUTCRACKER	0	1	1	1	1	1	1	1	1	1	1	1	1
74	COMMON CROW	1	1	1	1	1	1	1	1	1	1	1	1	1
75	COMMON RAVEN	1	1	1	1	1	1	1	1	1	1	1	1	1
76	BLACK-CAPPED CHICKADEE	1	1	1	0	0	1	1	1	1	1	1	1	1
77	MOUNTAIN CHICKADEE	1	1	1	1	1	1	1	1	1	1	1	1	0
78	BOREAL CHICKADEE	0	0	1	1	1	1	1	1	1	1	0	0	0
79	CHESTNUT-BACKED CHICKADEE	0	1	1	1	1	1	1	1	1	1	0	0	0
80	RED-BREASTED NUTHATCH	0	1	1	1	1	1	1	1	1	1	1	1	1
81	WHITE-BREASTED NUTHATCH	1	1	1	1	1	1	1	1	1	1	1	1	1
82	PYGMY NUTHATCH	0	1	1	1	1	1	1	1	1	1	1	1	1
83	BROWN CREEPER	1	1	1	1	1	1	1	1	1	1	1	1	1
84	HOUSE WREN	1	1	1	1	1	1	1	1	1	1	1	1	1
85	WINTER WREN	1	1	1	1	1	1	1	1	1	1	1	1	1
86	AMERICAN ROBIN	1	1	1	1	1	1	1	1	1	1	1	1	1
87	VARIED THRUSH	0	1	1	1	1	1	1	1	1	1	1	1	0
88	TOWNSEND'S SOLITAIRE	0	1	1	1	1	1	1	1	1	1	1	1	1
89	VEERY	1	1	1	1	1	1	1	1	1	1	1	1	1
90	HERMIT THRUSH	1	1	1	1	1	1	1	1	1	1	1	1	1
91	SWAINSON'S THRUSH	1	1	1	1	1	1	1	1	1	1	1	1	1
92	MOUNTAIN BLUEBIRD	1	1	1	1	1	1	1	1	1	1	1	1	1
93	WESTERN BLUEBIRD	1	1	1	1	1	1	1	1	1	1	1	0	0
94	EASTERN BLUEBIRD	1	1	1	0	0	1	1	0	0	1	1	0	1
95	RUBY-CROWNED KINGLET	1	1	1	1	1	1	1	1	1	1	1	1	1
96	GOLDEN-CROWNED KINGLET	1	1	1	1	1	1	1	1	1	1	1	1	1
97	CEDAR WAXWING	1	1	1	0	1	1	1	1	1	1	1	1	1
98	BOHEMIAN WAXWING	1	1	1	1	1	1	1	1	1	1	1	1	1
99	LOGGERHEAD SHRIKE	1	0	0	0	0	1	1	1	1	1	1	1	1
100	EUROPEAN STARLING	1	1	1	0	1	1	1	1	1	1	1	1	1
101	WARBLING VIREO	1	1	1	1	1	0	0	1	1	1	1	1	1
102	RED-EYED VIREO	1	0	0	0	0	0	0	1	1	1	1	1	1
103	SOLITARY VIREO	1	1	1	1	1	1	0	1	1	1	1	1	1
104	BLACK-AND-WHITE WARBLER	1	0	1	0	0	0	0	1	0	1	1	1	1
105	ORANGE-CROWNED WARBLER	1	1	1	0	1	0	0	1	1	1	1	1	1
106	YELLOW-RUMPED WARBLER	0	1	1	1	1	1	1	1	1	1	1	1	1
107	BLACKPOLL WARBLER	0	1	1	1	1	1	1	1	1	1	1	1	1
108	TOWNSEND'S WARBLER	0	0	0	0	1	0	0	1	1	1	1	1	1
109	MACGILLIVRAY'S WARBLER	1	1	1	1	1	1	1	1	1	1	1	1	1
110	WILSON'S WARBLER	1	0	1	1	1	1	1	1	1	1	1	1	1
111	AMERICAN REDSTART	1	0	0	0	0	0	0	1	1	1	1	1	1
112	OVENBIRD	1	1	1	0	0	1	1	0	1	1	1	1	1
113	NORTHERN WATERTHRUSH	1	0	1	0	0	1	1	1	1	1	1	1	1
114	COMMON YELLOWTHROAT	1	0	0	0	0	0	0	1	1	1	1	1	1
115	HOUSE SPARROW	1	0	0	0	0	0	0	1	1	1	1	1	1
116	BREWER'S BLACKBIRD	1	1	1	0	0	0	0	1	1	1	1	1	1
117	BROWN-HEADED COWBIRD	1	1	1	0	0	0	0	1	1	1	1	1	1
118	ORCHARD ORIOLE	1	0	0	0	0	0	0	0	0	0	1	1	1
119	WESTERN Tanager	1	1	1	1	1	1	1	1	1	1	1	1	1
120	BLACK-HEADED GROSBEAK	1	1	1	1	1	1	0	1	1	1	1	1	1
121	EVENING GROSBEAK	1	1	1	1	1	1	1	1	1	1	1	1	1
122	CASSIN'S FINCH	0	1	1	1	1	1	1	1	1	1	1	1	1
123	HOUSE FINCH	1	1	1	0	0	0	0	1	1	1	1	1	1
124	PINE GROSBEAK	0	1	1	1	1	1	1	1	1	1	1	1	1
125	COMMON REDPOLL	1	0	1	0	0	1	1	1	1	1	1	1	1

Obs	Common Name	-----Forest Type-----							-----DSL Land Office-----					
		Hard wood	Doug fir	Pine Larch	Grand fir	Lodge pole	Subalp fir	Cedar Hemlk	NWLO	SWLO	CLO	NELO	SLO	ELO
126	PINE SISKIN	1	1	1	1	1	1	1	1	1	1	1	1	1
127	RED CROSSBILL	0	1	1	1	1	1	1	1	1	1	1	1	1
128	WHITE-WINGED CROSSBILL	0	1	1	1	1	1	1	1	1	1	1	1	1
129	LARK SPARROW	0	0	1	0	0	0	0	1	1	1	1	1	1
130	DARK-EYED JUNCO	1	1	1	1	1	1	1	1	1	1	1	1	1
131	CHIPPING SPARROW	1	1	1	1	0	1	1	1	1	1	1	1	1
132	WHITE-THROATED SPARROW	1	1	1	0	0	0	0	1	1	1	1	1	1
133	MASKED SHREW	0	1	0	0	0	1	1	1	1	1	1	1	0
134	MERRIAM'S SHREW	0	0	0	0	0	1	1	0	0	0	1	1	1
135	VAGRANT SHREW	1	0	1	1	1	1	1	1	1	0	0	0	0
136	PREBLE'S SHREW	0	0	0	0	1	1	1	0	1	1	1	1	1
137	DWARF SHREW	0	0	0	0	0	1	0	0	0	1	1	1	1
138	PYGMY SHREW	0	1	1	1	1	1	1	1	0	0	1	0	0
139	CALIFORNIA MYOTIS	1	1	1	0	0	0	0	1	1	0	0	0	0
140	LONG-EARED MYOTIS	1	1	1	1	1	1	1	1	1	1	1	1	1
141	NORTHERN MYOTIS (KEEN'S)	1	0	1	0	0	0	0	0	0	0	0	0	1
142	LITTLE BROWN MYOTIS	1	1	1	1	1	1	1	1	1	1	1	1	1
143	WESTERN SMALL-FOOTED MYOTIS	1	1	1	1	1	1	1	0	0	1	0	1	1
144	LONG-LEGGED MYOTIS	0	1	1	1	1	1	1	1	1	1	1	1	1
145	YUMA MYOTIS	1	1	1	0	0	1	1	1	1	1	1	0	0
146	SILVER-HAIRED BAT	0	1	1	0	1	1	1	1	1	1	1	1	1
147	BIG BROWN BAT	1	1	1	1	1	1	0	1	1	1	1	1	1
148	HOARY BAT	1	1	1	1	1	1	1	1	1	1	1	1	1
149	SPOTTED BAT	0	0	1	0	0	1	1	0	0	0	0	1	1
150	TOWNSEND'S BIG-EARED BAT	0	1	1	1	1	0	0	1	1	1	1	1	1
151	PALLID BAT	0	0	1	0	0	1	1	0	0	0	0	1	0
152	BLACK BEAR	1	1	1	1	1	1	1	1	1	1	1	1	0
153	GRIZZLY BEAR	1	1	1	1	1	1	1	0	0	1	0	1	0
154	RACCOON	1	0	0	0	0	0	0	1	1	1	1	1	1
155	MARTEN	0	0	1	1	1	1	1	1	1	1	1	1	0
156	FISHER	1	1	1	1	1	1	1	1	1	1	0	0	0
157	ERMINE	1	0	1	1	1	1	1	1	1	1	1	1	1
158	LONG-TAILED WEASEL	1	1	1	1	1	1	1	1	1	1	1	1	1
159	WOLVERINE	1	0	1	0	1	1	1	1	1	1	1	1	0
160	BADGER	1	1	1	0	0	1	1	1	1	1	1	1	1
161	WESTERN SPOTTED SKUNK	1	1	1	0	0	0	0	0	1	1	0	0	0
162	STRIPED SKUNK	1	0	1	0	0	1	1	1	1	1	1	1	1
163	COYOTE	1	1	1	1	1	1	1	1	1	1	1	1	1
164	GRAY WOLF	1	1	1	1	1	1	1	1	0	1	1	0	0
165	RED FOX	1	1	1	1	1	1	1	1	1	1	1	1	1
166	MOUNTAIN LION	1	1	1	1	1	1	1	1	1	1	1	1	1
167	LYNX	1	1	1	1	1	1	1	1	1	1	1	1	0
168	BOBCAT	1	1	1	1	1	1	1	1	1	1	1	1	1
169	BLACK-TAILED PRAIRIE DOG	1	1	1	0	1	1	1	0	0	1	1	1	1
170	YELLOW-PINE CHIPMUNK	0	1	1	1	1	1	1	1	1	1	1	1	0
171	LEAST CHIPMUNK	1	1	1	1	1	1	1	1	1	1	1	1	1
172	RED-TAILED CHIPMUNK	0	0	1	1	1	1	1	1	1	1	0	0	0
173	UINTA CHIPMUNK	0	0	1	1	1	1	1	0	0	1	0	1	0
174	EASTERN GRAY SQUIRREL	1	0	1	0	0	1	1	0	0	1	1	0	1
175	EASTERN FOX SQUIRREL	1	0	1	0	0	1	1	0	1	1	0	1	1
176	RED SQUIRREL	1	1	1	1	1	1	1	1	1	1	1	1	1
177	NORTHERN FLYING SQUIRREL	1	1	1	1	1	1	1	1	1	1	0	1	0
178	WHITE-FOOTED MOUSE	1	1	1	1	1	1	1	0	0	0	1	1	1
179	BUSHY-TAILED WOODRAT	1	1	1	1	1	1	1	1	1	1	1	1	1
180	NORTHERN BOG LEMMING	1	0	1	0	1	1	1	1	1	1	0	0	0
181	HEATHER VOLE	0	0	1	0	1	1	1	1	1	1	1	1	0
182	SOUTHERN RED-BACKED VOLE	0	0	1	1	1	1	1	1	1	1	1	1	1
183	LONG-TAILED VOLE	1	1	1	1	1	1	1	1	1	1	1	1	1
184	NORWAY RAT	1	0	0	0	0	1	1	1	1	1	1	0	1
185	HOUSE MOUSE	1	0	1	0	0	1	1	1	1	1	1	1	1
186	PORCUPINE	1	1	1	1	1	1	1	1	1	1	1	1	1
187	SNOWSHOE HARE	1	0	1	1	1	1	1	1	1	1	1	1	1
188	BLACK-TAILED JACKRABBIT	0	0	1	0	0	1	1	0	0	1	0	0	0
189	DESERT COTTONTAIL	0	0	1	0	0	1	1	0	0	1	1	1	1
190	EASTERN COTTONTAIL	1	0	0	0	0	0	0	0	0	0	0	0	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Obs	Common Name	-----Forest Type-----							-----DSL Land Office-----					
		Hard wood	Doug fir	Pine Larch	Grand fir	Lodge pole	Subalp fir	Cedar Hemlk	NWLO	SWLO	CLO	NELO	SLO	ELO
191	WAPITI OR ELK	1	1	1	1	1	1	1	1	1	1	1	1	0
192	MULE DEER	0	1	1	1	1	1	1	1	1	1	1	1	1
193	WHITE-TAILED DEER	1	1	1	1	1	1	1	1	1	1	1	1	1
194	MOOSE	1	1	1	1	1	1	1	1	1	1	1	1	0
195	WOODLAND CARIBOU	0	0	1	1	1	1	1	0	0	0	0	0	0
196	RUBBER BOA	0	1	0	1	0	1	1	1	1	1	0	1	0
197	RACER	1	1	1	1	0	1	1	1	1	1	1	1	1
198	PINE OR GOPHER SNAKE	1	1	1	1	1	1	1	1	1	1	1	1	1
199	MILK SNAKE	1	1	1	0	0	0	0	0	0	0	1	1	1
200	W. TERRESTRIAL GARTER SNAKE	1	1	1	1	1	1	1	1	1	1	1	1	1
201	COMMON GARTER SNAKE	1	1	1	1	1	1	1	1	1	1	1	1	1
202	WESTERN RATTLESNAKE	1	0	1	0	0	0	0	1	1	1	1	1	1
203	SAGEBRUSH LIZARD	0	0	1	0	0	1	1	0	0	1	0	1	1
204	SHORT-HORNED LIZARD	0	1	1	0	0	1	1	0	0	1	1	1	1
205	WESTERN SKINK	0	1	1	0	1	1	1	1	1	0	0	0	0
206	NORTHERN ALLIGATOR LIZARD	1	1	0	0	0	1	1	1	1	0	0	0	0
207	COEUR D'ALENE SALAMANDER (VD)	1	1	1	1	1	1	1	1	1	0	0	0	0
208	WOOD FROG	0	1	1	0	0	1	1	0	0	0	0	0	0
209	WESTERN TOAD	0	0	0	0	0	1	1	1	1	1	1	1	0

Figure WLD-7

WILDLIFE SPECIES ASSOCIATED WITH SIX FOREST SUCCESSIONAL STAGES IN MONTANA

(A value of 1 in the successional stage indicates the species finds optimum feeding or breeding conditions in the class. A value of 1 indicates presence, 0 absence, in the Land Office area.)

Obs	Common Name	-----Successional Stage ^a -----						-----DSL Land Office-----					
		grass forb	seed- ling	pole	young	mat	old growth	NWLO	SWLO	CLO	NELO	SLO	ELO
1	GREAT BLUE HERON	0	0	0	1	1	1	1	1	1	1	1	1
2	BLACK-CROWNED NIGHT HERON	0	1	1	1	1	0	1	1	1	1	1	1
3	WOOD DUCK	0	0	0	0	1	1	1	1	1	1	1	1
4	BUFFLEHEAD	0	0	0	1	1	1	1	1	1	1	1	1
5	COMMON GOLDENEYE	0	0	0	1	1	1	1	1	1	1	1	1
6	BARROW'S GOLDENEYE	0	0	0	1	1	1	1	1	1	1	1	1
7	HOODED MERGANSER	0	0	0	0	1	1	1	1	1	1	1	1
8	COMMON MERGANSER	0	0	0	1	1	1	1	1	1	1	1	1
9	TURKEY VULTURE	1	1	0	0	1	1	1	1	1	1	1	1
10	COOPER'S HAWK	1	1	1	1	1	1	1	1	1	1	1	1
11	NORTHERN GOSHAWK	1	1	0	1	1	1	1	1	1	1	1	1
12	SHARP-SHINNED HAWK	1	1	1	1	1	1	1	1	1	1	1	1
13	RED-TAILED HAWK	1	1	1	1	1	1	1	1	1	1	1	1
14	ROUGH-LEGGED HAWK	1	1	0	0	1	1	1	1	1	1	1	1
15	BROAD-WINGED HAWK	1	1	1	1	1	1	1	0	1	1	1	1
16	FERRUGINOUS HAWK	1	1	0	1	1	1	1	1	1	1	1	1
17	SWAINSON'S HAWK	1	1	0	1	1	1	1	1	1	1	1	1
18	GOLDEN EAGLE	1	1	1	0	1	1	1	1	1	1	1	1
19	BALD EAGLE	1	1	1	1	1	1	1	1	1	1	1	1
20	OSPREY	0	0	0	0	1	1	1	1	1	1	1	1
21	MERLIN	1	1	1	1	1	1	1	1	1	1	1	1
22	AMERICAN KESTREL	1	0	1	1	1	1	1	1	1	1	1	1
23	WILD TURKEY	1	1	1	1	1	1	1	1	1	1	1	1
24	BLUE GROUSE	1	1	1	1	1	1	1	1	1	1	1	0
25	SPRUCE GROUSE	0	1	1	1	1	1	1	1	1	0	0	0
26	RUFFED GROUSE	1	1	1	1	0	1	1	1	1	1	1	1
27	NORTHERN BOBWHITE	1	1	1	1	0	0	1	1	0	1	0	0
28	RING-NECKED PHEASANT	1	1	1	1	1	1	1	1	1	1	1	1
29	GRAY PARTRIDGE	1	1	0	0	0	0	1	1	1	1	1	1
30	MOURNING DOVE	1	1	1	1	1	1	1	1	1	1	1	1
31	YELLOW-BILLED CUCKOO	0	1	1	1	1	0	1	1	1	1	1	1
32	BLACK-BILLED CUCKOO	0	1	1	1	1	0	1	1	1	1	1	1
33	WESTERN SCREECH-OWL	1	1	0	0	1	1	1	1	1	0	0	0
34	FLAMMULATED OWL	1	1	0	0	1	1	1	1	1	1	1	1
35	LONG-EARED OWL	1	1	1	1	1	1	1	1	1	1	1	1
36	GREAT HORNED OWL	1	1	1	1	1	1	1	1	1	1	1	1
37	GREAT GRAY OWL	1	1	1	1	1	1	1	1	1	1	1	0
38	BARRED OWL	1	1	0	0	1	1	1	1	1	1	0	0
39	SAW-WHET OWL	1	1	1	1	1	1	1	1	1	1	1	1
40	BOREAL OWL	1	1	0	1	1	1	1	1	1	0	1	0
41	NORTHERN PYGMY OWL	1	1	1	0	1	1	1	1	1	1	1	1
42	COMMON POORWILL	1	1	1	1	1	1	1	1	1	1	1	1
43	COMMON NIGHTHAWK	1	1	1	1	1	1	1	1	1	1	1	1
44	VAUX'S SWIFT	1	1	1	1	1	1	1	1	1	0	0	0
45	RUFIOUS HUMMINGBIRD	1	1	1	1	1	1	1	1	1	1	1	0
46	NORTHERN FLICKER	1	1	1	1	1	1	1	1	1	1	1	1
47	PILEATED WOODPECKER	0	0	0	1	1	1	1	1	1	0	0	0
48	RED-HEADED WOODPECKER	0	1	1	1	1	1	1	1	1	1	1	1
49	LEWIS' WOODPECKER	1	1	0	1	1	1	1	1	1	1	1	1
50	DOWNY WOODPECKER	0	1	1	1	1	1	1	1	1	1	1	1
51	HAIRY WOODPECKER	0	0	1	1	1	1	1	1	1	1	1	1
52	BLACK-BACKED WOODPECKER	0	0	1	1	1	1	1	1	1	0	1	1
53	THREE-TOED WOODPECKER	0	0	1	1	1	1	1	1	1	1	1	0
54	WILLIAMSON'S SAPSUCKER	0	0	1	1	1	1	1	1	1	0	1	0
55	YELLOW-BELLIED (R-NAP) SAPSUCKER	0	1	1	1	1	1	0	0	1	1	0	0
56	SAY'S PHOEBE	1	1	0	0	0	0	1	1	1	1	1	1
57	EASTERN KINGBIRD	1	1	1	1	1	1	1	1	1	1	1	1
58	WESTERN KINGBIRD	1	1	1	1	1	1	1	1	1	1	1	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Obs	Common Name	-----Successional Stage ^a -----						-----DSL Land Office-----					
		grass seed-		old		growth							
		forb	ling	pole	ynq	mat		NWLO	SWLO	CLO	NELO	SLO	ELO
59	CORDILLERAN FLYCATCHER	0	1	1	1	1	1	1	1	1	1	1	0
60	CASSIN'S KINGBIRD	1	1	1	1	1	1	0	0	0	1	1	1
61	HAMMOND'S FLYCATCHER	0	1	1	1	1	1	1	1	1	1	1	0
62	DUSKY FLYCATCHER	1	1	1	1	1	1	1	1	1	1	1	1
63	OLIVE-SIDED FLYCATCHER	1	1	1	1	1	1	1	1	1	1	1	1
64	WESTERN WOOD PEWEE	0	1	1	1	1	1	1	1	1	1	1	1
65	CLIFF SWALLOW	1	1	1	1	0	0	1	1	1	1	1	1
66	VIOLET-GREEN SWALLOW	1	1	1	1	1	1	1	1	1	1	1	1
67	TREE SWALLOW	1	1	0	1	1	1	1	1	1	1	1	1
68	BANK SWALLOW	1	1	0	0	0	0	1	1	1	1	1	1
69	ROUGH-WINGED SWALLOW	1	1	0	0	0	0	1	1	1	1	1	1
70	STELLER'S JAY	1	1	1	1	1	1	1	1	1	1	1	1
71	GRAY JAY	0	1	1	1	1	1	1	1	1	1	1	0
72	BLACK-BILLED MAGPIE	1	1	1	1	1	1	1	1	1	1	1	1
73	CLARK'S NUTCRACKER	0	0	0	1	1	1	1	1	1	1	1	1
74	COMMON CROW	1	1	1	1	1	1	1	1	1	1	1	1
75	COMMON RAVEN	1	1	1	1	1	1	1	1	1	1	1	1
76	BLACK-CAPPED CHICKADEE	0	1	1	1	1	1	1	1	1	1	1	1
77	MOUNTAIN CHICKADEE	0	0	1	1	1	1	1	1	1	1	1	0
78	BOREAL CHICKADEE	0	0	0	1	1	1	1	1	1	0	0	0
79	CHESTNUT-BACKED CHICKADEE	0	1	1	1	1	1	1	1	1	0	0	0
80	RED-BREASTED NUTHATCH	0	0	1	1	1	1	1	1	1	1	1	1
81	WHITE-BREASTED NUTHATCH	0	0	0	1	1	1	1	1	1	1	1	1
82	PYGMY NUTHATCH	0	0	1	1	1	1	1	1	1	1	1	1
83	BROWN CREEPER	0	0	1	1	1	1	1	1	1	1	1	1
84	HOUSE WREN	0	1	1	1	1	1	1	1	1	1	1	1
85	WINTER WREN	0	1	1	1	1	1	1	1	1	1	1	1
86	AMERICAN ROBIN	1	1	1	1	1	1	1	1	1	1	1	1
87	VARIED THRUSH	0	1	1	1	1	1	1	1	1	1	1	0
88	TOWNSEND'S SOLITAIRE	1	1	1	1	1	1	1	1	1	1	1	1
89	VEERY	0	1	1	1	1	1	1	1	1	1	1	1
90	HERMIT THRUSH	0	1	1	1	1	1	1	1	1	1	1	1
91	SWAINSON'S THRUSH	0	1	1	1	1	1	1	1	1	1	1	1
92	MOUNTAIN BLUEBIRD	1	1	1	1	1	1	1	1	1	1	1	1
93	WESTERN BLUEBIRD	1	1	1	1	1	1	1	1	1	1	0	0
94	EASTERN BLUEBIRD	1	1	1	1	1	1	0	0	1	1	0	1
95	RUBY-CROWNED KINGLET	0	1	1	1	1	1	1	1	1	1	1	1
96	GOLDEN-CROWNED KINGLET	0	1	1	1	1	1	1	1	1	1	1	1
97	CEDAR WAXWING	0	1	1	1	1	1	1	1	1	1	1	1
98	BOHEMIAN WAXWING	0	1	1	1	1	1	1	1	1	1	1	1
99	NORTHERN SHRIKE	1	1	0	0	0	0	1	1	1	1	1	1
100	LOGGERHEAD SHRIKE	1	1	1	1	1	1	1	1	1	1	1	1
101	EUROPEAN STARLING	1	1	0	1	1	1	1	1	1	1	1	1
102	WARBLING VIREO	0	1	1	1	1	1	1	1	1	1	1	1
103	RED-EYED VIREO	0	1	1	1	1	1	1	1	1	1	1	1
104	PHILADELPHIA VIREO	0	1	1	1	1	1	0	1	0	1	0	0
105	SOLITARY VIREO	0	0	1	1	1	1	1	1	1	1	1	1
106	BLACK-AND-WHITE WARBLER	0	0	1	1	1	1	1	0	1	1	1	1
107	ORANGE-CROWNED WARBLER	0	1	0	1	1	1	1	1	1	1	1	1
108	YELLOW-RUMPED WARBLER	0	1	1	1	1	1	1	1	1	1	1	1
109	BLACKPOLL WARBLER	0	0	0	1	1	1	1	1	1	1	1	1
110	TOWNSEND'S WARBLER	0	0	0	0	1	1	1	1	1	1	1	1
111	WILSON'S WARBLER	0	1	1	1	1	1	1	1	1	1	1	1
112	AMERICAN REDSTART	1	1	1	1	1	1	1	1	1	1	1	1
113	OVENBIRD	0	1	1	1	1	1	0	1	1	1	1	1
114	NORTHERN WATERTHRUSH	1	1	0	0	0	0	1	1	1	1	1	1
115	COMMON YELLOWTHROAT	1	1	0	0	0	0	1	1	1	1	1	1
116	HOUSE SPARROW	1	1	1	1	1	1	1	1	1	1	1	1
117	BREWER'S BLACKBIRD	1	1	1	1	1	1	1	1	1	1	1	1
118	BROWN-HEADED COWBIRD	1	1	1	1	1	1	1	1	1	1	1	1
119	ORCHARD ORIOLE	0	1	1	1	1	1	0	0	0	1	1	1
120	WESTERN Tanager	0	0	0	1	1	1	1	1	1	1	1	1
121	BLACK-HEADED GROSBEAK	1	1	1	1	1	1	1	1	1	1	1	1
122	EVENING GROSBEAK	1	1	1	1	1	1	1	1	1	1	1	1

APPENDIX WLD

Obs	Common Name	-----Successional Stage ^a -----						-----DSL Land Office-----					
		grass	seed-	old			growth	NWLO	SWLO	CLO	NELO	SLO	ELO
		forb	ling	pole	ynq	mat							
123	CASSIN'S FINCH	1	1	1	1	1	1	1	1	1	1	1	1
124	HOUSE FINCH	1	1	1	1	1	1	1	1	1	1	1	1
125	PINE GROSBEAK	0	0	1	1	1	1	1	1	1	1	1	1
126	COMMON REDPOL	1	1	0	0	0	0	1	1	1	1	1	1
127	PINE SISKIN	1	1	1	1	1	1	1	1	1	1	1	1
128	RED CROSSBILL	0	0	0	1	1	1	1	1	1	1	1	1
129	WHITE-WINGED CROSSBILL	0	0	0	1	1	1	1	1	1	1	1	1
130	VESPER SPARROW	1	1	0	0	0	0	1	1	1	1	1	1
131	LARK SPARROW	1	1	0	0	0	0	1	1	1	1	1	1
132	DARK-EYED JUNCO	1	1	1	1	1	1	1	1	1	1	1	1
133	CHIPPING SPARROW	0	1	1	1	1	1	1	1	1	1	1	1
134	WHITE-THROATED SPARROW	1	1	1	1	1	1	1	1	1	1	1	1
135	MASKED SHREW	1	1	1	1	1	1	1	1	1	1	1	0
136	MERRIAM'S SHREW	1	1	0	0	0	0	0	0	0	1	1	1
137	VAGRANT SHREW	1	1	1	1	1	1	1	1	0	0	0	0
138	PREBLE'S SHREW	1	1	1	1	1	1	0	1	1	1	1	1
139	DWARF SHREW	1	1	1	1	1	1	0	0	1	1	1	1
140	PYGMY SHREW	0	0	1	1	1	1	1	0	0	1	0	0
141	CALIFORNIA MYOTIS	1	1	1	1	1	1	1	1	0	0	0	0
142	LONG-EARED MYOTIS	1	1	1	1	1	1	1	1	1	1	1	1
143	NORTHERN MYOTIS (KEEN'S)	1	1	1	1	1	1	0	0	0	0	0	1
144	LITTLE BROWN MYOTIS	1	1	0	0	1	1	1	1	1	1	1	1
145	WESTERN SMALL-FOOTED MYOTIS	1	1	0	0	1	1	0	0	1	0	1	1
146	LONG-LEGGED MYOTIS	1	1	0	0	1	1	1	1	1	1	1	1
147	YUMA MYOTIS	1	1	0	0	1	1	1	1	1	1	0	0
148	SILVER-HAIRED BAT	1	1	1	1	1	1	1	1	1	1	1	1
149	BIG BROWN BAT	1	1	0	0	1	1	1	1	1	1	1	1
150	HOARY BAT	1	1	1	1	1	1	1	1	1	1	1	1
151	TOWNSEND'S BIG-EARED BAT	1	1	1	1	0	0	1	1	1	1	1	1
152	PALLID BAT	1	1	0	0	1	1	0	0	0	0	1	0
153	BLACK BEAR	1	1	1	1	1	1	1	1	1	1	1	0
154	GRIZZLY BEAR	1	1	1	1	1	1	0	0	1	0	1	0
155	RACCOON	1	1	0	0	1	1	1	1	1	1	1	1
156	MARTEN	0	0	1	1	1	1	1	1	1	1	1	0
157	FISHER	0	0	1	1	1	1	1	1	1	0	0	0
158	ERMINE	1	1	1	1	1	1	1	1	1	1	1	1
159	LONG-TAILED WEASEL	1	1	1	1	1	1	1	1	1	1	1	1
160	WOLVERINE	1	1	1	1	1	1	1	1	1	1	1	0
161	BADGER	1	1	0	0	0	0	1	1	1	1	1	1
162	WESTERN SPOTTED SKUNK	1	1	1	0	0	0	0	1	1	0	0	0
163	STRIPED SKUNK	1	1	0	0	0	0	1	1	1	1	1	1
164	COYOTE	1	1	1	1	1	1	1	1	1	1	1	1
165	GRAY WOLF	1	1	1	1	1	1	1	0	1	1	0	0
166	RED FOX	1	1	1	1	1	1	1	1	1	1	1	1
167	MOUNTAIN LION	1	1	1	1	1	1	1	1	1	1	1	1
168	LYNX	1	1	1	1	1	1	1	1	1	1	1	0
169	BOBCAT	1	1	1	1	1	1	1	1	1	1	1	1
170	BLACK-TAILED PRAIRIE DOG	1	1	0	0	0	0	0	0	1	1	1	1
171	YELLOW-PINE CHIPMUNK	0	1	1	1	1	1	1	1	1	1	1	0
172	LEAST CHIPMUNK	1	1	0	0	0	0	1	1	1	1	1	1
173	RED-TAILED CHIPMUNK	1	1	1	1	1	1	1	1	1	0	0	0
174	UINTA CHIPMUNK	0	1	0	0	1	1	0	0	1	0	1	0
175	EASTERN GRAY SQUIRREL	0	0	0	0	1	1	0	0	1	1	0	1
176	EASTERN FOX SQUIRREL	0	0	0	0	1	1	0	1	1	0	1	1
177	RED SQUIRREL	0	0	1	1	1	1	1	1	1	1	1	1
178	NORTHERN FLYING SQUIRREL	0	0	1	1	1	1	1	1	1	0	1	0
179	WHITE-FOOTED MOUSE	1	1	1	1	1	1	0	0	0	1	1	1
180	BUSHY-TAILED WOODRAT	1	1	1	1	1	1	1	1	1	1	1	1
181	NORTHERN BOG LEMMING	1	1	1	0	0	0	1	1	1	0	0	0
182	HEATHER VOLE	1	1	0	0	0	0	1	1	1	1	1	0
183	SOUTHERN RED-BACKED VOLE	0	0	1	1	1	1	1	1	1	1	1	1
184	MEADOW VOLE	1	0	0	0	0	0	1	1	1	1	1	1
185	LONG-TAILED VOLE	1	1	1	1	1	1	1	1	1	1	1	1
186	NORWAY RAT	0	1	1	0	0	0	1	1	1	1	0	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Obs	Common Name	-----Successional Stage ^a -----						-----DSL Land Office-----					
		grass	seed-	old				NWLO	SWLO	CLO	NELO	SLO	ELO
		forb	ling	pole	yng	mat	growth						
187	HOUSE MOUSE	1	1	0	0	0	0	1	1	1	1	1	1
188	PORCUPINE	1	1	1	1	1	1	1	1	1	1	1	1
189	SNOWSHOE HARE	1	1	1	1	1	1	1	1	1	1	1	1
190	WAPITI OR ELK	1	1	1	1	1	1	1	1	1	1	1	0
191	MULE DEER	1	1	1	1	1	1	1	1	1	1	1	1
192	WHITE-TAILED DEER	1	1	1	1	1	1	1	1	1	1	1	1
193	MOOSE	1	1	1	1	1	1	1	1	1	1	1	0
194	WOODLAND CARIBOU	1	1	0	0	1	1	0	0	0	0	0	0
195	RUBBER BOA	1	1	1	1	1	1	1	1	1	0	1	0
196	RACER	1	1	0	0	0	0	1	1	1	1	1	1
197	PINE OR GOPHER SNAKE	1	1	1	1	1	1	1	1	1	1	1	1
198	MILK SNAKE	1	1	1	1	1	1	0	0	0	1	1	1
199	W. TERRESTRIAL GARTER SNAKE	1	1	1	1	1	1	1	1	1	1	1	1
200	WESTERN RATTLESNAKE	1	1	1	1	1	1	1	1	1	1	1	1
201	SAGEBRUSH LIZARD	1	1	1	1	1	1	0	0	1	0	1	1
202	SHORT-HORNED LIZARD	1	1	1	1	1	1	0	0	1	1	1	1
203	WESTERN SKINK	1	1	0	0	0	0	1	1	0	0	0	0
204	NORTHERN ALLIGATOR LIZARD	1	1	1	1	1	1	1	1	0	0	0	0
205	COEUR D'ALENE SALAMANDER (VD)	1	1	1	1	1	1	1	1	0	0	0	0
206	WOOD FROG	0	0	1	1	1	1	0	0	0	0	0	0

^aSuccessional stages:

Grass/forb - plant community dominated by grasses and forbs.

Shrub/seedling - Plant community dominated by shrubs and/or tree seedlings (trees < 1 inch dbh).

Pole stand - Plant community dominated by saplings and pole size trees (1-8.9 inches dbh).

Yng=young forest - Dominant trees are at least 9 inches dbh but have not reached maturity.

Mat=mature - Plant community dominated by mature, vigorous trees.

Old growth -Plant community characterized by large dominant trees past maturity, showing decadence and with a significant component of dead trees.

Figure WLD-8

**WILDLIFE SPECIES ASSOCIATED WITH THREE FOREST CANOPY CLASSES IN MONTANA,
BASED ON PERCENT CANOPY CLOSURE**

(A value of 1 in the canopy class indicates that the species finds optimum feeding or breeding conditions in the class. A value of 1 indicates presence, 0 absence, in the Land Office area.)

Obs	Common name	---Canopy---			-----DSL Land Office-----					
		>70	30-70	<30	NWLO	SWLO	CLO	NELO	SLO	ELO
1	TURKEY VULTURE	0	1	1	1	1	1	1	1	1
2	COOPER'S HAWK	1	1	0	1	1	1	1	1	1
3	NORTHERN GOSHAWK	1	1	1	1	1	1	1	1	1
4	SHARP-SHINNED HAWK	1	1	1	1	1	1	1	1	1
5	RED-TAILED HAWK	1	1	1	1	1	1	1	1	1
6	ROUGH-LEGGED HAWK	0	0	1	1	1	1	1	1	1
7	FERRUGINOUS HAWK	0	0	1	1	1	1	1	1	1
8	SWAINSON'S HAWK	0	0	1	1	1	1	1	1	1
9	MERLIN	0	1	1	1	1	1	1	1	1
10	AMERICAN KESTREL	0	1	1	1	1	1	1	1	1
11	WILD TURKEY	0	1	1	1	1	1	1	1	1
12	BLUE GROUSE	0	1	1	1	1	1	1	1	0
13	SPRUCE GROUSE	1	1	1	1	1	1	0	0	0
14	RUFFED GROUSE	0	1	1	1	1	1	1	1	1
15	MOURNING DOVE	0	1	1	1	1	1	1	1	1
16	YELLOW-BILLED CUCKOO	1	0	0	1	1	1	1	1	1
17	BLACK-BILLED CUCKOO	1	0	0	1	1	1	1	1	1
18	WESTERN SCREECH-OWL	1	1	1	1	1	1	0	0	0
19	FLAMMULATED OWL	0	1	1	1	1	1	0	0	0
20	LONG-EARED OWL	1	0	0	1	1	1	1	1	1
21	GREAT GRAY OWL	1	1	1	1	1	1	1	1	0
22	NORTHERN PYGMY OWL	0	1	1	1	1	1	1	1	1
23	COMMON POORWILL	0	0	1	1	1	1	1	1	1
24	COMMON NIGHTHAWK	0	1	1	1	1	1	1	1	1
25	VAUX'S SWIFT	0	0	1	1	1	1	0	0	0
26	RUFIOUS HUMMINGBIRD	0	0	1	1	1	1	1	1	0
27	NORTHERN FLICKER	0	1	1	1	1	1	1	1	1
28	PILEATED WOODPECKER	1	0	0	1	1	1	0	0	0
29	LEWIS' WOODPECKER	0	0	1	1	1	1	1	1	1
30	DOWNY WOODPECKER	0	1	1	1	1	1	1	1	1
31	HAIRY WOODPECKER	0	1	1	1	1	1	1	1	1
32	BLACK-BACKED WOODPECKER	0	1	1	1	1	1	0	1	1
33	WILLIAMSON'S SAPSUCKER	1	0	0	1	1	1	0	1	0
34	WESTERN KINGBIRD	0	0	1	1	1	1	1	1	1
35	CORDILLERAN FLYCATCHER	1	1	0	1	1	1	1	1	0
36	CASSIN'S KINGBIRD	0	1	1	0	0	0	1	1	1
37	HAMMOND'S FLYCATCHER	0	1	1	1	1	1	1	1	0
38	DUSKY FLYCATCHER	0	0	1	1	1	1	1	1	1
39	OLIVE-SIDED FLYCATCHER	0	1	1	1	1	1	1	1	1
40	WESTERN WOOD PEWEE	0	1	1	1	1	1	1	1	1
41	BARN SWALLOW	0	0	1	1	1	1	1	1	1
42	CLIFF SWALLOW	0	0	1	1	1	1	1	1	1
43	VIOLET-GREEN SWALLOW	0	0	1	1	1	1	1	1	1
44	TREE SWALLOW	0	0	1	1	1	1	1	1	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Obs	Common name	---Canopy---			-----DSL Land Office-----					
		>70	30-70	<30	NWLO	SWLO	CLO	NELO	SLO	ELO
45	BANK SWALLOW	0	0	1	1	1	1	1	1	1
46	ROUGH-WINGED SWALLOW	0	0	1	1	1	1	1	1	1
47	STELLER'S JAY	1	1	0	1	1	1	1	1	1
48	GRAY JAY	1	0	0	1	1	1	1	1	0
49	CLARK'S NUTCRACKER	1	1	1	1	1	1	1	1	1
50	COMMON RAVEN	0	0	1	1	1	1	1	1	1
51	MOUNTAIN CHICKADEE	0	1	1	1	1	1	1	1	0
52	CHESTNUT-BACKED CHICKADEE	1	1	0	1	1	1	0	0	0
53	RED-BREASTED NUTHATCH	1	1	0	1	1	1	1	1	1
54	WHITE-BREASTED NUTHATCH	0	1	1	1	1	1	1	1	1
55	BROWN CREEPER	1	0	0	1	1	1	1	1	1
56	WINTER WREN	1	0	0	1	1	1	1	1	1
57	AMERICAN ROBIN	0	1	1	1	1	1	1	1	1
58	VARIED THRUSH	1	0	0	1	1	1	1	1	0
59	TOWNSEND'S SOLITAIRE	0	1	1	1	1	1	1	1	1
60	VEERY	1	0	0	1	1	1	1	1	1
61	HERMIT THRUSH	0	1	1	1	1	1	1	1	1
62	SWAINSON'S THRUSH	1	0	0	1	1	1	1	1	1
63	MOUNTAIN BLUEBIRD	0	0	1	1	1	1	1	1	1
64	WESTERN BLUEBIRD	0	0	1	1	1	1	1	0	0
65	EASTERN BLUEBIRD	0	0	1	0	0	1	1	0	1
66	RUBY-CROWNED KINGLET	1	1	0	1	1	1	1	1	1
67	GOLDEN-CROWNED KINGLET	0	1	1	1	1	1	1	1	1
68	CEDAR WAXWING	0	0	1	1	1	1	1	1	1
69	NORTHERN SHRIKE	0	0	1	1	1	1	1	1	1
70	LOGGERHEAD SHRIKE	0	0	1	1	1	1	1	1	1
71	WARBLING VIREO	0	0	1	1	1	1	1	1	1
72	SOLITARY VIREO	1	1	0	1	1	1	1	1	1
73	ORANGE-CROWNED WARBLER	0	1	1	1	1	1	1	1	1
74	NASHVILLE WARBLER	0	1	1	1	1	1	1	1	1
75	YELLOW-RUMPED WARBLER	0	0	1	1	1	1	1	1	1
76	TOWNSEND'S WARBLER	1	1	0	1	1	1	1	1	1
77	MACGILLIVRAY'S WARBLER	0	0	1	1	1	1	1	1	1
78	WILSON'S WARBLER	1	1	0	1	1	1	1	1	1
79	COMMON YELLOWTHROAT	0	0	1	1	1	1	1	1	1
80	BREWER'S BLACKBIRD	0	0	1	1	1	1	1	1	1
81	BROWN-HEADED COWBIRD	0	0	1	1	1	1	1	1	1
82	ORCHARD ORIOLE	0	1	1	0	0	0	1	1	1
83	WESTERN TANAGER	1	1	0	1	1	1	1	1	1
84	BLACK-HEADED GROSBEAK	0	1	1	1	1	1	1	1	1
85	CASSIN'S FINCH	0	1	0	1	1	1	1	1	1
86	HOUSE FINCH	0	1	1	1	1	1	1	1	1
87	COMMON REDPOLL	0	1	1	1	1	1	1	1	1
88	RED CROSSBILL	1	1	0	1	1	1	1	1	1
89	WHITE-WINGED CROSSBILL	1	1	0	1	1	1	1	1	1
90	LARK SPARROW	0	0	1	1	1	1	1	1	1
91	DARK-EYED JUNCO	0	1	1	1	1	1	1	1	1
92	CHIPPING SPARROW	0	1	1	1	1	1	1	1	1
93	WHITE-THROATED SPARROW	0	1	1	1	1	1	1	1	1
94	PYGMY SHREW	0	0	1	1	0	0	1	0	0
95	LITTLE BROWN MYOTIS	1	1	1	1	1	1	1	1	1

APPENDIX WLD

Obs	Common name	---Canopy---			-----DSL Land Office-----					
		>70	30-70	<30	NWLO	SWLO	CLO	NELO	SLO	ELO
96	LONG-LEGGED MYOTIS	1	1	1	1	1	1	1	1	1
97	SILVER-HAIRED BAT	1	1	1	1	1	1	1	1	1
98	BIG BROWN BAT	1	1	1	1	1	1	1	1	1
99	HOARY BAT	1	1	1	1	1	1	1	1	1
100	BLACK BEAR	1	1	1	1	1	1	1	1	0
101	GRIZZLY BEAR	1	1	1	0	0	1	0	1	0
102	MARTEN	1	1	0	1	1	1	1	1	0
103	FISHER	1	1	0	1	1	1	0	0	0
104	BADGER	0	0	1	1	1	1	1	1	1
105	WESTERN SPOTTED SKUNK	0	0	1	0	1	1	0	0	0
106	STRIPED SKUNK	0	0	1	1	1	1	1	1	1
107	COYOTE	1	1	1	1	1	1	1	1	1
108	GRAY WOLF	0	1	1	1	0	1	1	0	0
109	RED FOX	0	0	1	1	1	1	1	1	1
110	LYNX	1	1	1	1	1	1	1	1	0
111	BLACK-TAILED PRAIRIE DOG	0	0	1	0	0	1	1	1	1
112	YELLOW-PINE CHIPMUNK	0	1	1	1	1	1	1	1	0
113	LEAST CHIPMUNK	0	0	1	1	1	1	1	1	1
114	RED-TAILED CHIPMUNK	0	1	1	1	1	1	0	0	0
115	UINTA CHIPMUNK	0	1	1	0	0	1	0	1	0
116	EASTERN GRAY SQUIRREL	1	1	0	0	0	1	1	0	1
117	EASTERN FOX SQUIRREL	0	1	1	0	1	1	0	1	1
118	RED SQUIRREL	1	1	0	1	1	1	1	1	1
119	NORTHERN FLYING SQUIRREL	1	1	0	1	1	1	0	1	0
120	WHITE-FOOTED MOUSE	0	1	1	0	0	0	1	1	1
121	SOUTHERN RED-BACKED VOLE	1	1	0	1	1	1	1	1	1
122	MEADOW VOLE	0	0	1	1	1	1	1	1	1
123	EASTERN COTTONTAIL	0	1	1	0	0	0	0	0	1
124	WAPITI OR ELK	1	1	1	1	1	1	1	1	0
125	MULE DEER	0	1	1	1	1	1	1	1	1
126	WHITE-TAILED DEER	1	1	1	1	1	1	1	1	1
127	MOOSE	1	1	1	1	1	1	1	1	0
128	WOODLAND CARIBOU	0	1	1	0	0	0	0	0	0
129	RACER	0	1	1	1	1	1	1	1	1
130	PINE OR GOPHER SNAKE	0	1	1	1	1	1	1	1	1
131	SAGEBRUSH LIZARD	0	0	1	0	0	1	0	1	1
132	SHORT-HORNED LIZARD	0	0	1	0	0	1	1	1	1
133	NORTHERN ALLIGATOR LIZARD	0	1	1	1	1	0	0	0	0

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

**Figure WLD-9
WILDLIFE SPECIES DEPENDENT ON SNAGS TO MEET THEIR BREEDING AND FEEDING
NEEDS.**

(A value of 1 indicates presence, 0 absence, in the Land Office area. A value of 1 under Snags >15" indicates a species which depends on snags 15 inches dbh and larger; a 0 indicates an ability to use smaller snags.)

Obs	Common Name	-----DSL Land Office-----						Snags
		NWLO	SWLO	CLO	NELO	SLO	ELO	>15"
1	DOUBLE-CRESTED CORMORANT	1	1	1	1	1	1	1
2	WOOD DUCK	1	1	1	1	1	1	1
3	BUFFLEHEAD	1	1	1	1	1	1	1
4	COMMON GOLDENEYE	1	1	1	1	1	1	1
5	BARROW'S GOLDENEYE	1	1	1	1	1	1	1
6	HOODED MERGANSER	1	1	1	1	1	1	1
7	COMMON MERGANSER	1	1	1	1	1	1	1
8	TURKEY VULTURE	1	1	1	1	1	1	0
9	BROAD-WINGED HAWK	1	0	1	1	1	1	0
10	BALD EAGLE	1	1	1	1	1	1	1
11	OSPREY	1	1	1	1	1	1	1
12	MERLIN	1	1	1	1	1	1	1
13	AMERICAN KESTREL	1	1	1	1	1	1	1
14	EASTERN SCREECH-OWL	0	0	1	1	1	1	1
15	WESTERN SCREECH-OWL	1	1	1	0	0	0	1
16	FLAMMULATED OWL	1	1	1	0	0	0	1
17	GREAT HORNED OWL	1	1	1	1	1	1	0
18	GREAT GRAY OWL	1	1	1	1	1	0	0
19	BARRED OWL	1	1	1	1	0	0	1
20	SAW-WHET OWL	1	1	1	1	1	1	1
21	BOREAL OWL	1	1	1	0	1	0	0
22	NORTHERN PYGMY OWL	1	1	1	1	1	1	1
23	CHIMNEY SWIFT	0	0	1	1	1	1	1
24	VAUX'S SWIFT	1	1	1	0	0	0	1
25	NORTHERN FLICKER	1	1	1	1	1	1	1
26	PILEATED WOODPECKER	1	1	1	0	0	0	1
27	RED-HEADED WOODPECKER	1	1	1	1	1	1	0
28	LEWIS' WOODPECKER	1	1	1	1	1	1	0
29	DOWNY WOODPECKER	1	1	1	1	1	1	0
30	HAIRY WOODPECKER	1	1	1	1	1	1	0
31	BLACK-BACKED WOODPECKER	1	1	1	0	1	1	0
32	THREE-TOED WOODPECKER	1	1	1	1	1	0	1
33	WILLIAMSON'S SAPSUCKER	1	1	1	0	1	0	0
34	YELLOW-BELLIED (R-NAP) SAPSUCKER	0	0	1	1	0	0	0
35	SAY'S PHOEBE	1	1	1	1	1	1	0
36	CORDILLERAN FLYCATCHER	1	1	1	1	1	0	0
37	VIOLET-GREEN SWALLOW	1	1	1	1	1	1	0
38	TREE SWALLOW	1	1	1	1	1	1	0
39	BLACK-CAPPED CHICKADEE	1	1	1	1	1	1	0
40	MOUNTAIN CHICKADEE	1	1	1	1	1	0	0
41	BOREAL CHICKADEE	1	1	1	0	0	0	0
42	CHESTNUT-BACKED CHICKADEE	1	1	1	0	0	0	0
43	RED-BREASTED NUTHATCH	1	1	1	1	1	1	0
44	WHITE-BREASTED NUTHATCH	1	1	1	1	1	1	0
45	PYGMY NUTHATCH	1	1	1	1	1	1	1

APPENDIX WLD

Obs	Common Name	-----DSL Land Office-----						Snags
		NWLO	SWLO	CLO	NELO	SLO	ELO	>15"
46	BROWN CREEPER	1	1	1	1	1	1	0
47	HOUSE WREN	1	1	1	1	1	1	0
48	WINTER WREN	1	1	1	1	1	1	0
49	MOUNTAIN BLUEBIRD	1	1	1	1	1	1	0
50	WESTERN BLUEBIRD	1	1	1	1	0	0	0
51	EASTERN BLUEBIRD	0	0	1	1	0	1	0
52	EUROPEAN STARLING	1	1	1	1	1	1	0
53	HOUSE SPARROW	1	1	1	1	1	1	0
54	MASKED SHREW	1	1	1	1	1	0	0
55	CALIFORNIA MYOTIS	1	1	0	0	0	0	0
56	LONG-EARED MYOTIS	1	1	1	1	1	1	0
57	NORTHERN MYOTIS (KEEN'S)	0	0	0	0	0	1	0
58	LITTLE BROWN MYOTIS	1	1	1	1	1	1	0
59	WESTERN SMALL-FOOTED MYOTIS	0	0	1	0	1	1	0
60	LONG-LEGGED MYOTIS	1	1	1	1	1	1	0
61	SILVER-HAIRED BAT	1	1	1	1	1	1	0
62	BIG BROWN BAT	1	1	1	1	1	1	0
63	BLACK BEAR	1	1	1	1	1	0	0
64	RACCOON	1	1	1	1	1	1	1
65	MARTEN	1	1	1	1	1	0	1
66	FISHER	1	1	1	0	0	0	1
67	ERMINE	1	1	1	1	1	1	0
68	LONG-TAILED WEASEL	1	1	1	1	1	1	0
69	WESTERN SPOTTED SKUNK	0	1	1	0	0	0	0
70	STRIPED SKUNK	1	1	1	1	1	1	0
71	LYNX	1	1	1	1	1	0	0
72	LEAST CHIPMUNK	1	1	1	1	1	1	0
73	EASTERN GRAY SQUIRREL	0	0	1	1	0	1	0
74	EASTERN FOX SQUIRREL	0	1	1	0	1	1	1
75	RED SQUIRREL	1	1	1	1	1	1	0
76	NORTHERN FLYING SQUIRREL	1	1	1	0	1	0	0
77	WHITE-FOOTED MOUSE	0	0	0	1	1	1	0
78	PORCUPINE	1	1	1	1	1	1	0
79	MILK SNAKE	0	0	0	1	1	1	0

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Figure WLD-10

WILDLIFE SPECIES DEPENDENT ON DOWN WOODY DEBRIS (LOGS, STUMPS, ETC.) TO MEET THEIR BREEDING AND FEEDING NEEDS

(A value of 1 indicates presence, 0 absence, in the Land Office area.)

Obs	Common Name	-----DSL Land Office-----					
		NWLO	SWLO	CLO	NELO	SLO	ELO
1	WESTERN CHORUS FROG	0	0	1	1	1	1
2	UINTA GROUND SQUIRREL	0	0	1	0	1	0
3	IDAHO POCKET GOPHER	0	0	1	0	0	0
4	HARLEQUIN DUCK	1	1	1	1	1	0
5	NORTHERN GOSHAWK	1	1	1	1	1	1
6	BLUE GROUSE	1	1	1	1	1	0
7	SPRUCE GROUSE	1	1	1	0	0	0
8	RUFFED GROUSE	1	1	1	1	1	1
9	CHUKAR	1	1	1	1	1	1
10	DIPPER	1	1	1	1	1	0
11	VEERY	1	1	1	1	1	1
12	SWAINSON'S THRUSH	1	1	1	1	1	1
13	BLACK-AND-WHITE WARBLER	1	0	1	1	1	1
14	NORTHERN WATERTHRUSH	1	1	1	1	1	1
15	DARK-EYED JUNCO	1	1	1	1	1	1
16	MERRIAM'S SHREW	0	0	0	1	1	1
17	WATER SHREW	1	1	1	1	1	0
18	VAGRANT SHREW	1	1	0	0	0	0
19	DWARF SHREW	0	0	1	1	1	1
20	PYGMY SHREW	1	0	0	1	0	0
21	GRIZZLY BEAR	0	0	1	0	1	0
22	LEAST WEASEL	0	0	1	1	1	1
23	MINK	1	1	1	1	1	1
24	RIVER OTTER	1	1	1	1	1	1
25	WOLVERINE	1	1	1	1	1	0
26	COYOTE	1	1	1	1	1	1
27	RED FOX	1	1	1	1	1	1
28	BOBCAT	1	1	1	1	1	1
29	YELLOW-PINE CHIPMUNK	1	1	1	1	1	0
30	RED-TAILED CHIPMUNK	1	1	1	0	0	0
31	UINTA CHIPMUNK	0	0	1	0	1	0
32	DEER MOUSE	1	1	1	1	1	1
33	BUSHY-TAILED WOODRAT	1	1	1	1	1	1
34	NORTHERN BOG LEMMING	1	1	1	0	0	0
35	HEATHER VOLE	1	1	1	1	1	0
36	SOUTHERN RED-BACKED VOLE	1	1	1	1	1	1
37	MONTANE VOLE	1	1	1	1	1	0
38	MEADOW VOLE	1	1	1	1	1	1
39	WATER VOLE (RICHARDSON'S)	1	1	1	1	1	0
40	WESTERN JUMPING MOUSE	1	1	1	1	1	0
41	SNOWSHOE HARE	1	1	1	1	1	1
42	EASTERN COTTONTAIL	0	0	0	0	0	1
43	SNAPPING TURTLE	1	0	0	1	1	1
44	PAINTED TURTLE	1	1	1	1	1	1
45	RUBBER BOA	1	1	1	0	1	0
46	WESTERN HOGNOSE SNAKE	0	0	1	1	1	1

APPENDIX WLD

Obs	Common Name	-----DSL Land Office-----					
		NWLO	SWLO	CLO	NELO	SLO	ELO
47	RACER	1	1	1	1	1	1
48	PINE OR GOPHER SNAKE	1	1	1	1	1	1
49	W. TERRESTRIAL GARTER SNAKE	1	1	1	1	1	1
50	PLAINS GARTER SNAKE	0	0	1	1	1	1
51	COMMON GARTER SNAKE	1	1	1	1	1	1
52	WESTERN RATTLESNAKE	1	1	1	1	1	1
53	SAGEBRUSH LIZARD	0	0	1	0	1	1
54	WESTERN SKINK	1	1	0	0	0	0
55	NORTHERN ALLIGATOR LIZARD	1	1	0	0	0	0
56	LONG-TOED SALAMANDER	1	1	1	0	0	0
57	TIGER SALAMANDER	0	0	0	0	0	0
58	IDAHO GIANT SALAMANDER	1	1	0	0	0	0
59	ROUGHSKIN NEWT	1	0	0	0	0	0
60	COEUR D'ALENE SALAMANDER (VD)	1	1	0	0	0	0
61	TAILED FROG	1	1	1	0	0	0
62	PACIFIC CHORUS FROG	1	1	0	0	0	0
63	WOOD FROG	0	0	0	0	0	0
64	WESTERN TOAD	1	1	1	1	1	0

DSL FORESTED LANDS MANAGEMENT PLAN DEIS**Figure WLD-11****WILDLIFE SPECIES SENSITIVE TO HUMAN DISTURBANCE**

(These species may not be able to meet their breeding and feeding needs in suitable habitat when human use of the area exceeds their limit of tolerance. A value of 1 indicates presence, 0 absence, in the Land Office area.)

Obs	Common Name	-----DSL Land Office-----					
		NWLO	SWLO	CLO	NELO	SLO	ELO
1	WHITE PELICAN	1	1	1	1	1	1
2	DOUBLE-CRESTED CORMORANT	1	1	1	1	1	1
3	GREAT BLUE HERON	1	1	1	1	1	1
4	BLACK-CROWNED NIGHT HERON	1	1	1	1	1	1
5	TURKEY VULTURE	1	1	1	1	1	1
6	COOPER'S HAWK	1	1	1	1	1	1
7	NORTHERN GOSHAWK	1	1	1	1	1	1
8	SHARP-SHINNED HAWK	1	1	1	1	1	1
9	RED-TAILED HAWK	1	1	1	1	1	1
10	FERRUGINOUS HAWK	1	1	1	1	1	1
11	GOLDEN EAGLE	1	1	1	1	1	1
12	BALD EAGLE	1	1	1	1	1	1
13	OSPREY	1	1	1	1	1	1
14	PRAIRIE FALCON	1	1	1	1	1	1
15	PEREGRINE FALCON	1	1	1	1	1	1
16	AMERICAN KESTREL	1	1	1	1	1	1
17	WILD TURKEY	1	1	1	1	1	1
18	SAGE GROUSE	0	1	1	1	1	1
19	SANDHILL CRANE	1	1	1	1	1	1
20	MOUNTAIN PLOVER	1	1	1	1	1	1
21	LONG-BILLED CURLEW	1	1	1	1	1	1
22	PILEATED WOODPECKER	1	1	1	0	0	0
23	BLACK-BILLED MAGPIE	1	1	1	1	1	1
24	YUMA MYOTIS	1	1	1	1	0	0
25	TOWNSEND'S BIG-EARED BAT	1	1	1	1	1	1
26	BLACK BEAR	1	1	1	1	1	0
27	GRIZZLY BEAR	0	0	1	0	1	0
28	MARTEN	1	1	1	1	1	0
29	COYOTE	1	1	1	1	1	1
30	GRAY WOLF	1	0	1	1	0	0
31	RED FOX	1	1	1	1	1	1
32	MOUNTAIN LION	1	1	1	1	1	1
33	WAPITI OR ELK	1	1	1	1	1	0

Figure WLD-12
MONTANA WILDLIFE SPECIES WITH NO LEGAL PROTECTION

(These species may be shot, trapped, or otherwise harvested without restriction. A value of 1 indicates presence, 0 absence, in the Land Office area.)

Obs	Common Name	State						
		Protection	NWLO	SWLO	CLO	NELO	SLO	ELO
1	CORDILLERAN FLYCATCHER		1	1	1	1	1	0
2	NORTHERN CARDINAL		0	0	0	0	0	0
3	GRAY-CROWNED ROSY FINCH		1	0	1	0	0	0
4	MUTE SWAN	?	1	1	1	1	1	0
5	LONG-TOED SALAMANDER	NG	1	1	1	0	0	0
6	TIGER SALAMANDER	NG	0	0	0	0	0	0
7	COEUR D'ALENE SALAMANDER (VD)	NG	1	1	0	0	0	0
8	ROUGHSKIN NEWT	NG	1	0	0	0	0	0
9	IDAHO GIANT SALAMANDER	NG	1	1	0	0	0	0
10	TAILED FROG	NG	1	1	1	0	0	0
11	WESTERN TOAD	NG	1	1	1	1	1	0
12	GREAT PLAINS TOAD	NG	0	0	1	1	1	1
13	CANADIAN TOAD	NG	0	0	1	1	0	0
14	WOODHOUSE'S TOAD	NG	0	0	1	1	1	1
15	WESTERN CHORUS FROG	NG	0	0	1	1	1	1
16	PACIFIC CHORUS FROG	NG	1	1	0	0	0	0
17	PLAINS SPADEFOOT	NG	0	0	1	1	1	1
18	BULLFROG	NG	1	1	0	0	0	0
19	LEOPARD FROG	NG	1	1	1	1	1	1
20	SPOTTED FROG	NG	1	1	1	1	1	0
21	WOOD FROG	NG	0	0	0	0	0	0
22	MASKED SHREW	NG	1	1	1	1	1	0
23	PREBLE'S SHREW	NG	0	1	1	1	1	1
24	VAGRANT SHREW	NG	1	1	0	0	0	0
25	DWARF SHREW	NG	0	0	1	1	1	1
26	WATER SHREW	NG	1	1	1	1	1	0
27	MERRIAM'S SHREW	NG	0	0	0	1	1	1
28	PYGMY SHREW	NG	1	0	0	1	0	0
29	LITTLE BROWN MYOTIS	NG	1	1	1	1	1	1
30	YUMA MYOTIS	NG	1	1	1	1	0	0
31	LONG-EARED MYOTIS	NG	1	1	1	1	1	1
32	LONG-LEGGED MYOTIS	NG	1	1	1	1	1	1
33	CALIFORNIA MYOTIS	NG	1	1	0	0	0	0
34	WESTERN SMALL-FOOTED MYOTIS	NG	0	0	1	0	1	1
35	NORTHERN MYOTIS (KEEN'S)	NG	0	0	0	0	0	1
36	SILVER-HAIRED BAT	NG	1	1	1	1	1	1
37	BIG BROWN BAT	NG	1	1	1	1	1	1
38	HOARY BAT	NG	1	1	1	1	1	1
39	SPOTTED BAT	NG	0	0	0	0	1	1
40	TOWNSEND'S BIG-EARED BAT	NG	1	1	1	1	1	1
41	PALLID BAT	NG	0	0	0	0	1	0
42	PIKA	NG	1	1	1	1	1	0
43	EASTERN COTTONTAIL	NG	0	0	0	0	0	1
44	MOUNTAIN COTTONTAIL	NG	1	1	1	1	1	1
45	DESERT COTTONTAIL	NG	0	0	1	1	1	1

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Obs	Common Name	State						
		Protection	NWLO	SWLO	CLO	NELO	SLO	ELO
46	SNOWSHOE HARE	NG	1	1	1	1	1	1
47	WHITE-TAILED JACK RABBIT	NG	1	1	1	1	1	1
48	BLACK-TAILED JACKRABBIT	NG	0	0	1	0	0	0
49	PYGMY RABBIT	NG	0	0	1	0	0	0
50	LEAST CHIPMUNK	NG	1	1	1	1	1	1
51	YELLOW-PINE CHIPMUNK	NG	1	1	1	1	1	0
52	RED-TAILED CHIPMUNK	NG	1	1	1	0	0	0
53	UINTA CHIPMUNK	NG	0	0	1	0	1	0
54	YELLOW-BELLIED MARMOT	NG	1	1	1	1	1	1
55	HOARY MARMOT	NG	1	1	1	0	0	0
56	RICHARDSON'S GROUND SQUIRREL	NG	0	0	1	1	1	1
57	UINTA GROUND SQUIRREL	NG	0	0	1	0	1	0
58	COLUMBIAN GROUND SQUIRREL	NG	1	1	1	0	0	0
59	THIRTEEN-LINED GROUND SQUIRREL	NG	0	0	1	1	1	1
60	GOLDEN-MANTLED GROUND SQUIRREL	NG	1	1	1	1	1	1
61	BLACK-TAILED PRAIRIE DOG	NG	0	0	1	1	1	1
62	WHITE-TAILED PRAIRIE DOG	NG	0	0	0	0	1	0
63	EASTERN GRAY SQUIRREL	NG	0	0	1	1	0	1
64	EASTERN FOX SQUIRREL	NG	0	1	1	0	1	1
65	RED SQUIRREL	NG	1	1	1	1	1	1
66	NORTHERN FLYING SQUIRREL	NG	1	1	1	0	1	0
67	NORTHERN POCKET GOPHER	NG	1	1	1	1	1	1
68	IDAHO POCKET GOPHER	NG	0	0	1	0	0	0
69	OLIVE-BACKED POCKET MOUSE	NG	0	0	0	1	1	1
70	GREAT BASIN POCKET MOUSE	NG	0	0	1	0	0	0
71	HISPID POCKET MOUSE	NG	0	0	0	0	0	1
72	ORD'S KANGAROO RAT	NG	0	0	0	1	1	1
73	WESTERN HARVEST MOUSE	NG	0	0	0	1	1	1
74	DEER MOUSE	NG	1	1	1	1	1	1
75	WHITE-FOOTED MOUSE	NG	0	0	0	1	1	1
76	NORTHERN GRASSHOPPER MOUSE	NG	1	0	1	1	1	1
77	BUSHY-TAILED WOODRAT	NG	1	1	1	1	1	1
78	SOUTHERN RED-BACKED VOLE	NG	1	1	1	1	1	1
79	HEATHER VOLE	NG	1	1	1	1	1	0
80	MEADOW VOLE	NG	1	1	1	1	1	1
81	MONTANE VOLE	NG	1	1	1	1	1	0
82	LONG-TAILED VOLE	NG	1	1	1	1	1	1
83	PRAIRIE VOLE	NG	0	0	1	1	1	1
84	WATER VOLE (RICHARDSON'S)	NG	1	1	1	1	1	0
85	SAGEBRUSH VOLE	NG	0	1	1	1	1	1
86	NORTHERN BOG LEMMING	NG	1	1	1	0	0	0
87	NORWAY RAT	NG	1	1	1	1	0	1
88	HOUSE MOUSE	NG	1	1	1	1	1	1
89	MEADOW JUMPING MOUSE	NG	0	0	0	0	0	1
90	WESTERN JUMPING MOUSE	NG	1	1	1	1	1	0
91	PORCUPINE	NG	1	1	1	1	1	1
92	RED FOX	NG	1	1	1	1	1	1
93	RACCOON	NG	1	1	1	1	1	1
94	BADGER	NG	1	1	1	1	1	1
95	SNAPPING TURTLE	NG	1	0	0	1	1	1

APPENDIX WLD

Obs	Common Name	State	NWLO	SWLO	CLO	NELO	SLO	ELO
		Protection						
96	PAINTED TURTLE	NG	1	1	1	1	1	1
97	SPINY SOFTSHELL TURTLE	NG	0	0	0	1	1	1
98	NORTHERN ALLIGATOR LIZARD	NG	1	1	0	0	0	0
99	SHORT-HORNED LIZARD	NG	0	0	1	1	1	1
100	SAGEBRUSH LIZARD	NG	0	0	1	0	1	1
101	WESTERN SKINK	NG	1	1	0	0	0	0
102	RUBBER BOA	NG	1	1	1	0	1	0
103	RACER	NG	1	1	1	1	1	1
104	WESTERN HOGNOSE SNAKE	NG	0	0	1	1	1	1
105	MILK SNAKE	NG	0	0	0	1	1	1
106	PINE OR GOPHER SNAKE	NG	1	1	1	1	1	1
107	W. TERRESTRIAL GARTER SNAKE	NG	1	1	1	1	1	1
108	PLAINS GARTER SNAKE	NG	0	0	1	1	1	1
109	COMMON GARTER SNAKE	NG	1	1	1	1	1	1
110	WESTERN RATTLESNAKE	NG	1	1	1	1	1	1
111	ROCK DOVE	U	1	1	1	1	1	1
112	BLACK-BILLED MAGPIE	U	1	1	1	1	1	1
113	COMMON CROW	U	1	1	1	1	1	1
114	EUROPEAN STARLING	U	1	1	1	1	1	1
115	RED-WINGED BLACKBIRD	U	1	1	1	1	1	1
116	YELLOW-HEADED BLACKBIRD	U	1	1	1	1	1	1
117	RUSTY BLACKBIRD	U	1	1	1	1	1	1
118	BREWER'S BLACKBIRD	U	1	1	1	1	1	1
119	COYOTE	U	1	1	1	1	1	1
120	LEAST WEASEL	U	0	0	1	1	1	1
121	LONG-TAILED WEASEL	U	1	1	1	1	1	1
122	WESTERN SPOTTED SKUNK	U	0	1	1	0	0	0
123	STRIPED SKUNK	U	1	1	1	1	1	1

PART III: EFFECTS ANALYSIS ON WILDLIFE SPECIES BY DESCRIPTOR

**Figure WLD-13
DESCRIPTOR SUCCESSIONAL STAGE**

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	----	----
LONG-TOED SALAMANDER	?	?	?	?	?	?
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	?	?	?	?	?	?
ROUGHSKIN NEWT	?	?	?	?	?	?
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	?	?	?	?	?	?
WESTERN TOAD	?	?	?	?	?	?
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	?	?	?	?	?
PACIFIC CHORUS FROG	?	?	?	?	?	?
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	?	?	?	?	?	?
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	?	?	?	?	?	?
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	?	?	?	?	?	?
BLACK-CROWNED NIGHT HERON	?	?	?	?	?	?
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	?	?	?	?	?	?
TRUMPETER SWAN	?	?	?	?	?	?
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	?	?	?	?	?	?
SNOW GOOSE	?	?	?	?	?	?
ROSS' GOOSE	?	?	?	?	?	?
CANADA GOOSE	?	?	?	?	?	?
WOOD DUCK	?	?	?	?	?	?
GREEN-WINGED TEAL	?	?	?	?	?	?
MALLARD	?	?	?	?	?	?
NORTHERN PINTAIL	?	?	?	?	?	?
BLUE-WINGED TEAL	?	?	?	?	?	?
CINNAMON TEAL	?	?	?	?	?	?
NORTHERN SHOVELER	?	?	?	?	?	?
GADWALL	?	?	?	?	?	?
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	?	?	?	?	?	?
CANVASBACK	?	?	?	?	?	?
REDHEAD	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
RING-NECKED DUCK	?	?	?	?	?	?
LESSER SCAUP	?	?	?	?	?	?
HARLEQUIN DUCK	?	?	?	?	?	?
COMMON GOLDENEYE	?	?	?	?	?	?
BARROW'S GOLDENEYE	?	?	?	?	?	?
BUFFLEHEAD	?	?	?	?	?	?
HOODED MERGANSER	?	?	?	?	?	?
COMMON MERGANSER	?	?	?	?	?	?
RED-BREASTED MERGANSER	?	?	?	?	?	?
RUDDY DUCK	?	?	?	?	?	?
TURKEY VULTURE	?	?	?	?	?	?
OSPREY	?	?	?	?	?	?
BALD EAGLE	?	?	?	?	?	?
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	?	?	?	?	?	?
NORTHERN GOSHAWK	+	+	+	+	?	+
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	?	?	?	?	?	?
FERRUGINOUS HAWK	?	?	?	?	?	?
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	?	?	?	?	?	?
AMERICAN KESTREL	?	?	?	?	?	?
MERLIN	?	?	?	?	?	?
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	?	?	?	?	?	?
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	?	?	?	?	?	?
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	?	?	?	?	?
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	?	?	?	?	?	?
WILD TURKEY	?	?	?	?	?	?
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	?	?	?
SORA	?	?	?	?	?	?
AMERICAN COOT	?	?	?	?	?	?
SANDHILL CRANE	?	?	?	?	?	?
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	-----	----
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?
WILLET	?	?	?	?	?	?
SPOTTED SANDPIPER	?	?	?	?	?	?
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	?	?	?	?	?	?
MARbled GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	?	?	?	?	?	?
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	?	?	?	?	?	?
BLACK-BILLED CUCKOO	-	-	-	-	?	-
YELLOW-BILLED CUCKOO	-	-	-	-	?	-
FLAMMULATED OWL	?	?	?	?	?	?
EASTERN SCREECH-OWL	?	?	?	?	?	?
WESTERN SCREECH-OWL	?	?	?	?	?	?
GREAT HORNED OWL	?	?	?	?	?	?
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	?	?	+	?	-	+
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	?	?	?	?	?	?
GREAT GRAY OWL	?	?	?	?	?	?
LONG-EARED OWL	?	?	-	?	?	-
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	?	?	?	?	?	?
SAW-WHET OWL	?	?	?	?	?	?
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	?	?	?	?	?	?
WHITE-THROATED SWIFT	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFOUS HUMMINGBIRD	?	?	-	?	+	?
BELTED KINGFISHER	?	?	?	?	?	?
LEWIS' WOODPECKER	?	?	?	?	?	?
RED-HEADED WOODPECKER	?	?	?	?	?	?
YELLOW-BELLIED (R-NAP) SAPSUCKER?		?	?	?	?	?
WILLIAMSON'S SAPSUCKER	+	+	+	+	?	+
DOWNY WOODPECKER	+	+	+	+	?	+
HAIRY WOODPECKER	+	+	+	+	?	+
THREE-TOED WOODPECKER	?	?	+	?	-	+
BLACK-BACKED WOODPECKER	+	+	+	+	?	+
NORTHERN FLICKER	?	?	?	?	?	?
PILEATED WOODPECKER	?	?	+	?	-	+
OLIVE-SIDED FLYCATCHER	?	?	?	?	?	?
WESTERN WOOD PEWEE	+	+	+	+	?	+
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	?	?	-	?	+	?
CORDILLERAN FLYCATCHER	?	?	?	?	?	?
SAY'S PHOEBE	?	?	-	?	+	-
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	?	?	?	?	?	?
VIOLET-GREEN SWALLOW	?	?	?	?	?	?
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	?	?	?	?	?	?
STELLER'S JAY	?	+	?	?	?	+
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	+	+	+	+	?	+
BLACK-BILLED MAGPIE	?	?	?	?	?	?
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	?	?	?	?	?	?
MOUNTAIN CHICKADEE	+	+	+	+	?	+
BOREAL CHICKADEE	?	?	?	?	?	?
CHESTNUT-BACKED CHICKADEE	?	?	?	?	?	?
RED-BREASTED NUTHATCH	?	?	+	?	-	+
WHITE-BREASTED NUTHATCH	+	+	+	+	?	+
PYGMY NUTHATCH	+	+	+	+	?	+
BROWN CREEPER	+	+	+	+	?	+
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	+	+	+	+	?	+
RUBY-CROWNED KINGLET	?	?	?	?	?	?
WINTER WREN	?	?	?	?	?	?
MARSH WREN	?	?	?	?	?	?
DIPPER	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
GOLDEN-CROWNED KINGLET	+	+	+	+	?	+
EASTERN BLUEBIRD	?	?	?	?	?	?
WESTERN BLUEBIRD	?	?	?	?	?	?
MOUNTAIN BLUEBIRD	?	?	?	?	?	?
TOWNSEND'S SOLITAIRE	?	?	+	?	-	+
VEERY	?	?	?	?	?	?
SWAINSON'S THRUSH	+	+	+	+	?	+
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	-	?	+	?
VARIED THRUSH	?	?	?	?	?	?
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	?	?	?	?	?	?
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	?	?	?	?	?	?
SOLITARY VIREO	+	+	+	+	?	+
WARBLING VIREO	?	?	?	?	?	?
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	-	?	+	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	-	?	+	?
TOWNSEND'S WARBLER	+	+	+	+	?	+
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	?	?	?	?	?	?
AMERICAN REDSTART	-	-	-	-	?	-
OVENBIRD	+	+	?	+	?	+
NORTHERN WATERTHRUSH	?	?	?	?	?	?
MACGILLIVRAY'S WARBLER	?	?	?	?	?	?
COMMON YELLOWTHROAT	?	?	-	?	+	-
WILSON'S WARBLER	-	-	-	-	?	-
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN Tanager	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	?	?	?	?	?	?
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFIOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?
LE CONTE'S SPARROW	?	?	?	?	?	?
FOX SPARROW	?	?	?	?	?	?
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	-	-	-	-	?	-
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	?	?	-	?	+	?
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	+	+	+	+	?	+
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	+	+	+	+	?	+
WHITE-WINGED CROSSBILL	+	+	+	+	?	+
COMMON REDPOLL	?	?	-	?	+	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	?	?	?	?	?	?
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	?	?	?	?	?	?
DWARF SHREW	?	?	?	?	?	?
WATER SHREW	?	?	?	?	?	?
MERRIAM'S SHREW	?	?	-	?	+	-
PYGMY SHREW	?	?	?	?	?	?
LITTLE BROWN MYOTIS	?	?	?	?	?	?
YUMA MYOTIS	?	?	?	?	?	?
LONG-EARED MYOTIS	?	?	?	?	?	?
LONG-LEGGED MYOTIS	?	?	?	?	?	?
CALIFORNIA MYOTIS	?	?	?	?	?	?
WESTERN SMALL-FOOTED MYOTIS	?	?	?	?	?	?
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
SILVER-HAIRED BAT	?	?	?	?	?	?
BIG BROWN BAT	?	?	?	?	?	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	?	?	?	?	?	?
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	?	?	-	?	+	?
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	?	?	-	?	+	-
YELLOW-PINE CHIPMUNK	?	?	-	?	+	?
RED-TAILED CHIPMUNK	?	?	-	?	+	?
UINTA CHIPMUNK	?	?	-	?	+	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	+	+	+	+	?	+
EASTERN FOX SQUIRREL	?	?	+	?	?	+
RED SQUIRREL	+	+	+	+	?	+
NORTHERN FLYING SQUIRREL	+	+	+	+	?	+
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	?	?	?	?	?	?
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	?	?	?	?	?	?
WHITE-FOOTED MOUSE	?	?	-	?	+	?
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	+	+	+	+	?	+
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	?	?	-	?	?	-
MONTANE VOLE	?	?	?	?	?	?
LONG-TAILED VOLE	?	?	-	?	?	-
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	?	?	?	?	?	?
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	?	?	?	?	?	?
NORTHERN BOG LEMMING	?	?	-	?	?	-

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	-	?	?	-
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	?	?	?	?	?	?
PORCUPINE	+	+	+	+	?	+
COYOTE	?	?	?	?	?	?
GRAY WOLF	?	?	?	?	?	?
RED FOX	?	?	-	?	+	?
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	?	?	?	?	?	?
GRIZZLY BEAR	?	?	?	?	?	?
RACCOON	?	?	?	?	?	?
MARTEN	+	+	+	+	?	+
FISHER	+	+	+	+	?	+
ERMINE	?	?	?	?	?	?
LEAST WEASEL	?	?	?	?	?	?
LONG-TAILED WEASEL	?	?	?	?	?	?
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	?	?	?	?	?	?
WOLVERINE	?	?	?	?	?	?
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	?	?	-	?	+	?
STRIPED SKUNK	?	?	-	?	+	?
RIVER OTTER	?	?	?	?	?	?
MOUNTAIN LION	?	?	?	?	?	?
LYNX	+	+	+	+	?	+
BOBCAT	?	?	?	?	?	?
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	?	?	-	?	?	-
WHITE-TAILED DEER	?	?	?	?	?	?
MOOSE	?	?	?	?	?	?
WOODLAND CARIBOU	+	+	+	+	?	+
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	?	?	?	?	?	?
SNAPPING TURTLE	?	?	?	?	?	?
PAINTED TURTLE	?	?	?	?	?	?
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	?	?	?	?	?	?
SHORT-HORNED LIZARD	?	?	-	?	+	-
SAGEBRUSH LIZARD	?	?	-	?	+	?
WESTERN SKINK	?	?	?	?	?	?
RUBBER BOA	?	?	?	?	?	?
RACER	?	?	-	?	?	-
WESTERN HOGNOSE SNAKE	?	?	?	?	?	?
MILK SNAKE	?	?	-	?	+	-
PINE OR GOPHER SNAKE	?	?	-	?	+	-
W. TERRESTRIAL GARTER SNAKE	?	?	-	?	?	-
PLAINS GARTER SNAKE	?	?	?	?	?	?
COMMON GARTER SNAKE	?	?	?	?	?	?
WESTERN RATTLESNAKE	?	?	-	?	+	-

Figure WLD-14
DESCRIPTOR FOREST TYPE

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	-----	-----	-----	-----
LONG-TOED SALAMANDER	?	?	?	?	?	?
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	?	?	?	?	?	?
ROUGHSKIN NEWT	?	?	?	?	?	?
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	?	?	?	?	?	?
WESTERN TOAD	?	?	?	?	?	?
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	?	?	?	?	?
PACIFIC CHORUS FROG	?	?	?	?	?	?
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	?	?	?	?	?	?
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	?	?	?	?	?	?
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	?	?	?	?	?	?
BLACK-CROWNED NIGHT HERON	?	?	?	?	?	?
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	?	?	?	?	?	?
TRUMPETER SWAN	?	?	?	?	?	?
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	?	?	?	?	?	?
SNOW GOOSE	?	?	?	?	?	?
ROSS' GOOSE	?	?	?	?	?	?
CANADA GOOSE	?	?	?	?	?	?
WOOD DUCK	?	?	?	?	?	?
GREEN-WINGED TEAL	?	?	?	?	?	?
MALLARD	?	?	?	?	?	?
NORTHERN PINTAIL	?	?	?	?	?	?
BLUE-WINGED TEAL	?	?	?	?	?	?
CINNAMON TEAL	?	?	?	?	?	?
NORTHERN SHOVELER	?	?	?	?	?	?
GADWALL	?	?	?	?	?	?
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	?	?	?	?	?	?
CANVASBACK	?	?	?	?	?	?
REDHEAD	?	?	?	?	?	?
RING-NECKED DUCK	?	?	?	?	?	?
LESSER SCAUP	?	?	?	?	?	?
HARLEQUIN DUCK	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	?	?	?	?	?	?
BARROW'S GOLDENEYE	?	?	?	?	?	?
BUFFLEHEAD	?	?	?	?	?	?
HOODED MERGANSER	?	?	?	?	?	?
COMMON MERGANSER	?	?	?	?	?	?
RED-BREASTED MERGANSER	?	?	?	?	?	?
RUDDY DUCK	?	?	?	?	?	?
TURKEY VULTURE	?	?	?	?	?	?
OSPREY	?	?	?	?	?	?
BALD EAGLE	?	?	?	?	?	?
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	?	?	?	?	?	?
NORTHERN GOSHAWK	?	?	-	?	?	-
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	?	?	?	?	?	?
FERRUGINOUS HAWK	?	?	?	?	?	?
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	?	?	?	?	?	?
AMERICAN KESTREL	-	-	-	-	-	-
MERLIN	?	?	?	?	?	?
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	?	?	?	?	?	?
SPRUCE GROUSE	+	+	?	+	?	?
BLUE GROUSE	?	?-	+	?-	-	+
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	-	-	-	-	-	-
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	?	?	?	?	?	?
WILD TURKEY	?	?+	?+	+	+	?+
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	?	?	?
SORA	?	?	?	?	?	?
AMERICAN COOT	?	?	?	?	?	?
SANDHILL CRANE	?	?	?	?	?	?
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?
WILLET	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	----	----
SPOTTED SANDPIPER	?	?	?	?	?	?
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	?	?	?	?	?	?
MARbled GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	?	?	?	?	?	?
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	?	?	?	?	?	?
BLACK-BILLED CUCKOO	-	-	-	-	-	-
YELLOW-BILLED CUCKOO	-	-	-	-	-	-
FLAMMULATED OWL	?	?	?	?	?	?
EASTERN SCREECH-OWL	-	-	-	-	-	-
WESTERN SCREECH-OWL	-	-	-	-	-	-
GREAT HORNED OWL	-	-	-	?	?	-
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	?	?	?	?	?	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	?	?	?	?	?	?
GREAT GRAY OWL	?	+	?+	+	+	?+
LONG-EARED OWL	-	-	-	-	-	-
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	?	?	?	?	?	?
SAW-WHET OWL	?	?	?	?	?	?
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	?	?	?	?	?	?
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFIOUS HUMMINGBIRD	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
BELTED KINGFISHER	?	?	?	?	?	?
LEWIS' WOODPECKER	-	-	-	-	-	-
RED-HEADED WOODPECKER	-	-	-	-	-	-
YELLOW-BELLIED (R-NAP) SAPSUCKER?		?	?	?	?	?
WILLIAMSON'S SAPSUCKER	?	?	?	?	?	?
DOWNY WOODPECKER	-	-	-	-	-	-
HAIRY WOODPECKER	?	?	?	?	?	?
THREE-TOED WOODPECKER	+	+	+	+	-	+
BLACK-BACKED WOODPECKER	?	?	-	?	?	-
NORTHERN FLICKER	+	+	?	?	?	?
PILEATED WOODPECKER	?	?	?	?	?	+
OLIVE-SIDED FLYCATCHER	+	+	?	?	?	?
WESTERN WOOD PEWEE	?	?	?	?	?	?
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	-	?	?	-
DUSKY FLYCATCHER	-	-	-	-	-	-
CORDILLERAN FLYCATCHER	-	-	-	-	-	-
SAY'S PHOEBE	?	?	?	?	?	?
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	-	-	-	-	-	-
VIOLET-GREEN SWALLOW	?	?+	?+	+	+	?+
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	+	+	?	+	?	?
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	?	?	?	?	?	?
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	-	-	-	-	-	-
MOUNTAIN CHICKADEE	+	+	+	+	?-	+
BOREAL CHICKADEE	+	+	+	+	?-	+
CHESTNUT-BACKED CHICKADEE	+	+	?	+	?	?
RED-BREASTED NUTHATCH	?	?	?	?	?	?
WHITE-BREASTED NUTHATCH	?	?	-	?	?	-
PYGMY NUTHATCH	?	?	-	?	?	-
BROWN CREEPER	?	?	?	?	?	?
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	?	?	?	?	?	?
RUBY-CROWNED KINGLET	?	?-	+	?-	-	+
WINTER WREN	?	?	?	?	?	?
MARSH WREN	?	?	?	?	?	?
DIPPER	?	?	?	?	?	?
GOLDEN-CROWNED KINGLET	+	+	?	+	?	?
EASTERN BLUEBIRD	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
WESTERN BLUEBIRD	?	?	?	?	?	?
MOUNTAIN BLUEBIRD	?	?	?	?	?	?
TOWNSEND'S SOLITAIRE	?	?	?	?	?	?
VEERY	?	?	?	?	?	?
SWAINSON'S THRUSH	?	?	?	?	?	?
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	?	?	?	?
VARIED THRUSH	?	?	?	?	?	?
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	-	-	-	-	-	-
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	?	?	?	?	?	?
SOLITARY VIREO	+	+	?	+	?	?
WARBLING VIREO	-	-	-	-	-	-
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	?	?	?	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	?	?	?	?
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	-	-	-	-	-	-
AMERICAN REDSTART	-	-	-	-	-	-
OVENBIRD	-	-	-	-	-	-
NORTHERN WATERTHRUSH	?	?	?	?	?	?
MACGILLIVRAY'S WARBLER	-	-	-	-	-	-
COMMON YELLOWTHROAT	-	-	-	-	-	-
WILSON'S WARBLER	-	-	-	-	-	-
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN TANAGER	?	?	-	?	?	-
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	-	-	-	-	-	-
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFIOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?
LE CONTE'S SPARROW	?	?	?	?	?	?
FOX SPARROW	?	?	?	?	?	?
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	?	?	?	?	?	?
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	?	?	?	?	?	?
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	+	+	+	+	? -	+
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	?	?	?	?	?	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	?	?	?	?	?	?
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	?	?	?	?	?	?
DWARF SHREW	?	?	?	?	?	?
WATER SHREW	?	?	?	?	?	?
MERRIAM'S SHREW	?	?	?	?	?	?
PYGMY SHREW	?	?	?	?	?	?
LITTLE BROWN MYOTIS	?	?	?	?	?	?
YUMA MYOTIS	?	?	?	?	?	?
LONG-EARED MYOTIS	?	?	?	?	?	?
LONG-LEGGED MYOTIS	?	?	?	?	?	?
CALIFORNIA MYOTIS	?	?	?	?	?	?
WESTERN SMALL-FOOTED MYOTIS	?	?	?	?	?	?
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?
SILVER-HAIRED BAT	?	?	?	?	?	?
BIG BROWN BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	-	-	-	-	-	-
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	?	?	?	?	?	?
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	?	?	?	?	?	?
YELLOW-PINE CHIPMUNK	?	?	?	?	?	?
RED-TAILED CHIPMUNK	+	+	+	+	?-	+
UINTA CHIPMUNK	?	?	?	?	?	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	?	?	?	?	?	?
EASTERN FOX SQUIRREL	?	?	?	?	?	?
RED SQUIRREL	?	?	?	?	?	?
NORTHERN FLYING SQUIRREL	?	?	?	?	?	?
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	?	?	?	?	?	?
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	?	?	?	?	?	?
WHITE-FOOTED MOUSE	?	?	?	?	?	?
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	+	+	+	+	?-	+
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	?	?	?	?	?	?
MONTANE VOLE	?	?	?	?	?	?
LONG-TAILED VOLE	?	?	?	?	?	?
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	?	?	?	?	?	?
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	?	?	?	?	?	?
NORTHERN BOG LEMMING	?	?	?	?	?	?
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	?	?	?	?	?	?
PORCUPINE	+	+	?	?	?	?
COYOTE	?	?	?	?	?	?
GRAY WOLF	?	?	?	?	?	?
RED FOX	?	?	?	?	?	?
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	?	?	?	?	?	?
GRIZZLY BEAR	?	?	?	?	?	?
RACCOON	-	-	-	-	-	-
MARTEN	?	?	?	?	?	?
FISHER	?	?	?	?	?	?
ERMINE	+	+	+	+	?-	+
LEAST WEASEL	?	?	?	?	?	?
LONG-TAILED WEASEL	?	?	?	?	?	?
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	?	?	?	?	?	?
WOLVERINE	+	+	+	+	?-	+
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	?	?	?	?	?	?
STRIPED SKUNK	-	-	-	-	-	-
RIVER OTTER	?	?	?	?	?	?
MOUNTAIN LION	?	?	?	?	?	?
LYNX	+	+	?	+	?	?
BOBCAT	?	?	?	?	?	?
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	+	+	+	+	?-	+
WHITE-TAILED DEER	-	-	-	-	-	-
MOOSE	?	?	?	?	?	?
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	?	?	?	?	?	?
SNAPPING TURTLE	?	?	?	?	?	?
PAINTED TURTLE	?	?	?	?	?	?
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	?	?	?	?	?	?
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	?	?	?	?	?	?
WESTERN SKINK	?	?	?	?	?	?
RUBBER BOA	?	?	?	?	?	?
RACER	?	?	?	?	?	?
WESTERN HOGNOSE SNAKE	?	?	?	?	?	?
MILK SNAKE	?	?	?	?	?	?
PINE OR GOPHER SNAKE	?	?	?	?	?	?
W. TERRESTRIAL GARTER SNAKE	?	?	?	?	?	?
PLAINS GARTER SNAKE	?	?	?	?	?	?
COMMON GARTER SNAKE	?	?	?	?	?	?
WESTERN RATTLESNAKE	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

**Table WLD-15
DESCRIPTOR STOCKING LEVEL**

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LONG-TOED SALAMANDER	?	?	?	?	?	?
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	?	?	?	?	?	?
ROUGHSKIN NEWT	?	?	?	?	?	?
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	?	?	?	?	?	?
WESTERN TOAD	?	?	?	?	?	?
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	?	?	?	?	?
PACIFIC CHORUS FROG	?	?	?	?	?	?
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	?	?	?	?	?	?
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	?	?	?	?	?	?
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	?	?	?	?	?	?
BLACK-CROWNED NIGHT HERON	?	?	?	?	?	?
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	?	?	?	?	?	?
TRUMPETER SWAN	?	?	?	?	?	?
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	?	?	?	?	?	?
SNOW GOOSE	?	?	?	?	?	?
ROSS' GOOSE	?	?	?	?	?	?
CANADA GOOSE	?	?	?	?	?	?
WOOD DUCK	?	?	?	?	?	?
GREEN-WINGED TEAL	?	?	?	?	?	?
MALLARD	?	?	?	?	?	?
NORTHERN PINTAIL	?	?	?	?	?	?
BLUE-WINGED TEAL	?	?	?	?	?	?
CINNAMON TEAL	?	?	?	?	?	?
NORTHERN SHOVELER	?	?	?	?	?	?
GADWALL	?	?	?	?	?	?
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	?	?	?	?	?	?
CANVASBACK	?	?	?	?	?	?
REDHEAD	?	?	?	?	?	?
RING-NECKED DUCK	?	?	?	?	?	?
LESSER SCAUP	?	?	?	?	?	?
HARLEQUIN DUCK	?	?	?	?	?	?

APPENDIX WLD

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	?	?	?	?	?	?
BARROW'S GOLDENEYE	?	?	?	?	?	?
BUFFLEHEAD	?	?	?	?	?	?
HOODED MERGANSER	?	?	?	?	?	?
COMMON MERGANSER	?	?	?	?	?	?
RED-BREASTED MERGANSER	?	?	?	?	?	?
RUDDY DUCK	?	?	?	?	?	?
TURKEY VULTURE	?	?	?	?	?	?
OSPREY	?	?	?	?	?	?
BALD EAGLE	?	?	?	?	?	?
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	?	?	?	?	?	?
NORTHERN GOSHAWK	?	?	?	?	?	?
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	-	?	-	?	?	-
FERRUGINOUS HAWK	?	?	?	?	?	?
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	?	?	?	?	?	?
AMERICAN KESTREL	-	-	-	?	?+	-
MERLIN	-	-	-	?	?+	-
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	?	?	?	?	?	?
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	-	-	-	?	?+	-
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	?	?	?	?	?
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	?	?	?	?	?	?
WILD TURKEY	-	-	-	?	?+	-
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	?	?	?
SORA	?	?	?	?	?	?
AMERICAN COOT	?	?	?	?	?	?
SANDHILL CRANE	?	?	?	?	?	?
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?
WILLET	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
SPOTTED SANDPIPER	?	?	?	?	?	?
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	?	?	?	?	?	?
MARbled GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	?	?	?	?	?	?
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	?	?	?	?	?	?
BLACK-BILLED CUCKOO	+	+	+	?+	?-	+
YELLOW-BILLED CUCKOO	+	+	+	?+	?-	+
FLAMMULATED OWL	-	-	-	?	?+	-
EASTERN SCREECH-OWL	-	?	-	?	?	-
WESTERN SCREECH-OWL	-	?	-	?	?	-
GREAT HORNED OWL	?	?	?	?	?	?
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	?	?	?	?	?	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	?	?	?	?	?	?
GREAT GRAY OWL	?	?	?	?	?	?
LONG-EARED OWL	?	?	?	?	?	?
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	?	?	?	?	?	?
SAW-WHET OWL	?	?	?	?	?	?
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	?	?	?	?	?	?
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFOUS HUMMINGBIRD	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
BELTED KINGFISHER	?	?	?	?	?	?
LEWIS' WOODPECKER	-	-	-	?	?+	-
RED-HEADED WOODPECKER	?	?	?	?	?	?
YELLOW-BELLIED (R-NAP) SAPSUCKER	?	?	?	?	?	?
WILLIAMSON'S SAPSUCKER	?	?	?	?	?	?
DOWNY WOODPECKER	?	?	?	?	?	?
HAIRY WOODPECKER	-	-	-	?	?+	-
THREE-TOED WOODPECKER	?	?	?	?	?	?
BLACK-BACKED WOODPECKER	-	-	-	?	?+	-
NORTHERN FLICKER	-	-	-	?	?+	-
PILEATED WOODPECKER	?	?	?	?	?	?
OLIVE-SIDED FLYCATCHER	?	?	?	?	?	?
WESTERN WOOD PEWEE	?	?	?	?	?	?
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	?	?	?	?	?	?
CORDILLERAN FLYCATCHER	?	?	?	?	?	?
SAY'S PHOEBE	?	?	?	?	?	?
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	-	-	-	?	?+	-
VIOLET-GREEN SWALLOW	?	?	?	?	?	?
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	?	?	?	?	?	?
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	?	?	?	?	?	?
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	?	?	?	?	?	?
MOUNTAIN CHICKADEE	?	?	?	?	?	?
BOREAL CHICKADEE	?	?	?	?	?	?
CHESTNUT-BACKED CHICKADEE	+	+	+	?+	?-	+
RED-BREASTED NUTHATCH	+	+	+	?+	?-	+
WHITE-BREASTED NUTHATCH	-	-	-	?	?+	-
PYGMY NUTHATCH	?	?	?	?	?	?
BROWN CREEPER	?	?	?	?	?	?
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	?	?	?	?	?	?
RUBY-CROWNED KINGLET	+	+	+	?+	?-	+
WINTER WREN	+	+	+	?+	?-	+
MARSH WREN	?	?	?	?	?	?
DIPPER	?	?	?	?	?	?
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
WESTERN BLUEBIRD	?	?	?	?	?	?
MOUNTAIN BLUEBIRD	?	?	?	?	?	?
TOWNSEND'S SOLITAIRE	-	-	-	?	?+	-
VEERY	+	+	+	?+	?-	+
SWAINSON'S THRUSH	+	+	+	?+	?-	+
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	?	?	?	?
VARIED THRUSH	+	+	+	?+	?-	+
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	?	?	?	?	?	?
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	?	?	?	?	?	?
SOLITARY VIREO	+	+	+	?+	?-	+
WARBLING VIREO	?	?	?	?	?	?
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	?	?	?	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	?	?	?	?
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	?	?	?	?	?	?
AMERICAN REDSTART	?	?	?	?	?	?
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	?	?	?	?	?	?
MACGILLIVRAY'S WARBLER	?	?	?	?	?	?
COMMON YELLOWTHROAT	-	-	-	?	?+	-
WILSON'S WARBLER	?	?	?	?	?	?
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN Tanager	-	?-	-	?-	0	-
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	-	-	-	?	?+	-
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFIOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?
BAIRD'S SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
GRASSHOPPER SPARROW	?	?	?	?	?	?
LE CONTE'S SPARROW	?	?	?	?	?	?
FOX SPARROW	?	?	?	?	?	?
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	?	?	?	?	?	?
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	-	-	-	?	?+	-
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	?	?	?	?	?	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	?	?	?	?	?	?
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	?	?	?	?	?	?
DWARF SHREW	?	?	?	?	?	?
WATER SHREW	?	?	?	?	?	?
MERRIAM'S SHREW	?	?	?	?	?	?
PYGMY SHREW	?	?	?	?	?	?
LITTLE BROWN MYOTIS	?	?	?	?	?	?
YUMA MYOTIS	?	?	?	?	?	?
LONG-EARED MYOTIS	?	?	?	?	?	?
LONG-LEGGED MYOTIS	?	?	?	?	?	?
CALIFORNIA MYOTIS	?	?	?	?	?	?
WESTERN SMALL-FOOTED MYOTIS	?	?	?	?	?	?
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?
SILVER-HAIRED BAT	?	?	?	?	?	?
BIG BROWN BAT	?	?	?	?	?	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	-	-	-	?	?+	-
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	?	?	?	?	?	?
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	-	-	-	?	?+	-
YELLOW-PINE CHIPMUNK	?	?	?	?	?	?
RED-TAILED CHIPMUNK	-	-	-	?	?+	-
UINTA CHIPMUNK	-	-	-	?	?+	-
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	?	?	?	?	?-	?
EASTERN FOX SQUIRREL	?	?	?	?	?	?
RED SQUIRREL	?	?	?	?	?	?
NORTHERN FLYING SQUIRREL	?	?	?	?	?	?
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	?	?	?	?	?	?
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	?	?	?	?	?	?
WHITE-FOOTED MOUSE	-	-	-	?	?+	-
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	?	?	?	?	?	?
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	-	-	-	?	?+	-
MONTANE VOLE	?	?	?	?	?	?
LONG-TAILED VOLE	?	?	?	?	?	?
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	?	?	?	?	?	?
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	?	?	?	?	?	?
NORTHERN BOG LEMMING	?	?	?	?	?	?
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	?	?	?	?	?	?
PORCUPINE	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COYOTE	?	?	?	?	?	?
GRAY WOLF	?	?	?	?	?	?
RED FOX	?	?	?	?	?	?
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	?	?	?	?	?	?
GRIZZLY BEAR	?	?	?	?	?	?
RACCOON	?	?	?	?	?	?
MARTEN	?	?	?	?	? -	?
FISHER	+	+	+	? +	? -	+
ERMINE	?	?	?	?	?	?
LEAST WEASEL	?	?	?	?	?	?
LONG-TAILED WEASEL	?	?	?	?	?	?
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	?	?	?	?	?	?
WOLVERINE	?	?	?	?	?	?
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	-	-	-	?	? +	-
STRIPED SKUNK	-	-	-	?	? +	-
RIVER OTTER	?	?	?	?	?	?
MOUNTAIN LION	?	?	?	?	?	?
LYNX	+	+	+	? +	? -	+
BOBCAT	?	?	?	?	?	?
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	?	?	?	?	?	?
WHITE-TAILED DEER	?	?	?	?	?	?
MOOSE	?	?	?	?	?	?
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	?	?	?	?	?	?
SNAPPING TURTLE	?	?	?	?	?	?
PAINTED TURTLE	?	?	?	?	?	?
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	?	?	?	?	?	?
SHORT-HORNED LIZARD	-	-	-	?	? +	-
SAGEBRUSH LIZARD	-	-	-	?	? +	-
WESTERN SKINK	?	?	?	?	?	?
RUBBER BOA	?	?	?	?	?	?
RACER	-	-	-	?	? +	-
WESTERN HOGNOSE SNAKE	?	?	?	?	?	?
MILK SNAKE	?	?	?	?	?	?
PINE OR GOPHER SNAKE	-	-	-	?	? +	-
W. TERRESTRIAL GARTER SNAKE	?	?	?	?	?	?
PLAINS GARTER SNAKE	?	?	?	?	?	?
COMMON GARTER SNAKE	?	?	?	?	?	?
WESTERN RATTLESNAKE	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

**Table WLD-16
DESCRIPTOR SNAG ABUNDANCE**

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	-----	----
LONG-TOED SALAMANDER	?	?	?	?	?	?
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	?	?	?	?	?	?
ROUGHSKIN NEWT	?	?	?	?	?	?
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	?	?	?	?	?	?
WESTERN TOAD	?	?	?	?	?	?
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	?	?	?	?	?
PACIFIC CHORUS FROG	?	?	?	?	?	?
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	?	?	?	?	?	?
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	-	+	+	-	-	+
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	?	?	?	?	?	?
BLACK-CROWNED NIGHT HERON	?	?	?	?	?	?
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	?	?	?	?	?	?
TRUMPETER SWAN	?	?	?	?	?	?
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	?	?	?	?	?	?
SNOW GOOSE	?	?	?	?	?	?
ROSS' GOOSE	?	?	?	?	?	?
CANADA GOOSE	?	?	?	?	?	?
WOOD DUCK	-	+	+	-	-	+
GREEN-WINGED TEAL	?	?	?	?	?	?
MALLARD	?	?	?	?	?	?
NORTHERN PINTAIL	?	?	?	?	?	?
BLUE-WINGED TEAL	?	?	?	?	?	?
CINNAMON TEAL	?	?	?	?	?	?
NORTHERN SHOVELER	?	?	?	?	?	?
GADWALL	?	?	?	?	?	?
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	?	?	?	?	?	?
CANVASBACK	?	?	?	?	?	?
REDHEAD	?	?	?	?	?	?
RING-NECKED DUCK	?	?	?	?	?	?
LESSER SCAUP	?	?	?	?	?	?
HARLEQUIN DUCK	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	-	+	+	-	-	+
BARROW'S GOLDENEYE	-	+	+	-	-	+
BUFFLEHEAD	-	+	+	-	-	+
HOODED MERGANSER	-	+	+	-	-	+
COMMON MERGANSER	-	+	+	-	-	+
RED-BREASTED MERGANSER	?	?	?	?	?	?
RUDDY DUCK	?	?	?	?	?	?
TURKEY VULTURE	+	?	+	+	-	+
OSPREY	-	+	+	-	-	+
BALD EAGLE	-	+	+	-	-	+
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	?	?	?	?	?	?
NORTHERN GOSHAWK	?	?	?	?	?	?
BROAD-WINGED HAWK	+	?	+	+	-	+
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	?	?	?	?	?	?
FERRUGINOUS HAWK	?	?	?	?	?	?
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	-	+	+	-	-	+
AMERICAN KESTREL	-	+	+	-	-	+
MERLIN	-	+	+	-	-	+
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	?	?	?	?	?	?
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	?	?	?	?	?	?
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	?	?	?	?	?
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	?	?	?	?	?	?
WILD TURKEY	?	?	?	?	?	?
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	?	?	?
SORA	?	?	?	?	?	?
AMERICAN COOT	?	?	?	?	?	?
SANDHILL CRANE	?	?	?	?	?	?
WHOOPIING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?
WILLET	?	?	?	?	?	?
SPOTTED SANDPIPER	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	?	?	?	?	?	?
MARbled GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	?	?	?	?	?	?
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	?	?	?	?	?	?
BLACK-BILLED CUCKOO	?	?	?	?	?	?
YELLOW-BILLED CUCKOO	?	?	?	?	?	?
FLAMMULATED OWL	-	+	+	-	-	+
EASTERN SCREECH-OWL	-	+	+	-	-	+
WESTERN SCREECH-OWL	-	+	+	-	-	+
GREAT HORNED OWL	+	?	+	+	-	+
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	-	+	+	-	-	+
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	-	+	+	-	-	+
GREAT GRAY OWL	+	?	+	?	?	?
LONG-EARED OWL	?	?	?	?	?	?
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	+	?	+	+	-	+
SAW-WHET OWL	-	+	+	-	-	+
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	-	+	+	-	-	+
VAUX'S SWIFT	-	+	+	-	-	+
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFOUS HUMMINGBIRD	?	?	?	?	?	?
BELTED KINGFISHER	?	?	?	?	?	?
LEWIS' WOODPECKER	+	?	+	+	-	+

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
RED-HEADED WOODPECKER	+	?	+	+	-	+
YELLOW-BELLIED (R-NAP) SAPSUCKER	+	?	+	+	-	+
WILLIAMSON'S SAPSUCKER	+	?	+	+	-	+
DOWNY WOODPECKER	+	?	+	+	-	+
HAIRY WOODPECKER	+	?	+	+	-	+
THREE-TOED WOODPECKER	-	+	+	-	-	+
BLACK-BACKED WOODPECKER	+	?	+	+	-	+
NORTHERN FLICKER	-	+	+	-	-	+
PILEATED WOODPECKER	-	+	+	-	-	+
OLIVE-SIDED FLYCATCHER	?	?	?	?	?	?
WESTERN WOOD PEWEE	?	?	?	?	?	?
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	?	?	?	?	?	?
CORDILLERAN FLYCATCHER	+	?	+	+	-	+
SAY'S PHOEBE	+	?	+	+	-	+
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	+	?	+	+	-	+
VIOLET-GREEN SWALLOW	+	?	+	+	-	+
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	?	?	?	?	?	?
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	?	?	?	?	?	?
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	+	?	+	+	-	+
MOUNTAIN CHICKADEE	+	?	+	+	-	+
BOREAL CHICKADEE	+	?	+	+	-	+
CHESTNUT-BACKED CHICKADEE	+	?	+	+	-	+
RED-BREASTED NUTHATCH	+	?	+	+	-	+
WHITE-BREASTED NUTHATCH	+	?	+	+	-	+
PYGMY NUTHATCH	-	+	+	-	-	+
BROWN CREEPER	+	?	+	+	-	+
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	+	?	+	+	-	+
RUBY-CROWNED KINGLET	?	?	?	?	?	?
WINTER WREN	+	?	+	+	-	+
MARSH WREN	?	?	?	?	?	?
DIPPER	?	?	?	?	?	?
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	+	?	+	+	-	+
WESTERN BLUEBIRD	+	?	+	+	-	+
MOUNTAIN BLUEBIRD	+	?	+	+	-	+
TOWNSEND'S SOLITAIRE	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	-----	-----	-----	-----
VEERY	?	?	?	?	?	?
SWAINSON'S THRUSH	?	?	?	?	?	?
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	?	?	?	?
VARIED THRUSH	?	?	?	?	?	?
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	?	?	?	?	?	?
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	+	?	+	+	-	+
SOLITARY VIREO	?	?	?	?	?	?
WARBLING VIREO	?	?	?	?	?	?
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	?	?	?	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	?	?	?	?
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	?	?	?	?	?	?
AMERICAN REDSTART	?	?	?	?	?	?
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	?	?	?	?	?	?
MACGILLIVRAY'S WARBLER	?	?	?	?	?	?
COMMON YELLOWTHROAT	?	?	?	?	?	?
WILSON'S WARBLER	?	?	?	?	?	?
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN Tanager	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	?	?	?	?	?	?
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFIOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?
LE CONTE'S SPARROW	?	?	?	?	?	?
FOX SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	?	?	?	?	?	?
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	?	?	?	?	?	?
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	?	?	?	?	?	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	+	?	+	+	-	+
MASKED SHREW	+	?	+	+	-	+
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	?	?	?	?	?	?
DWARF SHREW	?	?	?	?	?	?
WATER SHREW	?	?	?	?	?	?
MERRIAM'S SHREW	?	?	?	?	?	?
PYGMY SHREW	?	?	?	?	?	?
LITTLE BROWN MYOTIS	+	?	+	+	-	+
YUMA MYOTIS	?	?	?	?	?	?
LONG-EARED MYOTIS	+	?	+	+	-	+
LONG-LEGGED MYOTIS	+	?	+	+	-	+
CALIFORNIA MYOTIS	+	?	+	+	-	+
WESTERN SMALL-FOOTED MYOTIS	+	?	+	+	-	+
NORTHERN MYOTIS (KEEN'S)	+	?	+	+	-	+
SILVER-HAIRED BAT	+	?	+	+	-	+
BIG BROWN BAT	+	?	+	+	-	+
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?
PALLID BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	-----	----
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	?	?	?	?	?	?
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	?	?	?	?	?	?
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	+	?	+	+	-	+
YELLOW-PINE CHIPMUNK	?	?	?	?	?	?
RED-TAILED CHIPMUNK	?	?	?	?	?	?
UINTA CHIPMUNK	?	?	?	?	?	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	+	?	+	+	-	+
EASTERN FOX SQUIRREL	-	+	+	-	-	+
RED SQUIRREL	+	?	+	+	-	+
NORTHERN FLYING SQUIRREL	+	?	+	+	-	+
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	?	?	?	?	?	?
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	?	?	?	?	?	?
WHITE-FOOTED MOUSE	+	?	+	+	-	+
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	?	?	?	?	?	?
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	?	?	?	?	?	?
MONTANE VOLE	?	?	?	?	?	?
LONG-TAILED VOLE	?	?	?	?	?	?
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	?	?	?	?	?	?
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	?	?	?	?	?	?
NORTHERN BOG LEMMING	?	?	?	?	?	?
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	?	?	?	?	?	?
PORCUPINE	+	?	+	+	-	+
COYOTE	?	?	?	?	?	?
GRAY WOLF	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
RED FOX	?	?	?	?	?	?
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	+	?	+	+	-	+
GRIZZLY BEAR	?	?	?	?	?	?
RACCOON	-	+	+	-	-	+
MARTEN	-	+	+	-	-	+
FISHER	-	+	+	-	-	+
ERMINE	+	?	+	+	-	+
LEAST WEASEL	?	?	?	?	?	?
LONG-TAILED WEASEL	+	?	+	+	-	+
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	?	?	?	?	?	?
WOLVERINE	?	?	?	?	?	?
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	+	?	+	+	-	+
STRIPED SKUNK	+	?	+	+	-	+
RIVER OTTER	?	?	?	?	?	?
MOUNTAIN LION	?	?	?	?	?	?
LYNX	+	?	+	+	-	+
BOBCAT	?	?	?	?	?	?
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	?	?	?	?	?	?
WHITE-TAILED DEER	?	?	?	?	?	?
MOOSE	?	?	?	?	?	?
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	?	?	?	?	?	?
SNAPPING TURTLE	?	?	?	?	?	?
PAINTED TURTLE	?	?	?	?	?	?
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	?	?	?	?	?	?
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	?	?	?	?	?	?
WESTERN SKINK	?	?	?	?	?	?
RUBBER BOA	?	?	?	?	?	?
RACER	?	?	?	?	?	?
WESTERN HOGNOSE SNAKE	?	?	?	?	?	?
MILK SNAKE	+	?	+	+	-	+
PINE OR GOPHER SNAKE	?	?	?	?	?	?
W. TERRESTRIAL GARTER SNAKE	?	?	?	?	?	?
PLAINS GARTER SNAKE	?	?	?	?	?	?
COMMON GARTER SNAKE	?	?	?	?	?	?
WESTERN RATTLESNAKE	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

**Table WLD-17
DESCRIPTOR WOODY DEBRIS ON THE FOREST FLOOR**

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LONG-TOED SALAMANDER	?	+	+	?	-	+
TIGER SALAMANDER	?	+	+	?	-	+
COEUR D'ALENE SALAMANDER (VD)	?	+	+	?	-	+
ROUGHSKIN NEWT	?	+	+	?	-	+
IDAHO GIANT SALAMANDER	?	+	+	?	-	+
TAILED FROG	?	+	+	?	-	+
WESTERN TOAD	?	+	+	?	-	+
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	+	+	?	-	+
PACIFIC CHORUS FROG	?	+	+	?	-	+
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	?	+	+	?	-	+
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	?	?	?	?	?	?
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	?	?	?	?	?	?
BLACK-CROWNED NIGHT HERON	?	?	?	?	?	?
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	?	?	?	?	?	?
TRUMPETER SWAN	?	?	?	?	?	?
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	?	?	?	?	?	?
SNOW GOOSE	?	?	?	?	?	?
ROSS' GOOSE	?	?	?	?	?	?
CANADA GOOSE	?	?	?	?	?	?
WOOD DUCK	?	?	?	?	?	?
GREEN-WINGED TEAL	?	?	?	?	?	?
MALLARD	?	?	?	?	?	?
NORTHERN PINTAIL	?	?	?	?	?	?
BLUE-WINGED TEAL	?	?	?	?	?	?
CINNAMON TEAL	?	?	?	?	?	?
NORTHERN SHOVELER	?	?	?	?	?	?
GADWALL	?	?	?	?	?	?
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	?	?	?	?	?	?
CANVASBACK	?	?	?	?	?	?
REDHEAD	?	?	?	?	?	?
RING-NECKED DUCK	?	?	?	?	?	?
LESSER SCAUP	?	?	?	?	?	?
HARLEQUIN DUCK	?	+	+	?	-	+

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	-----	----
COMMON GOLDENEYE	?	?	?	?	?	?
BARROW'S GOLDENEYE	?	?	?	?	?	?
BUFFLEHEAD	?	?	?	?	?	?
HOODED MERGANSER	?	?	?	?	?	?
COMMON MERGANSER	?	?	?	?	?	?
RED-BREASTED MERGANSER	?	?	?	?	?	?
RUDDY DUCK	?	?	?	?	?	?
TURKEY VULTURE	?	?	?	?	?	?
OSPREY	?	?	?	?	?	?
BALD EAGLE	?	?	?	?	?	?
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	?	?	?	?	?	?
NORTHERN GOSHAWK	?	+	+	?	-	+
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	?	?	?	?	?	?
FERRUGINOUS HAWK	?	?	?	?	?	?
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	?	?	?	?	?	?
AMERICAN KESTREL	?	?	?	?	?	?
MERLIN	?	?	?	?	?	?
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	+	+	?	-	+
RING-NECKED PHEASANT	?	?	?	?	?	?
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	?	+	+	?	-	+
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	+	+	?	-	+
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	?	?	?	?	?	?
WILD TURKEY	?	?	?	?	?	?
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	?	?	?
SORA	?	?	?	?	?	?
AMERICAN COOT	?	?	?	?	?	?
SANDHILL CRANE	?	?	?	?	?	?
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
WILLET	?	?	?	?	?	?
SPOTTED SANDPIPER	?	?	?	?	?	?
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	?	?	?	?	?	?
MARBLED GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	?	?	?	?	?	?
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	?	?	?	?	?	?
BLACK-BILLED CUCKOO	?	?	?	?	?	?
YELLOW-BILLED CUCKOO	?	?	?	?	?	?
FLAMMULATED OWL	?	?	?	?	?	?
EASTERN SCREECH-OWL	?	?	?	?	?	?
WESTERN SCREECH-OWL	?	?	?	?	?	?
GREAT HORNED OWL	?	?	?	?	?	?
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	?	?	?	?	?	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	?	?	?	?	?	?
GREAT GRAY OWL	?	?	?	?	?	?
LONG-EARED OWL	?	?	?	?	?	?
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	?	?	?	?	?	?
SAW-WHET OWL	?	?	?	?	?	?
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	?	?	?	?	?	?
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFIOUS HUMMINGBIRD	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
BELTED KINGFISHER	?	?	?	?	?	?
LEWIS' WOODPECKER	?	?	?	?	?	?
RED-HEADED WOODPECKER	?	?	?	?	?	?
YELLOW-BELLIED (R-NAP) SAPSUCKER	?	?	?	?	?	?
WILLIAMSON'S SAPSUCKER	?	?	?	?	?	?
DOWNY WOODPECKER	?	?	?	?	?	?
HAIRY WOODPECKER	?	?	?	?	?	?
THREE-TOED WOODPECKER	?	?	?	?	?	?
BLACK-BACKED WOODPECKER	?	?	?	?	?	?
NORTHERN FLICKER	?	?	?	?	?	?
PILEATED WOODPECKER	?	?	?	?	?	?
OLIVE-SIDED FLYCATCHER	?	?	?	?	?	?
WESTERN WOOD PEWEE	?	?	?	?	?	?
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	?	?	?	?	?	?
CORDILLERAN FLYCATCHER	?	?	?	?	?	?
SAY'S PHOEBE	?	?	?	?	?	?
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	?	?	?	?	?	?
VIOLET-GREEN SWALLOW	?	?	?	?	?	?
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	?	?	?	?	?	?
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	?	?	?	?	?	?
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	?	?	?	?	?	?
MOUNTAIN CHICKADEE	?	?	?	?	?	?
BOREAL CHICKADEE	?	?	?	?	?	?
CHESTNUT-BACKED CHICKADEE	?	?	?	?	?	?
RED-BREASTED NUTHATCH	?	?	?	?	?	?
WHITE-BREASTED NUTHATCH	?	?	?	?	?	?
PYGMY NUTHATCH	?	?	?	?	?	?
BROWN CREEPER	?	?	?	?	?	?
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	?	?	?	?	?	?
RUBY-CROWNED KINGLET	?	?	?	?	?	?
WINTER WREN	?	?	?	?	?	?
MARSH WREN	?	?	?	?	?	?
DIPPER	?	+	+	?	-	+
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	?	?	?	?	?	?
WESTERN BLUEBIRD	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	-----	-----	-----	-----
MOUNTAIN BLUEBIRD	?	?	?	?	?	?
TOWNSEND'S SOLITAIRE	?	?	?	?	?	?
VEERY	?	+	+	?	-	+
SWAINSON'S THRUSH	?	+	+	?	-	+
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	?	?	?	?
VARIED THRUSH	?	?	?	?	?	?
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	?	?	?	?	?	?
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	?	?	?	?	?	?
SOLITARY VIREO	?	?	?	?	?	?
WARBLING VIREO	?	?	?	?	?	?
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	?	?	?	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	?	?	?	?
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	?	+	+	?	-	+
AMERICAN REDSTART	?	?	?	?	?	?
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	?	+	+	?	-	+
MACGILLIVRAY'S WARBLER	?	?	?	?	?	?
COMMON YELLOWTHROAT	?	?	?	?	?	?
WILSON'S WARBLER	?	?	?	?	?	?
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN TANAGER	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	?	?	?	?	?	?
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	-----	----
LE CONTE'S SPARROW	?	?	?	?	?	?
FOX SPARROW	?	?	?	?	?	?
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	?	?	?	?	?	?
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	?	+	+	?	-	+
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	?	?	?	?	?	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	?	?	?	?	?	?
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	?	+	+	?	-	+
DWARF SHREW	?	+	+	?	-	+
WATER SHREW	?	+	+	?	-	+
MERRIAM'S SHREW	?	+	+	?	-	+
PYGMY SHREW	?	+	+	?	-	+
LITTLE BROWN MYOTIS	?	?	?	?	?	?
YUMA MYOTIS	?	?	?	?	?	?
LONG-EARED MYOTIS	?	?	?	?	?	?
LONG-LEGGED MYOTIS	?	?	?	?	?	?
CALIFORNIA MYOTIS	?	?	?	?	?	?
WESTERN SMALL-FOOTED MYOTIS	?	?	?	?	?	?
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?
SILVER-HAIRED BAT	?	?	?	?	?	?
BIG BROWN BAT	?	?	?	?	?	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	-----	-----	-----	-----
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	?	+	+	?	-	+
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	?	+	+	?	-	+
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	?	?	?	?	?	?
YELLOW-PINE CHIPMUNK	?	+	+	?	-	+
RED-TAILED CHIPMUNK	?	+	+	?	-	+
UINTA CHIPMUNK	?	+	+	?	-	+
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	+	+	?	-	+
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	?	?	?	?	?	?
EASTERN FOX SQUIRREL	?	?	?	?	?	?
RED SQUIRREL	?	?	?	?	?	?
NORTHERN FLYING SQUIRREL	?	?	?	?	?	?
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	?	+	+	?	-	+
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	?	?	?	?	?	?
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	?	+	+	?	-	+
WHITE-FOOTED MOUSE	?	?	?	?	?	?
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	+	+	?	-	+
SOUTHERN RED-BACKED VOLE	?	+	+	?	-	+
HEATHER VOLE	?	+	+	?	-	+
MEADOW VOLE	?	+	+	?	-	+
MONTANE VOLE	?	+	+	?	-	+
LONG-TAILED VOLE	?	?	?	?	?	?
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	?	+	+	?	-	+
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	?	?	?	?	?	?
NORTHERN BOG LEMMING	?	+	+	?	-	+
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	?	+	+	?	-	+
PORCUPINE	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COYOTE	?	+	+	?	-	+
GRAY WOLF	?	?	?	?	?	?
RED FOX	?	+	+	?	-	+
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	?	?	?	?	?	?
GRIZZLY BEAR	?	+	+	?	-	+
RACCOON	?	?	?	?	?	?
MARTEN	?	?	?	?	?	?
FISHER	?	?	?	?	?	?
ERMINE	?	?	?	?	?	?
LEAST WEASEL	?	+	+	?	-	+
LONG-TAILED WEASEL	?	?	?	?	?	?
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	?	+	+	?	-	+
WOLVERINE	?	+	+	?	-	+
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	?	?	?	?	?	?
STRIPED SKUNK	?	?	?	?	?	?
RIVER OTTER	?	+	+	?	-	+
MOUNTAIN LION	?	?	?	?	?	?
LYNX	?	?	?	?	?	?
BOBCAT	?	+	+	?	-	+
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	?	?	?	?	?	?
WHITE-TAILED DEER	?	?	?	?	?	?
MOOSE	?	?	?	?	?	?
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	?	?	?	?	?	?
SNAPPING TURTLE	?	+	+	?	-	+
PAINTED TURTLE	?	+	+	?	-	+
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	?	+	+	?	-	+
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	?	+	+	?	-	+
WESTERN SKINK	?	+	+	?	-	+
RUBBER BOA	?	+	+	?	-	+
RACER	?	+	+	?	-	+
WESTERN HOGNOSE SNAKE	?	+	+	?	-	+
MILK SNAKE	?	?	?	?	?	?
PINE OR GOPHER SNAKE	?	+	+	?	-	+
W. TERRESTRIAL GARTER SNAKE	?	+	+	?	-	+
PLAINS GARTER SNAKE	?	+	+	?	-	+
COMMON GARTER SNAKE	?	+	+	?	-	+
WESTERN RATTLESNAKE	?	+	+	?	-	+

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

**Table WLD-18
DESCRIPTOR RIPARIAN AREAS AND WETLANDS EAST OF THE DIVIDE**

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LONG-TOED SALAMANDER	-	-	-	-	-	-
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	?	?	?	?	?	?
ROUGHSKIN NEWT	?	?	?	?	?	?
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	-	-	-	-	-	-
WESTERN TOAD	-	-	-	-	-	-
GREAT PLAINS TOAD	-	-	-	-	-	-
CANADIAN TOAD	-	-	-	-	-	-
WOODHOUSE'S TOAD	-	-	-	-	-	-
WESTERN CHORUS FROG	-	-	-	-	-	-
PACIFIC CHORUS FROG	?	?	?	?	?	?
PLAINS SPADEFOOT	-	-	-	-	-	-
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	-	-	-	-	-	-
SPOTTED FROG	-	-	-	-	-	-
WOOD FROG	?	?	?	?	?	?
COMMON LOON	-	-	-	-	-	-
PIED-BILLED GREBE	-	-	-	-	-	-
HORNED GREBE	-	-	-	-	-	-
RED-NECKED GREBE	-	-	-	-	-	-
EARED GREBE	-	-	-	-	-	-
WESTERN GREBE (CLARK'S)	-	-	-	-	-	-
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	-	-	-	-	-	-
AMERICAN BITTERN	-	-	-	-	-	-
GREAT BLUE HERON	-	-	-	-	-	-
BLACK-CROWNED NIGHT HERON	-	-	-	-	-	-
WHITE-FACED IBIS	-	-	-	-	-	-
TUNDRA SWAN	-	-	-	-	-	-
TRUMPETER SWAN	-	-	-	-	-	-
MUTE SWAN	-	-	-	-	-	-
GREATER WHITE-FRONTED GOOSE	-	-	-	-	-	-
SNOW GOOSE	-	-	-	-	-	-
ROSS' GOOSE	-	-	-	-	-	-
CANADA GOOSE	-	-	-	-	-	-
WOOD DUCK	-	-	-	-	-	-
GREEN-WINGED TEAL	-	-	-	-	-	-
MALLARD	-	-	-	-	-	-
NORTHERN PINTAIL	-	-	-	-	-	-
BLUE-WINGED TEAL	-	-	-	-	-	-
CINNAMON TEAL	-	-	-	-	-	-
NORTHERN SHOVELER	-	-	-	-	-	-
GADWALL	-	-	-	-	-	-
EURASIAN WIGEON	-	-	-	-	-	-
AMERICAN WIGEON	-	-	-	-	-	-
CANVASBACK	-	-	-	-	-	-
REDHEAD	-	-	-	-	-	-
RING-NECKED DUCK	-	-	-	-	-	-
LESSER SCAUP	-	-	-	-	-	-
HARLEQUIN DUCK	-	-	-	-	-	-

APPENDIX WLD

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	-	-	-	-	-	-
BARROW'S GOLDENEYE	-	-	-	-	-	-
BUFFLEHEAD	-	-	-	-	-	-
HOODED MERGANSER	-	-	-	-	-	-
COMMON MERGANSER	-	-	-	-	-	-
RED-BREASTED MERGANSER	-	-	-	-	-	-
RUDDY DUCK	-	-	-	-	-	-
TURKEY VULTURE	-	-	-	-	-	-
OSPREY	-	-	-	-	-	-
BALD EAGLE	-	-	-	-	-	-
NORTHERN HARRIER (MARSH HAWK)	-	-	-	-	-	-
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	-	-	-	-	-	-
NORTHERN GOSHAWK	?	?	?	?	?	?
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	?	?	?	?	?	?
FERRUGINOUS HAWK	-	-	-	-	-	-
ROUGH-LEGGED HAWK	-	-	-	-	-	-
GOLDEN EAGLE	?	?	?	?	?	?
AMERICAN KESTREL	-	-	-	-	-	-
MERLIN	-	-	-	-	-	-
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	-	-	-	-	-	-
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	-	-	-	-	-	-
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	?	?	?	?	?	?
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	?	?	?	?	?
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	-	-	-	-	-	-
WILD TURKEY	?	?	?	?	?	?
NORTHERN BOBWHITE	-	-	-	-	-	-
VIRGINIA RAIL	-	-	-	-	-	-
SORA	-	-	-	-	-	-
AMERICAN COOT	-	-	-	-	-	-
SANDHILL CRANE	-	-	-	-	-	-
WHOOPING CRANE	-	-	-	-	-	-
BLACK-BELLIED PLOVER	-	-	-	-	-	-
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	-	-	-	-	-	-
PIPING PLOVER	-	-	-	-	-	-
KILLDEER	-	-	-	-	-	-
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	-	-	-	-	-	-
AMERICAN AVOCET	-	-	-	-	-	-
GREATER YELLOWLEGS	-	-	-	-	-	-
LESSER YELLOWLEGS	-	-	-	-	-	-
SOLITARY SANDPIPER	-	-	-	-	-	-
WILLET	-	-	-	-	-	-
SPOTTED SANDPIPER	-	-	-	-	-	-

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	-	-	-	-	-	-
LONG-BILLED CURLEW	-	-	-	-	-	-
MARbled GODWIT	-	-	-	-	-	-
RUDDY TURNSTONE	-	-	-	-	-	-
SANDERLING	-	-	-	-	-	-
SEMIPALMATED SANDPIPER	-	-	-	-	-	-
WESTERN SANDPIPER	-	-	-	-	-	-
LEAST SANDPIPER	-	-	-	-	-	-
BAIRD'S SANDPIPER	-	-	-	-	-	-
PECTORAL SANDPIPER	-	-	-	-	-	-
DUNLIN	-	-	-	-	-	-
STILT SANDPIPER	-	-	-	-	-	-
LONG-BILLED DOWITCHER	-	-	-	-	-	-
COMMON SNIPE	-	-	-	-	-	-
WILSON'S PHALAROPE	-	-	-	-	-	-
RED-NECKED PHALAROPE	-	-	-	-	-	-
FRANKLIN'S GULL	-	-	-	-	-	-
BONAPARTE'S GULL	-	-	-	-	-	-
RING-BILLED GULL	-	-	-	-	-	-
CALIFORNIA GULL	-	-	-	-	-	-
CASPIAN TERN	-	-	-	-	-	-
COMMON TERN	-	-	-	-	-	-
FORSTER'S TERN	-	-	-	-	-	-
LEAST TERN	-	-	-	-	-	-
BLACK TERN	-	-	-	-	-	-
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	-	-	-	-	-	-
BLACK-BILLED CUCKOO	-	-	-	-	-	-
YELLOW-BILLED CUCKOO	-	-	-	-	-	-
FLAMMULATED OWL	?	?	?	?	?	?
EASTERN SCREECH-OWL	-	-	-	-	-	-
WESTERN SCREECH-OWL	-	-	-	-	-	-
GREAT HORNED OWL	-	-	-	-	-	-
SNOWY OWL	-	-	-	-	-	-
NORTHERN PYGMY OWL	?	?	?	?	?	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	-	-	-	-	-	-
GREAT GRAY OWL	-	-	-	-	-	-
LONG-EARED OWL	-	-	-	-	-	-
SHORT-EARED OWL	-	-	-	-	-	-
BOREAL OWL	-	-	-	-	-	-
SAW-WHET OWL	-	-	-	-	-	-
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	-	-	-	-	-	-
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	-	-	-	-	-	-
CALLIOPE HUMMINGBIRD	-	-	-	-	-	-
RUFous HUMMINGBIRD	-	-	-	-	-	-
BELTED KINGFISHER	-	-	-	-	-	-

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LEWIS' WOODPECKER	-	-	-	-	-	-
RED-HEADED WOODPECKER	-	-	-	-	-	-
YELLOW-BELLIED (R-NAP) SAPSUCKER	-	-	-	-	-	-
WILLIAMSON'S SAPSUCKER	-	-	-	-	-	-
DOWNY WOODPECKER	-	-	-	-	-	-
HAIRY WOODPECKER	-	-	-	-	-	-
THREE-TOED WOODPECKER	-	-	-	-	-	-
BLACK-BACKED WOODPECKER	-	-	-	-	-	-
NORTHERN FLICKER	-	-	-	-	-	-
PILEATED WOODPECKER	-	-	-	-	-	-
OLIVE-SIDED FLYCATCHER	-	-	-	-	-	-
WESTERN WOOD PEWEE	-	-	-	-	-	-
WILLOW FLYCATCHER	-	-	-	-	-	-
LEAST FLYCATCHER	-	-	-	-	-	-
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	-	-	-	-	-	-
CORDILLERAN FLYCATCHER	-	-	-	-	-	-
SAY'S PHOEBE	?	?	?	?	?	?
CASSIN'S KINGBIRD	-	-	-	-	-	-
WESTERN KINGBIRD	-	-	-	-	-	-
EASTERN KINGBIRD	-	-	-	-	-	-
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	-	-	-	-	-	-
VIOLET-GREEN SWALLOW	-	-	-	-	-	-
ROUGH-WINGED SWALLOW	-	-	-	-	-	-
BANK SWALLOW	-	-	-	-	-	-
CLIFF SWALLOW	-	-	-	-	-	-
BARN SWALLOW	-	-	-	-	-	-
GRAY JAY	-	-	-	-	-	-
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	-	-	-	-	-	-
COMMON CROW	-	-	-	-	-	-
COMMON RAVEN	-	-	-	-	-	-
BLACK-CAPPED CHICKADEE	-	-	-	-	-	-
MOUNTAIN CHICKADEE	-	-	-	-	-	-
BOREAL CHICKADEE	-	-	-	-	-	-
CHESTNUT-BACKED CHICKADEE	-	-	-	-	-	-
RED-BREASTED NUTHATCH	-	-	-	-	-	-
WHITE-BREASTED NUTHATCH	-	-	-	-	-	-
PYGMY NUTHATCH	?	?	?	?	?	?
BROWN CREEPER	-	-	-	-	-	-
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	-	-	-	-	-	-
RUBY-CROWNED KINGLET	-	-	-	-	-	-
WINTER WREN	-	-	-	-	-	-
MARSH WREN	-	-	-	-	-	-
DIPPER	-	-	-	-	-	-
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	-	-	-	-	-	-
WESTERN BLUEBIRD	-	-	-	-	-	-
MOUNTAIN BLUEBIRD	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
TOWNSEND'S SOLITAIRE	-	-	-	-	-	-
VEERY	-	-	-	-	-	-
SWAINSON'S THRUSH	-	-	-	-	-	-
HERMIT THRUSH	-	-	-	-	-	-
AMERICAN ROBIN	-	-	-	-	-	-
VARIED THRUSH	-	-	-	-	-	-
GRAY CATBIRD	-	-	-	-	-	-
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	-	-	-	-	-	-
WATER PIPIT	-	-	-	-	-	-
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	-	-	-	-	-	-
CEDAR WAXWING	-	-	-	-	-	-
NORTHERN SHRIKE	-	-	-	-	-	-
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	-	-	-	-	-	-
SOLITARY VIREO	-	-	-	-	-	-
WARBLING VIREO	-	-	-	-	-	-
RED-EYED VIREO	-	-	-	-	-	-
TENNESSEE WARBLER	-	-	-	-	-	-
ORANGE-CROWNED WARBLER	-	-	-	-	-	-
NASHVILLE WARBLER	-	-	-	-	-	-
YELLOW WARBLER	-	-	-	-	-	-
YELLOW-RUMPED WARBLER	-	-	-	-	-	-
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	-	-	-	-	-	-
BLACK-AND-WHITE WARBLER	-	-	-	-	-	-
AMERICAN REDSTART	-	-	-	-	-	-
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	-	-	-	-	-	-
MACGILLIVRAY'S WARBLER	-	-	-	-	-	-
COMMON YELLOWTHROAT	-	-	-	-	-	-
WILSON'S WARBLER	-	-	-	-	-	-
YELLOW-BREASTED CHAT	-	-	-	-	-	-
WESTERN Tanager	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	-	-	-	-	-	-
LAZULI BUNTING	-	-	-	-	-	-
INDIGO BUNTING	-	-	-	-	-	-
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	-	-	-	-	-	-
RUFIOUS-SIDED TOWHEE	-	-	-	-	-	-
TREE SPARROW	-	-	-	-	-	-
CHIPPING SPARROW	-	-	-	-	-	-
CLAY-COLORED SPARROW	-	-	-	-	-	-
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	-	-	-	-	-	-
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LE CONTE'S SPARROW	-	-	-	-	-	-
FOX SPARROW	-	-	-	-	-	-
SONG SPARROW	-	-	-	-	-	-
LINCOLN'S SPARROW	-	-	-	-	-	-
WHITE-THROATED SPARROW	-	-	-	-	-	-
WHITE-CROWNED SPARROW	-	-	-	-	-	-
HARRIS' SPARROW	-	-	-	-	-	-
DARK-EYED JUNCO	-	-	-	-	-	-
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	-	-	-	-	-	-
BOBOLINK	-	-	-	-	-	-
RED-WINGED BLACKBIRD	-	-	-	-	-	-
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	-	-	-	-	-	-
RUSTY BLACKBIRD	-	-	-	-	-	-
BREWER'S BLACKBIRD	-	-	-	-	-	-
COMMON GRACKLE	-	-	-	-	-	-
BROWN-HEADED COWBIRD	-	-	-	-	-	-
ORCHARD ORIOLE	-	-	-	-	-	-
NORTHERN ORIOLE	-	-	-	-	-	-
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	-	-	-	-	-	-
HOARY REDPOLL	-	-	-	-	-	-
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	-	-	-	-	-	-
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	-	-	-	-	-	-
PREBLE'S SHREW	-	-	-	-	-	-
VAGRANT SHREW	?	?	?	?	?	?
DWARF SHREW	-	-	-	-	-	-
WATER SHREW	-	-	-	-	-	-
MERRIAM'S SHREW	?	?	?	?	?	?
PYGMY SHREW	-	-	-	-	-	-
LITTLE BROWN MYOTIS	-	-	-	-	-	-
YUMA MYOTIS	-	-	-	-	-	-
LONG-EARED MYOTIS	-	-	-	-	-	-
LONG-LEGGED MYOTIS	-	-	-	-	-	-
CALIFORNIA MYOTIS	?	?	?	?	?	?
WESTERN SMALL-FOOTED MYOTIS	-	-	-	-	-	-
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?
SILVER-HAIRED BAT	-	-	-	-	-	-
BIG BROWN BAT	?	?	?	?	?	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	-	-	-	-	-	-
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	-	-	-	-	-	-
MOUNTAIN COTTONTAIL	-	-	-	-	-	-
DESERT COTTONTAIL	-	-	-	-	-	-
SNOWSHOE HARE	-	-	-	-	-	-
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	-	-	-	-	-	-
YELLOW-PINE CHIPMUNK	?	?	?	?	?	?
RED-TAILED CHIPMUNK	?	?	?	?	?	?
UINTA CHIPMUNK	?	?	?	?	?	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	-	-	-	-	-	-
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	-	-	-	-	-	-
EASTERN FOX SQUIRREL	-	-	-	-	-	-
RED SQUIRREL	-	-	-	-	-	-
NORTHERN FLYING SQUIRREL	-	-	-	-	-	-
NORTHERN POCKET GOPHER	-	-	-	-	-	-
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	-	-	-	-	-	-
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	-	-	-	-	-	-
WESTERN HARVEST MOUSE	-	-	-	-	-	-
DEER MOUSE	-	-	-	-	-	-
WHITE-FOOTED MOUSE	-	-	-	-	-	-
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	-	-	-	-	-	-
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	-	-	-	-	-	-
MONTANE VOLE	-	-	-	-	-	-
LONG-TAILED VOLE	-	-	-	-	-	-
PRAIRIE VOLE	-	-	-	-	-	-
WATER VOLE (RICHARDSON'S)	-	-	-	-	-	-
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	-	-	-	-	-	-
NORTHERN BOG LEMMING	-	-	-	-	-	-
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	-	-	-	-	-	-
PORCUPINE	-	-	-	-	-	-
COYOTE	-	-	-	-	-	-

APPENDIX WLD

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
GRAY WOLF	?	?	?	?	?	?
RED FOX	-	-	-	-	-	-
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	-	-	-	-	-	-
GRIZZLY BEAR	-	-	-	-	-	-
RACCOON	-	-	-	-	-	-
MARTEN	-	-	-	-	-	-
FISHER	-	-	-	-	-	-
ERMINE	-	-	-	-	-	-
LEAST WEASEL	-	-	-	-	-	-
LONG-TAILED WEASEL	-	-	-	-	-	-
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	-	-	-	-	-	-
WOLVERINE	?	?	?	?	?	?
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	-	-	-	-	-	-
STRIPED SKUNK	-	-	-	-	-	-
RIVER OTTER	-	-	-	-	-	-
MOUNTAIN LION	-	-	-	-	-	-
LYNX	-	-	-	-	-	-
BOBCAT	-	-	-	-	-	-
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	-	-	-	-	-	-
WHITE-TAILED DEER	-	-	-	-	-	-
MOOSE	-	-	-	-	-	-
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	-	-	-	-	-	-
SNAPPING TURTLE	-	-	-	-	-	-
PAINTED TURTLE	-	-	-	-	-	-
SPINY SOFTSHELL TURTLE	-	-	-	-	-	-
NORTHERN ALLIGATOR LIZARD	?	?	?	?	?	?
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	?	?	?	?	?	?
WESTERN SKINK	?	?	?	?	?	?
RUBBER BOA	-	-	-	-	-	-
RACER	-	-	-	-	-	-
WESTERN HOGNOSE SNAKE	-	-	-	-	-	-
MILK SNAKE	-	-	-	-	-	-
PINE OR GOPHER SNAKE	-	-	-	-	-	-
W. TERRESTRIAL GARTER SNAKE	-	-	-	-	-	-
PLAINS GARTER SNAKE	-	-	-	-	-	-
COMMON GARTER SNAKE	-	-	-	-	-	-
WESTERN RATTLESNAKE	-	-	-	-	-	-

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Table WLD-19
DESCRIPTOR RIPARIAN AREA AND WETLANDS CONDITIONS WEST OF THE DIVIDE

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LONG-TOED SALAMANDER	-	+	+	+	+	+
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	-	+	+	+	+	+
ROUGHSKIN NEWT	-	+	+	+	+	+
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	-	+	+	+	+	+
WESTERN TOAD	-	+	+	+	+	+
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	?	?	?	?	?
PACIFIC CHORUS FROG	-	+	+	+	+	+
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	-	+	+	+	+	+
LEOPARD FROG	-	+	+	+	+	+
SPOTTED FROG	-	+	+	+	+	+
WOOD FROG	?	?	?	?	?	?
COMMON LOON	-	+	+	+	+	+
PIED-BILLED GREBE	-	+	+	+	+	+
HORNED GREBE	-	+	+	+	+	+
RED-NECKED GREBE	-	+	+	+	+	+
EARED GREBE	-	+	+	+	+	+
WESTERN GREBE (CLARK'S)	-	+	+	+	+	+
WHITE PELICAN	?	?	?	?	?	?
DOUBLE-CRESTED CORMORANT	-	+	+	+	+	+
AMERICAN BITTERN	-	+	+	+	+	+
GREAT BLUE HERON	-	+	+	+	+	+
BLACK-CROWNED NIGHT HERON	-	+	+	+	+	+
WHITE-FACED IBIS	-	+	+	+	+	+
TUNDRA SWAN	-	+	+	+	+	+
TRUMPETER SWAN	-	+	+	+	+	+
MUTE SWAN	-	+	+	+	+	+
GREATER WHITE-FRONTED GOOSE	-	+	+	+	+	+
SNOW GOOSE	-	+	+	+	+	+
ROSS' GOOSE	-	+	+	+	+	+
CANADA GOOSE	-	+	+	+	+	+
WOOD DUCK	-	+	+	+	+	+
GREEN-WINGED TEAL	-	+	+	+	+	+
MALLARD	-	+	+	+	+	+
NORTHERN PINTAIL	-	+	+	+	+	+
BLUE-WINGED TEAL	-	+	+	+	+	+
CINNAMON TEAL	-	+	+	+	+	+
NORTHERN SHOVELER	-	+	+	+	+	+
GADWALL	-	+	+	+	+	+
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	-	+	+	+	+	+
CANVASBACK	-	+	+	+	+	+
REDHEAD	-	+	+	+	+	+
RING-NECKED DUCK	-	+	+	+	+	+
LESSER SCAUP	-	+	+	+	+	+
HARLEQUIN DUCK	-	+	+	+	+	+

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	-	+	+	+	+	+
BARROW'S GOLDENEYE	-	+	+	+	+	+
BUFFLEHEAD	-	+	+	+	+	+
HOODED MERGANSER	-	+	+	+	+	+
COMMON MERGANSER	-	+	+	+	+	+
RED-BREASTED MERGANSER	-	+	+	+	+	+
RUDDY DUCK	-	+	+	+	+	+
TURKEY VULTURE	-	+	+	+	+	+
OSPREY	-	+	+	+	+	+
BALD EAGLE	-	+	+	+	+	+
NORTHERN HARRIER (MARSH HAWK)	-	+	+	+	+	+
SHARP-SHINNED HAWK	?	?	?	?	?	?
COOPER'S HAWK	-	+	+	+	+	+
NORTHERN GOSHAWK	?	?	?	?	?	?
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	-	+	+	+	+	+
FERRUGINOUS HAWK	-	+	+	+	+	+
ROUGH-LEGGED HAWK	-	+	+	+	+	+
GOLDEN EAGLE	?	?	?	?	?	?
AMERICAN KESTREL	-	+	+	+	+	+
MERLIN	-	+	+	+	+	+
PEREGRINE FALCON	?	?	?	?	?	?
GYRFALCON	-	+	+	+	+	+
PRAIRIE FALCON	?	?	?	?	?	?
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	-	+	+	+	+	+
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	?	?	?	?	?	?
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	?	?	?	?	?
SAGE GROUSE	?	?	?	?	?	?
SHARP-TAILED GROUSE (COL.)	-	+	+	+	+	+
WILD TURKEY	?	?	?	?	?	?
NORTHERN BOBWHITE	-	+	+	+	+	+
VIRGINIA RAIL	-	+	+	+	+	+
SORA	-	+	+	+	+	+
AMERICAN COOT	-	+	+	+	+	+
SANDHILL CRANE	-	+	+	+	+	+
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	-	+	+	+	+	+
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	-	+	+	+	+	+
PIPING PLOVER	-	+	+	+	+	+
KILLDEER	-	+	+	+	+	+
MOUNTAIN PLOVER	?	?	?	?	?	?
BLACK-NECKED STILT	-	+	+	+	+	+
AMERICAN AVOCET	-	+	+	+	+	+
GREATER YELLOWLEGS	-	+	+	+	+	+
LESSER YELLOWLEGS	-	+	+	+	+	+
SOLITARY SANDPIPER	-	+	+	+	+	+
WILLET	-	+	+	+	+	+
SPOTTED SANDPIPER	-	+	+	+	+	+

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	-	+	+	+	+	+
LONG-BILLED CURLEW	-	+	+	+	+	+
MARbled GODWIT	-	+	+	+	+	+
RUDDY TURNSTONE	-	+	+	+	+	+
SANDERLING	-	+	+	+	+	+
SEMIPALMATED SANDPIPER	-	+	+	+	+	+
WESTERN SANDPIPER	-	+	+	+	+	+
LEAST SANDPIPER	-	+	+	+	+	+
BAIRD'S SANDPIPER	-	+	+	+	+	+
PECTORAL SANDPIPER	-	+	+	+	+	+
DUNLIN	-	+	+	+	+	+
STILT SANDPIPER	-	+	+	+	+	+
LONG-BILLED DOWITCHER	-	+	+	+	+	+
COMMON SNIPE	-	+	+	+	+	+
WILSON'S PHALAROPE	-	+	+	+	+	+
RED-NECKED PHALAROPE	-	+	+	+	+	+
FRANKLIN'S GULL	-	+	+	+	+	+
BONAPARTE'S GULL	-	+	+	+	+	+
RING-BILLED GULL	-	+	+	+	+	+
CALIFORNIA GULL	-	+	+	+	+	+
CASPIAN TERN	-	+	+	+	+	+
COMMON TERN	-	+	+	+	+	+
FORSTER'S TERN	-	+	+	+	+	+
LEAST TERN	?	?	?	?	?	?
BLACK TERN	-	+	+	+	+	+
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	-	+	+	+	+	+
BLACK-BILLED CUCKOO	-	+	+	+	+	+
YELLOW-BILLED CUCKOO	-	+	+	+	+	+
FLAMMULATED OWL	?	?	?	?	?	?
EASTERN SCREECH-OWL	?	?	?	?	?	?
WESTERN SCREECH-OWL	-	+	+	+	+	+
GREAT HORNED OWL	-	+	+	+	+	+
SNOWY OWL	-	+	+	+	+	+
NORTHERN PYGMY OWL	?	?	?	?	?	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	-	+	+	+	+	+
GREAT GRAY OWL	-	+	+	+	+	+
LONG-EARED OWL	-	+	+	+	+	+
SHORT-EARED OWL	-	+	+	+	+	+
BOREAL OWL	-	+	+	+	+	+
SAW-WHET OWL	-	+	+	+	+	+
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	-	+	+	+	+	+
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	-	+	+	+	+	+
CALLIOPE HUMMINGBIRD	-	+	+	+	+	+
RUFIOUS HUMMINGBIRD	-	+	+	+	+	+
BELTED KINGFISHER	-	+	+	+	+	+
LEWIS' WOODPECKER	-	+	+	+	+	+

APPENDIX WLD

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	-----	-----	-----	----
RED-HEADED WOODPECKER	-	+	+	+	+	+
YELLOW-BELLIED (R-NAP) SAPSUCKER	?	?	?	?	?	?
WILLIAMSON'S SAPSUCKER	-	+	+	+	+	+
DOWNY WOODPECKER	-	+	+	+	+	+
HAIRY WOODPECKER	-	+	+	+	+	+
THREE-TOED WOODPECKER	-	+	+	+	+	+
BLACK-BACKED WOODPECKER	-	+	+	+	+	+
NORTHERN FLICKER	-	+	+	+	+	+
PILEATED WOODPECKER	-	+	+	+	+	+
OLIVE-SIDED FLYCATCHER	-	+	+	+	+	+
WESTERN WOOD PEWEE	-	+	+	+	+	+
WILLOW FLYCATCHER	-	+	+	+	+	+
LEAST FLYCATCHER	-	+	+	+	+	+
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	-	+	+	+	+	+
CORDILLERAN FLYCATCHER	-	+	+	+	+	+
SAY'S PHOEBE	?	?	?	?	?	?
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	-	+	+	+	+	+
EASTERN KINGBIRD	-	+	+	+	+	+
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	-	+	+	+	+	+
VIOLET-GREEN SWALLOW	-	+	+	+	+	+
ROUGH-WINGED SWALLOW	-	+	+	+	+	+
BANK SWALLOW	-	+	+	+	+	+
CLIFF SWALLOW	-	+	+	+	+	+
BARN SWALLOW	-	+	+	+	+	+
GRAY JAY	-	+	+	+	+	+
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	-	+	+	+	+	+
COMMON CROW	-	+	+	+	+	+
COMMON RAVEN	-	+	+	+	+	+
BLACK-CAPPED CHICKADEE	-	+	+	+	+	+
MOUNTAIN CHICKADEE	-	+	+	+	+	+
BOREAL CHICKADEE	-	+	+	+	+	+
CHESTNUT-BACKED CHICKADEE	-	+	+	+	+	+
RED-BREASTED NUTHATCH	-	+	+	+	+	+
WHITE-BREASTED NUTHATCH	-	+	+	+	+	+
PYGMY NUTHATCH	?	?	?	?	?	?
BROWN CREEPER	-	+	+	+	+	+
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	-	+	+	+	+	+
RUBY-CROWNED KINGLET	-	+	+	+	+	+
WINTER WREN	-	+	+	+	+	+
MARSH WREN	-	+	+	+	+	+
DIPPER	-	+	+	+	+	+
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	?	?	?	?	?	?
WESTERN BLUEBIRD	-	+	+	+	+	+
MOUNTAIN BLUEBIRD	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
TOWNSEND'S SOLITAIRE	-	+	+	+	+	+
VEERY	-	+	+	+	+	+
SWAINSON'S THRUSH	-	+	+	+	+	+
HERMIT THRUSH	-	+	+	+	+	+
AMERICAN ROBIN	-	+	+	+	+	+
VARIED THRUSH	-	+	+	+	+	+
GRAY CATBIRD	-	+	+	+	+	+
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	-	+	+	+	+	+
WATER PIPIT	-	+	+	+	+	+
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	-	+	+	+	+	+
CEDAR WAXWING	-	+	+	+	+	+
NORTHERN SHRIKE	-	+	+	+	+	+
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	-	+	+	+	+	+
SOLITARY VIREO	-	+	+	+	+	+
WARBLING VIREO	-	+	+	+	+	+
RED-EYED VIREO	-	+	+	+	+	+
TENNESSEE WARBLER	-	+	+	+	+	+
ORANGE-CROWNED WARBLER	-	+	+	+	+	+
NASHVILLE WARBLER	-	+	+	+	+	+
YELLOW WARBLER	-	+	+	+	+	+
YELLOW-RUMPED WARBLER	-	+	+	+	+	+
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	-	+	+	+	+	+
BLACK-AND-WHITE WARBLER	-	+	+	+	+	+
AMERICAN REDSTART	-	+	+	+	+	+
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	-	+	+	+	+	+
MACGILLIVRAY'S WARBLER	-	+	+	+	+	+
COMMON YELLOWTHROAT	-	+	+	+	+	+
WILSON'S WARBLER	-	+	+	+	+	+
YELLOW-BREASTED CHAT	-	+	+	+	+	+
WESTERN TANAGER	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	-	+	+	+	+	+
LAZULI BUNTING	-	+	+	+	+	+
INDIGO BUNTING	-	+	+	+	+	+
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	-	+	+	+	+	+
RUFOUS-SIDED TOWHEE	-	+	+	+	+	+
TREE SPARROW	-	+	+	+	+	+
CHIPPING SPARROW	-	+	+	+	+	+
CLAY-COLORED SPARROW	-	+	+	+	+	+
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	-	+	+	+	+	+
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LE CONTE'S SPARROW	-	+	+	+	+	+
FOX SPARROW	-	+	+	+	+	+
SONG SPARROW	-	+	+	+	+	+
LINCOLN'S SPARROW	-	+	+	+	+	+
WHITE-THROATED SPARROW	-	+	+	+	+	+
WHITE-CROWNED SPARROW	-	+	+	+	+	+
HARRIS' SPARROW	-	+	+	+	+	+
DARK-EYED JUNCO	-	+	+	+	+	+
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	-	+	+	+	+	+
BOBOLINK	-	+	+	+	+	+
RED-WINGED BLACKBIRD	-	+	+	+	+	+
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	-	+	+	+	+	+
RUSTY BLACKBIRD	-	+	+	+	+	+
BREWER'S BLACKBIRD	-	+	+	+	+	+
COMMON GRACKLE	-	+	+	+	+	+
BROWN-HEADED COWBIRD	-	+	+	+	+	+
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	-	+	+	+	+	+
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	-	+	+	+	+	+
HOARY REDPOLL	-	+	+	+	+	+
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	-	+	+	+	+	+
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	-	+	+	+	+	+
PREBLE'S SHREW	-	+	+	+	+	+
VAGRANT SHREW	-	+	+	+	+	+
DWARF SHREW	?	?	?	?	?	?
WATER SHREW	-	+	+	+	+	+
MERRIAM'S SHREW	?	?	?	?	?	?
PYGMY SHREW	-	+	+	+	+	+
LITTLE BROWN MYOTIS	-	+	+	+	+	+
YUMA MYOTIS	-	+	+	+	+	+
LONG-EARED MYOTIS	-	+	+	+	+	+
LONG-LEGGED MYOTIS	-	+	+	+	+	+
CALIFORNIA MYOTIS	-	+	+	+	+	+
WESTERN SMALL-FOOTED MYOTIS	?	?	?	?	?	?
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?
SILVER-HAIRED BAT	-	+	+	+	+	+
BIG BROWN BAT	?	?	?	?	?	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?
TOWNSEND'S BIG-EARED BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	---	---	---	---	---	---
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	?	?	?	?	?	?
MOUNTAIN COTTONTAIL	-	+	+	+	+	+
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	-	+	+	+	+	+
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	-	+	+	+	+	+
YELLOW-PINE CHIPMUNK	?	?	?	?	?	?
RED-TAILED CHIPMUNK	?	?	?	?	?	?
UINTA CHIPMUNK	?	?	?	?	?	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	-	+	+	+	+	+
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	?	?	?	?	?	?
EASTERN FOX SQUIRREL	-	+	+	+	+	+
RED SQUIRREL	-	+	+	+	+	+
NORTHERN FLYING SQUIRREL	-	+	+	+	+	+
NORTHERN POCKET GOPHER	-	+	+	+	+	+
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	-	+	+	+	+	+
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	-	+	+	+	+	+
WHITE-FOOTED MOUSE	?	?	?	?	?	?
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	-	+	+	+	+	+
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	-	+	+	+	+	+
MONTANE VOLE	-	+	+	+	+	+
LONG-TAILED VOLE	-	+	+	+	+	+
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	-	+	+	+	+	+
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	-	+	+	+	+	+
NORTHERN BOG LEMMING	-	+	+	+	+	+
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	-	+	+	+	+	+
PORCUPINE	-	+	+	+	+	+
COYOTE	-	+	+	+	+	+

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
GRAY WOLF	?	?	?	?	?	?
RED FOX	-	+	+	+	+	+
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	-	+	+	+	+	+
GRIZZLY BEAR	?	?	?	?	?	?
RACCOON	-	+	+	+	+	+
MARTEN	-	+	+	+	+	+
FISHER	-	+	+	+	+	+
ERMINE	-	+	+	+	+	+
LEAST WEASEL	?	?	?	?	?	?
LONG-TAILED WEASEL	-	+	+	+	+	+
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	-	+	+	+	+	+
WOLVERINE	?	?	?	?	?	?
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	-	+	+	+	+	+
STRIPED SKUNK	-	+	+	+	+	+
RIVER OTTER	-	+	+	+	+	+
MOUNTAIN LION	-	+	+	+	+	+
LYNX	-	+	+	+	+	+
BOBCAT	-	+	+	+	+	+
WAPITI OR ELK	?	?	?	?	?	?
MULE DEER	-	+	+	+	+	+
WHITE-TAILED DEER	-	+	+	+	+	+
MOOSE	-	+	+	+	+	+
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	-	+	+	+	+	+
SNAPPING TURTLE	-	+	+	+	+	+
PAINTED TURTLE	-	+	+	+	+	+
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	-	+	+	+	+	+
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	?	?	?	?	?	?
WESTERN SKINK	-	+	+	+	+	+
RUBBER BOA	-	+	+	+	+	+
RACER	-	+	+	+	+	+
WESTERN HOGNOSE SNAKE	?	?	?	?	?	?
MILK SNAKE	?	?	?	?	?	?
PINE OR GOPHER SNAKE	-	+	+	+	+	+
W. TERRESTRIAL GARTER SNAKE	-	+	+	+	+	+
PLAINS GARTER SNAKE	?	?	?	?	?	?
COMMON GARTER SNAKE	-	+	+	+	+	+
WESTERN RATTLESNAKE	-	+	+	+	+	+

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Table WLD-20
DESCRIPTOR RECREATIONAL USE

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LONG-TOED SALAMANDER	?	?	?	?	?	?
TIGER SALAMANDER	?	?	?	?	?	?
COEUR D'ALENE SALAMANDER (VD)	?	?	?	?	?	?
ROUGHSKIN NEWT	?	?	?	?	?	?
IDAHO GIANT SALAMANDER	?	?	?	?	?	?
TAILED FROG	?	?	?	?	?	?
WESTERN TOAD	?	?	?	?	?	?
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	?	?	?	?	?	?
PACIFIC CHORUS FROG	?	?	?	?	?	?
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	?	?	?	?	?	?
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	-	+	+	-	-	-
DOUBLE-CRESTED CORMORANT	-	-	-	-	-	-
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	-	-	-	-	-	-
BLACK-CROWNED NIGHT HERON	-	+	+	-	-	-
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	?	?	?	?	?	?
TRUMPETER SWAN	?	?	?	?	?	?
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	?	?	?	?	?	?
SNOW GOOSE	?	?	?	?	?	?
ROSS' GOOSE	?	?	?	?	?	?
CANADA GOOSE	?	?	?	?	?	?
WOOD DUCK	?	?	?	?	?	?
GREEN-WINGED TEAL	?	?	?	?	?	?
MALLARD	?	?	?	?	?	?
NORTHERN PINTAIL	?	?	?	?	?	?
BLUE-WINGED TEAL	?	?	?	?	?	?
CINNAMON TEAL	?	?	?	?	?	?
NORTHERN SHOVELER	?	?	?	?	?	?
GADWALL	?	?	?	?	?	?
EURASIAN WIGEON	?	?	?	?	?	?
AMERICAN WIGEON	?	?	?	?	?	?
CANVASBACK	?	?	?	?	?	?
REDHEAD	?	?	?	?	?	?
RING-NECKED DUCK	?	?	?	?	?	?
LESSER SCAUP	?	?	?	?	?	?
HARLEQUIN DUCK	?	?	?	?	?	?

APPENDIX WLD

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	?	?	?	?	?	?
BARROW'S GOLDENEYE	?	?	?	?	?	?
BUFFLEHEAD	?	?	?	?	?	?
HOODED MERGANSER	?	?	?	?	?	?
COMMON MERGANSER	?	?	?	?	?	?
RED-BREASTED MERGANSER	?	?	?	?	?	?
RUDDY DUCK	?	?	?	?	?	?
TURKEY VULTURE	-	-	-	-	-	-
OSPREY	-	-	-	-	-	-
BALD EAGLE	-	+	+	-	-	-
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	-	-	-	-	-	-
COOPER'S HAWK	-	-	-	-	-	-
NORTHERN GOSHAWK	-	+	+	-	-	-
BROAD-WINGED HAWK	?	?	?	?	?	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	-	-	-	-	-	-
FERRUGINOUS HAWK	-	+	+	-	-	-
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	-	-	-	-	-	-
AMERICAN KESTREL	-	-	-	-	-	-
MERLIN	?	?	?	?	?	?
PEREGRINE FALCON	-	+	+	-	-	-
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	-	-	-	-	-	-
GRAY PARTRIDGE	?	?	?	?	?	?
CHUKAR	?	?	?	?	?	?
RING-NECKED PHEASANT	?	?	?	?	?	?
SPRUCE GROUSE	?	?	?	?	?	?
BLUE GROUSE	?	?	?	?	?	?
WHITE-TAILED PTARMIGAN	?	?	?	?	?	?
RUFFED GROUSE	?	?	?	?	?	?
SAGE GROUSE	-	-	-	-	-	-
SHARP-TAILED GROUSE (COL.)	?	?	?	?	?	?
WILD TURKEY	-	-	-	-	-	-
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	?	?	?
SORA	?	?	?	?	?	?
AMERICAN COOT	?	?	?	?	?	?
SANDHILL CRANE	-	-	-	-	-	-
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	-	+	+	-	-	-
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?
WILLET	?	?	?	?	?	?
SPOTTED SANDPIPER	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	-	-	-	-	-	-
MARBLD GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	?	?	?	?	?	?
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	?	?	?	?	?	?
BLACK-BILLED CUCKOO	?	?	?	?	?	?
YELLOW-BILLED CUCKOO	?	?	?	?	?	?
FLAMMULATED OWL	?	?	?	?	?	?
EASTERN SCREECH-OWL	?	?	?	?	?	?
WESTERN SCREECH-OWL	?	?	?	?	?	?
GREAT HORNED OWL	?	?	?	?	?	?
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	?	?	?	?	?	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	?	?	?	?	?	?
GREAT GRAY OWL	?	?	?	?	?	?
LONG-EARED OWL	?	?	?	?	?	?
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	?	?	?	?	?	?
SAW-WHET OWL	?	?	?	?	?	?
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	?	?	?	?	?	?
VAUX'S SWIFT	?	?	?	?	?	?
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFIOUS HUMMINGBIRD	?	?	?	?	?	?
BELTED KINGFISHER	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LEWIS' WOODPECKER	?	?	?	?	?	?
RED-HEADED WOODPECKER	?	?	?	?	?	?
YELLOW-BELLIED (R-NAP) SAPSUCKER	?	?	?	?	?	?
WILLIAMSON'S SAPSUCKER	?	?	?	?	?	?
DOWNY WOODPECKER	?	?	?	?	?	?
HAIRY WOODPECKER	?	?	?	?	?	?
THREE-TOED WOODPECKER	?	?	?	?	?	?
BLACK-BACKED WOODPECKER	?	?	?	?	?	?
NORTHERN FLICKER	?	?	?	?	?	?
PILEATED WOODPECKER	-	-	-	-	-	-
OLIVE-SIDED FLYCATCHER	?	?	?	?	?	?
WESTERN WOOD PEWEE	?	?	?	?	?	?
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	?	?	?	?	?	?
CORDILLERAN FLYCATCHER	?	?	?	?	?	?
SAY'S PHOEBE	?	?	?	?	?	?
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	?	?	?	?	?	?
VIOLET-GREEN SWALLOW	?	?	?	?	?	?
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	?	?	?	?	?	?
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	-	-	-	-	-	-
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	?	?	?	?	?	?
MOUNTAIN CHICKADEE	?	?	?	?	?	?
BOREAL CHICKADEE	?	?	?	?	?	?
CHESTNUT-BACKED CHICKADEE	?	?	?	?	?	?
RED-BREASTED NUTHATCH	?	?	?	?	?	?
WHITE-BREASTED NUTHATCH	?	?	?	?	?	?
PYGMY NUTHATCH	?	?	?	?	?	?
BROWN CREEPER	?	?	?	?	?	?
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	?	?	?	?	?	?
RUBY-CROWNED KINGLET	?	?	?	?	?	?
WINTER WREN	?	?	?	?	?	?
MARSH WREN	?	?	?	?	?	?
DIPPER	?	?	?	?	?	?
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	?	?	?	?	?	?
WESTERN BLUEBIRD	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	-----	-----	-----	-----
TOWNSEND'S SOLITAIRE	?	?	?	?	?	?
VEERY	?	?	?	?	?	?
SWAINSON'S THRUSH	?	?	?	?	?	?
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	?	?	?	?
VARIED THRUSH	?	?	?	?	?	?
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	?	?	?	?	?	?
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	?	?	?	?	?	?
SOLITARY VIREO	?	?	?	?	?	?
WARBLING VIREO	?	?	?	?	?	?
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	?	?	?	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	?	?	?	?
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	?	?	?	?	?	?
AMERICAN REDSTART	?	?	?	?	?	?
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	?	?	?	?	?	?
MACGILLIVRAY'S WARBLER	?	?	?	?	?	?
COMMON YELLOWTHROAT	?	?	?	?	?	?
WILSON'S WARBLER	?	?	?	?	?	?
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN Tanager	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	?	?	?	?	?	?
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?
LE CONTE'S SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
FOX SPARROW	?	?	?	?	?	?
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	?	?	?	?	?	?
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	?	?	?	?	?	?
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	?	?	?	?	?	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	?	?	?	?	?	?
MASKED SHREW	?	?	?	?	?	?
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	?	?	?	?	?	?
DWARF SHREW	?	?	?	?	?	?
WATER SHREW	?	?	?	?	?	?
MERRIAM'S SHREW	?	?	?	?	?	?
PYGMY SHREW	?	?	?	?	?	?
LITTLE BROWN MYOTIS	?	?	?	?	?	?
YUMA MYOTIS	-	-	-	-	-	-
LONG-EARED MYOTIS	?	?	?	?	?	?
LONG-LEGGED MYOTIS	?	?	?	?	?	?
CALIFORNIA MYOTIS	?	?	?	?	?	?
WESTERN SMALL-FOOTED MYOTIS	?	?	?	?	?	?
NORTHERN MYOTIS (KEEN'S)	?	?	?	?	?	?
SILVER-HAIRED BAT	?	?	?	?	?	?
BIG BROWN BAT	?	?	?	?	?	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?
TOWNSEND'S BIG-EARED BAT	-	+	+	-	-	-
PALLID BAT	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
PIKA	?	?	?	?	?	?
EASTERN COTTONTAIL	?	?	?	?	?	?
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	?	?	?	?	?	?
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	?	?	?	?	?	?
YELLOW-PINE CHIPMUNK	?	?	?	?	?	?
RED-TAILED CHIPMUNK	?	?	?	?	?	?
UINTA CHIPMUNK	?	?	?	?	?	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	?	?	?	?	?	?
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	?	?	?	?	?	?
EASTERN FOX SQUIRREL	?	?	?	?	?	?
RED SQUIRREL	?	?	?	?	?	?
NORTHERN FLYING SQUIRREL	?	?	?	?	?	?
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	?	?	?	?	?	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	?	?	?	?	?	?
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	?	?	?	?	?	?
WHITE-FOOTED MOUSE	?	?	?	?	?	?
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	?	?	?	?	?	?
SOUTHERN RED-BACKED VOLE	?	?	?	?	?	?
HEATHER VOLE	?	?	?	?	?	?
MEADOW VOLE	?	?	?	?	?	?
MONTANE VOLE	?	?	?	?	?	?
LONG-TAILED VOLE	?	?	?	?	?	?
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	?	?	?	?	?	?
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	?	?	?	?	?	?
NORTHERN BOG LEMMING	?	?	?	?	?	?
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	?	?	?	?	?	?
PORCUPINE	?	?	?	?	?	?
COYOTE	-	-	-	-	-	?
GRAY WOLF	-	+	+	-	-	-

APPENDIX WLD

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
RED FOX	-	-	-	-	-	?
KIT OR SWIFT FOX	?	?	?	?	?	?
BLACK BEAR	-	-	-	-	-	+
GRIZZLY BEAR	-	+	+	-	-	+
RACCOON	?	?	?	?	?	?
MARTEN	-	-	-	-	-	+
FISHER	?	?	?	?	?	?
ERMINE	?	?	?	?	?	?
LEAST WEASEL	?	?	?	?	?	?
LONG-TAILED WEASEL	?	?	?	?	?	?
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	?	?	?	?	?	?
WOLVERINE	?	?	?	?	?	?
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	?	?	?	?	?	?
STRIPED SKUNK	?	?	?	?	?	?
RIVER OTTER	?	?	?	?	?	?
MOUNTAIN LION	-	-	-	-	-	+
LYNX	?	?	?	?	?	?
BOBCAT	?	?	?	?	?	?
WAPITI OR ELK	-	-	-	-	-	+
MULE DEER	?	?	?	?	?	?
WHITE-TAILED DEER	?	?	?	?	?	?
MOOSE	?	?	?	?	?	?
WOODLAND CARIBOU	?	?	?	?	?	?
PRONGHORN	?	?	?	?	?	?
BISON	?	?	?	?	?	?
MOUNTAIN GOAT	?	?	?	?	?	?
BIGHORN SHEEP	?	?	?	?	?	?
SNAPPING TURTLE	?	?	?	?	?	?
PAINTED TURTLE	?	?	?	?	?	?
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	?	?	?	?	?	?
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	?	?	?	?	?	?
WESTERN SKINK	?	?	?	?	?	?
RUBBER BOA	?	?	?	?	?	?
RACER	?	?	?	?	?	?
WESTERN HOGNOSE SNAKE	?	?	?	?	?	?
MILK SNAKE	?	?	?	?	?	?
PINE OR GOPHER SNAKE	?	?	?	?	?	?
W. TERRESTRIAL GARTER SNAKE	?	?	?	?	?	?
PLAINS GARTER SNAKE	?	?	?	?	?	?
COMMON GARTER SNAKE	?	?	?	?	?	?
WESTERN RATTLESNAKE	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

**Table WLD-21
DESCRIPTOR ROAD DENSITY**

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
LONG-TOED SALAMANDER	-	? -	+	-	-	?
TIGER SALAMANDER	-	? -	+	-	-	?
COEUR D'ALENE SALAMANDER (VD)	-	+	+	-	-	?
ROUGHSKIN NEWT	-	? -	+	-	-	?
IDAHO GIANT SALAMANDER	-	+	+	-	-	?
TAILED FROG	-	+	+	-	-	?
WESTERN TOAD	-	? -	+	-	-	?
GREAT PLAINS TOAD	?	?	?	?	?	?
CANADIAN TOAD	?	?	?	?	?	?
WOODHOUSE'S TOAD	?	?	?	?	?	?
WESTERN CHORUS FROG	-	? -	+	-	-	?
PACIFIC CHORUS FROG	-	? -	+	-	-	?
PLAINS SPADEFOOT	?	?	?	?	?	?
BULLFROG	?	?	?	?	?	?
LEOPARD FROG	?	?	?	?	?	?
SPOTTED FROG	?	?	?	?	?	?
WOOD FROG	-	? -	+	-	-	?
COMMON LOON	?	?	?	?	?	?
PIED-BILLED GREBE	?	?	?	?	?	?
HORNED GREBE	?	?	?	?	?	?
RED-NECKED GREBE	?	?	?	?	?	?
EARED GREBE	?	?	?	?	?	?
WESTERN GREBE (CLARK'S)	?	?	?	?	?	?
WHITE PELICAN	-	+	+	-	-	?
DOUBLE-CRESTED CORMORANT	-	? -	+	-	-	?
AMERICAN BITTERN	?	?	?	?	?	?
GREAT BLUE HERON	-	? -	+	-	-	?
BLACK-CROWNED NIGHT HERON	-	+	+	?	-	?
WHITE-FACED IBIS	?	?	?	?	?	?
TUNDRA SWAN	-	? -	+	+	-	+
TRUMPETER SWAN	-	+	+	+	-	+
MUTE SWAN	?	?	?	?	?	?
GREATER WHITE-FRONTED GOOSE	-	? -	+	+	-	+
SNOW GOOSE	-	? -	+	+	-	+
ROSS' GOOSE	-	? -	+	+	-	+
CANADA GOOSE	-	? -	+	+	-	+
WOOD DUCK	-	? -	+	+	-	+
GREEN-WINGED TEAL	-	? -	+	+	-	+
MALLARD	-	? -	+	+	-	+
NORTHERN PINTAIL	-	? -	+	+	-	+
BLUE-WINGED TEAL	-	? -	+	+	-	+
CINNAMON TEAL	-	? -	+	+	-	+
NORTHERN SHOVELER	-	? -	+	+	-	+
GADWALL	-	? -	+	+	-	+
EURASIAN WIGEON	-	? -	+	+	-	+
AMERICAN WIGEON	-	? -	+	+	-	+
CANVASBACK	-	? -	+	+	-	+
REDHEAD	-	? -	+	+	-	+
RING-NECKED DUCK	-	? -	+	+	-	+
LESSER SCAUP	-	? -	+	+	-	+
HARLEQUIN DUCK	-	+	+	+	-	+

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
COMMON GOLDENEYE	-	?-	+	+	-	+
BARROW'S GOLDENEYE	-	?-	+	+	-	+
BUFFLEHEAD	-	?-	+	+	-	+
HOODED MERGANSER	-	?-	+	+	-	+
COMMON MERGANSER	-	?-	+	+	-	+
RED-BREASTED MERGANSER	-	?-	+	+	-	+
RUDDY DUCK	-	?-	+	+	-	+
TURKEY VULTURE	-	?-	+	-	-	?
OSPREY	-	?-	+	-	-	?
BALD EAGLE	-	+	+	-	-	?
NORTHERN HARRIER (MARSH HAWK)	?	?	?	?	?	?
SHARP-SHINNED HAWK	-	?-	+	-	-	?
COOPER'S HAWK	-	?-	+	-	-	?
NORTHERN GOSHAWK	-	+	+	-	-	?
BROAD-WINGED HAWK	-	?-	+	-	-	?
SWAINSON'S HAWK	?	?	?	?	?	?
RED-TAILED HAWK	-	?-	+	-	-	?
FERRUGINOUS HAWK	-	+	+	-	-	?
ROUGH-LEGGED HAWK	?	?	?	?	?	?
GOLDEN EAGLE	-	?-	+	-	-	?
AMERICAN KESTREL	-	?-	+	-	-	?
MERLIN	-	?-	+	-	-	?
PEREGRINE FALCON	-	+	+	-	-	?
GYRFALCON	?	?	?	?	?	?
PRAIRIE FALCON	-	?-	+	-	-	?
GRAY PARTRIDGE	-	?-	+	+	-	+
CHUKAR	-	?-	+	+	-	+
RING-NECKED PHEASANT	-	?-	+	+	-	+
SPRUCE GROUSE	-	?-	+	+	-	+
BLUE GROUSE	-	?-	+	+	-	+
WHITE-TAILED PTARMIGAN	?	?	?	+	?	+
RUFFED GROUSE	-	?-	+	+	-	+
SAGE GROUSE	-	?-	+	+	-	+
SHARP-TAILED GROUSE (COL.)	-	+	+	+	-	+
WILD TURKEY	-	?-	+	+	-	+
NORTHERN BOBWHITE	?	?	?	?	?	?
VIRGINIA RAIL	?	?	?	+	?	+
SORA	?	?	?	+	?	+
AMERICAN COOT	-	?-	+	+	-	+
SANDHILL CRANE	-	?-	+	+	-	+
WHOOPING CRANE	?	?	?	?	?	?
BLACK-BELLIED PLOVER	?	?	?	?	?	?
LESSER GOLDEN PLOVER	?	?	?	?	?	?
SEMIPALMATED PLOVER	?	?	?	?	?	?
PIPING PLOVER	?	?	?	?	?	?
KILLDEER	?	?	?	?	?	?
MOUNTAIN PLOVER	-	+	+	-	-	?
BLACK-NECKED STILT	?	?	?	?	?	?
AMERICAN AVOCET	?	?	?	?	?	?
GREATER YELLOWLEGS	?	?	?	?	?	?
LESSER YELLOWLEGS	?	?	?	?	?	?
SOLITARY SANDPIPER	?	?	?	?	?	?
WILLET	?	?	?	?	?	?
SPOTTED SANDPIPER	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
UPLAND SANDPIPER	?	?	?	?	?	?
WHIMBREL	?	?	?	?	?	?
LONG-BILLED CURLEW	-	?-	+	-	-	?
MARbled GODWIT	?	?	?	?	?	?
RUDDY TURNSTONE	?	?	?	?	?	?
SANDERLING	?	?	?	?	?	?
SEMIPALMATED SANDPIPER	?	?	?	?	?	?
WESTERN SANDPIPER	?	?	?	?	?	?
LEAST SANDPIPER	?	?	?	?	?	?
BAIRD'S SANDPIPER	?	?	?	?	?	?
PECTORAL SANDPIPER	?	?	?	?	?	?
DUNLIN	?	?	?	?	?	?
STILT SANDPIPER	?	?	?	?	?	?
LONG-BILLED DOWITCHER	?	?	?	?	?	?
COMMON SNIPE	-	?-	+	+	-	+
WILSON'S PHALAROPE	?	?	?	?	?	?
RED-NECKED PHALAROPE	?	?	?	?	?	?
FRANKLIN'S GULL	?	?	?	?	?	?
BONAPARTE'S GULL	?	?	?	?	?	?
RING-BILLED GULL	?	?	?	?	?	?
CALIFORNIA GULL	?	?	?	?	?	?
CASPIAN TERN	?	?	?	?	?	?
COMMON TERN	?	?	?	?	?	?
FORSTER'S TERN	?	?	?	?	?	?
LEAST TERN	?	?	?	?	?	?
BLACK TERN	?	?	?	?	?	?
ROCK DOVE	?	?	?	?	?	?
MOURNING DOVE	-	?-	+	+	-	+
BLACK-BILLED CUCKOO	?	?	?	?	?	?
YELLOW-BILLED CUCKOO	?	?	?	?	?	?
FLAMMULATED OWL	-	+	+	-	-	?
EASTERN SCREECH-OWL	-	?-	+	-	-	?
WESTERN SCREECH-OWL	-	?-	+	-	-	?
GREAT HORNED OWL	-	?-	+	-	-	?
SNOWY OWL	?	?	?	?	?	?
NORTHERN PYGMY OWL	-	?-	+	-	-	?
BURROWING OWL	?	?	?	?	?	?
BARRED OWL	-	?-	+	-	-	?
GREAT GRAY OWL	-	+	+	-	-	?
LONG-EARED OWL	?	?	?	?	?	?
SHORT-EARED OWL	?	?	?	?	?	?
BOREAL OWL	-	+	+	-	-	?
SAW-WHET OWL	-	?-	+	-	-	?
COMMON NIGHTHAWK	?	?	?	?	?	?
COMMON POORWILL	?	?	?	?	?	?
BLACK SWIFT	?	?	?	?	?	?
CHIMNEY SWIFT	-	?-	+	-	-	?
VAUX'S SWIFT	-	?-	+	-	-	?
WHITE-THROATED SWIFT	?	?	?	?	?	?
BLACK-CHINNED HUMMINGBIRD	?	?	?	?	?	?
CALLIOPE HUMMINGBIRD	?	?	?	?	?	?
RUFOUS HUMMINGBIRD	?	?	?	?	?	?
BELTED KINGFISHER	?	?	?	?	?	?
LEWIS' WOODPECKER	-	?-	+	-	-	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
RED-HEADED WOODPECKER	-	?-	+	-	-	?
YELLOW-BELLIED (R-NAP) SAPSUCKER	-	?-	+	-	-	?
WILLIAMSON'S SAPSUCKER	-	?-	+	-	-	?
DOWNY WOODPECKER	-	?-	+	-	-	?
HAIRY WOODPECKER	-	?-	+	-	-	?
THREE-TOED WOODPECKER	-	?-	+	-	-	?
BLACK-BACKED WOODPECKER	-	+	+	-	-	?
NORTHERN FLICKER	-	?-	+	-	-	?
PILEATED WOODPECKER	-	?-	+	-	-	?
OLIVE-SIDED FLYCATCHER	?	?	?	?	?	?
WESTERN WOOD PEWEE	?	?	?	?	?	?
WILLOW FLYCATCHER	?	?	?	?	?	?
LEAST FLYCATCHER	?	?	?	?	?	?
HAMMOND'S FLYCATCHER	?	?	?	?	?	?
DUSKY FLYCATCHER	?	?	?	?	?	?
CORDILLERAN FLYCATCHER	-	?-	+	-	-	?
SAY'S PHOEBE	-	?-	+	-	-	?
CASSIN'S KINGBIRD	?	?	?	?	?	?
WESTERN KINGBIRD	?	?	?	?	?	?
EASTERN KINGBIRD	?	?	?	?	?	?
HORNED LARK	?	?	?	?	?	?
TREE SWALLOW	-	?-	+	-	-	?
VIOLET-GREEN SWALLOW	-	?-	+	-	-	?
ROUGH-WINGED SWALLOW	?	?	?	?	?	?
BANK SWALLOW	?	?	?	?	?	?
CLIFF SWALLOW	?	?	?	?	?	?
BARN SWALLOW	?	?	?	?	?	?
GRAY JAY	?	?	?	?	?	?
STELLER'S JAY	?	?	?	?	?	?
PINYON JAY	?	?	?	?	?	?
CLARK'S NUTCRACKER	?	?	?	?	?	?
BLACK-BILLED MAGPIE	-	?-	+	-	-	?
COMMON CROW	?	?	?	?	?	?
COMMON RAVEN	?	?	?	?	?	?
BLACK-CAPPED CHICKADEE	-	?-	+	-	-	?
MOUNTAIN CHICKADEE	-	?-	+	-	-	?
BOREAL CHICKADEE	-	?-	+	-	-	?
CHESTNUT-BACKED CHICKADEE	-	?-	+	-	-	?
RED-BREASTED NUTHATCH	-	?-	+	-	-	?
WHITE-BREASTED NUTHATCH	-	?-	+	-	-	?
PYGMY NUTHATCH	-	?-	+	-	-	?
BROWN CREEPER	-	?-	+	-	-	?
ROCK WREN	?	?	?	?	?	?
CANYON WREN	?	?	?	?	?	?
HOUSE WREN	-	?-	+	-	-	?
RUBY-CROWNED KINGLET	?	?	?	?	?	?
WINTER WREN	-	?-	+	-	-	?
MARSH WREN	?	?	?	?	?	?
DIPPER	-	?-	+	-	-	?
GOLDEN-CROWNED KINGLET	?	?	?	?	?	?
EASTERN BLUEBIRD	-	?-	+	-	-	?
WESTERN BLUEBIRD	-	?-	+	-	-	?
MOUNTAIN BLUEBIRD	-	?-	+	-	-	?
TOWNSEND'S SOLITAIRE	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
VEERY	-	?-	+	-	-	?
SWAINSON'S THRUSH	-	?-	+	-	-	?
HERMIT THRUSH	?	?	?	?	?	?
AMERICAN ROBIN	?	?	?	?	?	?
VARIED THRUSH	?	?	?	?	?	?
GRAY CATBIRD	?	?	?	?	?	?
SAGE THRASHER	?	?	?	?	?	?
BROWN THRASHER	?	?	?	?	?	?
WATER PIPIT	?	?	?	?	?	?
SPRAGUE'S PIPIT	?	?	?	?	?	?
BOHEMIAN WAXWING	?	?	?	?	?	?
CEDAR WAXWING	?	?	?	?	?	?
NORTHERN SHRIKE	?	?	?	?	?	?
LOGGERHEAD SHRIKE	?	?	?	?	?	?
EUROPEAN STARLING	-	?-	+	-	-	?
SOLITARY VIREO	?	?	?	?	?	?
WARBLING VIREO	?	?	?	?	?	?
RED-EYED VIREO	?	?	?	?	?	?
TENNESSEE WARBLER	?	?	?	?	?	?
ORANGE-CROWNED WARBLER	?	?	?	?	?	?
NASHVILLE WARBLER	?	?	?	?	?	?
YELLOW WARBLER	?	?	?	?	?	?
YELLOW-RUMPED WARBLER	?	?	?	?	?	?
TOWNSEND'S WARBLER	?	?	?	?	?	?
BLACKPOLL WARBLER	?	?	?	?	?	?
BLACK-AND-WHITE WARBLER	-	?-	+	-	-	?
AMERICAN REDSTART	?	?	?	?	?	?
OVENBIRD	?	?	?	?	?	?
NORTHERN WATERTHRUSH	-	?-	+	-	-	?
MACGILLIVRAY'S WARBLER	?	?	?	?	?	?
COMMON YELLOWTHROAT	?	?	?	?	?	?
WILSON'S WARBLER	?	?	?	?	?	?
YELLOW-BREASTED CHAT	?	?	?	?	?	?
WESTERN Tanager	?	?	?	?	?	?
NORTHERN CARDINAL	?	?	?	?	?	?
BLACK-HEADED GROSBEAK	?	?	?	?	?	?
LAZULI BUNTING	?	?	?	?	?	?
INDIGO BUNTING	?	?	?	?	?	?
DICKCISSEL	?	?	?	?	?	?
GREEN-TAILED TOWHEE	?	?	?	?	?	?
RUFOUS-SIDED TOWHEE	?	?	?	?	?	?
TREE SPARROW	?	?	?	?	?	?
CHIPPING SPARROW	?	?	?	?	?	?
CLAY-COLORED SPARROW	?	?	?	?	?	?
BREWER'S SPARROW	?	?	?	?	?	?
FIELD SPARROW	?	?	?	?	?	?
VESPER SPARROW	?	?	?	?	?	?
LARK SPARROW	?	?	?	?	?	?
LARK BUNTING	?	?	?	?	?	?
SAVANNAH SPARROW	?	?	?	?	?	?
BAIRD'S SPARROW	?	?	?	?	?	?
GRASSHOPPER SPARROW	?	?	?	?	?	?
LE CONTE'S SPARROW	?	?	?	?	?	?
FOX SPARROW	?	?	?	?	?	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	----	----	----	----	-----	-----
SONG SPARROW	?	?	?	?	?	?
LINCOLN'S SPARROW	?	?	?	?	?	?
WHITE-THROATED SPARROW	?	?	?	?	?	?
WHITE-CROWNED SPARROW	?	?	?	?	?	?
HARRIS' SPARROW	?	?	?	?	?	?
DARK-EYED JUNCO	-	?-	+	-	-	?
MCCOWN'S LONGSPUR	?	?	?	?	?	?
LAPLAND LONGSPUR	?	?	?	?	?	?
CHESTNUT-COLLARED LONGSPUR	?	?	?	?	?	?
SNOW BUNTING	?	?	?	?	?	?
BOBOLINK	?	?	?	?	?	?
RED-WINGED BLACKBIRD	?	?	?	?	?	?
WESTERN MEADOWLARK	?	?	?	?	?	?
YELLOW-HEADED BLACKBIRD	?	?	?	?	?	?
RUSTY BLACKBIRD	?	?	?	?	?	?
BREWER'S BLACKBIRD	?	?	?	?	?	?
COMMON GRACKLE	?	?	?	?	?	?
BROWN-HEADED COWBIRD	?	?	?	?	?	?
ORCHARD ORIOLE	?	?	?	?	?	?
NORTHERN ORIOLE	?	?	?	?	?	?
BLACK ROSY FINCH	?	?	?	?	?	?
GRAY-CROWNED ROSY FINCH	?	?	?	?	?	?
PINE GROSBEAK	?	?	?	?	?	?
CASSIN'S FINCH	?	?	?	?	?	?
HOUSE FINCH	?	?	?	?	?	?
RED CROSSBILL	?	?	?	?	?	?
WHITE-WINGED CROSSBILL	?	?	?	?	?	?
COMMON REDPOLL	?	?	?	?	?	?
HOARY REDPOLL	?	?	?	?	?	?
PINE SISKIN	?	?	?	?	?	?
AMERICAN GOLDFINCH	?	?	?	?	?	?
EVENING GROSBEAK	?	?	?	?	?	?
HOUSE SPARROW	-	?-	+	-	-	?
MASKED SHREW	-	?-	+	-	-	?
PREBLE'S SHREW	?	?	?	?	?	?
VAGRANT SHREW	-	?-	+	-	-	?
DWARF SHREW	-	+	+	-	-	?
WATER SHREW	-	?-	+	-	-	?
MERRIAM'S SHREW	-	+	+	-	-	?
PYGMY SHREW	-	?-	+	-	-	?
LITTLE BROWN MYOTIS	-	?-	+	-	-	?
YUMA MYOTIS	-	?-	+	-	-	?
LONG-EARED MYOTIS	-	?-	+	-	-	?
LONG-LEGGED MYOTIS	-	?-	+	-	-	?
CALIFORNIA MYOTIS	-	?-	+	-	-	?
WESTERN SMALL-FOOTED MYOTIS	-	?-	+	-	-	?
NORTHERN MYOTIS (KEEN'S)	-	+	+	-	-	?
SILVER-HAIRED BAT	-	?-	+	-	-	?
BIG BROWN BAT	-	?-	+	-	-	?
HOARY BAT	?	?	?	?	?	?
SPOTTED BAT	?	?	?	?	?	?
TOWNSEND'S BIG-EARED BAT	-	+	+	-	-	?
PALLID BAT	?	?	?	?	?	?
PIKA	?	?	?	?	?	?

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
EASTERN COTTONTAIL	-	?-	+	-	-	?
MOUNTAIN COTTONTAIL	?	?	?	?	?	?
DESERT COTTONTAIL	?	?	?	?	?	?
SNOWSHOE HARE	-	?-	+	-	-	?
WHITE-TAILED JACK RABBIT	?	?	?	?	?	?
BLACK-TAILED JACKRABBIT	?	?	?	?	?	?
PYGMY RABBIT	?	?	?	?	?	?
LEAST CHIPMUNK	-	?-	+	-	-	?
YELLOW-PINE CHIPMUNK	-	?-	+	-	-	?
RED-TAILED CHIPMUNK	-	?-	+	-	-	?
UINTA CHIPMUNK	-	?-	+	-	-	?
YELLOW-BELLIED MARMOT	?	?	?	?	?	?
HOARY MARMOT	?	?	?	?	?	?
RICHARDSON'S GROUND SQUIRREL	?	?	?	?	?	?
UINTA GROUND SQUIRREL	-	?-	+	-	-	?
COLUMBIAN GROUND SQUIRREL	?	?	?	?	?	?
THIRTEEN-LINED GROUND SQUIRREL	?	?	?	?	?	?
GOLDEN-MANTLED GROUND SQUIRREL	?	?	?	?	?	?
BLACK-TAILED PRAIRIE DOG	?	?	?	?	?	?
WHITE-TAILED PRAIRIE DOG	?	?	?	?	?	?
EASTERN GRAY SQUIRREL	-	?-	+	-	-	?
EASTERN FOX SQUIRREL	-	?-	+	-	-	?
RED SQUIRREL	-	?-	+	-	-	?
NORTHERN FLYING SQUIRREL	-	?-	+	-	-	?
NORTHERN POCKET GOPHER	?	?	?	?	?	?
IDAHO POCKET GOPHER	-	?-	+	-	-	?
OLIVE-BACKED POCKET MOUSE	?	?	?	?	?	?
GREAT BASIN POCKET MOUSE	?	?	?	?	?	?
HISPID POCKET MOUSE	?	?	?	?	?	?
ORD'S KANGAROO RAT	?	?	?	?	?	?
BEAVER	-	?-	+	+	-	+
WESTERN HARVEST MOUSE	?	?	?	?	?	?
DEER MOUSE	-	?-	+	-	-	?
WHITE-FOOTED MOUSE	-	?-	+	-	-	?
NORTHERN GRASSHOPPER MOUSE	?	?	?	?	?	?
BUSHY-TAILED WOODRAT	-	?-	+	-	-	?
SOUTHERN RED-BACKED VOLE	-	?-	+	-	-	?
HEATHER VOLE	-	?-	+	-	-	?
MEADOW VOLE	-	?-	+	-	-	?
MONTANE VOLE	-	?-	+	-	-	?
LONG-TAILED VOLE	?	?	?	?	?	?
PRAIRIE VOLE	?	?	?	?	?	?
WATER VOLE (RICHARDSON'S)	-	?-	+	-	-	?
SAGEBRUSH VOLE	?	?	?	?	?	?
MUSKRAT	-	?-	+	+	-	+
NORTHERN BOG LEMMING	-	+	+	-	-	?
NORWAY RAT	?	?	?	?	?	?
HOUSE MOUSE	?	?	?	?	?	?
MEADOW JUMPING MOUSE	?	?	?	?	?	?
WESTERN JUMPING MOUSE	-	?-	+	-	-	?
PORCUPINE	-	?-	+	-	-	?
COYOTE	-	?-	+	-	-	?
GRAY WOLF	-	+	+	-	-	?
RED FOX	-	?-	+	-	-	?

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
	-----	-----	-----	-----	-----	-----
KIT OR SWIFT FOX	?	?	?	+	?	+
BLACK BEAR	-	?-	+	+	-	+
GRIZZLY BEAR	-	+	+	+	-	+
RACCOON	-	?-	+	?	-	?
MARTEN	-	?-	+	+	-	+
FISHER	-	+	+	+	-	+
ERMINE	-	?-	+	+	-	+
LEAST WEASEL	-	?-	+	-	-	?
LONG-TAILED WEASEL	-	?-	+	-	-	?
BLACK-FOOTED FERRET	?	?	?	?	?	?
MINK	-	?-	+	+	-	+
WOLVERINE	-	+	+	+	-	+
BADGER	?	?	?	?	?	?
WESTERN SPOTTED SKUNK	-	?-	+	-	-	?
STRIPED SKUNK	-	?-	+	-	-	?
RIVER OTTER	-	?-	+	+	-	+
MOUNTAIN LION	-	?-	+	+	-	+
LYNX	-	+	+	+	-	+
BOBCAT	-	?-	+	+	-	+
WAPITI OR ELK	-	?-	+	+	-	+
MULE DEER	-	?-	+	+	-	+
WHITE-TAILED DEER	-	?-	+	+	-	+
MOOSE	-	?-	+	+	-	+
WOODLAND CARIBOU	?	?	?	+	?	+
PRONGHORN	-	?-	+	+	-	+
BISON	-	?-	+	+	-	+
MOUNTAIN GOAT	-	?-	+	+	-	+
BIGHORN SHEEP	-	?-	+	+	-	+
SNAPPING TURTLE	-	+	+	-	-	?
PAINTED TURTLE	-	?-	+	-	-	?
SPINY SOFTSHELL TURTLE	?	?	?	?	?	?
NORTHERN ALLIGATOR LIZARD	-	?-	+	-	-	?
SHORT-HORNED LIZARD	?	?	?	?	?	?
SAGEBRUSH LIZARD	-	?-	+	-	-	?
WESTERN SKINK	-	?-	+	-	-	?
RUBBER BOA	-	?-	+	-	-	?
RACER	-	?-	+	-	-	?
WESTERN HOGNOSE SNAKE	-	+	+	-	-	?
MILK SNAKE	-	?-	+	-	-	?
PINE OR GOPHER SNAKE	-	?-	+	-	-	?
W. TERRESTRIAL GARTER SNAKE	-	?-	+	-	-	?
PLAINS GARTER SNAKE	-	?-	+	-	-	?
COMMON GARTER SNAKE	-	?-	+	-	-	?
WESTERN RATTLESNAKE	-	?-	+	-	-	?

APPENDIX FSH

FISHERIES EFFECTS ASSESSMENT METHODOLOGY

The fisheries effects assessment was accomplished using a nonparametric ranking system which compared relative resource effects resulting from the primary variables impacting the fishery resource. Using the Resource Management Standards and the management scenarios developed for each alternative, the acting agents were ranked from 1-6 for each of the alternatives. In the event of a tied ranking, the next two rankings were averaged and assigned to each of the alternatives. For example, if alternatives Alpha and Beta were found to be tied for the second ranking behind Gamma, Gamma would receive a rank of '1' while Alpha and Beta would each receive a composite rank of '2.5' which reflects the second and third rank averaged (i.e. $(2+3)/2 = 2.5$). This procedure was used until all six alternatives were assigned a rank.

This ranking procedure was used to assess relative effects under each alternative. The fisheries effects assessment was split into three impact components: sediment and nutrient loading; availability of large organic debris; and water temperature. Each of the impact components was further divided into variables expected to be affected under the plan. The sediment and nutrient portion was divided into four variables: volume of timber harvested; percentage of area clearcut or seed tree cut; road density; and numbers of AUMs. The large organic debris section was divided into three variables: number of retention trees; amount of open roads; and SMZ width. The third segment, water temperature, was divided into three variables: number of retention trees; SMZ width, and numbers of AUMs.

Following the ranking of each sub-component by alternative, the sub-components were added together to give an overall score for the three main components. Each main component was weighted to indicate its relative influence on fisheries impact. For the purpose of this assessment, we determined that sediment and nutrients and large organic debris accounted for approximately 40 percent each to the overall impacts to fisheries. Water temperature, though important, was determined to have a smaller potential to be affected by activities under the alternatives and therefore accounted for 20 percent of any potential impacts.

The following tables show our effects rankings by alternative and descriptor, including our estimates of sub-component rankings.

Ranking for Sediment and Nutrients (Statewide):

Alternative	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Timber Harvest	4	3	1	5	6	2
CC and ST	5.5	3.5	1	3.5	5.5	2
Road Density	4	3	1	5	6	2
# of AUMs	<u>6</u>	<u>4</u>	<u>1</u>	<u>2.5</u>	<u>5</u>	<u>2.5</u>
Total	19.5	13.5	4	16	22.5	8.5

Ranking for Large Organic Debris:

Alternative	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Retention Trees	3	3	1	5.5	5.5	3
Open Roads	4	2.5	1	5.5	5.5	2.5
SMZ Width	<u>4</u>	<u>2.5</u>	<u>1</u>	<u>5.5</u>	<u>5.5</u>	<u>2.5</u>
Total	11	8	3	16.5	16.5	8

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Ranking for Water Temperature:

Alternative	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Retention Trees	3	3	1	5.5	5.5	3
Open Roads	4	2.5	1	5.5	5.5	2.5
# of AUMs	<u>6</u>	<u>4</u>	<u>1</u>	<u>2.5</u>	<u>5</u>	<u>2.5</u>
Total	13	9.5	3	13.5	16	8

Overall Scoring for Main Components Multiplied by Weighting:

Alternative	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Sediment and Nutrients	7.8	5.4	1.6	6.4	9	3.4
Large Organic Debris	4.4	3.2	1.2	6.6	6.6	3.2
Water Temp	<u>2.6</u>	<u>1.9</u>	<u>0.6</u>	<u>2.7</u>	<u>3.2</u>	<u>1.6</u>
Total	14.6	10.5	3.4	15.7	18.8	8.2

Relative Ranking of Potential Impacts

4	3	1	5	6	2
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APPENDIX ECN

ECONOMIC ASSESSMENT

In this Appendix, we present the logic, assumptions, and other documentation supporting our presentation in Chapters III and IV. The Appendix consists of the following three parts:

- PART I: School Funding from Forested Lands
- PART II: Net Present Value of Expected Revenues
- PART III: Impacts on the Regional Economy

PART I: SCHOOL FUNDING FROM FORESTED LANDS

References to the school trust fund should actually be plural as there are multiple trust funds, each tied to specific land ownerships and each having specific beneficiaries. By far the largest group designate the Common Schools (public schools) as beneficiary, with proceeds managed by the Office of the Superintendent of Public Instruction (OSPI).¹

Trust income follows two main paths to reach its beneficiaries. Some is Distributable, which means the largest share is paid directly to beneficiaries; and some is non-distributable, which means the money is invested in the permanent Trust and Legacy Account, managed by the State Board of Investments. Most of the annual interest earned from Permanent Fund investments is paid directly to trust beneficiaries. It appears as the Trust and Legacy Interest component of Distributable income.

FORESTED LANDS SHARE OF DSL CONTRIBUTIONS TO SCHOOL TRUSTS

Each year, DSL's Central Management Division compiles an updated "Five-Year Comparison of Distributable and Nondistributable Income Earned on State Lands". This one-page summary displays dollar amounts in each subsidiary account of the Distributable and Nondistributable income categories.² The Forested Lands Share of DSL's annual contributions to the school trust funds (displayed in Figure III-E1 in Chapter III) was compiled as follows.

The Distributable component derived from forested lands is comprised of Grazing, Timber Sale, and Other revenues; Transactions Fees; and Trust and Legacy Interest. Based on estimates made by DSL's Lands Division, about 2.5 percent of total grazing revenues are derived from forested lands. By definition, 100 percent of timber sale revenue comes from forested lands; and we estimate that 50 percent of revenues in the Other, and Transactions Fees categories are derived from forested lands. Our estimate that 31.5 percent of Trust and Legacy Interest is derived from forested lands is based on the fact that an annual average of 31.5 percent of Nondistributable earnings (the source of income for the T&L Account) come from forested lands.

The Nondistributable component is made up of revenues earned from Timber Sales, Rights-of-Way, sales of Sand and Gravel, and Miscellaneous sources. Again, 100 percent of timber sale revenues are earned from forested lands, as is an estimated 50 percent of revenues from rights-of-way, sand and gravel, and miscellaneous sources.³

¹ Alan Christianson, Chief of DSL's Administrative Support Bureau, estimates that 95 percent of distributable trust income is paid to OSPI (phone conversation, 9/27/94).

² Figure 1 is the 1994 update of DSL's "Five-Year Comparison of Distributable and Nondistributable Income Earned on State Lands".

³ Timber sale earnings from state trust lands whose designated beneficiaries are the State Industrial School (Pine Hills), the University of Montana, the School for the Deaf and Blind, Montana Tech, Montana State University, MSU-Morrill, Eastern Montana College, and Western

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The forested lands share of DSL contributions to the school trusts is taken as the sum of Distributable forest-land-derived income as a percentage of total Distributable income. We made computations for fiscal years 1992 through 1994 and averaged the results.

Figure 1
DSL FIVE-YEAR COMPARISON OF DISTRIBUTABLE AND NONDISTRIBUTABLE INCOME
EARNED ON STATE LANDS
(Dollars)

<u>Distributable</u>					
	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994
Grazing	4,133,290	4,397,372	4,341,521	4,178,056	4,264,030
Ag. Rentals	7,350,754	7,561,710	8,703,800	7,660,483	9,486,264
Oil & Gas Leases	1,561,866	1,255,508	974,390	882,720	1,086,708
Oil & Gas					
Penalties	712,388	520,859	390,309	242,082	218,941
Oil & Gas Bonus	225,303	298,907	57,518	123,212	498,875
Timber Sales			2,422,419 ⁴	3,074,174	3,769,170
Interest on CP's	16,551	11,281	10,554	7,892	5,450
T & L Interest	23,423,134	25,837,210	26,683,372	30,154,986	25,212,411
Other Revenues	291,723	388,731	535,202	780,375	880,018
Transaction Fees	<u>174,195</u>	<u>140,223</u>	<u>135,605</u>	<u>170,426</u>	<u>178,308</u>
Total Distrib. Income	37,889,204	40,411,801	44,254,690	47,274,406	45,600,175
<u>Nondistributable</u>					
	FY 1990	FY 1991	FY 1992	FY 1993	FY 1994
Install. on Land					
Sales	52,481	46,052	33,434	39,664	17,000
5% of Annual School Interest					
Income	1,826,685	1,887,657	2,085,059	2,193,351	2,154,000
Timber Sales	6,642,118	4,080,226	4,038,261	1,488,558	1,938,000
Rights-of-Way	105,350	111,059	100,704	96,002	87,000
Oil Royalties	2,597,544	3,027,647	2,556,997	2,251,402	1,669,000
Gas Royalties	1,115,172	864,965	832,843	841,818	754,000
Coal Royalties	2,302,504	1,576,105	1,489,909	1,726,767	3,632,000
Sand & Gravel	108,725	165,334	164,465	99,470	157,000
Miscellaneous	<u>39,659</u>	<u>52,596</u>	<u>122,959</u>	<u>140,765</u>	<u>168,000</u>
Ttl. Nondistrib. Income	14,790,238	11,811,641	11,424,631	8,877,797	10,580,000

Montana College are Nondistributable. That is, they are paid to the Trust and Legacy account for management by the State Board of Investments with subsequent interest earnings later paid to the benefiting institutions. All but 5 percent of timber sale earnings from other trust lands are Distributable and paid directly to the Office of the Superintendent of Public Instruction.

⁴ Timber Sales for the Common School Trust from 1/1/92 - 6/30/94 were distributed to OSPI.

DSL SHARE OF TOTAL SCHOOL TRUST CONTRIBUTIONS

The Office of Public Instruction maintains a record of income and expenditures for the Public School Equalization Aid Account (Figure 2). DSL contributions appear as the Common School I&I entry. We computed the DSL share as the Common School I&I amount divided by the total for all contributions, for fiscal years 1992 through 1994.

Figure 2
PUBLIC SCHOOL EQUALIZATION AID ACCOUNT (02403)⁵

Source	FY 1991	FY 1992	FY 1993
Beginning Balance	24,760,394	8,529,077	2,551,627
STATE EQUALIZATION			
Individual Income Tax	115,933,687	92,880,426	101,544,521
Corporate License Tax	17,841,427	15,982,988	18,697,338
Coal Severance Tax	5,752,194	6,169,009	4,044,872
Common School I & I	35,865,505	39,616,168	41,673,746
U.S. Mineral Royalties	21,928,394	21,150,278	21,799,728
Ed Trst/Loc Impact Int	176,629	108,285	92,881
Education Trust Transfer	0	0	0
Coal Trust Interest	7,037,440	7,060,263	7,475,242
Lottery Revenue	4,200,337	5,493,509	8,061,582
STIP	141,131	11	37,703
Local Impact Reversion	1,091	699,885	2,487,344
CTLP Reversion	0	3,770	0
40 Mill Statewide Levy	56,993,455	76,612,406	73,857,657
55 Mill Levy	71,040,641	72,277,592	134,154,928
County Fund Surplus	14,414,814	9,868,668	(754,209)
General Fund Appropriation	0	12,100,000	0
Total	351,326,747	360,023,259	413,173,333
EXPENDITURES			
Foundation/Direct State Aid	322,015,455	316,010,821	354,651,024
Guaranteed Tax Base Aid	45,146,997	45,752,351	45,961,049
Transportation	0	3,908,166	3,914,457
School Facility			
Reimbursements	0	0	0
Tax Increment Districts	195,603	17,832	7,553
Bonus Payments	255,000	183,750	213,874
Telecommunications	0	147,466	152,850
Dept. of Commerce Audit	0	0	166,500
Prior Year Expenditures	0	(19,679)	(48,126)
HB 667 MAEFAIRS	0	0	0
SIMMS Grant	0	0	0
Total	367,613,055	366,000,708	405,019,180
Ending Fund Balance	8,474,085 (54,992)	2,551,628	10,705,780

⁵ Source: Office of Public Instruction, 7/19/94

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FUTURE DSL CONTRIBUTIONS

We have no way of knowing how revenues other than those derived from forested state lands will change in the future. However, for the purpose of comparison of our alternatives, we can assume that all other sources of school funding will remain constant for the next twenty-five years. This will certainly not be true but for comparison purposes only, it is a legitimate assumption.

Figure IV-E17 (Net Present Value of Remaining Timber Asset Value under These Sets of Assumptions) tells us the range of expected future annual forested land earnings under each of the six alternatives. Earnings are displayed for high and low output levels, for each of three assumptions regarding future output prices. Dividing the annualized equivalent of these estimated future earnings by average total school funding (with Trust & Legacy interest removed) for the most recent past three years gives us the percentage shares expected to derive from forested state lands.⁶

Figure 3 shows us the results of those computations. Under our baseline price assumptions, the forested lands share of total school funding each year would range from a high of 2.62 percent under the Epsilon high output level, to a low of negative 0.23 percent under the Gamma low output level.^{7 8}

⁶ Computation of average total school funding:

	<u>FY92</u>	<u>FY93</u>	<u>FY94</u>
\$ TOTAL	\$360,023,259	\$413,173,333	\$411,682,300
INFLTN ADJ	\$389,173,723	\$431,499,570	\$411,682,300 (PPI-All Commod)
THREE-YEAR AVERAGE:	\$410,785,198		
T&L INTEREST:	\$ 28,516,265	COMPUTATION BASE: \$382,268,933	

⁷ We assume that "negative" contributions would simply mean zero contribution from forested state lands. We would not expect to withdraw money from the School Equalization Account.

⁸ In Chapter IV (Table IV-EC1), these numbers are reported as if T&L interest had been included, to make them comparable with recent DSL forest land contributions of just under three percent per year.

Figure 3
DSL FORESTED LANDS SHARE OF TOTAL SCHOOL FUNDING

Units	Recent Past	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
<hr/>							
Total School Funding* \$	382268933	382268933	382268933	382268933	382268933	382268933	382268933
<u>Forested Lands Earnings</u>							
<u>High Output (Annual)</u>							
Baseline \$	6550281	7570000	6656000	1815000	8755000	10007000	4443000
%	1.71	1.98	1.74	0.47	2.29 2.62	1.16	
Leased Rec. @ \$1.59 \$		7583000	6676000	1841000	8793000	10020000	4532000
%		1.98	1.75	0.48	2.30 2.62	1.19	
Timber Trend @ 2.6%/y \$		9200000	8086000	2243000	10585000	12238000	5271000
%		2.41	2.12	0.59	2.77 3.20	1.38	
<u>Low Output (Annual)</u>							
Baseline \$	6550281	1590000	585000	-890000	630000	4398000	36000
%	1.71	0.42	0.15	-0.23	0.16 1.15	0.01	
Leased Rec. @ \$1.59 \$		1594000	591000	-881000	642000	4402000	66000
%		0.42	0.15	-0.23	0.17 1.15	0.02	
Timber Trend @ 2.6%/y \$		2405000	1199000	-676000	1244000	5814000	50000
%		0.63	0.31	-0.18	0.33 1.52	0.12	

* WITH TRUST AND LEGACY INTEREST DEDUCTED. (We must remove the T&L interest component from the calculations in order to make meaningful comparisons between our known past figures and our estimated future figures.)

PART II: NET PRESENT VALUE OF EXPECTED REVENUES

In this section, we present the background necessary to understand how we arrived at estimated net present value equivalents of the future cost and revenue streams associated with each alternative. Part II is organized as follows:

- I. **USE LEVELS AND TRENDS**
Documentation of reasoning, assumptions, and data that led us to current use levels, trends, and estimated future use levels for grazing, recreation, and timber.
- II. **COST ASSUMPTIONS**
Explanation for our cost assumptions and our methodology for building costs into NPV calculations.
- III. **REVENUE ASSUMPTIONS**
Explanation of revenue assumptions for grazing, recreation, and timber; for both Baseline and Alternative levels.
- IV. **COMPUTATIONS**
Discussion of computation parameters and sensitivity analysis.

I. USE LEVELS AND TRENDS

In this sub-section, we provide the background needed to understand how we arrived at projected future use levels under each alternative. Because of the length and complexity of the discussion, particularly with respect to recreation use, the material is further divided into separate sections on Grazing, Recreation, and Timber.

Grazing

Kevin Chappell, Surface Management Bureau Chief, and Garry Williams, Central Land Office Forest and Lands Program Manager, interpreted the philosophy, specific intent, and resource management standards associated with each alternative to arrive at estimated future grazing levels on forested trust lands. Their estimates and supporting reasoning are presented in the Grazing Scenarios Appendix. The Table G-2 Grazing Use Schedule is based on these estimates with the classified Forest lands component expanded to give a high/low range of 50 percent above and 50 percent below the base levels.

The scenario estimates assumed each alternative was fully implemented. In reality, there would be a gradual adjustment from current use levels to the full-implementation level of any alternative. We assumed that the adjustment would take place at a rate of 1000 AUMs per year until the new level was reached, with use levels remaining constant thereafter, for the rest of the twenty-five year planning period. We structured the computations as if use levels remained constant for each five-year period then took a sudden jump to the next five-year level, and so forth.

Finally, in order to create a range of plausible High and Low levels of grazing use, we expanded the above use estimates to a range of High values, 50 percent above the core estimates, and a range of Low values, 50 percent below the core estimates. Figure 4 shows the resulting schedule of AUMs on forested lands.

Figure 4
ESTIMATED GRAZING USE SCHEDULE
 (Max. adjustment from 1995 level = 1000 AUM/yr)

<u>SCENARIO</u>		<u>1995</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
HIGH	ALPHA	26776	30765	34753	34753	34753	34753
	BETA	26776	26577	26377	26377	26377	26377
	GAMMA	26776	24782	22788	22788	22788	22788
	DELTA	26776	24896	23016	23016	23016	23016
	EPSLN	26776	27175	27574	27574	27574	27574
	ZETA	26776	24896	23016	23016	23016	23016
LOW	ALPHA	26776	22788	18799	18799	18799	18799
	BETA	26776	21392	16007	16007	16007	16007
	GAMMA	26776	21776	16776	14811	14811	14811
	DELTA	26776	21776	16776	13444	13444	13444
	EPSLN	26776	21591	16406	16406	16406	16406
	ZETA	26776	21776	16776	13444	13444	13444

Recreation

Estimating the environmental and economic effects of recreation management under each alternative has presented the challenge of predicting future recreation use levels and potential revenues on school trust lands in the absence of:

- 1) A well-developed current recreation program with known patterns of use.
- 2) Data on current levels of dispersed recreation use on trust lands.
- 3) Research studies on future participation rates in Montana as a whole, or on state lands in particular.
- 4) Research or experience-based estimates of prices and revenue collection mechanisms applicable to dispersed recreation use of state lands.

We have confronted this assessment challenge through the following procedural steps:

Framing the Problem

- 1) Grouping types of recreation whose environmental effects are of a similar kind and which lend themselves to a similar means of fee collection.
- 2) Developing impact profiles that characterize the probable kinds of environmental effects caused by activities in each group.

Estimating Current Recreation Use

- 1) Developed site recreation.
- 2) Dispersed recreation.

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Predicting Future Use

- 1) Studying national and regional trends to arrive at baseline growth trends for use in this analysis.
- 2) Adapting baseline trends for each activity group to reflect the philosophy of each alternative.
- 3) Combining estimated current use and estimated growth trends to calculate future use levels for each group, under each fully-implemented alternative.

Exclusive Leasing

- 1) Estimate the current share of recreation use in each activity group that is sold under exclusive leases.
- 2) Predict future shares of activity levels to be sold under exclusive leases.

Adjustment Schedule

- 1) Predict the schedule of adjustment from current use levels to fully-implemented recreation use levels for each activity group, under each alternative.

Estimating Prices

- 1) Estimating average current prices charged by DSL for those activities being marketed.
- 2) Estimating current market prices for each activity group.
- 3) Predicting future prices collected by DSL. In some cases, this includes estimating the rate at which DSL prices will approach market prices.
- 4) Predict future selling prices of recreation offered under exclusive leases.

Computing Total Present Value

- 1) Use the above schedules of predicted use levels and predicted prices; by activity group, time period, and alternative; to calculate future revenues.
- 2) Discount and add predicted future revenues to arrive at total present value of recreation sales under each alternative.

The problems of estimating prices and computing total present value are described in later sections. The remaining steps are discussed here.

Framing the Problem

Our first step was to develop a recreation classification scheme that allows us to:

- 1) Minimize the number of use categories to keep effects assessment manageable.
- 2) Correlate each category with a fee collection system that works the same for all activities in the category.
- 3) Correlate each category with the types of environmental impacts associated with those uses.

We approached this problem by first identifying the following seven impacts of recreation use and their resulting environmental effects.

Recreation Impact Parameters

- A) Road Construction and Maintenance: Erosion, De-vegetation, Temporary Human Disturbance, Increased Water Yield, Habitat Fragmentation.
- B) Road Use: Erosion, Human Disturbance.
- C) Trail Construction and Maintenance: Minor Erosion, Temporary Human Disturbance.
- D) Trail Use: Erosion, Human Disturbance.
- E) Site Use: Compaction, Erosion, De-vegetation, Human Disturbance, Sewage and Garbage, Riparian Damage.
- F) Sewage and Garbage: Wildlife Population Sinks, Health Hazard, Visual Pollution.
- G) Riparian Damage: Compaction, Erosion, De-vegetation.

Then we created a matrix that described the extent of each impact for three classes of recreation use, shown in Figure 5.

**Figure 5
RECREATION EFFECTS MATRIX**

IMPACTS	I	II	III
ROAD MAINT. & CONSTRUCTION A	More than 1/2 mile new. Maint. more than once yearly for recreation.	Up to 1/2 mile new. Maint. avg. 1/2 to 1 time/yr. for recreation.	No new roads. No additional maint. for recreation.
ROAD USE B	Open full season, daily use. Access & connected pleasure driving.	Seasonal closures. Use on 50% of days when open.	Seasonal closures. Non-motorized use, or pleasure driving without leaving vehicles.
TRAIL MAINT. & CONSTRUCTION C	Dense network of short trails around developed sites.	New trails of 1 to 3 miles to reach popular destinations.	Maintain existing trails, 3 to 10 miles connecting with other ownerships.
TRAIL USE D	Daily use during season.	Use on 50% of days during season.	Intermittent use spaced by long quiet periods.
SITE USE E	All use within 1/4 mile of site. Effects may last 10 yrs. or more.	Use concentrated within 3 miles of entry point and along road and trail corridors.	Use dispersed along road and trail corridors.
SEWAGE AND GARBAGE F	Must be removed or processed at least once weekly.	Removal or processing as needed, several times per season.	User-managed. Occasional agency cleanup (every few years).
RIPARIAN DAMAGE G	Need use control and engineered facilities to protect from long lasting damage.	Concentrated at access points. Noticeable but likely to heal in 5 to 7 years of non-use.	Small campsites, stream crossings. Not always noticeable. Would heal in 1 to 3 years of non-use.

Next, we assigned most of the recreation activities listed in An Analysis of the Outdoor Recreation and Wilderness Situation in the United States: 1989-2040 (Cordell, et. al, 1990), a numeric rating. The rating was compiled by assigning each activity the description of Level I, II, or III in the matrix, for each of the seven Impact Parameters, then averaging the seven numbers. This gave each activity a rating between a

minimum of 1.0 (Level I) and 3.0 (Level III). Examination of the results led to the following groupings of activities: Average scores less than 1.5 (Group I), between 1.5 and 2.5 (Group II), and greater than 2.5 (Group III). The overall average activity rating for Group I was 1.13; for Group II, 2.21; and for Group III, 2.69. We then selected those activities from Cordell (1990) that are likely to occur on Montana's forested state lands and listed them in Groups I, II, and III. Examination of the results prompted us to move several activities from Group II to Group III. The final grouping is as follows:

Recreation Use Groupings

GROUP I

VISITING MUSEUMS, HISTORIC SITES, OR INFORMATION CENTERS
CAMPING IN DEVELOPED CAMPGROUNDS
DOWNHILL SKIING
ORGANIZATION CAMPS
HOME SITES AND CABIN SITES
COMMERCIAL LODGES

GROUP II

CAMPING IN PRIMITIVE CAMPGROUNDS
BICYCLE RIDING
PICNICKING
COMMUNITY RECREATION SITES
HUNTING
COMMERCIAL OUTFITTER LICENSES
FISHING
FISHING ACCESS SITES
HORSEBACK RIDING
SHOOTING SPORT SITES
COLLECTING FIREWOOD
VISITING PREHISTORIC SITES
DRIVING VEHICLES OR MOTORCYCLES OFF-ROAD
SNOWMOBILING

GROUP III

WILDLIFE OBSERVATION, PHOTOGRAPHY, AND NATURE STUDY
WALKING, RUNNING
DAY HIKING
BACKPACKING
COLLECTING BERRIES OR MUSHROOMS
CANOEING, KAYAKING, OR RAFTING
CROSS-COUNTRY SKIING AND SNOWSHOEING
DRIVING FOR PLEASURE AND SIGHTSEEING

We wrote Impact Profiles which described the nature of environmental impacts associated with each Group. These profiles are included in the Recreation Scenarios used by resource specialists in their analyses.

Because of their relatively intense site development, and geographically compact nature, Group I activities are best suited for a user fee collection mechanism. We assume that revenue from Group I uses will come through lease fees, or their equivalent in on-site collections. Groups II and III have somewhat different environmental impacts, but both are best suited for fee collection through an area use permit such as our existing Recreation Use License. We assume that such a fee collection mechanism will be used for Groups II and III.

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The above recreation use classification scheme met our objectives of:

- 1) Minimizing the number of use categories.
- 2) Correlating each category with a fee collection system.
- 3) Correlating each category with associated environmental impacts.

Later, we added a Group IV, non-recreation special uses; and a Group V, exclusive recreation leases. Both of these groups would use a Group I leasing fee collection mechanism.

Estimating Current Recreation Use

Developed Recreation Use: We have taken current developed recreation use as the total number of active leases that represent uses included in, or similar to, those included in Groups I and IV.

Group IV is included here for convenience. It includes "Non-Recreation Special Leases" which cover a mixture of activities (electronics sites, parking lots, government or community use sites) whose environmental impacts and fee collection mechanisms make them similar to Group I type uses. The present value of accumulated revenue from Group IV uses is minor, in the range of one to two percent of the total from all "recreation" uses.

The estimates are based on data from a PFS computer file called "FDLEAS94.PFS", maintained by Jan Sayles of the DSL Forestry Division headquarters, in Missoula. Data are printed in an unpublished report called "1994 Forestry Leases and Licenses", referenced as File Page 1795 in the Project Record. Interpretive notes and calculations are found in File Pages 1796-1799 of the Project Record.

Dispersed Recreation Use: Dispersed recreation use estimates are based on three independent sources:

- 1) USFS RIM data, pro-rated on a per-acre basis using National Forests geographically closest to each Land Office (All).
- 2) BLM data, pro-rated in the same manner as USFS data (CLO, SLO, ELO, NELO).
- 3) Direct estimates by Area Managers (SWLO, CLO, SLO, ELO).

Area Manager Estimates: Unadjusted Area Manager estimates ranged from one percent to 56 percent of USFS estimates for all Land Offices, not including the Northwest Land Office. We had intended to assume NWLO dispersed recreation use was about 70 percent of the USFS level; however, numbers derived in that way were dramatically higher than AM estimates for the other Land Offices.

We believe Northwest use could be substantially higher because of the scenic beauty of that area, the fact that we have more consolidated ownership there than in most other areas of the state (Swan Forest, Coal Creek Forest, and Stillwater Forest), and the related fact that there are fewer access limitations here than in other parts of the state. In our first round of estimates, we set NWLO use at 56 percent of USFS use on surrounding lands. The choice to use 56 percent was based on the highest percentage of USFS use reported by any other field unit (Southern Land Office). Subsequently, when the SLO figures were judged too high, we settled on 50 percent as a reasonable share of USFS use for the NWLO.

Area Manager estimates showed fishing use on Southwest and Central Land Offices to be zero. This seemed inconsistent with our land ownership pattern, which includes some fishing access sites and some proximity to popular fishing streams. For assessment purposes, we adjusted the Area Manager estimates by assuming SWLO and CLO to have 0.5 user days per forty acres per year, of fishing use.

In another adjustment, we assumed SLO to have 1.29 user days per forty acres per year of use gathering forest products (berries, mushrooms, etc.). This is the same as the highest use reported by any other

Land Office for this category, and substantially lower than the 13.61 figure resulting from the Area Manager estimate. We used BLM data as a basis for guiding our adjustments for all Areas except the NWLO.

Fraction of USFS Estimates: Even after the adjustments noted, the Area Manager estimates had inconsistencies between land offices and between uses that were hard to explain. For example, estimated snowmobiling use in the Southern Area was forty-one times higher than in the Southwest Area while estimated bicycling use between the two Areas was nearly identical. Total estimated use in the more heavily forested and more densely populated Southwest Area was only 62 percent as great as in the Northeastern Area.

A second approach to estimating is to observe the proportional relationship between Area Manager estimates and USFS estimates in each Area. Using those observed proportions; plus our knowledge of land ownership patterns, population density, accessibility, and character of the land; we can arrive at estimates of use in each Area as a percentage of reported USFS use in nearby National Forests.

While USFS recreation use differs substantially from recreation use on state trust lands, this method still offers some distinct advantages. First, Forest Service data has been systematically collected for many years so, even though reliability varies from one Ranger District to another, the data base is large enough that the pattern of relative use estimates between different activities is probably more reliable than the relative use pattern based on our own one-time subjective estimates. The Forest Service data represents a bigger perspective, taken by many more estimators, over a much longer period of time.

Second, by using our own Area Manager estimates as a basis for developing adjustment factors for each Area, we are customizing the USFS data to more realistically represent our management situation, while still taking advantage of a larger and longer recreation use sample.

Final Estimates: We considered Garry Williams, of the Central Land Office staff, to be the most appropriate member of our team for reality checking the above two sets of computations. Based on his experience and knowledge of field conditions, he recommended adopting the Area Manager estimates, with modifications. Through telephone conversation, we agreed on the following adjustments:

- 1) The Southern Land Office figures looked unreasonably high so we decided to replace them with an average figure for use on the Central, Northeast, and Eastern Land Offices.
- 2) Garry agreed that there should be some fishing use reported for the Central and Southwest Areas but our first estimate looked a little high. We settled on 0.25 user days per 40 acres per year as a reasonable estimate.
- 3) The Area Manager hunting estimate for the Central Land Office seemed too high. It would be the equivalent of three hunters per day on each section of forested land, throughout the Central Area. We agreed that 20 percent of estimated Forest Service use was a more reasonable approximation and decided to go with that figure.

The resulting final estimates for each type of Group II and Group III use are reported in Figures 6 and 7.

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Figure 6
CURRENT LEVELS OF DISPERSED RECREATION USE (GROUP II - FINAL)

LAND OFFICE	MoCycle/ Scooter	Snow- mobile	Bicycling	Hunting	Fishing	Gathering Products	TOTAL GROUP II
NORTHWEST ⁹ 299,788 ¹⁰	1.35 10,118	1.60 11,992	0.55 4,122	2.10 15,739	4.70 35,225	1.15 8,619	11.45 85,815
SOUTHWEST 163,329	0.05 204	0.07 286	0.11 449	1.37 5,594	0.25 1,021	0.05 204	1.90 7,758
CENTRAL 105,308	0.08 211	0.26 685	0.05 132	1.70 4,476	0.25 658	0.26 685	2.60 6,847
SOUTHERN 37,242	0.04 37	0.11 102	0.03 28	1.35 1,257	0.08 74	0.11 102	1.72 1,600
NORTHEAST 37,242	0.04 37	0.07 65	0.05 47	1.91 1,778	0.00 0	0.06 56	2.13 1,983
EASTERN 18,621	0.00 0	0.00 0	0.00 0	0.45 209	0.00 0	0.00 0	0.45 209

Figure 7
CURRENT LEVELS OF DISPERSED RECREATION USE (GROUP III - FINAL)

LAND OFFICE	Driving and View. Scenery	Hiking	X-C Skiing & Snowshoeing	Non-Consump. Wildlife Use	TOTAL GROUP III
NORTHWEST 299,788	17.20 128,909	3.70 27,730	0.75 5,621	0.65 4,872	22.30 167,132
SOUTHWEST 163,329	0.49 2,001	0.33 1,347	0.19 776	0.37 1,511	1.38 5,635
CENTRAL 105,308	1.16 3,054	0.38 1,000	0.08 211	0.24 632	1.86 4,897
SOUTHERN 37,242	0.55 512	0.22 205	0.05 47	0.19 177	1.01 941
NORTHEAST 37,242	0.48 447	0.24 223	0.07 65	0.29 270	1.08 1,005
EASTERN 18,621	0.00 0	0.03 14	0.01 5	0.03 14	0.07 33

⁹ Expressed as user days per 40 acres per year.

¹⁰ Acres in Land Office that qualify for Plan jurisdiction with associated use levels in total user days per year.

Discussion of Our Estimates: While these estimates are very rough to begin with, and our assumptions and adjustments are equally rough, we accept the resulting use levels as suitable for a programmatic level assessment of environmental and economic effects.

Because we will estimate effects for groups of similar types of use, rather than for individual uses, poor estimates for any single activity will be partly compensated for by clustering multiple activities in each group. That is, overestimating some activities should be offset by underestimating others.

Also, once we have projected future use levels for each group, (under each alternative), we will bracket our effects assessment between a low level of use equal to one-half the projected baseline estimate, and a high level at fifty-percent above the projected baseline.

We have used a careful, informed estimating procedure which used several independent sources for reality checking our own estimates against reported use on lands administered by other agencies. Also, we will construct a generous margin for error by estimating effects for a wide bracket of use levels on either side of our projected estimates. Finally, the decision maker will be able to use variations in effects from the low end of the bracket, to the high end, to get a rough idea of how sensitive economic and environmental effects are to changes in dispersed recreation use levels.

We conclude that this combination of care and built-in safeguards is an appropriate procedure for assessing the likely economic and environmental effects of dispersed recreation use, at a programmatic planning level.

Predicting Future Use

It has been hard to find projections of future recreation use. A literature search using the University of Montana computerized database turned up only two articles with recreation use trend data (Murdock, et. al.; Hof and Kaiser). I found one relevant publication in my own reference files (McCool and Frost). None of these articles are sufficiently comprehensive or comparable to construct a usable schedule of future recreation use trends.

The University of Montana Institute of Travel and Tourism reports they have no trend research data though it is a high priority in their research agenda. The Bureau of Business and Economic Research reports that the only trend data is that available from Forest Service RIM reports. Wendell Beardsley (USFS, R-1 Recreation Specialist) says his office is not trying to forecast recreation use farther than five years into the future. DFWP planner, Dana Dolsen, has canvassed his colleagues and reports that no participation rate projections are available from his agency.

Greg Super (USFS Washington Office) reports only one source of recreation use trend data; the one used for updating RPA reports. He sent me a copy (Cordell, 1990) and, based on my similar finding that the data is not available elsewhere, I have used Cordell, et. al. as the best available source of recreation use projections.

Short term regional trends will deviate from these long term national averages; however, we have no basis for confidently predicting the size, direction, or duration of those deviations. For long term programmatic planning, such as our State Forest Land Management Plan, this incongruence is acceptable as we believe that long term national trends will parallel our own regional trends, and our main interest is in comparing one alternative with another rather than predicting exact levels of recreation use for any particular alternative.

From Table 14 (p. 44) of Cordell (1990), I was able to construct average predicted growth rates of recreation use in our activity groups I, II, and III, for the planning period 1995-2020. Through consultation with our Special Uses Supervisor, Jeanne Fairbanks, I modified these baseline rates to reflect the intent of each alternative. The resulting projected growth rates, and supporting logic, are as follows.

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Baseline Trends: Based on data sources and estimating procedures referenced above, we have arrived at the following baseline trends in growth in recreation demand. Profiles and descriptive data on the three recreation Groups are presented in the Recreation Scenarios Appendix.

GROUP I:	1.74 %/yr
GROUP II:	1.18 %/yr
GROUP III:	1.46 %/yr
GROUP IV:	1.18%/yr (See discussion)

Alpha: Under Alpha, we would rarely initiate recreation projects. Proposals would come from outside the Department. They would be evaluated in light of their impact on timber management opportunities, and evaluations would be given low priority except in cases where recreation use offered possible revenues in excess of those expected from timber management.

Group I activities (mainly cabinsites) typically require more processing time than those in Groups II and III. Consequently, the low priority of recreation management and the greater processing times would result in relative small increases in Group I recreation use. We project increases at about half the baseline rate.

[GROUP I: 0.87%/yr]

Group II and III activities require less processing time but are also less likely than Group I activities to offer revenues in excess of those expected from timber harvest. Recent legislation affecting outfitting, plus new emphasis on state lands recreation under the Recreation Use License are expected to exert some upward pressure on uses in these categories.

For analysis purposes, we estimate use in these groups to increase at about two-thirds the baseline rate. This is substantially lower than recent past trends in new Group II and III leases and licenses; however, we do not believe that growth rates approaching 20 percent in these categories are likely to be sustained for more than a few years. We will use conservative estimates and discuss the implications of higher growth rates in our effects narrative.

[GROUP II: 0.79%/yr]

[GROUP III: 0.97%/yr]

Beta: Under Beta, we expect recreation to play a more important role than under Alpha because we would initiate new developments that were compatible with maintenance of healthy ecosystems. These recreation projects would be favored over other uses that offered higher short-term monetary returns, but which were not compatible with maintaining healthy ecosystems.

Maintaining healthy ecosystems would increase opportunities for cabin site development and other Group I uses; however, expansion would be limited to additional uses that did not, themselves, diminish ecosystem health. We estimate that increase at about the baseline rate.

[GROUP I: 1.74%/yr]

Given our increased emphasis on recreation, the lesser complexity involved in initiating Group II and III recreation activities, and their relatively lower environmental impacts, we expect use in these categories to increase at about 50 percent above the baseline rate.

[GROUP II: 1.77%/yr]

[GROUP III: 2.19%/yr]

Gamma: Under Gamma, we would promote minimum impact recreation uses that were harmonious with maintenance of natural ecosystems; however, we would discourage concentrated recreation development, except in areas already unsuitable for restoration of natural conditions.

The net effect would be a slight to moderate reduction in Group I uses, no change or a slight reduction in Group II uses, and an increase in Group III uses at about twice the baseline rate. Reductions from current levels of leasing and licensing would be done through non-renewal of some contracts as their normal terms expired.

Estimated use levels under Gamma would be as follows:

[GROUP I: -1.0%/yr]
[GROUP II: -0.5%/yr]
[GROUP III: 2.92%/yr]

Delta: Potential high-income recreation uses would be actively promoted under Delta, though they would be competing for other, non-recreation, uses that also offered high monetary returns. The highest potential Group I, concentrated development, sites tend to be on water; whereas, potentially competing high-income uses, such as timber harvest, are less directly related to water frontage. Therefore, we would expect a solid increase in Group I recreation development, at about 1.5 times the baseline rate.

[GROUP I: 2.61%/yr]

We would also promote Group II activities. While they are somewhat less separable from potentially competing uses and generally offer less income potential than Group I activities, their dependence on specific sites (campgrounds, trails, firing ranges) and/or specific supporting equipment (bicycles, firearms, off-road vehicles), makes them more amenable to fee discrimination than Group III activities. The possible inclusion of exclusive leases for hunting, fishing, or other recreation uses in Group II would probably cause us to promote this group more heavily than we would in the absence of exclusive leasing. Consequently, we estimate the range of growth in these uses to be 1.5 times the baseline rate, the same range as predicted for Group I.

[GROUP II: 1.77%/yr]

Group III activities, because they offer the least income potential and represent the most difficult fee collection challenge, would receive low priority for recreation development. However, enjoyment of these uses also tends to require little or no development and they would be influenced by increases in Group I and II uses so, even in the absence of agency-initiated improvements, some increased use would be expected. We estimate use to increase at a pace about equal to the baseline rate.

[GROUP III: 1.46%/yr]

Epsilon: Selection of Epsilon would be a formal commitment to timber management as our primary money-making activity. As under Alpha, recreation development would be limited to proposals from outside the agency and they would be given low priority for processing except in cases where projected revenues clearly exceeded those expected from timber harvest on the same lands.

Because of our formal commitment to timber management, the rate of increase in Group I uses could be slightly less than under Alpha. We expect growth in Group I activities at about one-fourth the baseline rate. Activities in Groups II and III would be expected to increase at roughly the same rates as under Alpha. That is, at about two-thirds the baseline rate.

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[GROUP I: 0.44%/yr]
[GROUP II: 0.79%/yr]
[GROUP III: 0.97%/yr]

Zeta: Under Zeta, recreation and wildlife management would receive first attention in our search for revenue-generating land uses. Timber harvest and other uses would be considered only to the degree that they were compatible with, and/or clearly offered substantially higher monetary returns than recreation use of the same lands.

We would expect Group I developments to be limited mainly by market demand, including any additional demand we could create by innovative management and promotion. Estimated growth would be about 1.75 times the baseline rate.

[GROUP I: 3.05%/yr]

The generally lower income potential from Group II uses would be partially offset by possible offerings of some high-potential areas for exclusive leasing for hunting, fishing, or other recreation uses. Consequently, we assume growth in this category to be the same as for Group I, about 1.75 times the baseline rate.

[GROUP II: 2.07%/yr]

Group III uses would increase because of our general recreation emphasis and our development initiatives in Groups I and II; however, the lower income potential and more difficult fee collection would dampen the rate of increase in this category. We estimate use to grow at about 1.5 times the baseline rate.

[GROUP III: 2.19%/yr]

Exclusive Leasing

Non-recreation Special Leases: Group IV, non-recreation special leases, is currently dominated by electronic facilities sites and other public or private utility support facilities. We have no research basis for predicting demand for these kinds of uses. The degree to which we would promote them is reflected by our stance on promotion of Group I and II recreation activities. The expected monetary return is better represented by Group II than by Group I; therefore, we assume the same growth rates applied to Group II recreation, under each alternative, will also be applied to Group IV.

Exclusive Recreation Leases: We estimated Group V, exclusive recreation leasing use, separately, through interdisciplinary group discussion and observation of current levels of outfitter leasing that excludes other outfitters but not other hunters or anglers. Further discussion of this topic will follow.

Summary of Recreation Growth Rates

Figure 8 summarizes our projected recreation growth rates.

Figure 8
RECREATION AND SPECIAL LEASE GROWTH RATE PROJECTIONS
(percent per year)

<u>GROUP</u>	<u>ALPHA</u>	<u>BETA</u>	<u>GAMMA</u>	<u>DELTA</u>	<u>EPSILON</u>	<u>ZETA</u>
GROUP I	0.87	1.74	-1.0	2.61	0.44	3.05
GROUP II	0.79	1.77	-0.5	1.77	0.79	2.07
GROUP III	0.97	2.19	2.92	1.46	0.97	2.19
GROUP IV	0.79	1.77	-0.5	1.77	0.79	2.07
GROUP V	⁻¹¹	-	-	-	-	-

Adjustment Schedule

Once we have estimated recreation use levels for each fully implemented alternative, adjusting from current use levels to predicted future levels will be constrained by two things: the rate of increase in recreation demand, and our own adjustments in budgeting and staffing necessary to operate a revenue generating recreation program.

Expected changes in recreation demand are represented by the growth rates we assumed earlier, in the section entitled "Predicting Future Use". We assume demand will grow in a linear fashion throughout the planning period, and that the Department will, on average, sell all the recreation opportunities it offers.

Exclusive Use Leasing: Under all alternatives, there could be some exclusive leasing of dispersed recreation use rights. This is currently done with commercial outfitter licenses, whereunder, the licensee has exclusive commercial outfitting rights, but individual hunting or fishing remain unrestricted.

Exclusive leasing can take many forms. Some of the variables between leases may be:

- 1) The specific uses to which the lessee has exclusive rights.
- 2) The time period (season, time of day, etc.) of exclusive use.
- 3) Rules and regulations governing exclusive enjoyment.
- 4) Terms of renewal.
- 5) Other types of uses that may be concurrently leased to different lessees (i.i. Lease A for hunting and Lease B for fishing).

Data from our outfitter license files indicate that the equivalent of roughly 11 percent of our State Forest acres are currently under leases that exclude other users from engaging in the same type of activity, but do not exclude individual hunters or anglers. The type of "exclusive lease" proposed under some alternatives would exclude other hunters and anglers, but at a substantially higher lease price than the approximately \$.06 per acre realized now. Because of the higher degree of exclusivity, we would be offering a different good with a different demand curve. Expected prices would range from \$0.66 to \$1.59 per acre.

¹¹ This type of use was not trended because we estimated the full-implementation level for year 2020 and assumed we would approach that level at a linear pace over the intervening years.

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We decided to estimate future exclusive leasing use on a per acre basis. In our interdisciplinary group discussion, we made estimates of the percentage of State Forest acres that would be offered for exclusive leasing under each alternative. Not all leasing would take place on State Forest lands, and not all State Forest lands would be leased. However, we accepted State Forest acres as a proxy for leasable acres in general because we believe these lands, unlike many of our scattered parcels, are of such quality and character as to make them attractive for leasing. Here are our estimates of the percentage of State Forest acres that would be offered for exclusive leasing under each fully implemented alternative:

<u>Alternative</u>	<u>Percent</u>	<u>Reasoning</u>
Alpha	10	Based on current levels and alternative philosophy.
Beta	15	Slightly higher priority on recreation uses compatible with healthy ecosystems.
Gamma	20	Promotion of low-impact dispersed recreation use.
Delta	30	Active promotion of high value opportunities which may include dispersed recreation.
Epsilon	10	Low priority. Must not interfere with timber management.
Zeta	70	Active promotion of high value wildlife and recreation opportunities.

Recreation Use Schedule: The preceding assumptions and data lead us to the recreation use schedule shown in Figure 9. In the recreation scenarios (see Appendix) these values are expanded to give our range of high (50 percent above) and low (50 percent below) output estimates.

Figure 9
RECREATION USE LEVELS

Units: Groups I & IV = No. of leases
Groups II & III = User days
Group V = No. of acres

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
1995-2000						
Group I	673	711	613	758	657	786
Group II	108471	115317	101365	114509	108471	116207
Group III	188976	204798	216397	193426	188976	202019
Group IV	52	56	49	56	52	57
Group V	0	0	0	0	0	0
2000-2005						
Group I	704	780	585	874	672	930
Group II	112991	126683	98778	125067	112991	128463
Group III	198758	230402	253600	207658	198758	224845
Group IV	54	61	48	61	54	63
Group V	5348	8020	10694	16041	5348	37428
2005-2010						
Group I	735	850	556	991	686	1073
Group II	117512	138049	96192	135625	117512	140720
Group III	208539	256007	290802	221889	208539	247670
Group IV	56	67	46	67	57	70
Group V	10694	16041	21387	32081	10694	74855
2010-2015						
Group I	766	919	528	1107	701	1217
Group II	122032	149415	93605	146183	122032	152976
Group III	218321	281611	328005	236121	218321	270496
Group IV	58	72	45	72	59	76
Group V	16040	24061	32081	48122	16040	112283
2015-2020						
Group I	797	988	499	1223	716	1361
Group II	126552	160781	91019	156741	126552	165232
Group III	228103	307215	365208	250353	228103	293321
Group IV	61	78	44	78	61	83
Group V	21387	32081	42774	64162	21387	149710

Timber

Five members of the planning team made independent estimates of probable future timber harvest levels. They considered recent estimates of current harvest potential made by our Area Managers, actual harvests in the recent past, newly updated timber inventory data, and the philosophy of each alternative.

Through group discussion of our independent estimates, and subsequent review by other team members, and allowing a five-year period to adjust from recent past levels to probable future levels under each alternative, we arrived at the schedule shown in Figure 10.

Figure 10
ANNUAL TIMBER HARVEST SCHEDULE
(MBF sold per year)

<u>PERIOD</u>	<u>ALPHA</u>		<u>BETA</u>		<u>GAMMA</u>		<u>DELTA</u>		<u>EPSLN</u>		<u>ZETA</u>	
	<u>HI</u>	<u>LO</u>	<u>HI</u>	<u>LO</u>	<u>HI</u>	<u>LO</u>	<u>HI</u>	<u>LO</u>	<u>HI</u>	<u>LO</u>	<u>HI</u>	<u>LO</u>
1995	40	20	40	20	40	20	40	20	40	20	40	20
1996	40	20	39	19	34	17	41	19	43	23	36	18
1997	40	20	38	18	28	14	42	18	46	26	32	16
1998	40	20	37	17	22	11	43	17	49	29	28	14
1999	40	20	36	16	16	8	44	16	52	32	24	12
2000	40	20	35	15	10	5	45	15	55	35	20	10
2001- 2020	40	20	35	15	10	5	45	15	55	35	20	10

This completes the documentation of our projected use levels for grazing, recreation, and timber harvest over the planning period. We now turn attention to estimates of costs, revenues, and net present values.

II. COST ASSUMPTIONS

Trying to predict costs for individual programs (timber, recreation, grazing, special uses) raised many questions for which we could not develop credible, consistent answers. Our solution was to estimate total cost for all programs that would be affected by the Plan, without attempting to isolate costs for individual programs. We then subtract total discounted costs for each alternative from total discounted revenues (revenues are predicted for individual programs) to get net present value.

We arrived at total program costs by estimating changes in FTEs assigned to each affected program in order to fully implement the alternative. We made trial assumptions as to the rate of implementation so that costs could be specified for five-year time increments, throughout the planning period. However, we abandoned this approach in favor of assuming costs would increase linearly throughout the planning period in order to be consistent with our assumption that increases in output (i.e. revenue) would increase linearly. Figure 11 (also shown as Figure IV-E13 in the Chapter IV Economics discussion) displays our projected FTE changes and associated total program costs.

Figure 11
FTE CHANGES FOR FULLY IMPLEMENTED ALTERNATIVES
(1995-2020)

Alternative	Forest Product Sales	Resource Mngmnt.	Land Admin.	Forest Improv.	Forest Invtry.	Total	% +/- 1994
ALPHA	0.0	+3.0	+4.5	+1.5	+1.5	+10.5	+13.6%
BETA	0.0	+5.0	+5.5	+3.5	+1.5	+15.5	+20.0%
GAMMA	-25.0	10.0	+2.5	-10.0	0.0	-22.5	-29.1%
DELTA	0.0	+8.0	+6.0	0.0	+1.5	+15.5	+20.0%
EPSILON	+8.0	+3.0	+2.5	+5.5	+3.0	+22.0	+28.4%
ZETA	-18.0	+6.0	+8.0	0.0	+1.5	-2.5	-3.2%

TOTAL COST AND IMPLEMENTATION RATE
(Based on 1994 Costs Totaling \$3,359,540)

Alternative	Total Cost
ALPHA	\$3,816,437
BETA	\$4,031,448
GAMMA	\$2,381,914
DELTA	\$4,031,448
EPSILON	\$4,313,649
ZETA	\$3,252,035

Cost per FTE: Our estimated cost per FTE is based on FY 94 budgeting information. We observed the total budget and total number of FTEs (permanent plus seasonal) assigned to the Forest Product Sales, Resource Management, Land Administration, Forest Improvement, and Forest Inventory cost centers. Dividing total budget by number of FTEs gave us a cost of \$43,427 per FTE. This number includes personal services, operating costs, and capital expenditures. It does not include unallocated administrative costs.

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We don't know how to assign administrative costs to individual programs in a way we can be sure does not exert biases for or against particular programs. We accept this difficulty by reasoning that administrative costs will remain relatively constant for all alternatives so that including or not including them would not change the relative profitability of one alternative compared to another. However, this means the resulting net present values can not be taken as hard numbers, they will only be meaningful as a basis for comparing one alternative with another.

The reasoning in support of our estimated changes in FTE staffing levels for each alternative is documented in the Project Record. The associated cost estimates presented in Table EC-1 are based on 1994 costs of \$3,359,540.

III. REVENUE ASSUMPTIONS

Here are our baseline revenue assumptions. They represent our best estimates of how the future will unfold. All prices are expressed in constant 1994 dollars.

Grazing

Our current price for grazing is \$4.09 per AUM. It is set by law according to a formula based on the previous year's beef price. Our price is substantially below the current market price of \$8.00 estimated by Duffield (1993).

According to information in the Duffield report (pp. 55 and 62), real grazing market prices have declined from 1.5 to 3 percent per year over the last several decades. The 1990 RPA update used a real price increase of 0.6 percent per year between 1989 and 2000, increasing to 1.15 percent per year between 2000 and 2040. Based on these observations, we assume that real market prices for grazing will increase at 0.6 percent per year over the planning period of 1995-2020. We use Duffield's average of \$8.00 per AUM as the current market price for grazing.

We assume that upward political pressure on state land grazing fees will continue. When the state of Oklahoma was sued in the early 1980's, its lease rates doubled, and current lease prices range from 75 to 135 percent of average market rates (Duffield, p. 64). In Nebraska, rates average 60 to 100 percent of market rates (vs. 50 percent in Montana). Given these circumstances, we assume that DSL grazing fees will reach 80 percent of market value by the year 2010.

We arrive at the following schedule of estimated grazing prices.

Figure 12
ESTIMATED GRAZING FEE SCHEDULE
(Constant dollars)

YEAR:	1995	2000	2005	2010	2015	2020
\$ per AUM:	4.09*	5.03	5.95	7.00	7.21	7.43

* Based on a 1994 DSL minimum rate of \$4.09/AUM, and a current market rate of \$8.00/AUM.

Recreation

We make separate price assumptions for dispersed recreation use (Groups II and III), developed use (Groups I and IV), and exclusive leasing (Group V), partly because our data bases for the three categories are different. Developed site fees are expressed on a "per lease" basis, dispersed use fees are expressed on a "user day" basis, and exclusive leasing costs are expressed on a "per acre" basis. In the NPV calculations, Group I and IV use levels are expressed as "number of leases", Group II and III use is expressed in terms of "user days", and Group V use is expressed as "number of acres".

We assume that all Group I and IV uses will be under lease or "other equivalent contract". This means that if we directly manage the activity ourselves; or operate under some alternative "contract", such as a cooperative agreement with another agency; we assume the net revenues generated would be equivalent to the lease price if the activity had been under lease. Similarly, we assume that any toll station revenues or other direct collection of fees would be associated with Group I uses and therefore, incorporated in lease fees. These two assumptions allow us to use "number of leases" and "per lease" prices as bases for projecting Group I and IV revenues.

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Cordell (1990) predicts excess future demand for some types of recreation use, and excess supply for others. Normally, these disequilibrium conditions would indicate rising or falling real recreation prices. However, the combination of a lack of research data for estimating price trends, and the availability of free substitute opportunities on adjoining Federal lands, leaves us with no sound basis for making regional estimates of recreation price trends. Consequently, we assume that real price trends in recreation will match those projected for the 1990 RPA update.

Developed Use (Groups I and IV): Cabinsites account for 94.6 percent of current Group I revenues and 96.5 percent of all Group I leases. Under some alternatives, we would expect a larger share of camps, lodges, and campgrounds, however, cabinsites would probably remain the dominant revenue producer. For simplicity, we assume all Group I leases will be sold at the cabin site rate. We also assume that all Group I activities will be under lease (DSL initiated sites are assumed to be the equivalent of a lease to ourselves).

Our current cabin site lease rate is 3.5 percent of appraised value, whereas, Duffield (1993) estimates current market value at about 8.0 percent of appraised value. Our current annual rate averages \$768 per site. Because our current rates are substantially below market value, and because there is continuing pressure to move toward market value, we assume that Group I rates will rise to 80 percent of market value by 2005.

Group IV, non-recreation special leases, are assumed to remain at roughly their present rate of about \$400 per site per year.

Dispersed Use (Groups II and III): The most comprehensive studies on recreation prices report results in terms of consumers surplus, a measurement of total value received from a particular recreation usage, in excess of the amount actually paid. If we assume the amount paid is exactly equal to the cost of provision (no profit), then consumers surplus can be taken as an estimate of the potential revenue that might be collected if each recreationist could be charged individually at exactly the price she or he would be willing to pay.

In reality, such price discrimination does not seem feasible for us. In fact, the only feasible scheme for collecting recreation revenues from dispersed use of state lands seems to be some type of permit system such as the Recreation Use License now in use. In the future, we may develop a system of different permits, at different prices, for different categories of uses (like our current system of differential pricing for permits to hunt different wildlife species). However, for the purpose of this analysis, we assume there will be only one permit and we consider the price of that permit with respect to estimated open market value for the rights allowed under the permit.

Duffield, et. al. (1993) conclude that current market value for the Recreation Use License is about \$25 for Montana residents and about \$50 for non-residents. For this analysis, we assume about a 50:50 distribution between resident and non-resident recreationists and take the average of Duffield's two rates, or \$37.50 per year, as the "market price" for dispersed recreation on state lands.

DSL records show RUL purchases of 29,003 in 1992 and 30,490 in 1993, approximately 30,000 licenses per year. Our dispersed recreation use estimates for 1995 show about 37 percent of total use in Group II and 63 percent in Group III. Pro-rating the annual fee on this basis gives us \$13.88 per year for Group II and \$23.62 per year for Group III. If 37 percent of our 30,000 license holders paid \$13.88 per year to consume our estimated number of user days in Group II, the per unit price would be \$1.48 per user day. Likewise, the Group III price would be \$2.49 per day.

Our current price for the RUL is \$5.00 per year, or 13.3 percent of the estimated \$37.50 market price. On this basis, our current "prices" are \$0.20 per user day for Group II, and \$0.33 per user day for Group III. For analysis purposes, we assume that DSL will increase its license fee to equal market value within ten years, by 2005.

Exclusive Leasing (Group V): A review of the literature on exclusive hunting leases shows prices ranging from as low as 13 cents per acre to as high as 13 dollars per acre. The overall average of sixteen samples is \$2.13 per acre. With outliers (the two highest and the two lowest) dropped, the average is \$1.59 per acre. Duffield (1993) found an average price of \$0.66 per acre for exclusive hunting leases in Montana. We decided to use \$0.66 per acre for our baseline calculations, and \$1.59 per acre as an alternative assumption.

Recreation Price Schedule: From the above discussion, we arrive at the following schedule of recreation prices.

**Figure 13
RECREATION PRICE SCHEDULE**

<u>GROUP</u>	<u>1995-00</u>	<u>2000-05</u>	<u>2005-10</u>	<u>2010-15</u>	<u>2015-20</u>	<u>\$ PER</u>
I (DSL) (market)	768 (1755)	1086 (1755)	1404 (1755)	1404 (1755)	1404 (1755)	Lease
II (DSL) (market)	0.20 (1.48)	0.85 (1.49)	1.50 (1.50)	1.51 (1.51)	1.52 (1.52)	User Day
III (DSL) (market)	0.33 (2.49)	1.45 (2.53)	2.57 (2.57)	2.60 (2.60)	2.64 (2.64)	User Day
IV (DSL) (market)	400 (400)	400 (400)	400 (400)	400 (400)	400 (400)	Lease
V (DSL) (market)	0.04 (0.66)	0.36 (0.66)	0.67 (0.67)	0.67 (0.67)	0.68 (0.68)	Acre

Timber

We have two choices for real timber price trend, the 1990 RPA trend and regional trends based on research at the University of Montana.

In order to remain consistent with our baseline trends for grazing and recreation, we have chosen to use the RPA trend of 1.2 percent per year for the baseline timber calculations.

An alternative trend is based on the following projections compiled in 1994 by Darius Adams of the University of Montana Forestry School. Details are on file in the Project Record.

**Figure 14
REAL STUMPAGE PRICE TRENDS**

<u>PERIOD</u>	<u>1995-00</u>	<u>2001-05</u>	<u>2006-10</u>	<u>2011-15</u>	<u>2016-20</u>
%/Yr	10.60	-0.33	-1.60	3.80	2.80

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Because the large (10.6 percent) annual trend for the first five years of Adams' series has such a large short term effect on NPV calculations, we have chosen to convert these numbers to their uniform twenty-five year equivalent trend of 2.6 percent per year.

Current Stumpage Price: Future stumpage prices based on the above real price trend estimates will be strongly influenced by our choice of "current" stumpage price. Prices have fluctuated widely over the past several years and DSL rates have differed substantially from U.S. Forest Service rates. Consequently, a simple average of recent past stumpage prices may not be the best way to establish our "current" stumpage price.

Using Jane Markland's annual summaries of total volume cut and associated dollar value received, and adjusting to constant 1994 dollars, we arrive at a ten-year (1985-94) average value of \$157 per Mbf. Using only the most recent five years (1990-94), we get \$213 per Mbf, and using the most recent five years with the lowest and highest year dropped, we get \$192 per Mbf.

For comparison, during the period 1989-1992, USFS Northern Rockies stumpage averaged \$81 per Mbf compared with \$168 per Mbf for DSL timber, during the same period. Based on projected prices, the USFS average for the past five years, with high and low value dropped, would be \$91 per Mbf.

Given these circumstances, we have chosen to use \$192 per Mbf, DSL's most recent five years with highest and lowest value dropped, as a credible "current DSL stumpage value" for projecting future prices.

IV. NET PRESENT VALUE COMPUTATIONS

Total present values are calculated for each activity group and time period by multiplying predicted use by predicted price, discounting to year zero, and summing the discounted values. The discount rate used is 4 percent. It is common practice to use low discount rates in public sector decision making where entities are assumed to have indefinite life and the future is given relatively high value.¹²

V. RESULTS

The accompanying spreadsheet tables summarize our net present value computations. Figures 15 through 18 (which appear in the Chapter IV Economics discussion as Figures IV-E14 through IV-E17) present:

- 1) total present revenue, broken down by grazing, recreation, and timber components;
- 2) total present cost for all programs combined;
- 3) net present value;
- 4) the equivalent annual return to net present value;
- 5) the present value of our expected residual timber at the end of the planning period;
- 6) the sum of net present value plus remaining timber asset value.

Figure 15 reports this data for the baseline price assumptions. Figure 16 assumes a higher initial value for exclusive dispersed recreation leasing (\$1.59 per acre instead of \$0.66); all other assumptions are the same.

Figure 17 uses the baseline assumptions with the exception of a higher stumpage price trend (D. Adams' projected rate of 2.6 percent per year instead of the RPA rate of 1.2 percent). The last two tables (Figures 18a and 18b) display net present value and timber asset value for all three sets of price assumptions, on the same page. One table presents High output values and the second presents Low output values.

¹² We arrived at the 4 percent discount rate by adding a risk premium to the long term average yield on AAA corporate bonds. The risk premium of 0.54 percent is based on statistical variability in trended costs of stumpage, reforestation, and timber stand improvement. The 1960 to 1993 average AAA bond yield rate is 3.44 percent. These rates sum to 3.98 percent which we have rounded to 4 percent. See the appendix entitled "Support For 4% Discount Rate" for further discussion.

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Figure 15
NET PRESENT VALUE SPREADSHEET
(\$1000)

(Baseline)

=====						
HIGH	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA

GRAZING	3029	2463	2221	2236	2544	2236
RECREATION	31449	37201	29908	39524	30179	43514
TIMBER SOLD	142766	126812	47040	158721	190630	78949

TOTAL REVENUE	177244	166476	79169	200481	223353	124699

TOTAL COST	58981	62490	50814	63711	67016	55290

NET PRESENT VALUE	118263	103986	28355	136770	156337	69409

ANNUAL RETURN	7570	6656	1815	8755	10007	4443
REMAINING TIMBER ASSET						
VALUE	276750	291307	364092	262193	233079	334978
SUM OF NPV PLUS						
REMAINING ASSET VALUE	395013	395293	392447	398963	389416	404387
=====						
LOW	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA

GRAZING	1952	1763	1741	1689	1790	1689
RECREATION	10483	12400	9969	13175	10060	14505
TIMBER SOLD	71383	55429	23520	55429	119246	39474

TOTAL REVENUE	83818	69592	35230	70293	131096	55668

TOTAL COST	58981	60458	49127	60458	62396	55104

NET PRESENT VALUE	24837	9134	-13897	9835	68700	564

ANNUAL RETURN	1590	585	-890	630	4398	36
REMAINING TIMBER ASSET						
VALUE	334978	349535	378649	349535	291307	364092
SUM OF NPV PLUS						
REMAINING ASSET VALUE	359815	358669	364752	359370	360007	364656
=====						
* CURRENT TIMBER ASSET VALUE (\$1000) \$484,615						
(2,524,038 Mbf @ \$192/Mbf = 484615296)						
=====						
HIGH/LOW AVERAGE FOR SELECTED VARIABLES						

NET PRESENT VALUE	71550	56560	7229	73303	112519	34987

SUM OF NPV PLUS	377414	376981	378600	379167	374712	384522
REMAINING ASSET VALUE						
=====						

Figure 16

NET PRESENT VALUE SPREADSHEET
(\$1000)

(Leased Recreation @ \$1.59 vs. \$0.66)

=====						
HIGH						
	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA

GRAZING	3029	2463	2221	2236	2544	2236
RECREATION	31648	37501	30306	40123	30379	44910
TIMBER SOLD	142766	126812	47040	158721	190630	78949

TOTAL REVENUE	177443	166776	79567	201080	223553	126095

TOTAL COST	58981	62490	50814	63711	67016	55290

NET PRESENT VALUE	118462	104286	28753	137369	156537	70805

ANNUAL RETURN	7583	6676	1841	8793	10020	4532
REMAINING TIMBER ASSET						
VALUE	276750	291307	364092	262193	233079	334978
SUM OF NPV PLUS						
REMAINING ASSET VALUE	395212	395593	392845	399562	389616	405783
=====						
LOW						
	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA

GRAZING	1952	1763	1741	1689	1790	1689
RECREATION	10549	12500	10102	13374	10126	14970
TIMBER SOLD	71383	55429	23520	55429	119246	39474

TOTAL REVENUE	83884	69692	35363	70492	131162	56133

TOTAL COST	58981	60458	49127	60458	62396	55104

NET PRESENT VALUE	24903	9234	-13764	10034	68766	1029

ANNUAL RETURN	1594	591	-881	642	4402	66
REMAINING TIMBER ASSET						
VALUE	334978	349535	378649	349535	291307	364092
SUM OF NPV PLUS						
REMAINING ASSET VALUE	359881	358769	364885	359569	360073	365121
=====						
* CURRENT TIMBER ASSET VALUE (\$1000) \$484,615 (2,524,038 Mbf @ \$192/Mbf = 484615296)						
=====						
HIGH/LOW AVERAGE FOR SELECTED VARIABLES						
	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA

NET PRESENT VALUE	71683	56760	7495	73702	112652	35917

SUM OF NPV PLUS	377547	377181	378865	379566	374845	385452
REMAINING ASSET VALUE						
=====						

Figure 17

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

NET PRESENT VALUE SPREADSHEET (\$1000)

(Timber Trend @ 2.6%/yr.vs. RPA of 1.2%/yr.)

=====

HIGH

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
-----	-----	-----	-----	-----	-----	-----
GRAZING	3029	2463	2221	2236	2544	2236
RECREATION	31449	37201	29908	39524	30179	43514
TIMBER SOLD	168224	149140	53718	187309	225478	91887
-----	-----	-----	-----	-----	-----	-----
TOTAL REVENUE	202702	188804	85847	229069	258201	137637
-----	-----	-----	-----	-----	-----	-----
TOTAL COST	58981	62490	50814	63711	67016	55290
-----	-----	-----	-----	-----	-----	-----
NET PRESENT VALUE	143721	126314	35033	165358	191185	82347
-----	-----	-----	-----	-----	-----	-----
ANNUAL RETURN	9200	8086	2243	10585	12238	5271
REMAINING TIMBER ASSET						
VALUE	390175	410698	513313	369652	328605	472267
SUM OF NPV PLUS						
REMAINING ASSET VALUE	533896	537012	548346	535010	519790	554614

=====

LOW

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
-----	-----	-----	-----	-----	-----	-----
GRAZING	1952	1763	1741	1689	1790	1689
RECREATION	10483	12400	9969	13175	10060	14505
TIMBER SOLD	84112	65028	26859	65028	141366	45943
-----	-----	-----	-----	-----	-----	-----
TOTAL REVENUE	96547	79191	38569	79892	153216	62137
-----	-----	-----	-----	-----	-----	-----
TOTAL COST	58981	60458	49127	60458	62396	55104
-----	-----	-----	-----	-----	-----	-----
NET PRESENT VALUE	37566	18733	-10558	19434	90820	7033
-----	-----	-----	-----	-----	-----	-----
ANNUAL RETURN	2405	1199	-676	1244	5814	450
REMAINING TIMBER ASSET						
VALUE	472267	492790	533836	492790	410698	513313
SUM OF NPV PLUS						
REMAINING ASSET VALUE	509833	511523	523278	512224	501518	520346

=====

* CURRENT TIMBER ASSET VALUE (\$1000) \$484,615 (2,524,038 Mbf @ \$192/Mbf = 484615296)

=====

HIGH/LOW AVERAGE FOR SELECTED VARIABLES

	ALPHA	BETA	GAMMA	DELTA	EPSILON	ZETA
-----	-----	-----	-----	-----	-----	-----
NET PRESENT VALUE	90644	72524	12238	92396	141003	44690
-----	-----	-----	-----	-----	-----	-----
SUM OF NPV PLUS	521865	524268	535812	523617	510654	537480
REMAINING ASSET VALUE						

=====

Figure 18a
NET PRESENT VALUE and REMAINING TIMBER ASSET VALUE
UNDER THREE SETS OF ASSUMPTIONS

HIGH OUTPUT RANGES		(\$ Thousand)		
		BASELINE	LEASED REC @ \$1.59/ac	TIMBER PRICE @ 2.6%/yr
ALPHA	NPV	118263	118462	143721
	TIMBER ASSET	276750	276750	390175
	TOTAL	395013	395212	533896
BETA	NPV	103986	104286	126314
	TIMBER ASSET	291307	291307	410698
	TOTAL	395293	395593	537012
GAMMA	NPV	28355	28753	35033
	TIMBER ASSET	364092	364092	513313
	TOTAL	392447	392845	548346
DELTA	NPV	136770	137369	165358
	TIMBER ASSET	262193	262193	369652
	TOTAL	398963	399562	535010
EPSILON	NPV	156337	156537	191185
	TIMBER ASSET	233079	233079	328605
	TOTAL	389416	389616	519790
ZETA	NPV	69409	70805	82347
	TIMBER ASSET	334978	334978	472267
	TOTAL	404387	405783	554614

Figure 18b
NET PRESENT VALUE and REMAINING TIMBER ASSET VALUE
UNDER THREE SETS OF ASSUMPTIONS

=====		=====		
LOW OUTPUT RANGES		(\$ Thousand)		
		BASELINE	LEASED REC @ \$1.59/ac	TIMBER PRICE @ 2.6%/yr
-----		-----		
ALPHA	NPV	24837	24903	37566
	TIMBER ASSET	334978	334978	472267
	TOTAL	359815	359881	509833
-----		-----		
BETA	NPV	9134	9234	18733
	TIMBER ASSET	349535	349535	492790
	TOTAL	358669	358769	511523
-----		-----		
GAMMA	NPV	-13897	-13764	-10558
	TIMBER ASSET	378649	378649	533836
	TOTAL	364752	364885	523278
-----		-----		
DELTA	NPV	9835	10034	19434
	TIMBER ASSET	349535	349535	492790
	TOTAL	359370	359569	512224
-----		-----		
EPSILON	NPV	68700	68766	90820
	TIMBER ASSET	291307	291307	410698
	TOTAL	360007	360073	501518
-----		-----		
ZETA	NPV	564	1029	7033
	TIMBER ASSET	364092	364092	513313
	TOTAL	364656	365121	520346
-----		-----		
=====		=====		

PART III: IMPACTS ON THE REGIONAL ECONOMY

The regional economic analysis is intended to give us an idea of the scale of influence we may have, and not to generate precise answers. It was done by simply applying the best available multipliers to output levels estimated for our High and Low scenarios, and comparing the results to the Montana economy as a whole.

Outputs

Output levels, taken directly from the High and Low scenarios, are as follows.

Figure 19
OUTPUT RANGES FOR FULLY IMPLEMENTED ALTERNATIVES

	<u>ALPHA</u>	<u>BETA</u>	<u>GAMMA</u>	<u>DELTA</u>	<u>EPSLN</u>	<u>ZETA</u>
TIMBER (MMBF)						
High:	40	35	10	45	55	20
Low:	20	15	5	15	35	10
GRAZING(AUM)						
High:	34,753	26,377	22,788	23,016	27,574	23,016
Low:	18,799	16,007	14,811	13,444	16,406	13,444
RECREATION(\$)	1,952,482	1,849,780	1,838,758	2,495,602	2,691,100	3,071,367

Multipliers

Timber and grazing response coefficients were supplied by the USDA Forest Service, Intermountain Research Station. Timber multipliers were county aggregates representing the Northwest, Southwest, Central, and east side Land Office Areas. They were weighted by average annual volume harvested (past six years) by each Land Office to arrive at a single set of multipliers for the entire state. This weighted averaging was necessary because our estimated future harvests are not disaggregated below the statewide level.

We used a similar process to arrive at statewide, weighted average multipliers for grazing. In this case, the county aggregates were weighted by the share of total direct grazing jobs reported for each sub-region.

The recreation multiplier is a multiplier of direct spending to arrive at total spending. It was taken from Moisey and Yuan (1991) and based on several types of wildland recreation economic impacts in Montana.¹³

The resulting values are shown in Figure 20.

¹³ Moisey, Neil and Michael Yuan. (1991). Economic Significance and Characteristics of Select Wildland-Attracted Visitors to Montana, in Payne, Claire, et. al., The Economic Value of Wilderness: Proceedings of the conference: 1991 May 8-11; Jackson, WY. Gen. Tech. Rep. SE-78. Asheville, NC: USDA Forest Service, Southeastern Forest Experiment Station.

Figure 20
ECONOMIC RESPONSE COEFFICIENTS
(per each unit of output)

	<u>Units of Output</u>	<u>Total Jobs Supported</u>	<u>Total Income Generated</u>
TIMBER	MMBF	27.68	\$1763
GRAZING	million AUMs	1137	\$12.43 million
RECREATION	dollars of direct spending	n/a ¹⁴	\$2.40

Results

Combining outputs and multipliers (response coefficients) leads to the following results, shown in Figure 21.

¹⁴ For recreation, we have only an expenditure multiplier.

Figure 21
ANNUAL REGIONAL ECONOMIC EFFECTS

LOW OUTPUT ESTIMATES

	<u>ALPHA</u>	<u>BETA</u>	<u>GAMMA</u>	<u>DELTA</u>	<u>EPSLN</u>	<u>ZETA</u>
TIMBER						
No. of Jobs:	554	415	138	415	969	277
\$1000 Income:	35,260	26,445	8,815	26,445	61,705	17,630
GRAZING						
No. of Jobs:	21	18	17	15	19	15
\$1000 Income:	537	457	423	384	469	384
RECREATION						
No. of Jobs:	93 ¹⁵	119	88	129	88	147
\$1000 Income:	2,343	2,995	2,220	3,229	2,207	3,686

TOTAL						
JOBS: 668	553	244	559	1075	439	
TOTAL						
INCOME:	38,140	29,897	11,458	30,058	64,380	21,700

HIGH OUTPUT ESTIMATES

	<u>ALPHA</u>	<u>BETA</u>	<u>GAMMA</u>	<u>DELTA</u>	<u>EPSLN</u>	<u>ZETA</u>
TIMBER						
No. of Jobs:	1107	969	277	1246	1522	554
\$1000 Income:	70,520	61,705	17,630	79,335	96,965	35,260
GRAZING						
No. of Jobs:	40	30	26	26	31	26
\$1000 Income:	993	754	651	658	788	658
RECREATION						
No. of Jobs:	280	358	265	386	263	440
\$1000 Income:	7,029	8,984	6,659	9,688	6,620	11,057

TOTAL						
JOBS:	1426	1356	568	1657	1817	1020
TOTAL						
INCOME:	78,542	71,443	24,940	89,681	104,372	46,975

Statewide Economic Data

The most recent statewide jobs and income data were reported for 1993. The Montana Department of Labor and Industry (1993) reported a total of 326,400 non-farm wage and salary jobs, and \$6,741,596,160

¹⁵ In the absence of a recreation jobs multiplier, we estimated these numbers by assuming the same number of jobs per thousand dollars of total income as for grazing.

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in total wage and salary income.¹⁶ Total personal income (wages and salaries plus all other forms of personal income) was supplied by the Montana Department of Commerce, Census and Economic Information Center.¹⁷ This source reported total personal income for 1993 of \$14,616,978,000, and total wage and salary income of \$6,997,368,000.

Our subsequent calculations are based on the following figures:

Total Jobs:	326,400
Total Personal Income:	\$14,616,978,000

Impacts on the Regional Economy

Expressing jobs and incomes expected to be generated under each fully-implemented alternative as a share of total jobs and incomes leads to the results shown in Figure 22. Figure IV-E20 in Chapter IV is derived from Figure 22.

¹⁶ Total income was derived by multiplying 326,400 jobs times the reported average wage of \$9.93 per hour, times 2080 hours per year.

¹⁷ Data from the U.S. Bureau of Economic Analysis, Regional Economic Information System, supplied by fax from the Montana Department of Commerce.

Figure 22
RANGE OF ANNUAL REGIONAL ECONOMIC EFFECTS

=====								
TIMBER (Million Board Feet)								
	LOW	HIGH	NUMBER OF JOBS		\$1000 OF INCOME			
	OUTPUT	OUTPUT	LOW	HIGH	LOW	HIGH		

ALPHA	20	40	554	1107	35260	70520		
BETA	15	35	415	969	26445	61705		
GAMMA	5	10	138	277	8815	17630		
DELTA	15	45	415	1246	26445	79335		
EPSILON	35	55	969	1522	61705	96965		
ZETA	10	20	277	554	17630	35260		
=====								
GRAZING (Thousand AUMs)								
	LOW	HIGH	NUMBER OF JOBS		\$1000 OF INCOME		LOW	HIGH
	OUTPUT	OUTPUT	LOW	HIGH	LOW	HIGH	JOBS PER	\$1000

ALPHA	19	35	21	40	537	993	0.0398	0.0398
BETA	16	26	18	30	457	754		
GAMMA	15	23	17	26	423	651		
DELTA	13	23	15	26	384	658		
EPSILON	16	28	19	31	469	788		
ZETA	13	23	15	26	384	658		
=====								
RECREATION (\$1000 Direct Spending) ¹⁸								
	LOW	HIGH	NUMBER OF JOBS		\$1000 OF INCOME			
	OUTPUT	OUTPUT	LOW	HIGH	LOW	HIGH		

ALPHA	976	2929	93	280	2343	7029		
BETA	1248	3743	119	358	2995	8984		
GAMMA	925	2775	88	265	2220	6659		
DELTA	1346	4037	129	386	3229	9688		
EPSILON	919	2758	88	263	2207	6620		
ZETA	1536	4607	147	440	3686	11057		
=====								
TOTAL REGIONAL JOBS AND INCOMES								
	% OF TOTAL JOBS						% OF TOTAL INCOME	
	LOW	HIGH					LOW	HIGH

ALPHA	0.20	0.44	668	1426	38140	78542	0.26	0.54
BETA	0.17	0.42	553	1356	29897	71443	0.20	0.49
GAMMA	0.07	0.17	244	568	11458	24940	0.08	0.17
DELTA	0.17	0.51	559	1657	30058	89681	0.21	0.61
EPSILON	0.33	0.56	1075	1817	64380	104372	0.44	0.71
ZETA	0.13	0.31	439	1020	21700	46975	0.15	0.32
=====								

¹⁸ Recreation jobs were estimated by assuming the same income:jobs ratio as for grazing.

SUPPLEMENT TO ECONOMICS APPENDIX SUPPORT FOR CHOICE OF 4 PERCENT DISCOUNT RATE

THE PROPOSED DISCOUNT RATE FOR EVALUATING MONTANA DIVISION OF FORESTRY'S LONG TERM TIMBER INVESTMENTS

INTRODUCTION

Time preferences often enter into decisions made by individuals, corporations, and governments. These preferences are revealed or quantified in the form of discount rates. The decision individuals make to forego current consumption in favor of a 5 percent yield on a passbook savings account is similar to the decision corporations make to re-invest profits in capital goods. Both decision-makers have evaluated alternative uses of their money. The discount rates used by both the individual and the corporation to evaluate their investment have a profound impact on the relative attractiveness of a potential investment.

Several timber management decisions, when evaluated by a financial criterion, are affected by the discount rate applied. The choice of discount rate may impact the allocation of funds invested in different stands as well as the identification of the financially optimal regime for a single stand. For example, low productivity stands may represent marginal investments at a high discount rate but appear as favorable investments at a lower discount rate. Discount rate has a differential impact on the choice of a financially optimal regime for a single stand, depending on the type of analysis applied. If optimal rotation age and treatment intensity are both estimated a lower discount rate will theoretically lead to greater treatment intensity and shorter rotations. Conversely, if a lower discount rate will result in longer rotations if treatment intensity is assumed fixed.

ALTERNATIVE DISCOUNT RATES

Determining the appropriate discount rate to be used in evaluating public forestry investments is an inexact science, hence several rates have been proposed. The Office of Management and Budget (OMB) recommends all federal agencies use a 10 percent discount rate. The Water Resources Council (WRC) suggested in 1981 Federal water projects should be evaluated at a 7 3/8 percent rate. The USDA Forest Service is using a 4 percent discount rate in their long term forest planning (Row and others, 1981), the state of Washington chose a 7 percent rate (Smego 1982) and Idaho a 5 percent rate. The Bonneville Power Administration (BPA) uses a 3 percent rate (Norman 1983) and the state of Montana, Energy Division a 4.3 percent rate (Nordel 1983).

Several criteria influence the choice of a discount rate for public agencies. These criteria have been interpreted differently by various agencies. This variability in interpretation led to the current discrepancy in discount rates used by public agencies.

DECISION CRITERIA

Real vs. Nominal Rates

Inflation is the difference between real and nominal discount rates. Real rates are adjusted for inflation and nominal rates are not. Real rates must be distinguished from nominal rates to avoid erroneous results.

It is somewhat unclear whether the OMB and WRC discount rates are, or are intended to be used as real or nominal rates. The other public agency rates mentioned previously all represent real discount rates. We also chose a real rate for analyzing the state's long term timber investments. By using a real rate in our analysis we have eliminated the uncertainty associated with inflation.

Opportunity Cost of Capital

A discount rate represents the opportunity cost of capital. It is however uncertain whose capital this opportunity cost rate should represent when public investments are being evaluated. Several cogent arguments have been presented for basing discount rates for public investments on the opportunity cost of capital in the private sector (Baumol 1977, Hirshleifer and Shapiro 1977, Hanke and Anwyll 1980, Row and others 1981). There is disagreement, however, on how to best measure the opportunity capital costs in the private sector. Hirshleifer and Shapiro (1977) suggest using the market rate of interest. The state of Washington has chosen what they consider a conservative corporate capital earnings rate as their discount rate (Smego 1982). Row and others (1981) and Hanke and Anwyll (1980) both use returns on Aaa corporate bonds as their measure of returns to private capital investment. Jackson (1983) suggests that expected average return to the state school trust represents the opportunity cost rate for long term timber investments on trust lands. His approach has merit given that timber revenues from trust lands are in part remitted to the trust.

Aaa corporate bonds provide a return which is very low risk. We chose this low risk rate as the appropriate baseline for evaluating the state of Montana's long-term timber investments. This rate and expected yields will then be adjusted to account for the risks inherent in forestry investments.

Using the return on Aaa corporate bonds as the baseline discount rate has two distinct advantages. The first is that it is an accepted measure of returns to private capital investment. The second is that it is a measure of the potential yield on the school trust and legacy account, which Jackson (1983) suggests as the best source of the state's opportunity cost rate.

Risk Considerations

The lands managed by the Division of Forestry can be thought of as one investment within the school trust and legacy portfolio. Cohen and others (1973) describe an efficient portfolio as one yielding the highest return given an acceptable level of risk predetermined by the decision maker. The predetermined level of risk for the school trust is mandated by law and that level of risk is low (i.e. the risk associated with Aaa corporate bonds). Implicit in a corporate earnings rate is a corporate risk posture which is unique from that associated with the school trust account. It is, therefore, inappropriate to simply assume a corporate earnings rate as the discount rate to be used in the state's long-term timber investments.

The low level of risk mandated for the school trust and legacy portfolio must be considered in evaluating the management of school trust lands. We account for the low risk posture of the school trust by using the historical rate of return on permissible trust investments (i. e. Aaa corporate bonds) as our baseline discount rate. By applying a risk premium to our baseline rate we account for the unique risk associated with forestry investment, while remaining consistent with the mandated risk posture of the school trust portfolio.

ESTIMATING DISCOUNT RATE

We used the average rate of return on Moody's Aaa corporate bonds for 1960-1983 as our baseline, low risk discount rate. The returns were adjusted from nominal to real rates using the GNP implicit price deflator (Appendix 1). This baseline discount rate of 2.69 percent reflects one measure of the opportunity cost of capital in the private sector. It is also indicative of the expected returns on the school trust and legacy fund, given the mandated level of acceptable risk on the trust investments.

The inherent risk of forestry investments is addressed in our investment analyses in two ways. First, we account for the uncertainty associated with future stumpage prices and treatment costs by applying a direct adjustment to the discount rate. Our second risk adjustment is to reduce future yields by the amount of expected losses due to catastrophic events (i.e. fire, and insect and disease outbreaks).

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We estimated a risk adjustment for stumpage prices and costs by multiplying the expected variability in prices and costs by the sensitivity of internal rate of return (IROR) to this variability. Our measure of variability in future prices and costs was the standard error as a percent of the response mean about a linear trend of historical prices and costs (Appendix 2). The price trend was based on annual average stumpage prices for state sales over the past 36 years. We could not obtain good historical estimates of treatment costs on state lands. Instead we used 10 years of USDA Forest Service cost data to derive the trend (Bourassa 1984). We assumed that although actual costs would be different for state and Forest Service treatments the variability associated with cost trends would be similar.

The sensitivity of IROR to price and cost variability was estimated by Mills and others (1976) for several timber types (Appendix 3). They found stumpage prices could vary up to approximately 82 percent and result in only a 1 percent change to IROR. Reforestation costs could vary 101 percent and precommercial thinning 113 percent before altering IROR by 1 percent. The sensitivity multipliers used in Appendix 4 were calculated by dividing the 1 percent change in IROR by 82 percent, 101 percent, and 113 percent. These multipliers represent the change in IROR resulting from a 1 percent change in stumpage prices, reforestation costs, and precommercial thinning costs.

Multiplying the price and cost variability information by the sensitivity multipliers resulted in a .54 percent risk premium adjustment (Appendix 4). This premium was added to the 2.69 percent baseline discount rate to produce a final rate of 3.3 percent to be used in the evaluation of the state's long-term timber investments.

CONCLUSIONS

The proposed Division of Forestry discount rate of 3.3 percent is generally lower than those rates previously mentioned for other agencies. The use of a relatively low discount rate has important implications for several Division of Forestry bureaus. For example, the Assistance Bureau's tree improvement program will look much more favorable at a lower rate. The Fire Bureau's Planning efforts require estimates of wildfire-caused net value change in resources. These net value change estimates for the timber resource will be higher at a lower discount, which may lead to an expanded fire protection organization. The impact of a lower discount rate on the Forest Management Bureau's choice of optimal regimes will depend on the type of analysis applied, as described in the introduction.

The examples of the impact of a 3.3 percent discount rate on different bureau decisions suggest a broader conclusion: this relatively low rate will allow more liberal investment than a higher rate. Decision makers will not be highly constrained by a financial criterion in their management decisions if a 3.3 percent rate is applied.¹⁹

¹⁹ Adding risk premium of 0.54% to 1994 update of Aaa bond yield (3.44%) results in a real interest rate of 3.98%, or approximately 4.00%. See Appendix 5.

Appendix 1
RETURNS ON MOODY AAA CORPORATE BONDS
IN CURRENT AND REAL DOLLARS²⁰

<u>YEAR</u>	<u>CURRENT RATE (%)</u>	<u>REAL RATE (%)</u>
1960	4.40	2.80
1961	4.35	3.45
1962	4.32	2.52
1963	4.25	2.75
1964	4.40	2.90
1965	4.49	2.29
1966	5.12	1.92
1967	5.50	2.50
1968	6.17	1.77
1969	7.02	1.92
1970	8.04	2.64
1971	7.38	2.38
1972	7.21	3.01
1973	7.44	1.64
1974	8.56	-0.24
1975	8.82	-0.48
1976	8.43	3.23
1977	8.02	2.22
1978	8.72	1.32
1979	9.63	1.03
1980	11.94	2.64
1981	14.17	4.77
1982	13.79	7.79
1983	12.04	7.84 ²¹

²⁰ The GNP implicit price deflator was used to adjust current dollars to real (1972) dollars.

²¹ Based on 1983 preliminary estimates.

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Appendix 2 TREND EQUATIONS FOR STUMPAGE PRICES AND TREATMENT COSTS²²

<u>DATA</u>	<u>EQUATION</u>	<u>STATISTICS</u>
Stumpage prices	$Y = 11/1 + .97X_1$	$R^2 = .64$; S.E. = 7.86; $\bar{Y} = 29.10$
	Y = stumpage price(\$/MBF)	S.E. as a % of $\bar{Y} = 27.0$
	X_1 = number of years since 1959	
Reforestation costs	$Y = 57.72 + 8.12X_1$	$R^2 = .87$; S.E. = 9.87; $\bar{Y} = 102.37$
	Y = reforestation costs (\$/AC)	S.E. as a % of $\bar{Y} = 9.60$
	X_1 = number of years since 1973	
TSI costs	$Y = 102.20 + 1.74X$	$R^2 = .08$; S.E. = 19.03; $\bar{Y} = 111.74$
	Y = TSI costs (\$/AC)	S.E. as a % of $\bar{Y} = 17.00$
	X_1 = number of years since 1973	

²² The GNP implicit price deflator was used to adjust current dollars to real (1972) dollars.

Appendix 3
SENSITIVITY OF INTERNAL RATE OF RETURN
TO PRICE AND COST VARIABILITY²³

Stumpage Price Variability

<u>Case Type</u>	<u>Average % Sensitivity²⁴</u>
Douglas-fir	51.02
Ponderosa pine	93.38
Fir-spruce	76.00
Lodgepole pine	<u>109.17</u>
Mean	82.39

TSI Thinning Cost Variability

<u>Case Type</u>	<u>Average % Sensitivity</u>
Douglas-fir	40.54
Ponderosa pine	137.13
Lodgepole pine	<u>126.28</u>
Mean	101.32

Sensitivity multiplier = $1/101.21 = .01$

Reforestation Cost Variability

<u>Case Type</u>	<u>Average % Sensitivity</u>
Douglas-fir	82.03
Ponderosa pine	190.31
Fir-spruce	101.18
Lodgepole pine-	<u>77.38</u>
Mean	82.39

²³ From Mills and others, 1976

²⁴ Averaged upper and lower sensitivity levels

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

Appendix 4 ESTIMATING RISK PREMIUM FROM VARIABILITY AND SENSITIVITY INFORMATION

A. Variability measure X sensitivity multiplier = risk premium

B.	<u>Data</u>	<u>Variability</u>	<u>Sensitivity Multiplier</u>	<u>Risk Premium</u>
	Reforestation costs	9.60	.01	.10
	TSI costs	17.00	.01	.17
	Stumpage prices	27.00	.01	<u>.27</u>
			Total	.54

C. Risk premium + baseline discount rate = discount rate to be used in the evaluation of the state's long-term timber investments.
.54 + 2.69 = 3.23% or 3.3%

D. 12/6/94: Adding risk premium of 0.54% to 1994 update of Aaa bond yield (3.44%) results in a real interest rate of 3.98% or approximately 4.00%.

Appendix 5
DISCOUNT RATE CALCULATION 1960-1993
(AAA CORPORATE BOND YIELD)

INTEGRATES 1985-93 SERIES WITH OLDER SERIES COMPILED BY WILL WOOD IN 1987
(Older series has slightly different numbers in overlap years of 1985-87)

YEAR	AAA YIELD	GDP DFLTR	% INFLTN	REAL RETURN	
1960	4.40	26.00	-	-	
1961	4.35	26.30	1.15	3.20	
1962	4.32	26.90	2.28	2.04	
1963	4.25	27.20	1.12	3.13	
1964	4.40	27.70	1.84	2.56	
1965	4.49	28.40	2.53	1.96	
1966	5.12	29.40	3.52	1.60	
1967	5.50	30.30	3.06	2.44	
1968	6.17	31.80	4.95	1.22	
1969	7.02	33.40	5.03	1.99	
1970	8.04	35.20	5.39	2.65	
1971	7.38	37.10	5.40	1.98	
1972	7.21	38.80	4.58	2.63	
1973	7.44	41.30	6.44	1.00	
1974	8.56	44.90	8.72	-0.16	
1975	8.82	49.20	9.58	-0.76	
1976	8.43	52.30	6.30	2.13	
1977	8.02	55.90	6.88	1.14	
1978	8.72	60.30	7.87	0.85	
1979	9.63	65.50	8.62	1.01	
1980	11.94	71.70	9.47	2.47	
1981	14.17	78.90	10.04	4.13	
1982	13.79	83.80	6.21	7.58	
1983	12.04	87.20	4.06	7.98	
1984	12.71	91.00	4.36	8.35	
1985	11.37	94.40	3.74	7.63	
1986	9.02	96.90	2.65	6.37	
1987	9.38	100.00	3.20	6.18	
1988	9.71	103.90	3.90	5.81	
1989	9.26	108.50	4.43	4.83	
1990	9.32	113.30	4.42	4.90	
1991	8.77	117.70	3.88	4.89	
1992	8.14	121.10	2.89	5.25	
1993	7.22	124.20	2.56	4.66	
1960-1993 AVERAGE REAL RATE			-----	(1966-1993)	(1960-1987)
			3.44	3.60	3.09

"AAA YIELD" FROM SURVEY OF CURRENT BUSINESS, Table S-16

"GDP DFLTR" FROM ECONOMIC REPORT OF THE PRESIDENT, 1994, Table B-3
(Implicit GDP Price Deflator)

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

DISCOUNTED REVENUE SPREADSHEETS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 1 GRAZING – ALPHA

cws: 8/29/94
(Revised 9/22/94)
ALPH\$GRZ.WK2

Disc. Rate: 0.04

YEAR	MARKET \$/AUM	DSL \$/AUM	USE (AUM) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW
1995	8.00	4.09	26776	26776	-	-	-	-	-	-
1996	8.05	4.09	26776	26776	110	110				
1997	8.10	4.09	26776	26776	110	110				
1998	8.14	4.09	26776	26776	110	110				
1999	8.19	4.09	26776	26776	110	110				
2000	8.24	5.03	30765	22788	155	115	664	622	546	511
2001	8.29	5.06	30765	22788	156	115				
2002	8.34	5.09	30765	22788	157	116				
2003	8.39	5.12	30765	22788	157	117				
2004	8.44	5.15	30765	22788	158	117				
2005	8.49	5.95	34753	18799	207	112	936	650	632	439
2006	8.54	5.98	34753	18799	208	112				
2007	8.60	6.02	34753	18799	209	113				
2008	8.65	6.05	34753	18799	210	114				
2009	8.70	6.09	34753	18799	212	114				
2010	8.75	7.00	34753	18799	243	132	1216	658	675	365
2011	8.80	7.04	34753	18799	245	132				
2012	8.86	7.09	34753	18799	246	133				
2013	8.91	7.13	34753	18799	248	134				
2014	8.96	7.17	34753	18799	249	135				
2015	9.02	7.21	34753	18799	251	136	1395	754	637	344
2016	9.07	7.26	34753	18799	252	136				
2017	9.13	7.30	34753	18799	254	137				
2018	9.18	7.34	34753	18799	255	138				
2019	9.24	7.39	34753	18799	257	139				
2020	9.29	7.43	34753	18799	258	140	1437	777	539	292
TOTAL DISC REVENUE (ALPHA)									3029	1952

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 2
GRAZING – BETA

cws: 8/29/94
(Revised 9/22/94)
BETA\$GRZ.WK2

Disc. Rate: 0.04

YEAR	MARKET \$/AUM	DSL \$/AUM	USE (AUM) HIGH LOW	REVENUE (\$1000) HIGH LOW	ACCUM REVENUE HIGH LOW	DISC REVENUE HIGH LOW
1995	8.00	4.09	26776 26776	- -	- -	- -
1996	8.05	4.09	26776 26776	110 110	- -	- -
1997	8.10	4.09	26776 26776	110 110	- -	- -
1998	8.14	4.09	26776 26776	110 110	- -	- -
1999	8.19	4.09	26776 26776	110 110	- -	- -
2000	8.24	5.03	26577 21392	134 108	642 615	528 505
2001	8.29	5.06	26577 21392	134 108	- -	- -
2002	8.34	5.09	26577 21392	135 109	- -	- -
2003	8.39	5.12	26577 21392	136 110	- -	- -
2004	8.44	5.15	26577 21392	137 110	- -	- -
2005	8.49	5.95	26377 16007	157 95	786 600	531 406
2006	8.54	5.98	26377 16007	158 96	- -	- -
2007	8.60	6.02	26377 16007	159 96	- -	- -
2008	8.65	6.05	26377 16007	160 97	- -	- -
2009	8.70	6.09	26377 16007	161 97	- -	- -
2010	8.75	7.00	26377 16007	185 112	923 560	512 311
2011	8.80	7.04	26377 16007	186 113	- -	- -
2012	8.86	7.09	26377 16007	187 113	- -	- -
2013	8.91	7.13	26377 16007	188 114	- -	- -
2014	8.96	7.17	26377 16007	189 115	- -	- -
2015	9.02	7.21	26377 16007	190 115	1059 642	483 293
2016	9.07	7.26	26377 16007	191 116	- -	- -
2017	9.13	7.30	26377 16007	193 117	- -	- -
2018	9.18	7.34	26377 16007	194 118	- -	- -
2019	9.24	7.39	26377 16007	195 118	- -	- -
2020	9.29	7.43	26377 16007	196 119	1091 662	409 248
TOTAL DISCOUNTED REVENUE (BETA):						2463 1763

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 3 GRAZING – GAMMA

cws: 8/29/94
(Revised 9/22/94)
GAMA\$GRZ.WK2

Disc. Rate: 0.04

YEAR	MARKET \$/AUM	DSL \$/AUM	USE (AUM) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW
1995	8.00	4.09	26776	26776	–	–	–	–	–	–
1996	8.05	4.09	26776	26776	110	110				
1997	8.10	4.09	26776	26776	110	110				
1998	8.14	4.09	26776	26776	110	110				
1999	8.19	4.09	26776	26776	110	110				
2000	8.24	5.03	24782	21776	125	109	633	617	520	507
2001	8.29	5.06	24782	21776	125	110				
2002	8.34	5.09	24782	21776	126	111				
2003	8.39	5.12	24782	21776	127	111				
2004	8.44	5.15	24782	21776	128	112				
2005	8.49	5.95	22788	16776	135	100	722	614	488	415
2006	8.54	5.98	22788	16776	136	100				
2007	8.60	6.02	22788	16776	137	101				
2008	8.65	6.05	22788	16776	138	102				
2009	8.70	6.09	22788	16776	139	102				
2010	8.75	7.00	22788	14811	160	104	797	573	443	318
2011	8.80	7.04	22788	14811	160	104				
2012	8.86	7.09	22788	14811	161	105				
2013	8.91	7.13	22788	14811	162	106				
2014	8.96	7.17	22788	14811	163	106				
2015	9.02	7.21	22788	14811	164	107	915	594	417	271
2016	9.07	7.26	22788	14811	165	107				
2017	9.13	7.30	22788	14811	166	108				
2018	9.18	7.34	22788	14811	167	109				
2019	9.24	7.39	22788	14811	168	109				
2020	9.29	7.43	22788	14811	169	110	942	612	353	230
TOTAL DISCOUNTED REVENUE (GAMMA):									2221	1741

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 4
GRAZING – DELTA

cws: 8/29/94
(Revised 9/22/94)
DELT\$GRZ.WK2

Disc. Rate: 0.04

YEAR	MARKET \$/AUM	DSL \$/AUM	USE (AUM) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW
1995	8.00	4.09	26776	26776	-	-	-	-	-	-
1996	8.05	4.09	26776	26776	110	110				
1997	8.10	4.09	26776	26776	110	110				
1998	8.14	4.09	26776	26776	110	110				
1999	8.19	4.09	26776	26776	110	110				
2000	8.24	5.03	24896	21776	125	109	633	617	520	507
2001	8.29	5.06	24896	21776	126	110				
2002	8.34	5.09	24782	21776	126	111				
2003	8.39	5.12	24896	21776	127	111				
2004	8.44	5.15	24896	21776	128	112				
2005	8.49	5.95	23016	16776	137	100	725	614	490	415
2006	8.54	5.98	23016	16776	138	100				
2007	8.60	6.02	23016	16776	138	101				
2008	8.65	6.05	23016	16776	139	102				
2009	8.70	6.09	23016	16776	140	102				
2010	8.75	7.00	23016	13444	161	94	805	563	447	312
2011	8.80	7.04	23016	13444	162	95				
2012	8.86	7.09	23016	13444	163	95				
2013	8.91	7.13	23016	13444	164	96				
2014	8.96	7.17	23016	13444	165	96				
2015	9.02	7.21	23016	13444	166	97	924	540	422	246
2016	9.07	7.26	23016	13444	167	98				
2017	9.13	7.30	23016	13444	168	98				
2018	9.18	7.34	23016	13444	169	99				
2019	9.24	7.39	23016	13444	170	99				
2020	9.29	7.43	23016	13444	171	100	952	556	357	209
TOTAL DISCOUNTED REVENUE (DELTA):									2236	1689

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 5 GRAZING – EPSILON

cws: 8/29/94
(Revised 9/22/94)
EPSN\$GRZ.WK2

Disc. Rate: 0.04

YEAR	MARKET \$/AUM	DSL \$/AUM	USE (AUM) HIGH LOW	REVENUE (\$1000) HIGH LOW	ACCUM REVENUE HIGH LOW	DISC REVENUE HIGH LOW
1995	8.00	4.09	26776 26776	- -	- -	- -
1996	8.05	4.09	26776 26776	110 110		
1997	8.10	4.09	26776 26776	110 110		
1998	8.14	4.09	26776 26776	110 110		
1999	8.19	4.09	26776 26776	110 110		
2000	8.24	5.03	27175 21591	137 109	645 616	530 506
2001	8.29	5.06	27175 21591	137 109		
2002	8.34	5.09	27175 21591	138 110		
2003	8.39	5.12	27175 21591	139 111		
2004	8.44	5.15	27175 21591	140 111		
2005	8.49	5.95	27574 16406	164 98	807 607	545 410
2006	8.54	5.98	27574 16406	165 98		
2007	8.60	6.02	27574 16406	166 99		
2008	8.65	6.05	27574 16406	167 99		
2009	8.70	6.09	27574 16406	168 100		
2010	8.75	7.00	27574 16406	193 115	965 574	536 319
2011	8.80	7.04	27574 16406	194 116		
2012	8.86	7.09	27574 16406	195 116		
2013	8.91	7.13	27574 16406	197 117		
2014	8.96	7.17	27574 16406	198 118		
2015	9.02	7.21	27574 16406	199 118	1107 658	505 300
2016	9.07	7.26	27574 16406	200 119		
2017	9.13	7.30	27574 16406	201 120		
2018	9.18	7.34	27574 16406	203 120		
2019	9.24	7.39	27574 16406	204 121		
2020	9.29	7.43	27574 16406	205 122	1140 678	428 254
TOTAL DISCOUNTED REVENUE (EPSILON):						2544 1790

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 6
GRAZING – ZETA

cws: 8/29/94
(Revised 9/22/94)
ZETA\$GRZ.WK2

Disc. Rate: 0.04

YEAR	MARKET \$/AUM	DSL \$/AUM	USE (AUM)		REVENUE (\$1000)		ACCUM REVENUE		DISC REVENUE	
			HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
1995	8.00	4.09	26776	26776	-	-	-	-	-	-
1996	8.05	4.09	26776	26776	110	110				
1997	8.10	4.09	26776	26776	110	110				
1998	8.14	4.09	26776	26776	110	110				
1999	8.19	4.09	26776	26776	110	110				
2000	8.24	5.03	24896	21776	125	109	633	617	520	507
2001	8.29	5.06	24896	21776	126	110				
2002	8.34	5.09	24896	21776	127	111				
2003	8.39	5.12	24896	21776	127	111				
2004	8.44	5.15	24896	21776	128	112				
2005	8.49	5.95	23016	16776	137	100	726	614	490	415
2006	8.54	5.98	23016	16776	138	100				
2007	8.60	6.02	23016	16776	138	101				
2008	8.65	6.05	23016	16776	139	102				
2009	8.70	6.09	23016	16776	140	102				
2010	8.75	7.00	23016	13444	161	94	805	563	447	312
2011	8.80	7.04	23016	13444	162	95				
2012	8.86	7.09	23016	13444	163	95				
2013	8.91	7.13	23016	13444	164	96				
2014	8.96	7.17	23016	13444	165	96				
2015	9.02	7.21	23016	13444	166	97	924	540	422	246
2016	9.07	7.26	23016	13444	167	98				
2017	9.13	7.30	23016	13444	168	98				
2018	9.18	7.34	23016	13444	169	99				
2019	9.24	7.39	23016	13444	170	99				
2020	9.29	7.43	23016	13444	171	100	952	556	357	209
TOTAL DISCOUNTED REVENUE (ZETA):									2236	1689

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

DISCOUNTED REVENUE SPREADSHEET 7
GRAZING FEE SCHEDULE - REVISED

RPA PRICE TREND: 0.6%/YEAR

cws 9/22/94

<u>PERIOD</u>	<u>DEPARTMENT OF STATE LANDS</u>	<u>MARKET</u>
1995-2000	4.09 (0.51 * MARKET)	8.00
2000-2005	5.17 (.61 * MARKET)	8.48
2005-2010	6.29 (.70 * MARKET)	8.99
2010-2015	7.62 (.80 * MARKET)	9.53
2015-2020	8.08 (.80 * MARKET)	10.10

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 8
RECREATION-ALPHA

APPENDIX ECN

* Units: Groups I & IV = No. of leases

ALPH\$REC.WK1

Groups II & III = User Days

cws: 9/26/94

Group V = No. of Acres

=====						
	Level*	Price	Revenue	N	n	Present Value

1995-2000						
GROUP I	673	768.00	516864	5	0	2300987
GROUP II	108471	0.20	21694	5	0	96579
GROUP III	188976	0.33	62362	5	0	277625
GROUP IV	52	400.00	20800	5	0	92598
GROUP V	0	0.66	0	5	0	0
2000-2005						
GROUP I	704	1086.00	764544	10	5	2797523
GROUP II	112991	0.85	96042	10	5	351426
GROUP III	198758	1.45	288199	10	5	1054542
GROUP IV	54	400.00	21600	10	5	79036
GROUP V	5348	0.66	3530	10	5	12915
2005-2010						
GROUP I	735	1404.00	1031940	15	10	3103551
GROUP II	117512	1.50	176268	15	10	530125
GROUP III	208539	2.57	535945	15	10	1611851
GROUP IV	56	400.00	22400	15	10	67368
GROUP V	10694	0.67	7165	15	10	21549
2010-2015						
GROUP I	766	1404.00	1075464	20	15	2658481
GROUP II	122032	1.51	184268	20	15	455500
GROUP III	218321	2.60	567635	20	15	1403158
GROUP IV	58	400.00	23200	20	15	57349
GROUP V	16040	0.67	10747	20	15	26565
2015-2020						
GROUP I	797	1404.00	1118988	25	20	2273508
GROUP II	126552	1.52	192359	25	20	390826
GROUP III	228103	2.64	602192	25	20	1223506
GROUP IV	61	400.00	24400	25	20	49575
GROUP V	21387	0.68	14543	25	20	29548

TOTAL PRESENT VALUE						20965689
=====						
High NPV (\$1000):						31449
Low NPV (\$1000):						10483

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 9
RECREATION-BETA

* Units: Groups I & IV = No. of leases

BETA\$REC.WK1

Groups II & III = User Days

cws: 9/26/94

Group V = No. of Acres

	Level*	Price	Revenue	N	n	Present Value
1995-2000						
GROUP I	711	768.00	546048	5	0	2430909
GROUP II	115317	0.20	23063	5	0	102674
GROUP III	204798	0.33	67583	5	0	300869
GROUP IV	56	400.00	22400	5	0	99721
GROUP V	0	0.66	0	5	0	0
2000-2005						
GROUP I	780	1086.00	847080	10	5	3099528
GROUP II	126683	0.85	107681	10	5	394011
GROUP III	230402	1.45	334083	10	5	1222434
GROUP IV	61	400.00	24400	10	5	89281
GROUP V	8020	0.66	5293	10	5	19368
2005-2010						
GROUP I	850	1404.00	1193400	15	10	3589141
GROUP II	138049	1.50	207074	15	10	622772
GROUP III	256007	2.57	657938	15	10	1978743
GROUP IV	67	400.00	26800	15	10	80601
GROUP V	16041	0.67	10747	15	10	32323
2010-2015						
GROUP I	919	1404.00	1290276	20	15	3189483
GROUP II	149415	1.51	225617	20	15	557711
GROUP III	281611	2.60	732189	20	15	1809925
GROUP IV	72	400.00	28800	20	15	71192
GROUP V	24061	0.67	16121	20	15	39850
2015-2020						
GROUP I	988	1404.00	1387152	25	20	2818351
GROUP II	160781	1.52	244387	25	20	496534
GROUP III	307215	2.64	811048	25	20	1647849
GROUP IV	78	400.00	31200	25	20	63391
GROUP V	32081	0.68	21815	25	20	44323
TOTAL PRESENT VALUE						24800983
High NPV (\$1000):						37201
Low NPV (\$1000):						12400

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 10
RECREATION-GAMMA

* Units: Groups I & IV = No. of leases

GAMA\$REC.WK1

Groups II & III = User Days

cws: 9/26/94

Group V = No. of Acres

	Level*	Price	Revenue	N	n	Present Value

1995-2000						
GROUP I	613	768.00	470784	5	0	2095847
GROUP II	101365	0.20	20273	5	0	90252
GROUP III	216397	0.33	71411	5	0	317909
GROUP IV	49	400.00	19600	5	0	87256
GROUP V	0	0.66	0	5	0	0
2000-2005						
GROUP I	585	1086.00	635310	10	5	2324646
GROUP II	98778	0.85	83961	10	5	307221
GROUP III	253600	1.45	367720	10	5	1345514
GROUP IV	48	400.00	19200	10	5	70254
GROUP V	10694	0.66	7058	10	5	25826
2005-2010						
GROUP I	556	1404.00	780624	15	10	2347720
GROUP II	96192	1.50	144288	15	10	433945
GROUP III	290802	2.57	747361	15	10	2247682
GROUP IV	46	400.00	18400	15	10	55338
GROUP V	21387	0.67	14329	15	10	43095
2010-2015						
GROUP I	528	1404.00	741312	20	15	1832478
GROUP II	93605	1.51	141344	20	15	349393
GROUP III	328005	2.60	852813	20	15	2108102
GROUP IV	45	400.00	18000	20	15	44495
GROUP V	32081	0.67	21494	20	15	53133
2015-2020						
GROUP I	499	1404.00	700596	25	20	1423438
GROUP II	91019	1.52	138349	25	20	281091
GROUP III	365208	2.64	964149	25	20	1958913
GROUP IV	44	400.00	17600	25	20	35759
GROUP V	42774	0.68	29086	25	20	59096

TOTAL PRESENT VALUE						19938403
=====						

High NPV (\$1000): 29908
Low NPV (\$1000): 9969

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 11
RECREATION-DELTA

* Units: Groups I & IV = No. of leases

DELT\$REC.WK1

Groups II & III = User Days

cws: 9/26/94

Group V = No. of Acres

	Level*	Price	Revenue	N	n	Present Value
1995-2000						
GROUP I	758	768.00	582144	5	0	2591602
GROUP II	114509	0.20	22902	5	0	101955
GROUP III	193426	0.33	63831	5	0	284162
GROUP IV	56	400.00	22400	5	0	99721
GROUP V	0	0.66	0	5	0	0
2000-2005						
GROUP I	874	1086.00	949164	10	5	3473061
GROUP II	125067	0.85	106307	10	5	388985
GROUP III	207658	1.45	301104	10	5	1101762
GROUP IV	61	400.00	24400	10	5	89281
GROUP V	16041	0.66	10587	10	5	38739
2005-2010						
GROUP I	991	1404.00	1391364	15	10	4184516
GROUP II	135625	1.50	203438	15	10	611837
GROUP III	221889	2.57	570255	15	10	1715036
GROUP IV	67	400.00	26800	15	10	80601
GROUP V	32081	0.67	21494	15	10	64644
2010-2015						
GROUP I	1107	1404.00	1554228	20	15	3841957
GROUP II	146183	1.51	220736	20	15	545647
GROUP III	236121	2.60	613915	20	15	1517559
GROUP IV	72	400.00	28800	20	15	71192
GROUP V	48122	0.67	32242	20	15	79700
2015-2020						
GROUP I	1223	1404.00	1717092	25	20	3488708
GROUP II	156741	1.52	238246	25	20	484058
GROUP III	250353	2.64	660932	25	20	1342851
GROUP IV	78	400.00	31200	25	20	63391
GROUP V	64162	0.68	43630	25	20	88646
TOTAL PRESENT VALUE						26349608
High NPV (\$1000):						39524
Low NPV (\$1000):						13175

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 12
RECREATION-EPSILON

* Units: Groups I & IV = No. of leases

EPSN\$REC.WK1

Groups II & III = User Days

cws: 9/26/94

Group V = No. of Acres

	Level*	Price	Revenue	N	n	Present Value
1995-2000						
GROUP I	657	768.00	504576	5	0	2246283
GROUP II	108471	0.20	21694	5	0	96579
GROUP III	188976	0.33	62362	5	0	277625
GROUP IV	52	400.00	20800	5	0	92598
GROUP V	0	0.66	0	5	0	0
2000-2005						
GROUP I	672	1086.00	729792	10	5	2670363
GROUP II	112991	0.85	96042	10	5	351426
GROUP III	198758	1.45	288199	10	5	1054542
GROUP IV	54	400.00	21600	10	5	79036
GROUP V	5348	0.66	3530	10	5	12915
2005-2010						
GROUP I	686	1404.00	963144	15	10	2896648
GROUP II	117512	1.50	176268	15	10	530125
GROUP III	208539	2.57	535945	15	10	1611851
GROUP IV	57	400.00	22800	15	10	68571
GROUP V	10694	0.67	7165	15	10	21549
2010-2015						
GROUP I	701	1404.00	984204	20	15	2432892
GROUP II	122032	1.51	184268	20	15	455500
GROUP III	218321	2.60	567635	20	15	1403158
GROUP IV	56	400.00	22400	20	15	55371
GROUP V	16040	0.67	10747	20	15	26565
2015-2020						
GROUP I	716	1404.00	1005264	25	20	2042449
GROUP II	126552	1.52	192359	25	20	390826
GROUP III	228103	2.64	602192	25	20	1223506
GROUP IV	61	400.00	24400	25	20	49575
GROUP V	21387	0.68	14543	25	20	29548
TOTAL PRESENT VALUE						20119499
High NPV (\$1000):						30179
Low NPV (\$1000):						10060

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 13
RECREATION-ZETA

* Units: Groups I & IV = No. of leases
Groups II & III = User Days
Group V = No. of Acres

ZETA\$REC.WK1
cws: 9/26/94

	Level*	Price	Revenue	N	n	Present Value
1995-2000						
GROUP I	786	768.00	603648	5	0	2687334
GROUP II	116207	0.20	23241	5	0	103467
GROUP III	202019	0.33	66666	5	0	296786
GROUP IV	57	400.00	22800	5	0	101502
GROUP V	0	0.66	0	5	0	0
2000-2005						
GROUP I	930	1086.00	1009980	10	5	3695591
GROUP II	128463	0.85	109194	10	5	399547
GROUP III	224845	1.45	326025	10	5	1192950
GROUP IV	63	400.00	25200	10	5	92209
GROUP V	37428	0.66	24702	10	5	90388
2005-2010						
GROUP I	1073	1404.00	1506492	15	10	4530762
GROUP II	140720	1.50	211080	15	10	634821
GROUP III	247670	2.57	636512	15	10	1914304
GROUP IV	70	400.00	28000	15	10	84210
GROUP V	74855	0.67	50153	15	10	150834
2010-2015						
GROUP I	1217	1404.00	1708668	20	15	4223723
GROUP II	152976	1.51	230994	20	15	571002
GROUP III	270496	2.60	703290	20	15	1738489
GROUP IV	76	400.00	30400	20	15	75147
GROUP V	112283	0.67	75230	20	15	185963
2015-2020						
GROUP I	1361	1404.00	1910844	25	20	3882364
GROUP II	165232	1.52	251153	25	20	510280
GROUP III	293321	2.64	774367	25	20	1573324
GROUP IV	83	400.00	33200	25	20	67454
GROUP V	149710	0.68	101803	25	20	206838
TOTAL PRESENT VALUE						29009290

High NPV (\$1000): 43514
Low NPV (\$1000): 14505

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 14
TIMBER-ALPHA

cws: 9/21/94
ALPH\$TIM.WK2

Disc. rate: 0.04

YEAR	RPA (1.2) \$/Mbf	VOLUME (MMbf)		REVENUE (\$1000)		ACCUM REVENUE		DISC REVENUE		RESIDUAL TIMBER ASSET	
		HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
1995	192.00	-	-	-	-	-	-	-	-		
	192.00										
1996	194.30	40	20	7772	3886						
1997	196.64	40	20	7865	3933						
1998	199.00	40	20	7960	3980						
1999	201.38	40	20	8055	4028						
2000	203.80	40	20	8152	4076	44802	22401	36824	18412		
2001	206.25	40	20	8250	4125						
2002	208.72	40	20	8349	4174						
2003	211.23	40	20	8449	4225						
2004	213.76	40	20	8550	4275						
2005	216.32	40	20	8653	4326	47555	23778	32127	16063		
2006	218.92	40	20	8757	4378						
2007	221.55	40	20	8862	4431						
2008	224.21	40	20	8968	4484						
2009	226.90	40	20	9076	4538						
2010	229.62	40	20	9185	4592	50478	25239	28029	14014		
2011	232.38	40	20	9295	4648						
2012	235.16	40	20	9407	4703					Mbf	Mbf
2013	237.99	40	20	9519	4760					2851723	3451723
2014	240.84	40	20	9634	4817						
2015	243.73	40	20	9749	4875	53580	26790	24453	12227	\$	\$
2016	246.66	40	20	9866	4933					737770659	892996954
2017	249.62	40	20	9985	4992						
2018	252.61	40	20	10104	5052					Disc Asset \$	Disc Asset \$
2019	255.64	40	20	10226	5113					276750171	334978162
2020	258.71	40	20	10348	5174	56873	28437	21334	10667		
TOTAL DISCOUNTED REVENUE (ALPHA):								142766	71383	Disc Revenue	Disc Revenue
										142766	71383
TOTAL GROSS DISCOUNTED VALUE:										276892937	335049545

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 15 TIMBER-ALPHA ADAMS PROJECTIONS

cws: 9/21/94
ALPH\$TIM.WK3

Disc. rate: 0.04

YEAR	ADAM(2.6) \$/Mbf	VOLUME (MMbf)		REVENUE (\$1000)		ACCUM REVENUE		DISC REVENUE		RESIDUAL TIMBER ASSET	
		HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
1995	192.00	-	-	-	-	-	-	-	-		
	192.00										
1996	196.99	40	20	7880	3940						
1997	202.11	40	20	8085	4042						
1998	207.37	40	20	8295	4147						
1999	212.76	40	20	8510	4255						
2000	218.29	40	20	8732	4366	46661	23330	38352	19176		
2001	223.97	40	20	8959	4479						
2002	229.79	40	20	9192	4596						
2003	235.77	40	20	9431	4715						
2004	241.90	40	20	9676	4838						
2005	248.18	40	20	9927	4964	53051	26525	35839	17920		
2006	254.64	40	20	10185	5093						
2007	261.26	40	20	10450	5225						
2008	268.05	40	20	10722	5361						
2009	275.02	40	20	11001	5500						
2010	282.17	40	20	11287	5643	60315	30158	33491	16745		
2011	289.51	40	20	11580	5790						
2012	297.03	40	20	11881	5941					Mbf	Mbf
2013	304.76	40	20	12190	6095					2851723	3451723
2014	312.68	40	20	12507	6254						
2015	320.81	40	20	12832	6416	68575	34287	31297	15648	\$	\$
2016	329.15	40	20	13166	6583					1040141888	1258986823
2017	337.71	40	20	13508	6754						
2018	346.49	40	20	13860	6930					Disc Asset \$	Disc Asset \$
2019	355.50	40	20	14220	7110					390174699	472267111
2020	364.74	40	20	14590	7295	77965	38983	29246	14623		
TOTAL DISCOUNTED REVENUE (ALPHA):								168224	84112	Disc Revenue	Disc Revenue
										168224	84112
TOTAL GROSS DISCOUNTED VALUE:										390342923	472351223

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 16
TIMBER-BETA

cws: 9/21/94
BETA\$TIM.WK2

Disc. rate: 0.04

YEAR	RPA (1.2) \$/Mbf	VOLUME (MMbf) HIGH LOW	REVENUE (\$1000) HIGH LOW	ACCUM REVENUE HIGH LOW	DISC REVENUE HIGH LOW	RESIDUAL TIMBER ASSET HIGH LOW
1995	192.00 192.00	40 20	- -	- -	- -	
1996	194.30	39 19	7578 3692			
1997	196.64	38 18	7472 3539			
1998	199.00	37 17	7363 3383			
1999	201.38	36 16	7250 3222			
2000	203.80	35 15	7133 3057	41503 19102	34112 15700	
2001	206.25	35 15	7219 3094			
2002	208.72	35 15	7305 3131			
2003	211.23	35 15	7393 3168			
2004	213.76	35 15	7482 3206			
2005	216.32	35 15	7571 3245	41611 17833	28111 12047	
2006	218.92	35 15	7662 3284			
2007	221.55	35 15	7754 3323			
2008	224.21	35 15	7847 3363			
2009	226.90	35 15	7941 3403			
2010	229.62	35 15	8037 3444	44168 18929	24525 10511	
2011	232.38	35 15	8133 3486			
2012	235.16	35 15	8231 3527			Mbf 3001723 Mbf 3601723
2013	237.99	35 15	8329 3570			
2014	240.84	35 15	8429 3613			
2015	243.73	35 15	8531 3656	46883 20093	21397 9170	\$ 776577233 \$ 931803528
2016	246.66	35 15	8633 3700			
2017	249.62	35 15	8737 3744			
2018	252.61	35 15	8841 3789			Disc Asset \$ 291307168 Disc Asset \$ 349535160
2019	255.64	35 15	8947 3835			
2020	258.71	35 15	9055 3881	49764 21327	18667 8000	
TOTAL DISCOUNTED REVENUE (BETA):					126812 55429	Disc Revenue 126812 Disc Revenue 55429
				TOTAL GROSS DISCOUNTED VALUE:		291433980 349590589

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 17 TIMBER-BETA ADAMS PROJECTIONS

cws: 9/21/94
BETA\$TIM.WK3

Disc. rate:

0.04
0.04

YEAR	ADAM(2.6) \$/Mbf	VOLUME (MMbf) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW	RESIDUAL TIMBER ASSET HIGH	LOW
1995	192.00 192.00	40	20	-	-	-	-	-	-		
1996	196.99	39	19	7683	3743						
1997	202.11	38	18	7680	3638						
1998	207.37	37	17	7673	3525						
1999	212.76	36	16	7659	3404						
2000	218.29	35	15	7640	3274	43193	19862	35501	16326		
2001	223.97	35	15	7839	3360						
2002	229.79	35	15	8043	3447						
2003	235.77	35	15	8252	3536						
2004	241.90	35	15	8466	3628						
2005	248.18	35	15	8686	3723	46419	19894	31359	13440		
2006	254.64	35	15	8912	3820						
2007	261.26	35	15	9144	3919						
2008	268.05	35	15	9382	4021						
2009	275.02	35	15	9626	4125						
2010	282.17	35	15	9876	4233	52776	22618	29305	12559		
2011	289.51	35	15	10133	4343						
2012	297.03	35	15	10396	4456					Mbf 3001723	Mbf 3601723
2013	304.76	35	15	10666	4571						
2014	312.68	35	15	10944	4690						
2015	320.81	35	15	11228	4812	60003	25715	27384	11736	\$ 1094853122	\$ 1313698056
2016	329.15	35	15	11520	4937						
2017	337.71	35	15	11820	5066						
2018	346.49	35	15	12127	5197					Disc Asset \$ 410697802	Disc Asset \$ 492790214
2019	355.50	35	15	12442	5332						
2020	364.74	35	15	12766	5471	68219	29237	25590	10967		
TOTAL DISCOUNTED REVENUE (BETA):								149140	65028	Disc Revenue 149140	Disc Revenue 65028
TOTAL GROSS DISCOUNTED VALUE:										410846942	492855242

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 18
TIMBER – GAMMA

cws: 9/21/94

GAMA\$TIM.WK2

Disc. rate:

0.04

YEAR	RPA (1.2) \$/Mbf	VOLUME (MMbf)		REVENUE (\$1000)		ACCUM REVENUE		DISC REVENUE		RESIDUAL TIMBER ASSET	
		HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
1995	192.00	40	20	-	-	-	-	-	-		
	192.00										
1996	194.30	34	17	6606	3303						
1997	196.64	28	14	5506	2753						
1998	199.00	22	11	4378	2189						
1999	201.38	16	8	3222	1611						
2000	203.80	10	5	2038	1019	25008	12504	20555	10277		
2001	206.25	10	5	2062	1031						
2002	208.72	10	5	2087	1044						
2003	211.23	10	5	2112	1056						
2004	213.76	10	5	2138	1069						
2005	216.32	10	5	2163	1082	11889	5944	8032	4016		
2006	218.92	10	5	2189	1095						
2007	221.55	10	5	2215	1108						
2008	224.21	10	5	2242	1121						
2009	226.90	10	5	2269	1134						
2010	229.62	10	5	2296	1148	12619	6310	7007	3504		
2011	232.38	10	5	2324	1162						
2012	235.16	10	5	2352	1176					Mbf	Mbf
2013	237.99	10	5	2380	1190					3751723	3901723
2014	240.84	10	5	2408	1204						
2015	243.73	10	5	2437	1219	13395	6698	6113	3057	\$	\$
2016	246.66	10	5	2467	1233					970610102	1009416676
2017	249.62	10	5	2496	1248						
2018	252.61	10	5	2526	1263					Disc Asset \$	Disc Asset \$
2019	255.64	10	5	2556	1278					364092158	378649156
2020	258.71	10	5	2587	1294	14218	7109	5334	2667		
TOTAL DISCOUNTED REVENUE (GAMMA):								47040	23520	Disc Revenue	Disc Revenue
										47040	23520
TOTAL GROSS DISCOUNTED VALUE:										364139198	378672676

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 19 TIMBER - GAMMA ADAMS PROJECTIONS

cws: 9/21/94
GAMA\$TIM.WK3

Disc. rate: 0.04

YEAR	ADAM(2.6) \$/Mbf	VOLUME (MMbf) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW	RESIDUAL TIMBER ASSET HIGH	LOW
1995	192.00 192.00	40	20	-	-	-	-	-	-		
1996	196.99	34	17	6698	3349						
1997	202.11	28	14	5659	2830						
1998	207.37	22	11	4562	2281						
1999	212.76	16	8	3404	1702						
2000	218.29	10	5	2183	1091	25853	12927	21249	10625		
2001	223.97	10	5	2240	1120						
2002	229.79	10	5	2298	1149						
2003	235.77	10	5	2358	1179						
2004	241.90	10	5	2419	1209						
2005	248.18	10	5	2482	1241	13263	6631	8960	4480		
2006	254.64	10	5	2546	1273						
2007	261.26	10	5	2613	1306						
2008	268.05	10	5	2681	1340						
2009	275.02	10	5	2750	1375						
2010	282.17	10	5	2822	1411	15079	7539	8373	4186		
2011	289.51	10	5	2895	1448						
2012	297.03	10	5	2970	1485					Mbf	Mbf
2013	304.76	10	5	3048	1524					3751723	3901723
2014	312.68	10	5	3127	1563						
2015	320.81	10	5	3208	1604	17144	8572	7824	3912	\$	\$
2016	329.15	10	5	3292	1646					1368409290	1423120523
2017	337.71	10	5	3377	1689						
2018	346.49	10	5	3465	1732					Disc Asset \$	Disc Asset \$
2019	355.50	10	5	3555	1777					513313317	533836420
2020	364.74	10	5	3647	1824	19491	9746	7312	3656		
TOTAL DISCOUNTED REVENUE (GAMMA):								53718	26859	Disc Revenue	Disc Revenue
										53718	26859
TOTAL GROSS DISCOUNTED VALUE:										513367035	533863279

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 20
TIMBER-DELTA

cws: 9/21/94
DELT\$TIM.WK2

Disc. rate: 0.04

YEAR	RPA (1.2) \$/Mbf	VOLUME (MMbf) HIGH LOW	REVENUE (\$1000) HIGH LOW	ACCUM REVENUE HIGH LOW	DISC REVENUE HIGH LOW	RESIDUAL TIMBER ASSET HIGH LOW
1995	192.00 192.00	40 20	- -	- -	- -	
1996	194.30	41 19	7966 3692			
1997	196.64	42 18	8259 3539			
1998	199.00	43 17	8557 3383			
1999	201.38	44 16	8861 3222			
2000	203.80	45 15	9171 3057	48101 19102	39535 15700	
2001	206.25	45 15	9281 3094			
2002	208.72	45 15	9392 3131			
2003	211.23	45 15	9505 3168			
2004	213.76	45 15	9619 3206			
2005	216.32	45 15	9735 3245	53500 17833	36142 12047	
2006	218.92	45 15	9851 3284			
2007	221.55	45 15	9970 3323			
2008	224.21	45 15	10089 3363			
2009	226.90	45 15	10210 3403			
2010	229.62	45 15	10333 3444	56788 18929	31532 10511	
2011	232.38	45 15	10457 3486			
2012	235.16	45 15	10582 3527			Mbf 2701723
2013	237.99	45 15	10709 3570			Mbf 3601723
2014	240.84	45 15	10838 3613			
2015	243.73	45 15	10968 3656	60278 20093	27510 9170	\$ 698964086
2016	246.66	45 15	11100 3700			\$ 931803528
2017	249.62	45 15	11233 3744			
2018	252.61	45 15	11368 3789			Disc Asset \$ 262193173
2019	255.64	45 15	11504 3835			Disc Asset \$ 349535160
2020	258.71	45 15	11642 3881	63982 21327	24001 8000	
TOTAL DISCOUNTED REVENUE (DELTA):					158721 55429	Disc Revenue 158721
TOTAL GROSS DISCOUNTED VALUE:						262351893 349590589

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 21 TIMBER-DELTA ADAMS PROJECTIONS

cws: 9/21/94
DELT\$TIM.WK3

Disc. rate: 0.04

YEAR	ADAM(2.6) \$/Mbf	VOLUME (MMbf) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW	RESIDUAL TIMBER ASSET HIGH	LOW
1995	192.00	40	20	-	-	-	-	-	-		
	192.00										
1996	196.99	41	19	8077	3743						
1997	202.11	42	18	8489	3638						
1998	207.37	43	17	8917	3525						
1999	212.76	44	16	9361	3404						
2000	218.29	45	15	9823	3274	50129	19862	41202	16326		
2001	223.97	45	15	10079	3360						
2002	229.79	45	15	10341	3447						
2003	235.77	45	15	10609	3536						
2004	241.90	45	15	10885	3628						
2005	248.18	45	15	11168	3723	59682	19894	40319	13440		
2006	254.64	45	15	11459	3820						
2007	261.26	45	15	11757	3919						
2008	268.05	45	15	12062	4021						
2009	275.02	45	15	12376	4125						
2010	282.17	45	15	12698	4233	67855	22618	37677	12559		
2011	289.51	45	15	13028	4343						
2012	297.03	45	15	13367	4456					Mbf	Mbf
2013	304.76	45	15	13714	4571					2701723	3601723
2014	312.68	45	15	14071	4690						
2015	320.81	45	15	14436	4812	77146	25715	35209	11736	\$	\$
2016	329.15	45	15	14812	4937					985430655	1313698056
2017	337.71	45	15	15197	5066						
2018	346.49	45	15	15592	5197					Disc Asset \$	Disc Asset \$
2019	355.50	45	15	15997	5332					369651596	492790214
2020	364.74	45	15	16413	5471	87711	29237	32902	10967		
TOTAL DISCOUNTED REVENUE (DELTA):								187309	65028	Disc Revenue	Disc Revenue
										187309	65028
TOTAL GROSS DISCOUNTED VALUE:										369838905	492855242

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 22
TIMBER – EPSILON

cws: 9/21/94
EPSN\$TIM.WK2

Disc. rate: 0.04

YEAR	RPA (1.2) \$/Mbf	VOLUME (MMbf) HIGH LOW	REVENUE (\$1000) HIGH LOW	ACCUM REVENUE HIGH LOW	DISC REVENUE HIGH LOW	RESIDUAL TIMBER ASSET HIGH LOW
1995	192.00 192.00	40 20	- -	- -	- -	
1996	194.30	43 23	8355 4469			
1997	196.64	46 26	9045 5113			
1998	199.00	49 29	9751 5771			
1999	201.38	52 32	10472 6444			
2000	203.80	55 35	11209 7133	54699 32298	44959 26547	
2001	206.25	55 35	11343 7219			
2002	208.72	55 35	11480 7305			
2003	211.23	55 35	11617 7393			
2004	213.76	55 35	11757 7482			
2005	216.32	55 35	11898 7571	65389 41611	44174 28111	
2006	218.92	55 35	12041 7662			
2007	221.55	55 35	12185 7754			
2008	224.21	55 35	12331 7847			
2009	226.90	55 35	12479 7941			
2010	229.62	55 35	12629 8037	69407 44168	38539 24525	
2011	232.38	55 35	12781 8133			
2012	235.16	55 35	12934 8231			Mbf 2401723
2013	237.99	55 35	13089 8329			Mbf 3001723
2014	240.84	55 35	13246 8429			
2015	243.73	55 35	13405 8531	73673 46883	33623 21397	\$ 621350938
2016	246.66	55 35	13566 8633			\$ 776577233
2017	249.62	55 35	13729 8737			
2018	252.61	55 35	13894 8841			Disc Asset \$ 233079177
2019	255.64	55 35	14060 8947			Disc Asset \$ 291307168
2020	258.71	55 35	14229 9055	78200 49764	29334 18667	
TOTAL DISCOUNTED REVENUE (EPSILON):					190630 119246	Disc Revenue 190630
TOTAL GROSS DISCOUNTED VALUE:						233269807 291426415

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 23 TIMBER—EPSILON ADAMS PROJECTIONS

cws: 9/21/94
EPSN\$TIM.WK3

Disc. rate: 0.04

YEAR	ADAM(2.6) \$/Mbf	VOLUME (MMbf) HIGH LOW	REVENUE (\$1000) HIGH LOW	ACCUM REVENUE HIGH LOW	DISC REVENUE HIGH LOW	RESIDUAL TIMBER ASSET HIGH LOW
1995	192.00 192.00	40 20	- -	- -	- -	
1996	196.99	43 23	8471 4531			
1997	202.11	46 26	9297 5255			
1998	207.37	49 29	10161 6014			
1999	212.76	52 32	11064 6808			
2000	218.29	55 35	12006 7640	57065 33734	46903 27727	
2001	223.97	55 35	12318 7839			
2002	229.79	55 35	12638 8043			
2003	235.77	55 35	12967 8252			
2004	241.90	55 35	13304 8466			
2005	248.18	55 35	13650 8686	72945 46419	49279 31359	
2006	254.64	55 35	14005 8912			
2007	261.26	55 35	14369 9144			
2008	268.05	55 35	14743 9382			
2009	275.02	55 35	15126 9626			
2010	282.17	55 35	15519 9876	82933 52776	46050 29305	
2011	289.51	55 35	15923 10133			
2012	297.03	55 35	16337 10396			Mbf 2401723
2013	304.76	55 35	16762 10666			Mbf 3001723
2014	312.68	55 35	17197 10944			
2015	320.81	55 35	17645 11228	94290 60003	43033 27384	\$ 876008187
2016	329.15	55 35	18103 11520			\$ 1094853122
2017	337.71	55 35	18574 11820			
2018	346.49	55 35	19057 12127			Disc Asset \$ 328605390
2019	355.50	55 35	19552 12442			Disc Asset \$ 410697802
2020	364.74	55 35	20061 12766	107202 68219	40213 25590	
TOTAL DISCOUNTED REVENUE (EPSILON):						225478 141366
TOTAL GROSS DISCOUNTED VALUE:						328830868 410839168

APPENDIX ECN
DISCOUNTED REVENUE SPREADSHEET 24
TIMBER-ZETA

cws: 9/21/94
ZETA\$TIM.WK3

Disc. rate: 0.04

YEAR	RPA (1.2) \$/Mbf	VOLUME (MMbf) HIGH	LOW	REVENUE (\$1000) HIGH	LOW	ACCUM REVENUE HIGH	LOW	DISC REVENUE HIGH	LOW	RESIDUAL TIMBER ASSET HIGH	LOW
1995	192.00 192.00	40	20	-	-	-	-	-	-		
1996	194.30	36	18	6995	3497						
1997	196.64	32	16	6292	3146						
1998	199.00	28	14	5572	2786						
1999	201.38	24	12	4833	2417						
2000	203.80	20	10	4076	2038	31606	15803	25978	12989		
2001	206.25	20	10	4125	2062						
2002	208.72	20	10	4174	2087						
2003	211.23	20	10	4225	2112						
2004	213.76	20	10	4275	2138						
2005	216.32	20	10	4326	2163	23778	11889	16063	8032		
2006	218.92	20	10	4378	2189						
2007	221.55	20	10	4431	2215						
2008	224.21	20	10	4484	2242						
2009	226.90	20	10	4538	2269						
2010	229.62	20	10	4592	2296	25239	12619	14014	7007		
2011	232.38	20	10	4648	2324						
2012	235.16	20	10	4703	2352					Mbf 3451723	Mbf 3751723
2013	237.99	20	10	4760	2380						
2014	240.84	20	10	4817	2408						
2015	243.73	20	10	4875	2437	26790	13395	12227	6113	\$ 892996954	\$ 970610102
2016	246.66	20	10	4933	2467						
2017	249.62	20	10	4992	2496						
2018	252.61	20	10	5052	2526					Disc Asset \$ 334978162	Disc Asset \$ 364092158
2019	255.64	20	10	5113	2556						
2020	258.71	20	10	5174	2587	28437	14218	10667	5334		
TOTAL DISCOUNTED REVENUE (ZETA):								78949	39474	Disc Revenue 78949	Disc Revenue 39474
TOTAL GROSS DISCOUNTED VALUE:										335057111	364131632

DSL FORESTED LANDS MANAGEMENT PLAN DEIS

APPENDIX ECN DISCOUNTED REVENUE SPREADSHEET 25 TIMBER-ZETA ADAMS PROJECTIONS

cws: 9/21/94
ZETA\$TIM.WK4

Disc. rate:

0.04

YEAR	ADAM(2.6) \$/Mbf	VOLUME (MMbf)		REVENUE (\$1000)		ACCUM REVENUE		DISC REVENUE		RESIDUAL TIMBER ASSET	
		HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW
1995	192.00	40	20	-	-	-	-	-	-		
	192.00										
1996	196.99	36	18	7092	3546						
1997	202.11	32	16	6468	3234						
1998	207.37	28	14	5806	2903						
1999	212.76	24	12	5106	2553						
2000	218.29	20	10	4366	2183	32789	16395	26950	13475		
2001	223.97	20	10	4479	2240						
2002	229.79	20	10	4596	2298						
2003	235.77	20	10	4715	2358						
2004	241.90	20	10	4838	2419						
2005	248.18	20	10	4964	2482	26525	13263	17920	8960		
2006	254.64	20	10	5093	2546						
2007	261.26	20	10	5225	2613						
2008	268.05	20	10	5361	2681						
2009	275.02	20	10	5500	2750						
2010	282.17	20	10	5643	2822	30158	15079	16745	8373		
2011	289.51	20	10	5790	2895						
2012	297.03	20	10	5941	2970					Mbf	Mbf
2013	304.76	20	10	6095	3048					3451723	3751723
2014	312.68	20	10	6254	3127						
2015	320.81	20	10	6416	3208	34287	17144	15648	7824	\$	\$
2016	329.15	20	10	6583	3292					1258986823	1368409290
2017	337.71	20	10	6754	3377						
2018	346.49	20	10	6930	3465					Disc Asset \$	Disc Asset \$
2019	355.50	20	10	7110	3555					472267111	513313317
2020	364.74	20	10	7295	3647	38983	19491	14623	7312		
TOTAL DISCOUNTED REVENUE (ZETA):								91887	45943	Disc Revenue	Disc Revenue
										91887	45943
TOTAL GROSS DISCOUNTED VALUE:										472358997	513359260

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